DEPARTMENT OF ELECTRICAL ENGINEERING

PROGRAMME EDUCATIONAL OBJECTIVE, PROGRAMME OUTCOME, COURSE OUTCOME

Vision and mission of the institute

VISION

To become an internationally acceptable Institute of Technical Education which shall always promote pursuit of Excellence and inculcation Values.

MISSION

1.To impart quality engineering Education and Technological Skill.

2. To empower students with professional Competencies for meeting Global Challenges.

3. To inculcate the habit of continual learning.

4.To nourish the qualities of leadership, Entrepre, Innovation and Ethics.

5. To create outstanding ambience of Academics Intellectual pursuits, Innovative Research and Physicals activities.

GOAL

To make SYNERGY a preferred place to Work and Study.

VISION OF DEPARTMENT

- To develop the department as a renowned academic center of learning in the discipline of electrical engineering.
- To establish research and development center of repute so as to encourage active participation with industry by staff and students to take on practical problems of industry.
- To establish tie-ups with institutions of national and international repute and to foster building up of a wide knowledge base to keep in tune with ever increasing demands of technologies.
- To Develop appropriate technologies for up-liftment of rural society.
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MISSION OF DEPARTMENT

To empower the young Electrical Engineers for understanding the emerging trends in technology and make them the leading professionals in the ever changing environments. The all round development of personalities of our students may pursue them to take up any challenges in their life for excellence. To inculcate values to our young dynamic Electrical Engineers for fostering the natural resources in a balanced ecosystem with a greater capability and capacity, so that India will be a developed country at par Excellency.

GOAL

• Up gradation of existing laboratories so as to enable the students and faculty to study and provide feasible solutions to technical problems of the industry.

• To establish research and development center.

• To have tie ups with renowned institutions.

• To establish a center for dissemination of technical knowledge to rural areas by taking up projects in appropriate technology.

• To recruit well-qualified and experienced faculty to enhance the quality of teaching.

Objectives and outcomes of the department along with mapping

Program Educational Objectives (PEOs) :

I To prepare students to excel in postgraduate programmes or to succeed in industry / technical profession through global, rigorous education.

II. To provide students with a solid foundation in mathematical, scientific and engineering fundamentals required to solve engineering problems and also to pursue higher studies.

III. To train students with good scientific and engineering breadth so as to comprehend, analyze, design, and create novel products and solutions for the real life problems.

IV To inculcate in students professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate engineering issues to broader social context.

V. To provide student with an academic environment aware of excellence, leadership, written ethical codes and guidelines, and the life-long learning needed for a successful professional career. Within above five broad categories, each programme may define its own objectives appropriate for the specific discipline.

Programme Outcomes:

(a) Graduates will demonstrate knowledge of Mathematics, Science and electrical and electronics engineering.

(b) Graduates will demonstrate an ability to identify, formulate and solve electrical engineering problems.

(c) Graduate will demonstrate an ability to design electrical and electronic circuits and conduct experiments with electrical systems, analyze and interpret data.

(d) Graduates will demonstrate an ability to design electrical machines.

(e) Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.

(f) Graduate will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.

(g) Graduates will demonstrate knowledge of professional and ethical responsibilities.

(h) Graduate will be able to communicate effectively in both verbal and written form.

(i) Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.

(j) Graduate will develop confidence for self education and ability for life-long learning.

(k) Graduate who can participate and succeed in competitive examinations like GATE, GRE.

Relation between Programme Objective and Outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
I	√	√									
II	√	√	√	√		√					√
III		√	√	√	√						
IV				√			√	√	√		
V									√	√	

Course Offered in Electrical Crricullam:

BS 1101 Mathematics-I
BS 1104 Mathematics-II
BS 1102 Physics –I
BS 1103 Chemistry I
BE 2101 Basic Electronics
BE 2102 Basic Electrical Engineering
BE 2103 Thermodynamics
BE 2104 Mechanics
HM 3101 Communicative English
BE 2106 Data Structure Using “C”
HM 3102 Business Comm in English
BE 3101 Programming in “C”

BE 7101 Engineering Drawing
BE 7102 Workshop Practice
BS 7101 Physics laboratory
BE 7101 Chemistry Laboratory
BE 7105 Basic Electronics Lab
Be 7106 Basic Electrical Lab

BE 7107 “C” Programming Lab
HM 7101 Communication English Lab
HM 7102 Business Communication Lab

BE 7108 Data Structure in Laboratory “C”

BSC M 1205 Mathematics-III
BSMS 1213 Material Science & Engineering
HSSM 3204 Engineering Economics and Costing
HSSM 3204 Organizational Behavior
BEES 2211 Network Theory
BECS 2212 C++ & Object Oriented Programming
PCEC 4201 Analog Electronics circuit

BEME 2209 Fluid Mechanics and Machines
BSCP 1207 Physics of Semiconductors Devices
PCEE4203 Electrical Machines-I
PCEE 4204 Elctrical and Electronics Measurment
PCEC 4202 Digital Electronics Circuit

PCEE 7203 Electrical Machines Lab-I
PCEE 7204 Electrical and Electronics Measurement Laboratory
PCEC 7202 Digital Electronics Circuit Lab
HSSM 7203 Communication & Interpersonal skills Corporate Readiness Laboratory

5th /6th

HSSM 3303 Environmental Engineering and Safty
HSSM 3202 Optimization Engineering
PCEC4303 Control System Engineering
PCEL 4301 Power Electronics
PCEL 4302 Electrical Machines-II
PEEL 5302 Renewable Energy Systems
FEEC 6301 Data Base Management Systems
PCEC 7303 Control & Instrumentation
PCEL7301 Power Electronics Lab
PCEL7302 Electrical machine-II
PCEL4603 Microprocessor and Microcontroller
PCEL4301 Transmission and Distribution
PCEE 4302 Electromagnetic Theory
PEEL 5303 Electric Drive
PCCS 4304 Operating Systems
PCEC7303 Control & Instrumentation Lab
PCEL 7301 Power electronics Lab
PCEL7302 Electrical Machine Lab-II
PCEL 7303 Microprocessor & Microcontroller Lab.
PCEL 7304 Machine Design & Simulation Lab
PEEL 7303 Electric Drive Lab
PCEE 7304 Communication Engineering Lab
PCEC 7304 Digital Signal Processing

7th / 8th

CPEE 5401 Power System Operation and Control
CPEE 5402 Power System Protection

PECS 3401 Soft Computing
CPEC 5308 Communication Engineering
PEEE 5402 Power Station Engineering
HSSM 4404 Marketing Management
CPEE 5403 Electric Drives
CPEC 5404 Mobile Communication
BCSE 3401 Computer Graphics and Multimedia

CPEE 9401 Project
CPEC 9403 VLSI Lab
CPEE 9402 Power System Lab
CPEE 9403 Seminar

CPEE 9404 project
CPEE 9405 Seminar
CPEE 9406 Entrepreneurship Project
CPEE 9407 Comp Viva Voce

The outcome can be categorized of Electrical Engineering course in following groups.

Outcome (a)

BSCM 2101 Mathematics-I
BSCM 2102 Mathematics-II
BSCM 1205 Mathematics-III
BSCP 2101 Physics –I
BSCC 2101 Chemistry I
BENG 1105 Basic Electronics
BENG 1102 Basic Electrical Engineering
BSCP 9101 Physics laboratory
BSCC 9101 Chemistry Laboratory

Outcome (b)

BEES 2211 Network Theory
PCEE4203 Electrical Machines-I
PCEE 4204 Electrical and Electronics Measurement
PCEE 7203 Electrical Machines Lab-I
PCEE 7204 Electrical and Electronics Measurement Laboratory

Outcome (c)

BENG 1105 Basic Electronics
PCEE 4204 Elctrical and Electronics Measurment
PCEC 4202 Digital Electronics Circuit
BE 7105 Basic Electronics Lab

Be 7106 Basic Electrical Lab
PCEE 7204 Electrical and Electronics Measurement Laboratory
PCEC 7202 Digital Electronics Circuit Lab

Outcome (d)

PCEE4203 Electrical Machines-I
PCEE 7203 Electrical Machines Lab-I
PCEL 4302 Electrical Machines-II
PCEL7302 Electrical Machine Lab-II
PEEL 5303 Electricc Drive
PEEL 7303 Electric Drive Lab
PCEC4303 Control System Engineering
PCEL 4301 Power Electronics
PCEL 4302 Electrical Machines-II
PEEL 5302 Renewable Energy Systems
PCEC 7303 Control & Instrumentation
PCEL7301 Power Electronics Lab
PCEL7302 Electrical machine-II
PCEL4603 Microprocessor and Microcontroller
PCEL4301 Transmission and Distribution
PCEE 4302 Electromagnetic Theory
PEEL 5303 Electric Drive

Outcome (e)

BE 2103 Thermodynamics
BE 2104 Mechanics
BE 7101 Engineering Drawing
BE 7102 Workshop Practice
BSMS 1213 Material Science & Engineering
HSSM 3204 Engineering Economics and Costing
HSSM 3204 Organizational Behavior
BEME 2209 Fluid Mechanics and Machines
BSCP 1207 Physics of Semiconductors Devices
PCEL4603 Microprocessor and Microcontroller
PCEC 7304 Digital Signal Processing

Outcome (f)

BE 2106 Data Structure Using “C”
BE 3101 Programming in “C”
BE 7107 “C” Programming Lab
BE 7108 Data Structure in Laboratory “C”
BECS 2212 C++ & Object Oriented Programming
FEEC 6301 Data Base Management Systems
BCSE 3401 Computer Graphics and Multimedia
PCCS 4304 Operating Systems

PECS 3401 Soft Computing
CPEE 9401 Project

Outcome (g)

HM 7101 Communication English Lab
HSSM 3204 Organizational Behavior
HSSM 7203 Communication & Interpersonal skills Corporate Readiness Laboratory

Outcome (h)

HM 3101 Communicative English
BE 2106 Data Structure Using "C"
HM 3102 Business Comm in English
HSSM 7203 Communication & Interpersonal skills Corporate Readiness Laboratory

Outcome (i)

HSSM 3204 Organizational Behavior
HSSM 4404 Marketing Management
Advance level elective courses

CPEC 5404 Mobile Communication
BCSE 3401 Computer Graphics and Multimedia

Outcome (j)

CPEE 9404 project
CPEE 9405 Seminar
CPEE 9406 Entrepreneurship Project
CPEE 9407 Comp Viva Voce

Outcome (k)

All Electrical courses.

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√

2		√									
3		√	√								√
4				√							
5					√						
6						√	√				√
7				√							
8								√			

Course: Basic Electrical Engineering

Class: B. Tech-1st/2nd Semester

Course Description :

Fundamentals of Electric circuits.Node voltage analysis, Mesh current analysis, node and mesh current analysis with controlled sources, principle of superposition, maximum power transfer Energy Storage elements, AC circuit analysis methods Transient Analysis, DC steady state solutions of circuits, Transient Response of second order circuits Power in AC circuits, Complex Power, Transformers, Three-phase power, Residential Wiring: Grounding and safety Generation and distribution of AC Power Measurement Systems and Transducers, Wiring, Grounding and noise, signal conditioning, A/D and D/A Conversion Electricity and Magnetism, Magnetic Circuits, Magnetic Materials and B-H curves, transformers, Electromechanical Energy Conversion Rotating Electric machines, DC Machines, AC machines

Course objectives:

In this subject students will learn about the following points:

a. To learn about the fundamentals of electric circuits.
b. To learn about resistive network analysis.
c. To learn about AC network analysis.
d. To make the students understand the basics generation ,distribution of ac power.
e. To learn about electronic instruments and measurements.
f. To understand the principles of electromechanics.
g. To introduce the students to electronic mechanics for utilization of electric power.

Course Outcome:

After completion of this course students of all branches engineering.

1. Will understand about electric charge current,voltage,power and electrical circuit elements and their characteristics.
2. Will understand the difference between ideal and practical source of voltage and current and measuring devices like voltmeter ,ammeter,wattmeter.
3. Will understand the dc network analysis using ohm’s law,kirchoff’s current and voltages laws.

4. Will be able to analysis the DC network using nodal analysis,maxwells loop analysis,superposition theorems.
5. Will be able to analysis AC network and solve the problems of AC circuits containing energy storage elements like inductance and capacitance.
6. Will be able to solve the circuits with sinusoidal excitation with phasor method.
7. Will be able to formulate first order and second order differential equations and find the transient response.
8. Will understand residential wiring,earthing and safety measures to be taken for saving human being from shock hazard.
9. Will understand about AC complex power (Active power, Reactive power, Apparent Power, Power Factor)
10. Will learn about AC 3-Phase network Analysis.
11. Will understand about generation and distribution of AC Power.
12. Will understand about measurement systems, Transducers,wiring,grounding,noise and signal conditioning.
13. Will learn about A/D and D/A conversion.
14. Will learn about electricity and magnetism, magnetic circuits, transformers and electromechanical energy conversion.
15. Will learn about AC motors, AC generators(Alternator), DC motor, DC generator.

Mapping of course objective and outcomes

Course Objectives	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
a	√	√	√													
b				√												
c					√	√										
d							√									
e								√	√	√	√					
f												√	√			
g														√		
h															**√**	

Contribute to the outcome: Contribution can be done -

a. By providing lectures.

b. By solving some mathematical problems.

c. By performing lab work.

d. By Quiz tests.

e. Daily class room interactions.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By small quiz and tutorials.

Text Books:

1 Principles and Application of Electrical Engineering by GIORGIO RIZZONI.

Reference Books:

1. Electrical and Electronic Technology By E. HUGES PEARSON 9th Editions.
2. Basic Electrical Engineering By A. Fitzerlad,D.E Higginbotham and A. Grabel TMH 5th Edition.
3. Electrical Engineering Fundamentals By VINCENT DEL TORO 2nd Edition PHI.

Prepared By: Prof. S.K. Roy

Course: Mathematics 1

Class: B. Tech – 1st semester

Course Description :

Ordinary differential equation,series solution ,matrix and determinant,.curvature and asymptotes

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the methods for finding the solutions of initial value problems and boundary value problems

2.To learn about the modeling problems like growth decay,Newtons law of cooling, circuit problems like RC,RLC,RL –circuits,and problems based on mass spring system.

3.To learn the ideas about elastic deformation of a spring etc as a basic tool for mechanical engineering by using the concept of matrix theory.

4. To understand the concept of curvature thoroughly because it has a lot of applications like deflection in kinamatics and dynamics ..

5.To familiar with the concept of asymptotes ,students will be benefited for curve tracing .

6.To familiar with the concept of matrix algebra students acess themselves with several applications like group codes that is used in computer cryptography and security ..

Course Outcome

After completion of this course:

a) Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems .

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to measure the bendness of a street by the concept of angle of contingence as in curvature .

d) Graduate will learn the piecewise continuity behavior of a function by using concept of vertical asymptotes .

e) Students will be able to understand about the linear transformations that is basic concept of computer science background

f) Students will understand regarding the dimensions of a complex vector space and real vector space with the concept of linear independence which is a basic concept of matrix theory

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differencial equation

<u>Mapping of course</u> objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**
1	√	√					√
2							√
3					√	√	
4		√	√	√			
5			√				
6					√	√	
7					√	√	

Contribute to the outcome:

Contribution can be done -

f. By providing lectures.

g. By providing references for white papers and articles.

h. By solving problems

d Daily class room interaction

e. By providing question banks

Assessment: Assessment of a Student can be performed -

4. By regular and surprise class tests.
5. By mid term and semester exams.
6. By evolution of their programming approach for a specific task or operation.
7. By home assignments and tutorials.
8. By doubt clear classes

<u>Text Book:</u>

1. ADVANCED ENGIEERING MATHEMATICS by ERWIN KREYSZIG 8th edition
2. Differential calculus by Shanti Narayanan and Mittal

Prepared By :Dept. of mathematics

Class: B. Tech – 2nd semester

Course Description :

Lapalace transformation , fourer series and transformations , gammaand beta functions , vector differential and integral calculus

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the methods of laplace transformation as it is a tool to solve ordinary and partial differential equation

2.To learn about the modeling problems like, circuit problems like RC,RLC,RL –circuits,and problems based on mass spring system.

3.To learn the ideas about fourier series and transformation as it is an important tool in solving problems like ordinary and partial differential equations.

4. To understand the concept of beta gamma function as several improper integrals can be solved by using this concept,

5.To familiar with the concept of vector differential calculus as it has lot of applications as paths of moving bodies in mechanics .

6.To familiar the students with line integral , double integral, triple integral as lot of applications are there like potential theory ,area, volume ,and lot in mechanics

Course Outcome

After completion of this course:

b) Graduate will demonstrate knowledge of formulating the physical problems into mathematical modeling and they can give the inference on the physical problems .

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to find a sum of series of constant terms by fourier series .d) Graduate will how to find the areas ,volume ,length , .and path of a particle .

e) Students will be able to understand about the rate of change of a function in arbitrary direction ,to find normal to surface , to find maximum increase or decrease of a function in a direction

f) Students will understand regarding the concept divergence and curl as it has a lot of application in fluid mechanics

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differencial equation and able to give their inference by using laplace transformation

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**
1	√	√					√
2							√
3					√	√	
4		√	√	√			
5			√				
6					√	√	

Contribute to the outcome:

Contribution can be done -

i. By providing lectures.

j. By providing references for white papers and articles.

k. By solving problems

d Daily class room interaction

f. By providing question banks

Assessment: Assessment of a Student can be performed -

9. By regular and surprise class tests.
10. By mid term and semester exams.
11. By evolution of their programming approach for a specific task or operation.
12. By home assignments and tutorials.
13. By doubt clear classes

Text Book:

3. ADVANCED ENGIEERING MATHEMATICS by ERWIN KREYSZIG 8th edition
4. Higher engineering mathematics by B. V. Raman

Prepared By :Dept. of mathematics

Course: Mathematics 1II

Class: B. Tech – 1st semester

Course Description :

Partial differential equation and its applications , complex analysis ,

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the methods for finding the solutions of partial differential equation in first and second order by charpit method and lagrage method , monges method separation of variable as a lot of applications are there in fluid machanics , electromagnetic theory and quantum mechanics as these are leads to partial differential equation

2.To learn about the conformal mapping as it has a lot of applications in various fields..

3.To learn the ideas about elastic deformation of a spring etc as a basic tool for mechanical engineering by using the concept of matrix theory.

4. To understand the concept of curvature thoroughly because it has a lot of applications like deflection in kinamatics and dynamics ..

5.To familiar with the concept of asymptotes ,students will be benefited for curve tracing .

6.To familiar with the concept of matrix algebra students acess themselves with several applications like group codes that is used in computer cryptography and security ..

Course Outcome

After completion of this course:

c) Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems .

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to measure the bendness of a street by the concept of angle of contingence as in curvature .

d) Graduate will learn the piecewise continuity behavior of a function by using concept of vertical asymptotes .

e) Students will be able to understand about the linear transformations that is basic concept of computer science background

f) Students will understand regarding the dimensions of a complex vector space and real vector space with the concept of linear independence which is a basic concept of matrix theory

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differencial equation

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**
1	√	√					√
2							√
3					√	√	
4		√	√	√			
5			√				
6					√	√	
7					√	√	

Contribute to the outcome:

Contribution can be done -

l. By providing lectures.

m. By providing references for white papers and articles.

n. By solving problems

d Daily class room interaction

g. By providing question banks

Assessment: Assessment of a Student can be performed -

14. By regular and surprise class tests.
15. By mid term and semester exams.
16. By evolution of their programming approach for a specific task or operation.
17. By home assignments and tutorials.
18. By doubt clear classes

Text Book:

5. ADVANCED ENGIEERING MATHEMATICS by ERWIN KREYSZIG 8th edition
6. Differential calculus by Shanti Narayanan and Mittal

Prepared By :Dept. of mathematics

Course: Mathematics 1V

Class: B. Tech – 4th semester

Course Description :

Numerical methods , probability and statistics

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the methods for finding the solutions of equation by newton raphson method, secant method, regul falsi etc.

2.To learn about interpolation and extrapolation as it is a method to reconstruct the function

3.To learn the ideas about LU decomposition , matrix inverse, gause seidal method .

4. To understand the concept of numerical integration like trapeziodal rule Simpsons rule and gause quadrature formula as most complicated integral can be solved by these methods

5.To familiar with the concept of numerical solutions of ordinary differential equation like R-K method .

6.To familiar with the concept probability and its distributions as it has a lot of application in various fields ..

Course Outcome

After completion of this course:

d) Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems .

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to measure the bendness of a street by the concept of angle of contingence as in curvature .

d) Graduate will learn the piecewise continuity behavior of a function by using concept of vertical asymptotes .

e) Students will be able to understand about the linear transformations that is basic concept of computer science background

f) Students will understand regarding the dimensions of a complex vector space and real vector space with the concept of linear independence which is a basic concept of matrix theory

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differencial equation

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**
1	√	√					√
2							√
3					√	√	
4		√	√	√			
5			√				
6					√	√	

Contribute to the outcome:

Contribution can be done -

o. By providing lectures.

p. By providing references for white papers and articles.

q. By solving problems

d Daily class room interaction

h. By providing question banks

Assessment: Assessment of a Student can be performed -

19. By regular and surprise class tests.
20. By mid term and semester exams.
21. By evolution of their programming approach for a specific task or operation.
22. By home assignments and tutorials.
23. By doubt clear classes

Text Book:

7. ADVANCED ENGIEERING MATHEMATICS by ERWIN KREYSZIG 8^{th} edition
8. Numerical methods by engineers by s.c. chapra and R. c. canale

Prepared By :Dept. of mathematics

Course: Mathematics 1

Class: B. Tech – 1st semester

Course Description :

Mathematical induction ,propositional logic, predicate logic, Boolean algebra, graph theory, group theory, finite state machines, combinatorials

Course Objectives:

In this subject students will learn about the following points:

1.To make students understand to read comprehend and construct mathematical arguments using propositional logic

2.to understand the combinatorials so that the problem solving solving skill is the ability to count or enumerate objects

3.to make student solve certain classes of problems that can be solved by the specification of the algorithm .

4. To understand the concept of graph theory to understand different network models in computer science..

5.To familiar with the concept of group theory to understand the different crypto systems in cryptography.

6.To familiar with the concept of predicate logic to make students understand the neural network ..

Course Outcome

After completion of this course:

e) Graduate will demonstrate knowledge of formulating the mathematical logic which serves as the foundations for the subsequent discussions of methods of prof

b) Graduate will demonstrate to analyse algorithms not applying formulae.

c)Graduate can demonstrate the basic counting techniques .

d) Graduate will learn how to develop the artificial neurons

e) Students will be able to understand the concept of data structure by using graph theory

f) Students will understand regarding the probability of occurring and non occurring of some events using combinatorics

g) Students will learn regarding the lexical analysis using finite state machines or turing machines etc.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**
1	√						
2			√			√	
3					√	√	
4		√	√	√			
5			√				
6					√	√	

Contribute to the outcome:

Contribution can be done -

r. By providing lectures.

s. By providing references for white papers and articles.

t. By solving problems

d Daily class room interaction

i. By providing question banks

Assessment: Assessment of a Student can be performed -

24. By regular and surprise class tests.
25. By mid term and semester exams.
26. By evolution of their programming approach for a specific task or operation.
27. By home assignments and tutorials.
28. By doubt clear classes

Text Book:

12. .discrete mathematical structure , by Kenneth h. rosen

2. discrete mathematical structure ,by c. lou

Prepared By :Dept. of mathematics

Course: Mathematics 1

Class: B. Tech – 1^{st} semester

<u>Course Description</u> :

Ordinary differential equation,series solution ,matrix and determinant,.curvature and asymptotes

<u>Course Objectives</u>:

In this subject students will learn about the following points:

1.To learn about the methods for finding the solutions of initial value problems and boundary value problems

2.To learn about the modeling problems like growth decay,Newtons law of cooling, circuit problems like RC,RLC,RL –circuits,and problems based on mass spring system.

3.To learn the ideas about elastic deformation of a spring etc as a basic tool for mechanical engineering by using the concept of matrix theory.

4. To understand the concept of curvature thoroughly because it has a lot of applications like deflection in kinamatics and dynamics ..

5.To familiar with the concept of asymptotes ,students will be benefited for curve tracing .

6.To familiar with the concept of matrix algebra students acess themselves with several applications like group codes that is used in computer cryptography and security ..

<u>Course Outcome</u>

After completion of this course:

f) Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems .

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to measure the bendness of a street by the concept of angle of contingence as in curvature .

d) Graduate will learn the piecewise continuity behavior of a function by using concept of vertical asymptotes .

e) Students will be able to understand about the linear transformations that is basic concept of computer science background

f) Students will understand regarding the dimensions of a complex vector space and real vector space with the concept of linear independence which is a basic concept of matrix theory

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differencial equation

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**
1	√	√					√
2							√
3					√	√	
4		√	√	√			
5			√				
6					√	√	
7					√	√	

Contribute to the outcome:

Contribution can be done -

u. By providing lectures.

v. By providing references for white papers and articles.

w. By solving problems

d Daily class room interaction

j. By providing question banks

Assessment: Assessment of a Student can be performed -

29. By regular and surprise class tests.
30. By mid term and semester exams.
31. By evolution of their programming approach for a specific task or operation.
32. By home assignments and tutorials.
33. By doubt clear classes

Text Book:

9. ADVANCED ENGIEERING MATHEMATICS by ERWIN KREYSZIG 8th edition
10. Differential calculus by Shanti Narayanan and Mittal

Prepared By :Dept. of mathematics

Course:Electrical Power Transmission and Distribution

Class: B. Tech - 6th semester

Course Description :Transmission Line parameters, Calculation of Resistance, Inductance, Capacitance of various form and situation of transmission line. Performance of short, medium and Long Transmission Line, power flow through transmission line, compensation. HVDC transmission and its recent advancement. Overhead line insulator, String efficiency ,Testing of insulators. Mechanical Design of overhead transmission line,Sag and Tension, AC and DC Distribution system ,Kelvin's Law Load estimation etc., Underground Cables, its operating problems ,HVDC cables, Power system earthing ,Design of earthing grid.

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the detail design of Transmission and Distribution line.

2.To learn about the line parameters and hence its affect on transmission line.

3.To understand the performance of the transmission line.

4. To understand the recent development in HVDC line.

5. To make students familiar with the basic concepts of Insulators and how they function at high voltage.

6 To understand the Mechanical Design of transmission line.

7. To make the students understand the underground cables and HVDC underground cables.

8. To learn about the electric safety measures and earthing of equipment..

Course Outcome

After completion of this course:

g) Graduate will demonstrate knowledge on erecting of transmission and Distribution line.

b) Graduate will demonstrate an ability ,formulate and design the Transmission line.

c) Graduate will demonstrate an ability to visualize and work on laborotary and multidisciplinary tasks.

d) Students will able to understand the laying of cables and able to locate faults of underground cables.

e) Students will be able to understand the testing of high voltage isulators and can test in laboratory.

f) Students will understand the mechanical design of transmission line.

g) Students will understand the economic aspects of design of transmission and distribution line.

h) Students will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.

i) Graduate will develop confidence for self education and ability for life long learning.

j) Graduate can participate and succeed in competitive examination like GATE,GRE.

k) Graduate will show of impact of engineering solution.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√
2		√									
3		√	√								√
4				√							
5					√						
6						√	√				√
7				√							
8								√			

Contribute to the outcome:

Contribution can be done -

x. By providing lectures.

y. By performing some Lab work.

z. By providing references for white papers and articles.

aa. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

34. By regular and surprise class tests.
35. By mid term and semester exams.
36. By evolution of their programming approach for a specific task or operation.
37. By small quiz and tutorials.
38. Expert lecture from industries
39. Video lectures through NPTEL.

Text Book:

11. Power System Analysis- By John J .Grainger & W.D.Stevenson, Jr tata Mcgraw-Hill
12. Power System Analysis & Design-By B.R.Gupta , S.Chand Publications.

Prepared By :Mr S.S.Pati, AP, Elect Engg

Course: Electrical Machine-1

Class: B. Tech - 4th semester

Course Description : General Principles of DC Machines, Armature Reaction, Commutation, Characteristics of DC generator, Parallel operation of DC generator, Characteristic of DC Motor, Comparison Between Different types of DC Motors and their Application. Necessity of a Starter, Starting of DC Shunt, Series and Compound Motors, Precautions During Starting of DC Series Motor, Speed Control of DC Shunt and Series Motors, Classification of Losses, Efficiency, Constructional Features of Transformer, EMF Equation, Phasor Diagrams at No-Load and Load Conditions, Equivalent Circuit, Determination of Parameters From Tests, Voltage Regulation, Per Unit Calculation, Losses and Efficiency, Auto Transformers and their application. Constructional Features of Squirrel Cage Rotor type and Slip Ring/Wound Rotor type of Induction Motors, Principle of Operation, Concept of Slip, Slip Speed, Equivalent Circuit and Phasor Diagram, No-Load and Blocked Rotor tests, Determination of Parameters, Slip-Torque Characteristics and Effect of Rotor resistance on it, Losses and Efficiency. Starting of Squirrel Cage Rotor type and Slip Ring/Wound Rotor type of Induction Motors, Speed Control of Induction Motors, Cogging, Crawling and Electrical Braking of Induction Motors, Brief Idea on Induction Generators.

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the constructional features of varieties of electrical machines

2.To learn about the operating principles of each individual electrical machine.

3.To understand the armature reaction and its commutation of the DC generator.

4. To learn about the starter for the starting purpose in case of DC motor.

5. To make students familiar with the Phasor diagrams of a single phase transformer and induction motors.

6 To calculate the losses and efficiency of various electrical machines.

7. To make the students understand the methods of starting of different induction motors .

Course Outcome

After completion of this course:

a) Graduate will demonstrate knowledge on construct of electrical machines.

b) Graduate will demonstrate an ability to design the different electrical machines.

c) Graduate will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.

d) Students will able to work on different industries.

e) Students will be able to understand the testing of different motors.

f) Students will understand the starting and sped control of induction motor.

g) Students will understand the economic aspects of design of electrical machines.

h) Students will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.

i) Graduate will develop confidence for self education and ability for lifelong learning.

j) Graduate can participate and succeed in competitive examination like GATE, GRE.

k) Graduate will show of impact of engineering solution.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√
2		√	√	√						√	
3		√	√							√	√
4				√	√					√	
5			√							√	
6		√	√	√			√			√	√
7			√	√		√			√	√	

Contribute to the outcome:

Contribution can be done -

a. By providing lectures.

b. By performing some Lab work.

c. By providing references for white papers and articles.

d. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By small quiz and tutorials.
4. Expert lecture from industries

6. Video lectures through NPTEL.

Text Book:

1. Electric Machines – D P Kothari and I J Nagrath – Tata McGraw Hill.

Prepared By: Mr S.S.Pati,Asso Prof, Elect Engg

Course: Electrical Drives

Class: B.Tech-6th semester

Course Description: Study of electrical drives, choice of electrical drives, fundamentals of torque equation, multi-quardant operation, Nature and classification of load torque, calculation of time and energy loss in transient operations, steady state stability, Load equalization, Heating and cooling, class of motor duty, Determination of motor rating, steady state performance of DC/AC drives, starting, breaking, transient analysis's, controlled and uncontrolled rectifier fed DC drives, chopper controlled DC drives, induction motor drives, synchronous motor drives, Nature of traction load, calculation of traction drive ratings and energy consumption, conventional DC and AC traction Drives, Drives consideration for textile mills, steel rolling mills, cairns and hoist drives, cement mills, sugar mills, coal mines, centrifugal pumps, microprocessor control of electrical drives.

Course Objectives:

In this subject students will learn the following points:

1. To learn about dynamics and control of electrical drives

2. To learn about selection of motor rating from class of motor duty.

3. To learn about starting, breaking and transient operation of AC and DC drives.

4. To learn about speed torque conversation and Multi-guardant operation.

5. To lean about load equalization and steady state stability.

6. To learn about Energy losses during transient operation.

7. Learn about traction motor control in real time application.

8. To learn about microprocessor based control of electrical drives.

<u>Course Outcome</u>

After completion of this course:

a. Introduction to different types of drives and applications in various industries.

b. To know the characteristics of various motors and loads.

c. Gain the knowledge about operation of d.c motor speed control using Converters and choppers.

d. To understand the modes of operation of a drive in various applications.

e. To enable the students identify the need and choice for various drives.

f. To acquire the knowledge of different speed control methods in a.c motors using thyristors based control schemes.

g. Learn speed control of induction motor drives in an energy efficient manner.

h. Identify the use of drives in industries using microprocessor.

i. To able to design the hierarchical control structures for drive systems.

j. To able to select and design important elements of a drive system.

k. Graduate can participate and succeed in competitive examination like GATE, GRE.

Mapping of course objective and the outcomes

Course objective	**Course outcome**										
	a	b	c	d	e	f	g	h	i	j	k
1	√								√	√	√
2		√									
3		√	√								√
4				√							
5					√						
6						√	√				√
7				√							
8								√			

Contribute to the outcome:

Contribution can be done-

1. By providing lectures.

2. By performing lab experiments.

3. By solving problems.

4. Daily class room interaction.

Assessment: Assessment of a student can be performed

1. By regular and surprise class tests.

2. By mid term and semester exams.

3. By evaluation of their programming approach using MATLAB

4. Expert lecture from industries.

5. Video lectures through NPTEL.

Text Book:

1. Book-1:Fundamentals of Electrical Drives-By G.K.Dubey,Alpha Science International Limited,Pangbourne,UK,Second Edication,2001

2. Book-2:Electric Drives-Concepts and applications-By Vedam Subramanyam,second edition,Tata McGraw Hill Publication,2010-11

Referenance Book:

1. Modern Power Electronics and AC drives-By B.K.Bose,Pearson Education.

Course: Network Theory

Class: B. Tech – 3^{rd} semester

Course Description :

Graph of a network, Concept of tree, Incidence matrix, Tie-set matrix, Cut-set matrix, Formulation and solution of network equilibrium equations on loop and node basis.Substitution theorem, Reciprocity theorem, Maximum power transfer theorem, Tellegen's theorem, Millman's theorem, Compensation theorem, Coupled Circuits, Dot Convention for representing coupled circuits, Coefficient of coupling, Band Width and Q-factor for series and parallel resonant circuitsIntroduction to Laplace Transform, Laplace transform of some basic functions, Laplace transform of periodic functions, Inverse Laplace transform, Application of Laplace transform: Circuit Analysis (Steady State and Transient). z, y, ABCD and **h**-parameters, Reciprocity and Symmetry, Interrelation of two-port parameters, Interconnection of two-port networks, Network Functions, Significance of Poles and Zeros, Restriction on location of Poles and Zeros, Time domain behaviour from Pole-Zero plots. Fourier series, Fourier analysis and evaluation of coefficients, Steady state response of network to periodic signals, Fourier transform and convergence, Fourier transform of some functions, Brief idea about network filters (Low pass, High pass, Band pass and Band elimination) and their frequency response. Hurwitz polynomial, Properties of Hurwitz polynomial, Positive real functions and their properties, Concepts of network synthesis, Realization of simple R-L, R-C and L-C functions in Cauer-I, Cauer-II, Foster-I and Foster-II forms.

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the about the graph of a network, Concept of tree, Incidence matrix, Tie-set matrix, Cut-set matrix.

2.To learn about network solving by the different theorems.

3.To understand the concept of coupled circuits..

4. To learn about the principles of resonance in electric circuits.

5. To make students familiar with transformations from time domain to laplace domain and their applications in circuits.

6 To calculate two port network parameters and Network functions..

7. To learn the applications of fouriier series and fourier transform for the different waveforms

8. To learn about the basic concepts of active and passive filters.

9. To understand the concept of network synthesis and design.

Course Outcome

After completion of this course:

b) Students will be able to undertand the concept of network topology.

b) Students will be able to solve different networks by application of theorems in laboratory and field works.

c) Students wil be able to design of different coupled circuits. .

d) Students will able realize the effect of resonance in electrical machines,power systems etc.

e) Students will be able to understand the application of laplace transform in transient and steady state analysis..

f) Students will learn to determine constants in two port networks..

g) Students will understand the concepts of pole and zeros and their applications.

h) Students will be able to solve nonsinusoidal waves by fourier series and transform..

i) Students will be able to design active and passive filters.

j) Students will be able to learn about network synthesis.

k)Graduate shoul be participate the programme like MATLAB for developing circuit theory.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√										√
2		√									√
3		√	√								√
4				√							√
5					√						√
6						√	√				√
7								√			√
8						√			√		√
9						√	√			√	√

Contribute to the outcome:

Contribution can be done -

e. By providing lectures.

f. By performing some Lab work.

c. By solving problems

d. By giving assignments.

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

5. By regular and surprise class tests.
6. By mid term and semester exams.
7. By small quiz and tutorials.
8. Expert lecture from eminent institutes.
6. Video lectures through NPTEL.

Text Book:

2. Network Analysis and Sysnthesis – M E Van Valkenburg – Pearson Education
3. Fundamentals of Electric Circuits-Alexander and Sadiku-Tata McGraw Hill.

Prepared By: Mr R.K.Mahanta,Asst Prof Electrical Engg. Dept.

Course: Power electronics

Class:B.Tech-6th semester

Course Description:

Switching and V-I characteristic of devices Thyristor family: SCR, IAC,GTO,RCT,MCT, and Transistor Family: BJT, IGBT, and MOSFET , Triggering Methods: SCR: UJT and R-C triggering scheme, MOSFET Gate drive, BJT base drive, IGBT gate drive, Isolation of gate and base drive, Protection of Devices: SCR, Over voltage, over current, dv/dt, di/dt, Gate Protection, Single phase half wave and full wave rectifiers with R-L and R -L-E load ,3 phase bridge rectifier with R-L and R-L-E load , Principle of phase controlled converter operation, single phase full converter with R-L and R-L-E load,3 phase full converter with R-L and R-L-E load ,3 phase semi converter with R-L and R-L-E load,Single phase PWM rectifier, Three phase PWM rectifier. AC voltage controller: Single phase bi-directional controllers with R and R-L load, single phase cycloconverters, ac-voltagecontrollers with PWM control, First quadrant, second quardrant, first and second quardrant, third and fourth quardrant, fourth quardrant converter. Switching mode regulators: Buck regulators, Boost regulators, Buck-Boost regulators, Cuk regulators, Isolated Types: Fly Back Converters, Forward converters, Push Pull Converters, Bridge Converter. PWM inverters, Single phase Bridge Inverters, 3-Phase Inverters-180 deg. conduction, 120 deg. conduction. voltage control of 3-Phase Inverters: Sinusoidal PWM , space vector modulation, Current Source Inverter, Zero Current Switching resonant inverters, Zero Voltage Switching resonant inverter, UPS, SMPS, Battery Chargers, Electronic Ballast, Static VAR Compensator.

Course Objectives:

In this subject students will learn the following points:

1. Give an overview of the major aspects of power electronics.

2. Emphasis will be placed on basic theoretical methods of calculation and design of important power electronic circuits such as: ac to dc uncontrolled and controlled rectifiers, ac voltage controllers, dc-dc converters, dc to ac inverters and resonant converters.

3. Develop and quantify common performance objectives for power electronic circuits, such as efficiency, power factor, etc.

4. To study the power control using choppers &inverters

5. Aanalyze power electronic converter operation to develop design guidelines for choice of switching devices and reactive elements

6. Iidentify and use switching device and reactive component performance characteristics to apply them appropriately in power electronic circuits .

7. Describe operation of diode and SCR based power electronic circuits

8. Outline operating principles of application of power electronic circuits as motor drives, UPS systems, active filters, etc.

Course Outcome

After successfully completing this course, students, will able to demonstrate that they can do the following:

a. Describe the role of Power Electronics as an enabling technology in various applications such as flexible production systems, energy conservation, renewable energy, transportation, etc.

b. Identify a switching power-pole as the basic building block and use Pulse Width Modulation to synthesize the desired output.

c. Design the switching power-pole using the available power semiconductor devices, their drive circuitry and driver ICs, and heat sinks.

d. Learn the basic concepts of operation of dc-dc converters in steady state in continuous and discontinuous mode.

e. Learn the basic concepts of operation of dc-dc converters in steady state in continuous and discontinuous modes and be able to analyze basic converter topologies.

f. Using the average model of the building block, quickly simulate the dynamic performance of dc-dc converters and compare them with their switching counterparts.

g. Design controllers for dc-dc converters in voltage and peak-current mode

h. Design, using simulations, the interface between the power electronics equipment and single-phase and three-phase utility using diode rectifiers and analyze the total harmonic distortion.

i. Design the single-phase power factor correction (PFC) circuits to draw sinusoidal currents at unity power factor.

j. Learn basic concepts of soft-switching and their applications to dc-dc converters, compact fluorescent lamps (CFL) and induction heating.

k. Graduate can participate and succeed in competitive examination like GATE,GRE.

Mapping of course objective and the outcomes

Course objective	**Course outcome**										
	a	b	c	d	e	f	g	h	i	j	k
1	√								√	√	√
2		√									
3		√	√								√
4				√							
5					√						
6						√	√				√
7				√							

8								√			

Contribute to the outcome:

Contribution can be done-

1. By providing lectures.

2. By performing lab experiments.

3. By solving problems.

4. Daily class room interaction.

Assessment: Assessment of a student can be performed

1. By regular and surprise class tests.

2. By mid term and semester exams.

3. By evoulation of their programming approach using MATLAB

4. Expert lecture from industries.

5. Vedio lectures through NPTEL.

Text Books:

1. Power Electronics: Circuits,Devices and Applications by M H Rashid, 3rd Edition, Pearson

Reference Books:

1. Power Electronics: Principles and Applications by J. Vithayathil, TMH Edition

2. Power Converter Circuits by W Shepherd and L Zhang, CRC, Taylor and Francis, Special Indian Edition

3. Power Electronics: Converters , Applications, and Design by Mohan, Undeland and Robbins, Wiley Student Edition.

Course: Power System Protection

Class: B. Tech - 7^{th} semester

Course Description

Faults on power system and their classification, evolution of a power system, protection system attributes, system transducer, principles of power system protection, over current protection : over current relay, IDMT and DTOC relays, Directional over current relays, Feeder protection.**si**mple differential protection, Zone of protection, percentage differential relay, Earth Leakage protection Over current protection, Differential protection of single and three phase transformers, Star-delta and Delta star connections, Harmonic restraint for magnetizing inrush. Interturn and incipient faults in transformers, Busbar protection.Introduction, impedance, Reactance, and MHO relays, Three stepped distance protection, Carrier added protection of transmission lines.Stator and rotor faults, Abnormal operating conditions, Generator, differential protection, earth fault relaysStatic comparators as relays, Amplitude and phase comparators, Synthesis of distance relaying using static comparators, electronic circuits for Static relays. Microprocessor based numerical protection, Digital filtering, Numerical overcurrent, differential, and distance protection, effect of CT and PT saturation's on Numerical relays.

Course Objectives:

In this subject students will learn about the following points

1.To learn about the different types of faults and their evolutions.

2.To learn about the operating principles of over current relays.

3.To understand the principles of differential relays.

4. To learn about the earth leakage protection.

5. To learn about transformer protection.

6 To understand theory of transmission line protection..

7. To make the students understand about generator protection.

8. To learn about the busbar protection.

9. To understand the basic ideas about different types of numerical protection

Course Outcome

After completion of this course:

c) Students will be able to understand the concept of various faults.

b)Students will able to learn the operating principles of differential relays.

c) Graduate will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.

d) Students will able to work on different industries.

e) Students will be able to understand the concept of earth leakage protection.

f) Students will be able to understand the theory of transformer protection.

g) Students will be able to understand the concept of transmission line protection.

h)Students will be able to learn the theory of generator protection and basic ideas about different types of numerical protection.

i) Students will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.

j) Graduate will develop confidence for self education and ability for lifelong learning.

k)Graduate should visit the power generation plant.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√		√	√					√	√	√
2		√	√	√					√	√	√
3		√	√	√					√	√	√
4			√	√	√				√	√	√
5			√	√		√			√	√	√
6		√	√	√			√		√	√	√
7			√	√		√	√	√	√	√	√

Contribute to the outcome:

Contribution can be done -

g. By providing lectures.

h. By performing some Lab work.

i. By giving assignments.

j. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

9. By regular and surprise class tests.
10. By mid term and semester exams.
3. By arranging seminar.
4 Visit to any Power Plant.
5. Attending the Summer Training Programme.
5. By MATLAB Prgramming.
6. Video lectures through NPTEL.

Text Book:

4. Fundamental of Power System Protection – Y.G. Paithankar,S.R. Bhide(PHI)

Prepared By: Mr S.S.Mahapatra Elect. Engg Dept.

Course: **Renewable Energy Systems**

Class: B. Tech - 5th semester

Course Description : Fossil fuel based systems Impact of fossil fuel based systems, Non conventional energy, seasonal variations and availability, Renewable energy sources and features, Hybrid energy systems, Distributed energy systems and dispersed generation. Operating principle of Solar Photovoltaic systems, Photovoltaic cell concepts, Cell, module, array, Series and parallel connections, Maximum power point tracking, Applications, Battery charging, Pumping, Lighting, Peltier cooling. Solar processes and spectral composition of solar radiation; Radiation flux at the Earth's surface. Solar collectors. Types and performance characteristics. Applications. Wind energy conversion; efficiency limit for wind energy conversion, types of converters, aerodynamics of wind rotors, power ~ speed and torque ~ speed characteristics of wind turbines, wind turbine control systems; conversion to electrical power: induction and synchronous generators, grid connected and self excited induction generator operation, constant voltage and constant frequency generation with power electronic control, single and double output systems, reactive power compensation; Characteristics of wind power plant. Applications: Operating principle of Biomass Power, Combustion and fermentation, anaerobic digester. Wood gassifier, Pyrolysis, Applications, Bio gas, Wood stoves, Bio diesel, Combustion engine. Application, Need for Hybrid Systems, Range and type of Hybrid systems, Case studies of Diesel-PV, Wind-PV, Microhydel-PV, Biomass-Diesel systems, electric and hybrid electric vehicles

Course Objectives : In this subject students will learn about the following points:

1. To learn about different non-conventional energy sources and their features.
2. To learn about hybrid systems, distributed systems and dispersed generation.
3. To understand the applications of different types of non-conventional energy sources.
4. To learn about maximum power point tracking.
5. To know the harnessing processes of different renewable sources.
6. To learn about different characteristics of energy sources.

Course Outcome **After completion of this course:**

d) Graduate will be able to understand the role and need of renewable energy sources in different fields.

b) Graduate will demonstrate an ability to design the different machines used in renewable energy

sources.

c) Graduate will demonstrate an ability to visualize and work on laboratory.

d) Graduate will able to work on different industries where these sources are used.

f) Graduate will understand the application of renewable energy for green environment.

g) Graduate will understand the economic aspects of design of these machines.

h) Graduate will demonstrate skill to visualize and work on laboratory on safety in renewable energy

Equipments.

i) Graduate will develop confidence for self education and ability for lifelong learning.

j) Graduate can participate and succeed in competitive examination like GATE, GRE.

k) Graduate will show the impact of engineering solution.

Mapping of course objective and the outcomes

Course	Course Outcomes										
Objectives	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√
2		√	√	√						√	
3		√	√							√	√
4				√	√					√	
5			√							√	
6		√	√	√			√			√	√

Contribute to the outcome:

Contribution can be done -

k. By providing lectures.

l. By performing Lab work.

m. By providing references for white papers and articles.

n. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

11. By regular and surprise class tests.
12. By mid term and semester exams.
13. By small quiz and tutorials.
14. Expert lecture from industries

5. By assignments

Text Books:

1. D. P. Kothari, K. C. Singal, R. Ranjan, *Renewable Energy Sources and Emerging Technologies*, Prentice Hall of India, New Delhi, 2008.
2. B.H.Khan, Non-Conventional Energy Resources, Tata McGrawHill, 2009
3. S. N. Bhadra, D. Kastha, S. Banerjee, *Wind Electrical Systems*, Oxford Univ. Press, New Delhi, 2005.

Prepared by Mr.P.K.Nayak.

Course: Energy Conversion Devices

Class: B. Tech - 4th semester (ETC)

Course Description : General Principles of DC Machines, Constructional Features, Methods of Excitation, Expression for emf induced and torque developed in the armature, Characteristics of DC generator, Conditions for self excitation, critical resistance and critical speed, Losses and Efficiency, Characteristic of DC Motor, Speed Control and Starting of DC Shunt and Series motors, Comparison between Different types of DC Motors and their Application. Constructional Features of Transformer, EMF Equation, Turns ratio, Determination of Parameters from Tests (open circuit and short circuit tests), Equivalent Circuit, Losses and Efficiency, Introduction to three phase transformer, Three single phase transformers connected as bank of Three phase transformers. Constructional Features of Three phase synchronous machines, Principle of Operation as alternator and synchronous motor, synchronous impedance, voltage regulation by synchronous impedance method, power angle curve, and synchoronization of alternators, Torque expression and phasor diagram for synchronous motor, Electrical power and mechanical power, Starting of synchronous motor. Constructional Features of Squirrel Cage Rotor type and Slip Ring/Wound Rotor type of three phase Induction Motors, Principle of operation, Concept of Slip, Slip-Torque Characteristics, Starting of Squirrel Cage Rotor type and Slip Ring/Wound Rotor type of Induction Motors, Speed Control of Induction Motors, Single phase induction motor revolving field theory, starting of split phase (capacitor start ant run) and shaded pole single phase induction motors, Characteristics of single phase ac series motor.

Course Objectives:

In this subject students will learn about the following points:

1. To learn about the constructional features of different energy conversion devices.

2. To learn about the operating principles of each individual electrical machine.

3. To learn about different types of starter used in DC motor.

4. To familiar with different characteristics of DC machines and ac machines.

5. To make students familiar with the Phasor diagrams of a single phase transformer and synchronous motor.

6 To calculate the losses and efficiency of various electrical machines.

7. To make the students understand the methods of starting of different induction motors.

8. To learn about the speed control of DC motor and induction motors.

9. To know about the synchronization of alternators.

Course Outcome

After completion of this course:

e) Graduate will be able to understand the role and need of electrical machines in different fields.

b) Graduate will demonstrate an ability to design the different electrical machines.

c) Graduate will demonstrate an ability to visualize and work on laboratory.

d) Graduate will able to work on different industries.

f) Graduate will understand the starting and sped control of dc and induction motor.

g) Graduate will understand the economic aspects of design of electrical machines.

h) Graduate will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.

i) Graduate will develop confidence for self education and ability for lifelong learning.

j) Graduate can participate and succeed in competitive examination like GATE, GRE.

k) Graduate will show the impact of engineering solution.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√
2		√	√	√						√	
3		√	√							√	√

4				√	√					√	
5			√							√	
6		√	√	√			√			√	√
7			√	√		√			√	√	
8			√	√		√		√			
9			√	√			√				√

Contribute to the outcome:

Contribution can be done -

o. By providing lectures.

p. By performing Lab work.

q. By providing references for white papers and articles.

r. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

15. By regular and surprise class tests.
16. By mid term and semester exams.
17. By small quiz and tutorials.
18. Expert lecture from industries

5. By assignments

<u>Text Book:</u>

5. Electric Machines – D P Kothari and I J Nagrath – Tata McGraw Hill.

Prepared By: Mr. P.K.Nayak Elect Engg.

Sub: Energy Conversion Technique Sem:4th Mechanical Engg

Course Description: Constructional features ,operating principles ,classification,development of emf and speed ,torque and power equations of rotating electrical machines like DC motor and generator, Synchronous generator and motor,induction motors etc. their characteristics,phasor diagram and equivalent circuits and applications.Determination of losses and efficiency. Constructional features,types and operation principles of transformers, development of emf equation,Open circuit and short circuit test for losses and efficiency.Synchronisation of alternators.

Course Objectives:

In this subject the students will learn the following.

1.The different techniques of energy conversions in various electrical machines

2. The constructional features, operating principles,classifications of varieties of electrical machines.

3. To derive the emf equations ,to draw the equivalent circuit and phasor diagrams of synchronous machines.

4. Study various characteristics,method of starting ,speed control of electrical machines.

5. Carry out the tests to justify losses and to obtain efficiency.

6. Applications of all the above electrical machines.

7.Synchronisation of alternators.

Course Outcome: After completion of the course

a. Graduates will easily identify the machines and know its application in the field

b.Graduates will know the technical know how of each machine that will lead to innovative thinking in their working areas.

c. Graduates will be able to design the electrical machines using mathematical models which will help them for R& D works.

d.Graduates will understand the behavior of machine , starting methodologies and control strategies so as to implement in the real field.

e.Graduates will emphasise on the low loss, high efficient machine so as to design machines of best performance.

f. understand the applications of all the above electrical machines in places taking care of their drive requirements like speed-load characteristics, controllabilities, safety levels etc.

g.Graduates will be aware of the increase in load demand from time to time and reliability of power system operation and adopt the process of synchronization of one alternator with many more.

h.The graduates will correlate the electrical machines with mechanical machines.

i.Graduates will be confident enough to do their jobs anywhere they like.

Course mapping

Course Outcomes	Course Objectives								
	a	b	c	d	e	f	g	h	i
1	√							√	
2		√						√	
3			√						√
4				√					
5					√				√
6						√			√
7							√		

Contribute to the outcome: Contribution can be done **–**

(a) By taking adequate lecture classes.
(b) By performing experiments in the laboratory.
(c) By involving the students in delivering seminars and undergoing project works.
(d) By providing references for white papers and articles
(e) By inducing the students for self learning.
(f) By inducing the students to refer standard books in the library.
(g) By solving numerical.
(h) By giving home tasks &assignments.
(i) By conducting Expert lecture from industries

Assessment:

Assessment of a Student can be performed -

19. By regular and surprise class tests.

(b)By mid term and semester examinations..

(©)By evolution of their programming approach for a specific task or Operation.

(d)By small quiz and tutorials.

Text Books:

1.Electric Machines –D.P Kothari & J.Nagrath
Tata Mc Graw Hill Publication

Reference Books:

1.The performance & Design of DC Machines-A.E Clayton.

2.Theory & Performance of A.C Machines:M.G Say.

Prepared by:-

L.Dhal Samanta
Prof, Dept. of Electrical Engg

Sub:Electrical Machine-II, 6th sem Electrical Engg.

Course Description:

Constructional features,operating principles,classification, development of emf ,torque and power equations,characteristics,phasor diagram,equivalent circuits of rotating electrical machines like synchronous generator and motor. Armature reaction at various p.fs, ,voltage regulation by different methods, parallel operation of altenators . Starting,p.f improvement in synchronous motors, Comparision with three-phase induction motor. Constructional features,operating principles,classification, development of connection diagrams, open delta,scott-connections, Parallel operation of three phase transformers,Construction,principle,types of single phase induction motors.

Course Objectives:

In this subject the students will learn the following.

1. Energy conversion phenomena in DC & AC machines .

2. The constructional features, operating principles, classifications of rotating electrical machines like synchronous generator & motor.

3. To derive the emf equations ,to draw the equivalent circuit and phasor diagrams of synchronous machines.

4.The effect of armature reaction at different load power factors upon alternator.

5.Different methodologies adopted for finding voltage regulations.

6. Study of Parallel operation of alternator.

7. Study of various characteristics, method of starting of electrical machines.

8. Constructional features, operating principles,classification development of connection diagrams, open delta,scott-connections for three phase transformers.

Course Outcome: After completion of the course

(a) Graduates will easily identify the machines and know its application in the field .
(b) Graduates will know the technical know how of each machine that will lead to innovative thinking in their working areas.

(c) Graduates will be able to design the synchronous machines using mathematical models which will help them for R& D works.
(d) The students will know the effect of armature reaction causing the generated emf increase or decrease in an alternator and provides information for voltage regulation to calculate the machine performance.
(e) The students will know the different methods of voltage regulations & verify all these methods in the laboratory to know their applications at suitable places.
(f) Graduates will be aware of the increase in load demand from time to time and reliability of power system operation and adopt tudents the process of synchronization of one alternator with many more.
(g) Graduates will understand the behavior of machine , starting methodologies and control strategies so as to implement in the real field
(h) Graduates will understand each of the component of the three phase transformer in all respects and be able to design the transformers in different configurations to operate reliably and efficiently one over the other as the situation demands.
(i) The students will verify the the different requisite conditions and sharing of loads in three-phase transformer in the laboratory to develop self confidence while working in the field.
(j) The students will understand the difference in the design and application of three and single phase induction motor drives.
(k) The graduates will be able to correlate the laboratory work with the requirement of industry.
(l) Graduates will be confident enough to do their jobs anywhere they like.

Course Mapping:-

Course Objectives	Course Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
1	√											
2		√										√
3			√									
4				√								
5					√						√	√
6						√					√	√
7							√				√	
8								√				√

Contribute to the outcome:

Contribution can be done –

(j) By taking adequate lecture classes.

(k) By performing experiments in the laboratory.

(l) By involving the students in delivering seminars and undergoing project works.

(m)By providing references for white papers and articles

(n) By inducing the students for self learning.

(o) By inducing the students to refer standard books in the library.

(p) By solving numerical.

(q) By giving home tasks &assignments.

(r) By conducting Expert lecture from industries

Assessment:

Assessment of a Student can be performed -

20. By regular and surprise class tests.

(b)By mid term and semester examinations..

(©)By evolution of their programming approach for a specific task or operation.

21. By small quiz and tutorials.

Text Books:

1.Stephan Chapman-'Electrical Machinry and fundamentals"-4th ediion. Mc Graw Hill,2005

2.M.G Say-"Alternating current Machines'-"English Language Book Society/Lngman,5th Edition.

Reference Books:

P.C Sen-'Principles of Electrical Machines & Power Electronics 2nd Edition ,John Willey and sons,2003

2.B.S Guru and H.R Hiziroglu-:-: Electric Machinery and transformers-3rd Edition,Oxford University Press,2003.

Prepared by:-

L.Dhal Samanta

Prof, Electrical Engg Department

Course: CONTROL SYSTEM ENGINEERING

B. Tech - 4th semester

Course Description : Basic Concepts of Control Systems, Open loop and closed loop systems, Servo Mechanism/Tracking System, Regulators, Mathematical Models of Physical Systems: Differential Equations of Physical Systems: Mechanical Translational Systems, Rotational systems, Gear Trains, Electrical Systems, Analogy between Mechanical and electrical quanties, Thermal systems, fluid systems, Derivation of Transfer functions, Block Diagram Algebra, Signal flow graph.
Synchros, Stepper Motors. Standard Test Signals: Time response of first order systems to unit step and unit ramp inputs. Time Response of Second order systems to unit step input, Time Response specifications, Steady State Errors and Static Error Constants of different types of systems. Generalized error constant Root locus concepts, Rules of Construction of Root locus, Determination of Roots from Root locus for a specified open loop gain, Root contours, Systems with transportation lag. Effect of adding open loop poles and zeros on Root locus. Frequency domain specifications correlation between Time and Frequency Response with respect to second order system
Stability in frequency domain: Principle of argument, Nyquist stability criterion, Application of Nyquist stability criterion for linear feedback system.
Closed loop frequency response: Constant Mcircles, Constant N-Circles, Nichol's chart.
Controllers: Concept of Proportional, Derivative and Integral Control actions, P, PD, PI, PID controllers. Zeigler-Nichols method of tuning PID controller

Course Objectives: In this subject students will learn about the following points:

1.To learn about different types of control system.

2.To learn about regulator and tracking system.

3.To learn about different model of physical system.

4.To learn the block diagram algebra and signal flow graph.

5. To learn about Mechanical and electrical quanties, Thermal systems, fluid systems.

6.To draw the block diagram of thermal power plant.

7.To learn about Root locus concepts, Rules of Construction of Root locus

Course Outcome : After the completion of this course:

a.Student will be able to co-relate different types of control system.

b.Student will be able to draw the block diagram from differential equation.

c.Student will be able to understand and distinguish between types of electrical, fluid, thermal &mechanical system.

d.Student will be able to solve the problems related to mason gain formula.

e.Student will be able to understand the difference between static error constant and generalized error constant.

f. Student will be able to understand the Rules of Construction of Root locus

g.Student will be able to understand Root contours, Systems with transportation lag

h.Student will be able to know the different types of controller.

i.Student will be able to understand the Constant Mcircles, Constant N-Circles

j.Student will be able to understand the. Nyquist stability criterion Nichol's chart

k.Student will be able to understand the Zeigler-Nichols method of tuning PID controller

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√
2		√	√	√						√	
3		√	√							√	√
4				√	√					√	
5			√							√	
6		√	√	√			√			√	√
7			√	√		√			√	√	

IMPORTANT TOPICS COVERED

a. Types of control system

b. Basic concept of electrical system

c. Basic concept of time signal

d. Types of controller

e. Brief idea about root locus

Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By solving some mathematical problems.
c. By providing references for white papers and articles.

Assessment: Assessment of a Student can be performed -

22. By regular and surprise class tests.
23. By mid term and semester exams.
24. By small quiz and tutorials

Text book:

1. Modern Control Engineering by K. Ogata, 5^{th} edition PHI.
2. Control Systems Engg. by I.J. Nagrath and M.Gopal, 5th Edition, New Age International Publishers (2010).
3. Modern Control Systems by Richard C.Dorf and Robert H. Bishop, 11^{th} Ed (2009), Pearson

Reference:

1. Design of Feedback Control Systems by R.T. Stefani, B. Shahian, C.J. Savator, G.H. Hostetter, Fourth Edition (2009), Oxford University Press.
2. Control Systems (Principles and Design) by M.Gopal 3rd edition (2008), TMH.
3. Analysis of Linear Control Systems by R.L. Narasimham, I.K. International Publications
4. Control Systems Engineering by S.P. Eugene Xavier and J. Josheph Cyril Babu, 1^{st} Edition (2004), S. Chand Co. Ltd.
5. Problems and solutions in Control System Engineering by S.N. Sivanandam and S.N. Deepa, Jaico Publishing House.

7. RELATION OF COURSE TO PRAGRAM OUTCOMES:

This course is required of all electrical engineering students and has a significant relationship with the following objectives for electrical engineering:

1) To train students with good engineering breadth so as to comprehend, analyze, different control system.

2) To provide student with a solid foundation in mathematical and logical fundamentals required to solve engineering problems.

3) To prepare student to excel in postgraduate programs or to successes in industry/technical profession through global, rigorous education.

Prepared by:

Elora Das,Asst Prof

Electrical engg dept

Course: Power System Protection

Class: B. Tech - 7^{th} semester

Course Description

Faults on power system and their classification, evolution of a power system, protection system attributes, system transducer, principles of power system protection, over current protection : over current relay, IDMT and DTOC relays, Directional over current relays, Feeder protection.**si**mple differential protection, Zone of protection, percentage differential relay, Earth Leakage protection Over current protection, Differential protection of single and three phase transformers, Star-delta and Delta star connections, Harmonic restraint for magnetizing inrush. Interturn and incipient faults in transformers, Busbar protection.Introduction, impedance, Reactance, and MHO relays, Three stepped distance protection, Carrier added protection of transmission lines.Stator and rotor faults, Abnormal operating conditions, Generator, differential protection, earth fault relaysStatic comparators as relays, Amplitude and phase comparators, Synthesis of distance relaying using static comparators, electronic circuits for Static relays.
Microprocessor based numerical protection, Digital filtering, Numerical overcurrent, differential, and distance protection, effect of CT and PT saturation's on Numerical relays.

Course Objectives:

In this subject students will learn about the following points

1.To learn about the different types of faults and their evolutions.

2.To learn about the operating principles of over current relays.

3.To understand the principles of differential relays.

4. To learn about the earth leakage protection.

5. To learn about transformer protection.

6 To understand theory of transmission line protection..

7. To make the students understand about generator protection.

8. To learn about the busbar protection.

9. To understand the basic ideas about different types of numerical protection

Course Outcome

After completion of this course:

f) Students will be able to understand the concept of various faults.

b)Students will able to learn the operating principles of differential relays.

c) Graduate will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.

d) Students will able to work on different industries.

e) Students will be able to understand the concept of earth leakage protection.

f) Students will be able to understand the theory of transformer protection.

g) Students will be able to understand the concept of transmission line protection.

h)Students will be able to learn the theory of generator protection and basic ideas about different types of numerical protection.

i) Students will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.

j) Graduate will develop confidence for self education and ability for lifelong learning.

k)Graduate should visit the power generation plant.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√		√	√					√	√	√
2		√	√	√					√	√	√
3		√	√	√					√	√	√
4			√	√	√				√	√	√
5			√	√		√			√	√	√
6		√	√	√			√		√	√	√
7			√	√		√	√	√	√	√	√

Contribute to the outcome:

Contribution can be done -

s. By providing lectures.

t. By performing some Lab work.

u. By giving assignments.

v. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

25. By regular and surprise class tests.
26. By mid term and semester exams.
3. By arranging seminar.
4 Visit to any Power Plant.
5. Attending the Summer Training Programme.
5. By MATLAB Prgramming.
6. Video lectures through NPTEL.

Text Book:

6. Fundamental of Power System Protection – Y.G. Paithankar,S.R. Bhide(PHI)

Prepared By: Mr S.S.Mohapatra,Asst Prof Elect. Engg Dept.

Course: Power System Operation and Control

Class: B. Tech - 7th semester

Course Description :Concept Complex power, real and reactive power, shunt and series compensation, Load frequency mechanism, tap changing and regulating transformer, FACTS Devices, Load flow Analysis, SLFE, load flow sample study, effect of regulation transformer, Load frequency control, PF verses QV control MW frequency Speed governing system, Division of power system, Economic dispatch controller, Economics Operation of Power System,Transmission losses as function of plant generation,Loss coefficient, Automatic load dispatching, Unit commitment Power System Stability, Transient Stability, Equal Area Criterion,Improvement of transient stability,

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the detail design of Transmission and Distribution line.

2.To learn about the line parameters and hence its affect on transmission line.

3.To understand the performance of the transmission line.

4. To understand the recent development in HVDC line.

5. To make students familiar with the basic concepts of Insulators and how they function at high voltage.

6 To understand the Mechanical Design of transmission line.

7. To make the students understand the underground cables and HVDC underground cables.

8. To learn about the electric safety measures and earthing of equipment..

Course Outcome

After completion of this course:

g) Graduate will demonstrate knowledge on erecting of transmission and Distribution line.

b) Graduate will demonstrate an ability ,formulate and design the Transmission line.

c) Graduate will demonstrate an ability to visualize and work on laborotary and multidisciplinary tasks.

d) Students will able to understand the laying of cables and able to locate faults of underground cables.

e) Students will be able to understand the testing of high voltage isulators and can test in laboratory.

f) Students will understand the mechanical design of transmission line.

g) Students will understand the economic aspects of design of transmission and distribution line.

h) Students will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.

i) Graduate will develop confidence for self education and ability for life long learning.

j) Graduate can participate and succeed in competitive examination like GATE,GRE.

k) Graduate will show of impact of engineering solution.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√
2		√									
3		√	√								√
4				√							
5					√						
6						√	√				√
7				√							
8								√			

Contribute to the outcome:

Contribution can be done -

w. By providing lectures.

x. By performing some Lab work.

y. By providing references for white papers and articles.

z. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

1.By regular and surprise class tests.

2.By mid term and semester exams.

3.By evolution of their programming approach for a specific task or operation.

4.By small quiz and tutorials.

5.Expert lecture from industries

6.Video lectures through NPTEL.

Text Book:

1. Power System Analysis- By Hadi Saadat

2.Power System Analysis & Design-By B.R.Gupta , S.Chand

3.An introduction to Energy System Theory,O I Elegerd

4. Elements of Power System Analysis –W.D.Stevenson

Reference Book

1. Power System Analysis- Nagrath & Kothari

Prepared By : Mr S.S. Pati, AP, Elect Engg

Course: Principle of management

Class: B. Tech – 6th semester

Course Description: concept of management, management as an Art or Science, The process of Management , management skills, Levels & types of Management ,Evolution of management Thought: Managerial Environment , The Process of Management - Planning , organizing, Directing, Staffing, Controlling . Modern concept of marketing, function of a marketing management, marketing mix, fundamental need of customers, Role of distribution channels in marketing, advertising, Marketing, Consumerism, &Environmentalism. Financial Concept, concept of financial management, Project appraisal, Tools of Financial decisions making, Overview of Working Capital. HRM Function of management Human resource management , human resource development , importance of HRM Overview of job Analysis, Job Description, job specification, Labour Turnover. Manpower planning, recruitment, selection, Induction, Training &Development, Placement, wage & salary Administration, Performance Appraisal, Grievance Handling, Welfare Aspects.

Course Objectives:

Understand fundamental concepts and principles of management, including the basic roles, skills, and functions of management;

1) To acquire knowledge of historical development, theoretical aspects and practice application of managerial process;
2) To be familiar with interactions between the environment, technology, human resources, and organizations in order to achieve high performance;
3) To be aware of the ethical dilemmas faced by managers and the social responsibilities of businesses.
4) It will help in manpower planning & recruitment

The material covered will be relevant to you, regardless of your career objectives. In all likelihood, you will either be a manager or work with one in any occupation you choose. In the final analysis, we are all managers of our own lives and can benefit by studying to be better managers.

Course Outcomes

After completion of this course:

a) Graduate will able to understand the fundamental concept of principal of management.

b) Students will understand the basic role, skills & function of management.

c) Students will be able to generate the theoretical aspects and practice application of managerial process.
d) Students will be familiar with interactions between the environment, technology, human resources, how and organizations in order to achieve high performance.
e) Students must be aware of the ethical dilemmas faced by managers and the social responsibilities of businesses.
f) It will help the students in understanding the concept of financial management & also give an overview look on working capital.
g) Student will come to know about the salary structure which will help them to calculate their worth in any organization.
h) Student will be able to know about the manpower planning.
i) Student will be able to understand about the importance of recruitment, selection, induction & training & development program.
j) Student will be able to know about the importance of performance appraisal & **other welfare aspect of employee.**

k) They will be able to understand the important grievance handling**.**

<u>Mapping of course </u>objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√	√									√
2				√						√	
3			√	√					√		
4					√		√	√			
5						√					

Contribute to the outcome:

Contribution can be done -

aa. By providing lectures.

bb. By providing references for white papers and articles.

cc. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed **–**

By regular and surprise class tests.

27. By mid term and semester exams.

3. By small quiz and tutorials.

4. Expert lecture from industries

<u>Text Book:</u>

1.Business Organisation & Management, CR Basu, TMH
2. Business Organisation & Management, Tulsia, pandey, Pearson
3.marketing management, Kotler, Keller,Koshi, Jha, Pearson
4. Financial Management, I.m. Pandey, Vikas
5. Human Resource Management, Aswasthapa, TMH
6. Modern Business Organisation& Management By Sherlekar, Himalaya Publishing House

Course: Engineering economics & costing

Class: B. Tech – 3^{rd}/4th semester

<u>Course Description</u> : Engineering Economics – Nature and scope, General concepts on micro & macro economics. The Theory of demand & supply Determination of equilibrium price under perfect competition. Theory of production, Law of variable proportion. Time value of money ,Cash flow diagram, Principle of economic equivalence. Evaluation of engineering projects, Cost-benefit analysis in public projects. Depreciation. Cost concepts, Break-even analysis-Linear approach. Banking: Meaning and functions of commercial banks; functions of Reserve Bank of India. Overview of Indian Financial system.

<u>Course Objectives</u>:

In this subject students will learn about the following points:

1) To understand the Time value of money.
2) To learn the demand & supply of the product in the market.
3) To understand the determination of price in the market.
4) To learn about different bank and financial institutions.
5) To evaluate different financial proposals.

<u>Course Outcomes</u>

After completion of this course:

h) Graduate will able distinguish between present value and future value.

b) Students will be able to understand the equivalent situations in the market at the time of purchasing different products.

c) Graduate will understand the demand and supply conditions in the market.

d) Students will able to understand the general price determination in the market.

e) Students will be able to understand the evaluation of investment proposals

f) Students will understand the different markets in the economy.

g) Students will be able to calculate the Break-even point

h) Students will understand the functions of the commercial bank and the central bank

i) Graduate will acquire knowledge about Indian Money market and capital market.

j) Graduate will have knowledge about loss of the value of the asset.

k) Graduate will be able to understand the different cost concepts in the production.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√	√			√		√			√	
2			√	√							
3			√			√					
4		√			√			√	√		
5					√						√

Contribute to the outcome:

Contribution can be done -

a.By providing lectures.

b.By providing references for white papers and articles.

c.By solving problems

e. Daily class room interaction

Assessment: Assessment of a Student can be performed

a.By regular and surprise class tests.

b.By mid term and semester exams.

c. By small quiz and tutorials.

d.Expert lecture from industries

Text Book:

1.Engineering economics by J.L.Riggs

2. Micro economics by H.L.Ahuja

3. Principles of economics by D.M.Mithani

Course: Marketing Management

Class: B. Tech – 7^{th} / 8^{th} semesters

Course Description :

Marketing Management : Concept, Process, Functions and relevance in the current context.
Marketing Environment : Socio-economic forces. Competition : national and global, Technology, Competition Analysis : Factors contributing to competition, Competition analysis tools, Competitive arena mapping, Segmentation matrix.
Market Planning : Exploring Opportunity, Product –market selection, Approaches to Market Planning, Market Planning Process. Market Research and Information Systems : Research Process, The Internet and World Wide Web based Information collection and processing, Database, Data Warehouses and Data Mining, Global Market Research, Competitive Intelligence.
Consumer Behaviour : Importance of buyer and his/ her role in purchasing. Influence of buyer behaviour, Buyer behaviour study tools. Organizational buying behaviour.
Market Segmentation, Targeting and Positioning : Market Positioning.
Market Demand Forecasting Product Planning : Product Life Cycle, Packaging and Labeling, Product-mix and Product Line, Product-Mix strategies, Promotion Decisions
Channels of Distributions : Designing Distribution Channels, Wholesaling and Physical Distribution, Retailing. Supply Chain Management (Basic only). Personal selling, Direct Marketing, Managing Sales Force. Trends in Marketing : Global Marketing, Customer Services, Customer Relationship Management, Rural Marketing and Service Marketing.

Course Objectives:

In this subject students will learn about the following points:

Objective of the Course : The course aims at introducing the basic concepts of marketing to the undergraduate students in engineering. The learning shall help the students in better designing, manufacturing and selling product/ service packages keeping competitive market, customers and cost in view.

1) To understand the Market, especially the global market.
2) To understand competition strategies.
3) To understand Consumer behavior in the modern market.
4) To use knowledge for product development.
5) To study different promotional techniques.

Course Outcome

After completion of this course:

a) Students will understand regarding the environmental factors which influence the marketing system.

b) Students will be able to understand competition and make them effective in tackling competition.

c) Students will understand the behavior and needs of consumer properly.

d) This knowledge will help in new cost effective product development.

e) Students will be interested in rendering their services in rural area .

f) Quality will be imparted in tangible & intangible way in service market.

g) Market research & market interpretation system will reach at new height which will introduce new product in an integral way increasing utility .

h) Promotional business will create new employment.

i) Students as managers will understand the concept of future trading.

j) Their will be a big revolution in retail market bringing prices down & increasing employment.

k) Students will be able to understand the actual role of price in the market.

Mapping of course; objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√	√									
2		√			√				√	√	
3	√						√			√	
4			√								√
5				√		√		√			

Contribute to the outcome:

Contribution can be done -

a.By providing lectures.
b.By providing references for white papers and articles.
c.By solving problems
d.Daily class room interaction

Assessment: Assessment of a Student can be performed -

1.By regular and surprise class tests.
2.By mid term and semester exams.
3. By small quiz and tutorials.
4. Expert lecture from industries

Text Book:

References :

1. M. J. Etazel , B. J. Walker and W. J. Stanton, Marketing, Tata McGraw Hill, 13th Edition, 2004.
2. R. Saxena, “Marketing Management” Tata McGraw Hill, second Edition, 2003.
3. Philips Kotler : Marketing Management
4. Ramswamy & Namkumari: Marketing Management

Course: Organizational Behaviour

Class: B. Tech – 3rd/4th semesters

Course Description : The study of organizational Behaviour, How learning occurs, Foundation of individual behavior, i.e. Personality, Perception & Motivation. Communication as a tool for improving interpersonal effectiveness. Group, Group cohesiveness and Group decision-making managerial implications.
Effective team building, How to be an effective Leader, Nature of conflict & Conflict resolution, Culture & Organizational effectiveness, Introduction to Human resource Management, Organization Change, Individual & Organizational Behaviour in global Perspective.

Course Objectives:

In this subject students will learn about the following points:

6) To understand the Organizational Behavior.
7) To know how learning occurs in Organization.
8) To know how to improve personality & its effectiveness.
9) To know the motivational factors & how it affect the Organization.
10) To realize the communication as a tool for interpersonal effectiveness.

Course Outcome

After completion of this course:

i) Students will understand the behavior of organization. i.e. the individual and group behavior.

j) Students will be able to understand, how learning occurs and how it helps them to grow.

c) Students will understand the perception level of the individuals and how to react to the situations.

d) Students will understand the motivational factors and how to use it to make individuals to the action for attaining the organizational goal.

e) Students will know how to communicate properly inside the organization to develop interpersonal relationship.

f) Students will understand the benefits of group work and the decision made by the group.

g) Students will be able to understand how to be a good leader and leadership qualities.

h) Students will understand to manage the conflict and making solutions to the conflicts.

i) Students will understand the organization's culture and the benefits of implication.

j) Students will understand how to manage the Human resources and motivate them towards the organizational goal.

k) Students will understand the organization's change and how to handle the changes towards improving the organization.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√					√		√			
2		√								√	
3				√	√		√		√		√
4	√		√	√				√			
5				√			√			√	

Contribute to the outcome:

Contribution can be done -

dd. By providing lectures.

ee. By providing references for white papers and articles.

ff. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

28. By regular and surprise class tests.
29. By mid term and semester exams.
30. By evolution of their programming approach for a specific task or operation.
31. By small quiz and tutorials.
32. **32.** Expert lecture from industries

Text Book:

1. Organization theory and Behaviour (V S P Rao & P S Narayana)

2. Organizational Behaviour (Stephen P. Robbins & Timothy A. Judge)

3. Organizational Behaviour (K. Aswathappa)

REPORT

ON

PROGRAM EDUCATIONAL OBJECTIVE

DEPT.OF ELECTRONICS & TELECOMMUNICATION ENGG.

SYNERGY INSTITUTE OF ENGINEERING & TECHNOLOGY

DHENKANAL

Vision and mission of the institute

VISION

To become an internationally acceptable Institute of Technical Education which shall always promote pursuit of Excellence and inculcation Values.

MISSION

1.To impart quality engineering Education and Technological Skill.

2. To empower students with professional Competencies for meeting Global Challenges.

3. To inculcate the habit of continual learning.

4.To nourish the qualities of leadership, Entrepreneurship, Innovation and Ethics.

5. To create outstanding ambience of Academics Intellectual pursuits, Innovative Research and Physicals activities.

GOAL

To make SYNERGY a preferred place to Work and Study.

MISSION

To become a leader in providing quality engineering education and professional services through dynamic and innovative education, research and consultancy for the benefits of humanity, the advancement of the profession and progress of the nation

Programme Educational Objectives

a. Applying Electronics Engineering knowledge based on a solid foundation in Telecommunication Engineering areas for the needs of the stakeholders.
b. Upholding the importance of professionalism and ethics Electronics Engineering profession to form a cultured and more developed society.
c. Possessing communication and interpersonal skills, to meet the nation's and stakeholders' aspiration.
d. Developing skills in research in Electronics Engineering particularly in the areas of Telecommunication Engineering to generate new knowledge to satisfy the needs of the stakeholders.

Programme Outcomes

The Programme Outcomes of the Department of Electronics Engineering are listed below:

1. Ability to apply knowledge of mathematics, science related to Electronics Engineering fundamental.
2. Ability to conduct experiments, analyze and interpret data.
3. Ability to gather broad education necessary to recognize the impact of engineering solutions in global and societal context.
4. Ability to exercise professional and ethical responsibility in multicultural environment.
5. Ability to communicate effectively with engineers and community at large.
6. Ability to identify, formulate and solve Electronic Engineering problems.
7. Ability to recognize the need and engage in life-long learning.
8. Ability to comprehend management and entrepreneurship skills.
9. Ability to design process, components and system to meet specified needs in Electronic Engineering.
10. Understanding of the principle of sustainable development for Electronic Engineering Design.
11. Ability to use the techniques, skills and modern engineering tools necessary for Electronics Engineering practice.
12. Ability to work in multi-disciplinary teams within Electronic Engineering discipline.

Course Objectives	Course Outcomes									
	1	2	3	4	5	6	7	8	9	10
a	√		√		√					

b				√			√			
c		√	√	√						
d						√	√	√		
e	√	√				√				

A list of courses offered in Electronics & Tele communication Engineering curriculum

Theory :

Code	**Subject**
BS1101	Mathematics-I
BS1102	Physics – I
BS1103	Chemistry-I
BE2101	Basic Electronics
BE2102	Basic Electrical Engineering
BE2103	Thermodynamics
BE2104	Mechanics
HM3101	Communicative English
BE2105	Programming in 'C'
BS1104	Mathematics-II
HM3102	Business Comm.in English 2- 0- 0 2
BE2106	Data Structure using '*C*'
BSCM1205	Mathematics – III
PCEC4205	Electromagnetic Field & Waves
HSSM3204	Engineering Economics & Costing
HSSM3205	Organizational Behavior
BSMS1213	Material Science & Engineering
BSCP1207	Physics of Semiconductor Devices
BEES2211	Network Theory
BEEC2214	Energy Conversion Devices
PCEE4204	Electrical & Electronic Measurement
BECS2212	C++ & Object Oriented Programming
PCEC4201	Analog Electronics Circuit
PCEC4202	Digital Electronics
HSSM3303	Environmental Engineering & Safety
HSSM3301	Principles of Management
PCEC4303	Control System Engineering
PCEC4304	Digital Signal Processing
PCEC4301	Microprocessors
PCEC4305	Digital Communication Techniques
PCEC 4302	Analog Communication Techniques

Practical/ Seasonal:

BE7101	Engineering Drawing
BE7102	Workshop Practice
BE7103	Physics Laboratory
BE7104	Chemistry Laboratory
BE7105	Basic Electronics Laboratory
BE7106	Basic Electrical Engg. Lab
BE7107 'C'	Programming Laboratory
HM7101	Communicative English Lab.
HM7102	Business Communicative Lab
BE7108	Data Structure using 'C' Lab Circuit
BEES7211	Network & Devices Laboratory
BEEC7214	Energy Conversion Devices Laboratory
PCEC7201	Analog Electronics Circuit Laboratory
PCEC7202	Digital Electronics Circuit Laboratory
PCEE7204	Electrical & Electronic Measurement Laboratory
BECS7212	C++ & Object Oriented Programming Laboratory
HSSM7203	*Communication & Interpersonal skills for Corporate Readiness Laboratory*
PCEC7303	Control & Instrumentation Lab.
PCEC7304	Digital Signal Processing Lab.
PCEC7301	Microprocessor Lab.
PCEC7306	Communication Engineering Lab.
PCEC7302	Analog Communication Lab.
PCEC7305	Digital Communication Lab.

Mapping of faculty expertise with subjects

SL No	***NAME***	***Qualification/Expertise***	***Mapping with subject***
01	Dr P.K.Nayak.	Ph.D	Communication Engg, Analog Communication, Digital Communication, Digital Electronics, Analog Electronics, Basic Electronics
02	Mr B.D.Pradhan	M. Tech in communication System Engineering	Communication Engg, Analog Communication, Digital Communication, Radar & Tv Engg.
03	Mr G.Muduli	M.Tech Vlsi & Embedded system Design	Digital integrated circuit, VLSI Design, Microprocessor& Microcontroller, Analog communication
04	Mrs B.Sahoo	M.Tech in VLSI& Embedded System Design	Microprocessor & Microcontroller, DSP, Digital Electronics, Basic Electronics,

Objectives and outcomes of each course along with mapping

Course: English Communication Skills

Class: B. Tech – 1st semester

Course Description:

The importance of communication in English at the present time, the process of communication and factors that influence communication, the information gap principle : given and new information ; information overload , verbal and non-verbal communication : body language , comparing general communication and business communication, The Sounds of English: Stress , Intonation, Varieties of Spoken English : Standard Indian, American and British, Review of English grammar.

Course Objectives:

The course attempts to:

1. Develop the students' communicative ability in English both in verbal and written forms to enhance their employability.
2. Enhance the students' interpersonal skills by enabling them to combine verbal and non-verbal communication in all communicative activities.
3. Familiarize the students with the sounds of English in a nutshell, particularly long and short vowels, consonants, stress and intonation.
4. Provide students with adequate listening and speaking practice to enable them to speak with ease, fluency and clarity in common everyday situations and on formal occasions.
5. Enable students to use grammar in meaningful contexts for effective communication.

Course Outcomes

a) Students will be able to communicate effectively in both verbal and written form which is an ability most sought after in the professional sphere.
b) Students will be able to demonstrate effective interpersonal communication skills which would further their chances of employability.
c) Students will be able to distinguish the different sounds of the English Language along with the Stress and Intonation patterns.
d) Students will be able to find out the correct pronunciation of words with the help of a dictionary
e) Students will be able to know the different varieties of English such as British, American and Standard Indian etc.

f) Students will be able to develop their skills of communication in listening, speaking and writing.
g) Students will develop confidence for self-education and ability for life-long learning.
h) Students will be able to participate and succeed in competitive examinations like GATE, GRE.
i) Students will be able to eliminate the common errors in the different aspects of communication.
j) Students will be able to participate effectively in Group discussion and other such team based activities where soft skills play a major role.
k) Students will be able to achieve clarity and fluency in all communicative activities both in personal and professional sphere.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√	√								√	
2		√									
3			√	√	√					√	√
4						√	√	√			
5								√	√		√

Contribution to the outcome:

Contribution can be done -

a. By class room interaction
b. By introducing writing activities
c. By asking students to make oral presentations.
d. By encouraging students' participation in debates and extempore speech
e. By giving them practices in Pronunciation by language softwares
f. By making students participate in effective conversation which would enhance their ready wit.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By making them participate in various spoken activities.
4. By regular written assignments.
5. By testing their pronunciation skills through the language software

Text Book:

1. An Introduction to Professional English & Soft Skills by B.K.Das et al.,Cambridge University Press(Recommended by BPUT)

Course: Chemistry-I

Course Description :Dual nature of matter, Schrodinger wave equation,MOT of diatomic molecules,Metallic bonding, Phase diagram of water, Sulphur, Bi-Cd and Fe-C system, Crystal systems, Bravais lattices, Close packed structures, Ionic solids,Crystal defects, Kinetics of zero, 1^{st} and 2^{nd} order reactions, Determination of order of reaction, Collision theory , Theory of absolute reaction rate, Energy of activation, Catalysis, Electrochemical cell, EMF and its measurement, electrode potential and measurements w.r.t.SHE, Calomel electrode, Determination of pH, dry cell, fuel cell, storage cell, Thermochemistry, thermochemical calculations based on Hess law and Born Haber cycle, 2^{nd} law of thermodynamics,entropy, Free energy concepts, Gibbs Helmholtz equation, Free energy change and criterion of spontaneity and equilibrium of chemical reactions, Chemical equilibrium and Maxwells relations

Course Objectives:

a. To develop basic concept of quantum mechanics and its application in bonding.

b.To develop basic concepts about the rates of reaction and catalysis.

c.To give an idea about the applications of thermodynamic principles to chemical systems.

d. To give the practical knowledge to find out hardness dissolved oxygen, pH of water, viscosity of lubricating oil.

2. e.To develop basic concepts of EMF, Electrode Potential and construction of various types of cells

3.

4. **Course Out comes:**

5. 1. Molecules can be compared based on their bond order, bond strength, and stability of the molecules can also be stated.

6. 2. The equilibrium existing between different phases of a heterogeneous system can be predicted.

7. 3. Quality of water & lubricating oil can be known.

8. 4. The fundamental of catalysis & transport will be applied in the analysis & design of reacting system.

9. 5. The procedures necessary to deduce chemical & phase equilibria from readily available physical properties data (T, P, and C) &state equation can be known and the conventional symbols, reference, states & standard conditions used.

10. 6. Fundamental understanding of the principles of electrochemical processes & competence in analysis of industrial system.

11. Mapping:

12.

	1	**2**	**3**	**4**	**5**	**6**
a	√					
b				√		
c					√	
d			√			

e						√

Contribute to the outcome:

13. Contribution can be done -

1.By providing lectures.

2.By performing some Lab work.

3.By providing references for white papers and articles.

4.By solving problems

5. Daily class room interaction and doubt clearing

Assessment: Assessment of a Student can be performed -

1.By regular and surprise class tests.

2.By mid term and semester exams.

3.By evolution of their programming approach for a specific task or operation.

4.By conducting vivavoce in sessional classes

5.By small quiz and tutorials.

6.Expert lecture from eminent professors and scientists

Text Book:

1.A Text book of physical Chemistry by G.M.Barrow

2.A Text book of physical Chemistry by P.W.Atkins

Course: Mathematics 1

Class: B. Tech – 1st semester

Course Description :

Ordinary differential equation,series solution ,matrix and determinant,.curvature and asymptotes

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the methods for finding the solutions of initial value problems and boundary value problems

2.To learn about the modeling problems like growth decay,Newtons law of cooling, circuit problems like RC,RLC,RL –circuits,and problems based on mass spring system.

3.To learn the ideas about elastic deformation of a spring etc as a basic tool for mechanical engineering by using the concept of matrix theory.

4. To understand the concept of curvature thoroughly because it has a lot of applications like deflection in kinamatics and dynamics ..

5.To familiar with the concept of asymptotes ,students will be benefited for curve tracing .

6.To familiar with the concept of matrix algebra students acess themselves with several applications like group codes that is used in computer cryptography and security ..

Course Outcome

After completion of this course:

a) Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems .

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to measure the bendness of a street by the concept of angle of contingence as in curvature .

d) Graduate will learn the piecewise continuity behavior of a function by using concept of vertical asymptotes .

e) Students will be able to understand about the linear transformations that is basic concept of computer science background

f) Students will understand regarding the dimensions of a complex vector space and real vector space with the concept of linear independence which is a basic concept of matrix theory

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differencial equation

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**

1	√	√					√
2							√
3					√	√	
4		√	√	√			
5			√				
6					√	√	
7					√	√	

Contribute to the outcome:

Contribution can be done -

e. By providing lectures.

f. By providing references for white papers and articles.

g. By solving problems

d Daily class room interaction

e. By providing question banks

Assessment: Assessment of a Student can be performed -

6. By regular and surprise class tests.
7. By mid term and semester exams.
8. By evolution of their programming approach for a specific task or operation.
9. By home assignments and tutorials.
10. By doubt clear classes

Text Book:

14. ADVANCED ENGIEERING MATHEMATICS by ERWIN KREYSZIG 8th edition
15. Differential calculus by Shanti Narayanan and Mittal

Course: **Engineering Mechanics**

Class: B.Tech, 2nd Sem

Course Objectives :-

The engineering mechanics has the following objectives:

(a) It is used to apply fundamentals of engineering mechanics and related areas of applied science to define model and solve a wide range of engineering problems.

(b) It is used to apply fundamental mathematics and scientific principles as well as computational and experimental techniques to meet the demands of engineering and scientific practice.

(c) It maintains high productivity and high ethical standard.
(d) It continually enhances the knowledge of the students through their career.
(e) It functions on and lead teams that engage in new area of research and development in engineering, particularly those that cross the boundaries of traditional disciplines.

Course Outcomes:-

1. An ability to apply fundamental knowledge of mathematics, science and engineering.
2. An ability to design and conduct mechanical experiments.
3. An ability to analyze and interpret mechanical experiments.
4. An ability to design a system, component or process to meet desired needs by synergistically combining mechanics of materials, fluid mechanics and dynamics when necessary.
5. An ability to effectively function as the leader or member of a multi disciplinary team.
6. An ability to identify, formulate and solve engineering problems involving mechanics of materials, fluid mechanics and/or dynamics.
7. An understanding of professional and ethical responsibility to communicate effectively- orally, graphically and in writing.
8. The board education necessary to understand the impact of engineering solution on society and environment.

MAPPING

PEO	1.	2.	3.	4.	5.	6.	7.	8.
a.	*			*				
b.						*		
c.					*		*	*
d.		*						
e.			*					

Important topics covered:

- Concurrent forces
- Composition of forces
- Resolution of forces
- Equilibrium of forces

Topics beyond syllabus:

- Quantum mechanics
- Wave function

- Electromagnetic mechanics
- Classical mechanics

Advance Topics:

- Particle physics
- Nuclear physics

Contemporary Issues/ Trends:

- Condensed matter physics
- Quantum statistical mechanics

Application Orientation: Following topics are covered in the class

Moment of inertia of material bodies, curvilinear translation, Work-energy relation.

Text Books Referred:

Required:

1. Engineering mechanics by S. Timoshenko, D.H. Young and J.V. Rao, Revised 4th edition, TMH

Course : Programming in C

Class : B Tech. 1st sem

Course description :

Introduction to "c advantage of "c",Data types and operators,Assignments in "c",Programming approach,if structure,case choice in c ,while statement in c,for loop and its infinite structure,Array,structure,pointer and .their application,function,file management in c,command line argument and their application.

Course Objectives:

In this subject students will learn about the following points:

1. To learn fundamentals of procedure oriented programming.
2. To understand variables, their scope and use.
3. To learn different data types.
4. To understand flow of control in the program.
5. To learn about loops.
6. To learn user defined type.
7. To make the students understand about the files.
8. To learn about command line arguments.

Course Outcome:

After completion of this course:

a) Graduate will be able to learn object oriented programming and any other programming languages.
b) Graduate will be able to debug the programs written in C language.
c) Students will be able to write programs for large applications.
d) Students will be able to maintain software written in C
e) Graduate can participate and succeed in competitive examinations like GATE ,PSU.
f) Graduate can face interview in software companies.
g) Students can do projects using C programming.
h) Students will understand how to modularize a problem.
i) Students will be able to face interviews in software companies.
j) Students will be able to write programs using command line arguments.

<u>Mapping of course objective and the outcomes</u>:

<u>Mapping of course objective and the outcomes</u>:

Course Objectives	Course Outcomes									
	a	b	c	d	E	f	g	h	i	j
1	√					√	√		√	
2		√	√		√			√		
3			√		√					
4		√								
5			√							
6			√		√					
7				√						
8					√		√			√

<u>Contribution to the outcome</u> –

Contribution can be done –

a. By providing lectures.
b. By performing lab work.
c. By providing some tutorial classes.
d. Daily class room interaction.

Assessment : Assessment of a student can be performed –

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By giving assignments regularly.

Text Book:

1. "C Programming" by E. Balagurusamy (TMH Publication)
2. "Let Us C" by Y. Kanitkar(BPB Publisher)

Sub/Course :BASIC ELECTRONICS

Course Description :

introduction to electronics: Signals, Frequency sprectrum of signals, Amplifiers and Digital logic inverter, OP-Amp and its applications, Semiconductor Diodes, Zener Diodes, Rectifiers, Light Emitting Diodes, . Bipolar Junction Transistors (BJTs), Biasing in BJT amplifier circuits, Simplified hybrid-π model and its application to single stage BJT amplifiers, Feedback Amplifiers and Oscillators, Feedback Amplifiers and Oscillators, Basic principles of sinusoidal oscillators, Electronic Instruments, AF sine and square wave generator, Digital Electronic Principles, Logic Gates and Boolean Algebra, Combinational Logic and Their Functions.

Course Objectives : In this subject students will learn about the following points:

a. To learn about signals and sprectrum of signals
b. To develop an understanding of op amp and its applications.
c. To learn about semiconductors, zener diodes and rectifiers.
d. To develop an understanding of BJTs and biasing of BJTs and application..
e. To know Electronics instruments like AF sine and square wave generator.
f. To understand the logic gates and Boolean algebra and digital logic and circuits.

Course Outcome : Upon completion of this course:

1. Student will be able to know signals and sprectrum of signals.
2. Student will be able to understand about amplifiers and digital inverters
3. Student will be able to know about op amp and its applications.
4. Student will be able to understand semiconductors, zener diodes and rectifiers.
5. Student will be able to know about the BJTs and biasing of BJTs.

6. Student will be able to know about feedback amplifiers and oscillators.
7. Student will be able to know about basic principle of sinusoidal oscillators
8. Student will be able to know about Electronics instruments like AF sine and square wave generator
9. Student will be able to understand the logic gates and Boolean algebra.
10. To know about the basic concept of combinational logic and their function

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
a	√									
b		√	√							
c			√	√	√					
d				√	√	√	√			
e					√			√		
f						√	√		√	√

Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By providing class notes.
c. By providing reference articles on different concepts.
d. By presenting Practical examples related to the subject.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By semester exams.
3. By encouraging them for their involvement in Discussions regarding the subject.
4. By small quiz and tutorials.

Text Books:

1. Microelectronic Circuits (Fifth Edition), Adel S. Sedra and Kenneth C. Smith, Oxford University Press, YMCA Library Building Jai Singh Road, New Delhi – 110 001.

2. Digital Fundamentals (Eighth Edition), Thomas L. Floyd and R.P. Jain, Pearson Education, 482 FIE, Patparganj, Delhi – 110 092.

3. Electronic Instrumentation, H.S. Kalsi, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Course: Business Communication

Class: B. Tech – 2nd semester

Course Description: The Elements of Business Communication: Patterns of communication in the business world: upward, downward,
horizontal, grapevine etc, internal and external channels of communication; formal and informal channels, introduction to cross-cultural communication., avoiding gender, racial and other forms of bias in communication, common forms of oral and written communication in the business world: ,Oral presentations, interviews
Reading and writing: The importance of developing reading,
, Soft skill development: soft skills: becoming a good leader and team-player,
Inter-relating soft skills and communication skills

Course Objectives:

The course attempts to:

1. Develop the students' communicative ability in English both in verbal and written forms to enhance their employability.
2. Inculcate in them the soft skills such as emotional intelligence, teamwork and leadership qualities so as to enable them to function as parts of teams on multidisciplinary projects.
3. Prepare students along the lines of requirements of the corporate sector by sharpening their interpersonal skills.
4. Develop the students' understanding of the dynamics of cross-cultural communication and bias-free communication.
5. Enhance the students' reading and writing skills along with the sub-skills of reading and the qualities of effective writing.

Course Outcomes

After completion of this course:

a. Students will be able to communicate effectively in both verbal and written form which is an ability most sought after in the professional sphere.
b. Students will be able to demonstrate effective interpersonal communication skills which would make their transition into the corporate sector easy.
c. Students will be able to participate effectively in Group discussion and other such team based activities where soft skills play a major role.
d. Students will be able to cultivate leadership skills and other soft skills which will enable them to participate effectively in team based activities in their professional domain.
e. Students will be able to demonstrate effective interpersonal skills in a multi-cultural workforce.

f. Students will be able to develop an understanding of the dynamics of cross-cultural communication and bias-free communication.

g. Students will develop reading and writing skills along with the sub-skills of reading and the qualities of effective writing.

h. Students will develop comprehension skills, study skills and reference skills along with vocabulary enrichment.

i. . Students will demonstrate an understanding of their professional and ethical responsibilities.

j. Students will be able to achieve clarity and fluency in all communicative activities both in personal and professional sphere.

k. Students will develop confidence for self-education and ability for life-long learning.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	A	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√	√								√	
2			√	√					√		√
3		√		√							
4					√	√					
5							√	√			

Contribution to the outcome: Contribution can be done –

a. By classroom interactions and lectures

b. By engaging students in communicative activities in work-related situations

c. By giving students practice in reading and comprehending passages on topics of general as well as professional interest.

d. By giving them practice in writing business letters,reports,resumes etc.

e. By making them participate in group activities to sharpen their soft skills.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By making them participate in various spoken activities.
4. By regular written assignments.
5. By making them participate in various group activities

Text Book:

1. Business Communication Today by Bovee et al (Pearson)
2. Business Communication by Meenakshi Raman & Prakash Singh (Oxford)
3. Crash Course in Personal Development by Brian Clegg (Kogan page)
4. Activities for Developing Emotional Intelligence by Adele B.Lynn(HRD Press)
5. Lateral Thinking by Edward De Bono (Penguin)

Course: Mathematics 1I

Class: B. Tech – 2nd semester

Course Description :

Lapalace transformation , fourer series and transformations , gammaand beta functions , vector differential and integral calculus

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the methods of laplace transformation as it is a tool to solve ordinary and partial differential equation

2.To learn about the modeling problems like, circuit problems like RC,RLC,RL –circuits,and problems based on mass spring system.

3.To learn the ideas about fourier series and transformation as it is an important tool in solving problems like ordinary and partial differential equations.

4. To understand the concept of beta gamma function as several improper integrals can be solved by using this concept,

5.To familiar with the concept of vector differential calculus as it has lot of applications as paths of moving bodies in mechanics .

6.To familiar the students with line integral , double integral, triple integral as lot of applications are there like potential theory ,area, volume ,and lot in mechanics

Course Outcome

After completion of this course:

b) Graduate will demonstrate knowledge of formulating the physical problems into mathematical modeling and they can give the inference on the physical problems .

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to find a sum of series of constant terms by fourier series .d) Graduate will how to find the areas ,volume ,length , .and path of a particle .

e) Students will be able to understand about the rate of change of a function in arbitrary direction ,to find normal to surface , to find maximum increase or decrease of a function in a direction

f) Students will understand regarding the concept divergence and curl as it has a lot of application in fluid mechanics

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differencial equation and able to give their inference by using laplace transformation

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**
1	√	√					√
2							√
3					√	√	
4		√	√	√			
5			√				
6					√	√	

Contribute to the outcome:

Contribution can be done -

h. By providing lectures.

i. By providing references for white papers and articles.

j. By solving problems

d Daily class room interaction

f. By providing question banks

Assessment: Assessment of a Student can be performed -

11. By regular and surprise class tests.
12. By mid term and semester exams.
13. By evolution of their programming approach for a specific task or operation.
14. By home assignments and tutorials.
15. By doubt clear classes

Text Book:

16. ADVANCED ENGIEERING MATHEMATICS by ERWIN KREYSZIG 8th edition

17. Higher engineering mathematics by B. V. Raman

Course: Physics-I

Class: B. Tech – 2nd semester

1. **Course Description** : Harmonic Oscillation, Waves, interference (Biprism, Newton's ring), Fresnel And Fraunhofer Diffraction, Diffraction Grating, Polarization, Vector Calculus, Gauss's Law Of Electrostatics, Amperes Circuital Law, Faraday's Law, Maxwell's Electromagnetic Equation, Poynting Theorem, Electromagnetic Wave Equation, Black Body Radiation, Photoelectric Effect, Compton Scattering, Pair Production, De Broglie Hypothesis, Heisenberg Uncertainty Principles, Wave Function, Observables and Operators, Probability Density, Schrodinger Equation, Potential Step, Potential Barrier, Infinite Deep Potential Well.

Course Objectives:

In this subject students will learn about the following points:

1. To learn about the transverse and longitudinal waves in mechanical media, such as springs and ropes, and on the earth (seismic waves).
2. To learn about the light and X-rays of different wavelength bands in the spectrum of electromagnetic waves.
3. To learn about the characteristic properties of waves: interference, diffraction, and polarization.
4. To understand that changing magnetic fields produce electric fields, thereby inducing currents in nearby conductors.
5. To understand the quantum formalisms to pursue research in quantum computing.
6. To understand the methods of solving problems in the realm of various fields like Semiconductor Devices, Relativity, Nuclear Physics, Particle Physics, Superconductivity, and Electrodynamics, etc.

Course Outcome

After completion of this course:

a) Graduate will demonstrate knowledge on the application of principles of science in the respective branches of Engineering & Technology
b) Graduate will solve application oriented problems easily.
c) Graduate will Gain knowledge about the advanced subjects of Physics, like Relativity, Astrophysics so that they can pursue Space research to serve India.
d) Graduates can apply principle of Quantum Mechanics in Semiconductor Physics.
e) Graduate will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.
f) Students will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.
g) Graduate will develop confidence for self education and ability for lifelong learning.

h) Graduate can participate and succeed in competitive examination like GATE,GRE.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**			
1	√	√			√		√	√			
2	√	√	√		√		√	√			
3			√		√		√				
4	√				√	√	√	√			
5		√	√	√			√	√			
6	√	√	√				√	√			

Contribute to the outcome:

Contribution can be done -

k. By providing lectures.

l. By performing some Lab work.

m. By providing references for articles.

n. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

16. By regular and surprise class tests.
17. By mid term and semester exams.
18. By evolution of their programming approach for a specific task or operation.

19. By small quiz and tutorials.
20. Expert lecture from industries
6. Video lectures through NPTEL.

Text Book:

1. Engineering Physics by D.R. Joshi, Mc Graw Hill
2. Engineering Physics by H.K. Malik and A.K. Singh, Mc Graw Hill.

Course: Data structure using 'c'
Class : B.Tech-2nd Semester

Course Description:

Data structures: storage structure for arrays Stacks and Queues Linked lists: stacks and Queues. Double linked list, circular list.
Dynamic storage management infix to post fix conversion, postfix expression evaluation. Trees: Tree terminology, Binary tree, Binary search tree, General tree, B+ tree, AVL Tree, Complete Binary Tree representation, Tree traversals, operation on Binary tree-expression Manipulation. Graphs: Graph terminology, Representation of graphs, path matrix, BFS (breadth first search), DFS (depth first search), topological sorting, Warshall's algorithm (shortest path algorithm.) Sorting and Searching techniques – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort, Heap sort, Radix sort. Linear and binary search methods, Hashing techniques and hash functions.

Course Objective:

In this subject student will learn about following points

1 To learn the data structure of array, stack, Queues, Linklist
2. To lean the Dynamic storage management
3. To understand the expression evaluation
4. To learn the Tree terminology
5. To understand the Graph Terminology
6. To learn various sorting Technique namely Quick sort, Merge sort, Heap sort, Radix sort
7. To lean the searching Technique namely linear search and binary search
8. To understand the Hashing Techniques and Hash function

Course Outcomes

a. Student will understand the implementation of different data structures namely stack, queue

b. Student will understand the concept of Dynamic storage management

c. Student will understand to use conversion and evaluation of infix and postfix

d. Student will get the knowledge about Tree terminology

e. Student will understand the complete implementation of the graph

f. Student will implement and able to understand the sorting Techniques

g. Student will get searching Technique namely linear search and binary search

h. Student will get knowledge To understand the Hashing Techniques and Hash function

i. Students will be able to develop software by choosing appropriate data structure.

j. Students will be able to appear competitive examinations.

k. Student will be able to choose the data structure for any application.

<u>**Mapping of course**</u> objective and outcomes

Course Objectives	**Course outcomes**										
	a	b	c	d	e	f	g	h	i	j	k
1	✓								√	√	
2		✓									
3			✓								
4				✓							
5					✓						
6						✓					
7							✓				
8								✓			√

Contribute to the outcome:

Contribution can be done in following ways

- ✓ By providing the lecture
- ✓ By performing some lab work

- ✓ Providing reference for other books and articles
- ✓ By assigning the program in class and Lab
- ✓ Daily class room interaction

Assessment: Assessment of a student can be performed

1. By regular and surprise class tests
2. By mid term and semester exam
3. By evolution of their programming approach for specific task
4. By small quiz and tutorials
5. Expect lecture from industries
6. video lecture through projector

Textbooks

1. Gilberg and Forouzan: “Data Structure- A Pseudo code approach with C” by Thomson publication
2. “Data structure in C” by Tanenbaum, PHI publication / Pearson publication.
3. Pai: ”Data Structures & Algorithms; Concepts, Techniques & Algorithms ”Tata McGraw Hill.

Semester-2nd

Subject-thermodynamics

Objectives

1. To explain the students about types properties of system process

2. To convince the students about necessity & application of laws of thermodynamics

3. To establish the importance and kinds of energy transfer

4. To present a case study of pure substance

Outcome students can

a. Know the basic s of thermodynamics
b. Prepare examples of properties, process, systems, functions etc.
c. Have idea about temp., pressure, enthalpy, Internal energy,sp.heat etc.
d. Verify energy principle in control volumes

e. Identify heat transfer in different mediums
f. Compute the performance of I. c. engine, refrigerator, heat pump
g. Know about generation, types, utilization of steam.
h. Be acquainted with use of steam table.

Mapping

Programme objectives	A	B	C	D	E	F	G	H
I	*	*						
II			*	*				
III					*	*		
IV							*	*

Course: Basic Electrical Engineering

Class: B. Tech-1st/2nd Semester

<u>Course Description</u> :

Fundamentals of Electric circuits.Node voltage analysis, Mesh current analysis, node and mesh current analysis with controlled sources, principle of superposition, maximum power transfer Energy Storage elements, AC circuit analysis methods Transient Analysis, DC steady state solutions of circuits, Transient Response of second order circuits Power in AC circuits, Complex Power, Transformers, Three-phase power, Residential Wiring: Grounding and safety Generation and distribution of AC Power Measurement Systems and Transducers, Wiring, Grounding and noise, signal conditioning, A/D and D/A Conversion Electricity and Magnetism, Magnetic Circuits, Magnetic Materials and B-H curves, transformers, Electromechanical Energy Conversion Rotating Electric machines, DC Machines, AC machines

<u>Course objectives:</u>

In this subject students will learn about the following points:

b. To learn about the fundamentals of electric circuits.
c. To learn about resistive network analysis.
d. To learn about AC network analysis.
e. To make the students understand the basics generation ,distribution of ac power.
f. To learn about electronic instruments and measurements.
g. To understand the principles of electromechanics.
h. To introduce the students to electronic mechanics for utilization of electric power.

Course Outcome:

After completion of this course students of all branches engineering.

1. Will understand about electric charge current,voltage,power and electrical circuit elements and their characteristics.
2. Will understand the difference between ideal and practical source of voltage and current and measuring devices like voltmeter ,ammeter,wattmeter.
3. Will understand the dc network analysis using ohm's law,kirchoff's current and voltages laws.
4. Will be able to analysis the DC network using nodal analysis,maxwells loop analysis,superposition theorems.
5. Will be able to analysis AC network and solve the problems of AC circuits containing energy storage elements like inductance and capacitance.
6. Will be able to solve the circuits with sinusoidal excitation with phasor method.
7. Will be able to formulate first order and second order differential equations and find the transient response.
8. Will understand residential wiring,earthing and safety measures to be taken for saving human being from shock hazard.
9. Will understand about AC complex power (Active power, Reactive power, Apparent Power, Power Factor)
10. Will learn about AC 3-Phase network Analysis.
11. Will understand about generation and distribution of AC Power.

12. Will understand about measurement systems, Transducers,wiring,grounding,noise and signal conditioning.
13. Will learn about A/D and D/A conversion.
14. Will learn about electricity and magnetism, magnetic circuits, transformers and electromechanical energy conversion.
15. Will learn about AC motors, AC generators(Alternator), DC motor, DC generator.

Mapping of course objective and outcomes

Course Objectives	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
a	√	√	√													
b				√												
c					√	√										
d							√									
e								√	√	√	√					
f												√	√			
g														√		
h															**√**	

Contribute to the outcome: Contribution can be done -

a. By providing lectures.

b. By solving some mathematical problems.

c. By performing lab work.

d. By Quiz tests.

e. Daily class room interactions.

Assessment: Assessment of a Student can be performed -

21. By regular and surprise class tests.
22. By mid term and semester exams.
23. By small quiz and tutorials.

Text Books:

1 Principles and Application of Electrical Engineering by GIORGIO RIZZONI.

Reference Books:

1. Electrical and Electronic Technology By E. HUGES PEARSON 9th Editions.

2. Basic Electrical Engineering By A. Fitzerlad,D.E Higginbotham and A. Grabel TMH 5th Edition.
3. Electrical Engineering Fundamentals By VINCENT DEL TORO 2nd Edition PHI.

Course: Mathematics 1

Class: B. Tech – 1st semester

Course Description :

Partial differential equation and its applications , complex analysis ,

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the methods for finding the solutions of partial differential equation in first and second order by charpit method and lagrage method , monges method separation of variable as a lot of applications are there in fluid machanics , electromagnetic theory and quantum mechanics as these are leads to partial differential equation

2.To learn about the conformal mapping as it has a lot of applications in various fields..

3.To learn the ideas about elastic deformation of a spring etc as a basic tool for mechanical engineering by using the concept of matrix theory.

4. To understand the concept of curvature thoroughly because it has a lot of applications like deflection in kinamatics and dynamics ..

5.To familiar with the concept of asymptotes ,students will be benefited for curve tracing .

6.To familiar with the concept of matrix algebra students acess themselves with several applications like group codes that is used in computer cryptography and security ..

Course Outcome

After completion of this course:

c) Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems .

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to measure the bendness of a street by the concept of angle of contingence as in curvature .

d) Graduate will learn the piecewise continuity behavior of a function by using concept of vertical asymptotes .

e) Students will be able to understand about the linear transformations that is basic concept of computer science background

f) Students will understand regarding the dimensions of a complex vector space and real vector space with the concept of linear independence which is a basic concept of matrix theory

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differencial equation

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes						
	a	**b**	**c**	**d**	**e**	**f**	**g**
1	√	√					√
2							√
3					√	√	
4		√	√	√			
5			√				
6					√	√	
7					√	√	

Contribute to the outcome:

Contribution can be done -

f. By providing lectures.

g. By providing references for white papers and articles.

h. By solving problems

d Daily class room interaction

g. By providing question banks

Assessment: Assessment of a Student can be performed -

24. By regular and surprise class tests.
25. By mid term and semester exams.
26. By evolution of their programming approach for a specific task or operation.
27. By home assignments and tutorials.
28. By doubt clear classes

Text Book:

18. ADVANCED ENGIEERING MATHEMATICS by ERWIN KREYSZIG 8th edition
19. Differential calculus by Shanti Narayanan and Mittal

Course: Material Science

Class: B. Tech – 3rd/4th semester

Course Description :Classification of engineering materials,Engg. Properties of materials,selection of materials, mechanical properties of materials,Electrical& electronic materials,electrical&thermal conductivity, free electron theory, energy band concept, superconductor materials, magnetic materials,optical materials,composite materials,ceramics,nanophase materials,shape memory alloy.smart materials.

Course Objectives:

a. To develop the basic knowledge of designing of materials like the superstructure for a building, an oil refinery component, transmission gear, or, an integrated circuit chip.

b. There is a recognized need to find new economical source of energy & to use present resources more efficiently.

c. To give an idea about the prevention of corrosion, the facts behind polymers.

d. To give the fundamental concepts of energy bond.

e. To understand the characteristics of superconductors.

f. To understand the polarization of dielectric materials.

g. To give the fundamental concepts of magnetism, hysteresis.

h. To learn the concepts of optical properties like scattering, reflection, refraction & absorption.

i. To understand the principle of laser action & opticalfiberes.

Course Outcomes:

1. The right material having ideal set of properties from the many thousands that are available by using appropriate criteria can be selected.

2. The learner can classify the materials on the basis of energy bond diagram.

3. Know the application of superconductors.

4. Understand the polarization mechanism.

5. Classify the materials magnetically into dia, para & ferromagnetic material.

6. Understand the operation of different types of lasers.

7. Understand the transmission of signals through opticalfibres.

Mapping:

	1	2	3	4	5	6	7
a	√	√					
b	√						
c	√						
d		√					
e			√				
f			√	√			
g					√		
h						√	√
i						√	√

Contribute to the outcome:

Contribution can be done -

1.By providing lectures.

2.By performing some Lab work.

3.By providing references for white papers and articles.

4.By solving problems

5. Daily class room interaction and doubt clearing

Assessment: Assessment of a Student can be performed -

1.By regular and surprise class tests.

2.By mid term and semester exams.

3.By evolution of their programming approach for a specific task or operation.

4.By small quiz and tutorials.

Text Book:

1.Material Science for Engineers, James F.Shackelford & Madanapalli K. Muralidhara, pearson education

2.Material Science& Engineering, W.D.Callister, Wiley & Sons Inc

Sub/Course :Analog Electronics Circuit

Course Description:

MOS Field-Effect Transistor , Biasing of BJTs , Biasing of FETs and MOSFETs,Small Signal Analysis of BJTs, Small Signal Analysis of FETs, High Frequency Response of FETs and BJTs ,Feedback and Oscillators, Operational Amplifier, Power Amplifier **Course Objectives:** In this subject students will learn about the following points:

Course Objectives : In this subject students will learn about the following points:

a. Principle and Physical Operation of BJT, FETs and MOSFETs.(P-Channel and N-Channel),CMOS.
b. Biasing configuration of different Biasing circuits.
c. Small-Signal Equivalent-Circuit Model of BJT & FETs and frequency response.
d. Analysis of Cascade, Darlington Connection and Current Mirror Circuit.
e. Feedback Concepts, Topologies, Practical Circuits, Feedback Amplifier Stability.
f. Op-Amp parameters & applications.
g. Classifications of Power Amplifier & their operation.

Course Outcome: Upon completion of this course Student will be able to :

1. understand the physical construction & operation of BJTs(npn & pnp), FETs,MOSFETs(n-ch & p-ch).

2. analyze VI characteristics of different biasing configuration, operating point selection by load line anlysis.
3. design Fixed biased, Self_biased & Voltage divider configuration of BJTs & FETs.
4. understand Bias Stabilization, Design Operation of different biasing configurations.
5. determine h-parameters by Small Signal Analysis of CE, CC, CB Amplifier with and without RE.
6. understand Small Signal Analysis of CS, CD, CG Amplifier with and without RS.,
7. understand effect of RS and RL on CE Amplifier, Effect of RSIG and RL on CS Amplifier,
8. Analyze Cascade, Darlington Connection and Current .mirror circuit and Cascaded System.
9. understand Low and High Frequency Response of CS & CE Amplifier, Miller Effect Capacitance.
10. understand Basic Principle of Sinusoidal Oscillator, Wein-Bridge, Phase Shift and Crystal Oscillator Circuits.
11. understand Slew rate, effect of Finite Open-loop and Closed-loop Gain, Differentiator and Integrator, Instrumentation amplifier circuits,
12. get some idea about Class-A and Class-B Amplifier Circuits,Power Dissipation and Conversion Efficiency of Power Amplifiers .

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
a	√											
b		√	√	√								
c					√	√	√	√				
d									√			
e										√		
f											√	
g		√										√

Contribute to the outcome: Contribution can be done -

a. By providing lectures.

b. By providing fundamentals of use & care of digital & analog equipments.

c. By providing references of articles & journals.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By giving regular assignment to them .
4. By small quiz and doubt clearing classes.
5. By asking the need & practical applications of a specific device.

Text Books:

1. Electronic Devices and Circuits theory, 9th/10th Edition, R.L. Boylestad and L.Nashelsky (Selected portions of Chapter 4, 5, 6, 7, 8, 9, 10, 11, 12, and 14), Pearson Education, New Delhi.
2. Microelectronics Circuits, 5th Edition, International Student Edition Sedra and Smith (Selected portion of Chapter 2,4, 5, 6, 8, 13, and 14), Oxford University Press, New Delhi.
3. Electronic Devices and Circuits, 3rd Edition, Jimmie J. Cathey adapted by Ajay Kumar Singh, Tata McGraw Hill Publishing Company Ltd., New Delhi. (For Problem Solving)

Course: Network Theory

Class: B. Tech – 3rd semester

Course Description :

Graph of a network, Concept of tree, Incidence matrix, Tie-set matrix, Cut-set matrix, Formulation and solution of network equilibrium equations on loop and node basis.Substitution theorem, Reciprocity theorem, Maximum power transfer theorem, Tellegen's theorem, Millman's theorem, Compensation theorem, Coupled Circuits, Dot Convention for representing coupled circuits, Coefficient of coupling, Band Width and Q-factor for series and parallel resonant circuitsIntroduction to Laplace Transform, Laplace transform of some basic functions, Laplace transform of periodic functions, Inverse Laplace transform, Application of Laplace transform: Circuit Analysis (Steady State and Transient). z, y, ABCD and **h**-parameters, Reciprocity and Symmetry, Interrelation of two-port parameters, Interconnection of two-port networks, Network Functions, Significance of Poles and Zeros, Restriction on location of Poles and Zeros, Time domain behaviour from Pole-Zero plots. Fourier series, Fourier analysis and evaluation of coefficients, Steady state response of network to periodic signals, Fourier transform and convergence, Fourier transform of some functions, Brief idea about network filters (Low pass, High pass, Band pass and Band elimination) and their frequency response. Hurwitz polynomial, Properties of Hurwitz polynomial, Positive real functions and their properties, Concepts of network synthesis, Realization of simple R-L, R-C and L-C functions in Cauer-I, Cauer-II, Foster-I and Foster-II forms.

Course Objectives:

In this subject students will learn about the following points:

1.To learn about the about the graph of a network, Concept of tree, Incidence matrix, Tie-set matrix, Cut-set matrix.

2.To learn about network solving by the different theorems.

3.To understand the concept of coupled circuits..

4. To learn about the principles of resonance in electric circuits.

5. To make students familiar with transformations from time domain to laplace domain and their applications in circuits.

6 To calculate two port network parameters and Network functions..

7. To learn the applications of fouriier series and fourier transform for the different waveforms

8. To learn about the basic concepts of active and passive filters.

9. To understand the concept of network synthesis and design.

Course Outcome

After completion of this course:

a) Students will be able to undertand the concept of network topology.

b) Students will be able to solve different networks by application of theorems in laboratory and field works.

c) Students wil be able to design of different coupled circuits. .

d) Students will able realize the effect of resonance in electrical machines,power systems etc.

e) Students will be able to understand the application of laplace transform in transient and steady state analysis..

f) Students will learn to determine constants in two port networks..

g) Students will understand the concepts of pole and zeros and their applications.

h) Students will be able to solve nonsinusoidal waves by fourier series and transform..

i) Students will be able to design active and passive filters.

j) Students will be able to learn about network synthesis.

k)Graduate shoul be participate the programme like MATLAB for developing circuit theory.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√										√
2		√									√
3		√	√								√
4				√							√
5					√						√
6						√	√				√
7								√			√
8						√			√		√
9						√	√			√	√

Contribute to the outcome:

Contribution can be done -

i. By providing lectures.

j. By performing some Lab work.

c. By solving problems

d. By giving assignments.

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

29. By regular and surprise class tests.
30. By mid term and semester exams.
31. By small quiz and tutorials.
32. Expert lecture from eminent institutes.

6. Video lectures through NPTEL.

Text Book:

20. Network Analysis and Sysnthesis – M E Van Valkenburg – Pearson Education
21. Fundamentals of Electric Circuits-Alexander and Sadiku-Tata McGraw Hill.

Course: Engineering economics & costing

Class: B. Tech – 3rd/4th semester

Course Description : Engineering Economics – Nature and scope, General concepts on micro & macro economics. The Theory of demand & supply Determination of equilibrium price under perfect competition. Theory of production, Law of variable proportion. Time value of money ,Cash flow diagram, Principle of economic equivalence. Evaluation of engineering projects, Cost-benefit analysis in public projects. Depreciation. Cost concepts, Break-even analysis-Linear approach. Banking: Meaning and functions of commercial banks; functions of Reserve Bank of India. Overview of Indian Financial system.

Course Objectives:

In this subject students will learn about the following points:

1) To understand the Time value of money.
2) To learn the demand & supply of the product in the market.
3) To understand the determination of price in the market.
4) To learn about different bank and financial institutions.
5) To evaluate different financial proposals.

Course Outcomes

After completion of this course:

b) Graduate will able distinguish between present value and future value.

b) Students will be able to understand the equivalent situations in the market at the time of purchasing different products.

c) Graduate will understand the demand and supply conditions in the market.

d) Students will able to understand the general price determination in the market.

e) Students will be able to understand the evaluation of investment proposals

f) Students will understand the different markets in the economy.

g) Students will be able to calculate the Break-even point

h) Students will understand the functions of the commercial bank and the central bank

i) Graduate will acquire knowledge about Indian Money market and capital market.

j) Graduate will have knowledge about loss of the value of the asset.

k) Graduate will be able to understand the different cost concepts in the production.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√	√			√		√			√	
2			√	√							
3			√			√					
4		√			√			√	√		
5					√						√

Contribute to the outcome:

Contribution can be done -

k. By providing lectures.

l. By providing references for white papers and articles.

m. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed

33. By regular and surprise class tests.
34. By mid term and semester exams.
3. By small quiz and tutorials.
4. Expert lecture from industries

Text Book:

1.Engineering economics by J.L.Riggs

2. Micro economics by H.L.Ahuja

3. Principles of economics by D.M.Mithani

Course: Energy Conversion Devices

Class: B. Tech - 4^{th} semester (ETC)

<u>Course Description</u> : General Principles of DC Machines, Constructional Features, Methods of Excitation, Expression for emf induced and torque developed in the armature, Characteristics of DC generator, Conditions for self excitation, critical resistance and critical speed, Losses and Efficiency, Characteristic of DC Motor, Speed Control and Starting of DC Shunt and Series motors, Comparison between Different types of DC Motors and their Application. Constructional Features of Transformer, EMF Equation, Turns ratio, Determination of Parameters from Tests (open circuit and short circuit tests), Equivalent Circuit, Losses and Efficiency, Introduction to three phase transformer, Three single phase transformers connected as bank of Three phase transformers. Constructional Features of Three phase synchronous machines, Principle of Operation as alternator and synchronous motor, synchronous impedance, voltage regulation by synchronous impedance method, power angle curve, and synchoronization of alternators, Torque expression and phasor diagram for synchronous motor, Electrical power and mechanical power, Starting of synchronous motor. Constructional Features of Squirrel Cage Rotor type and Slip Ring/Wound Rotor type of three phase Induction Motors, Principle of operation, Concept of Slip, Slip-Torque Characteristics, Starting of Squirrel Cage Rotor type and Slip Ring/Wound Rotor type of Induction Motors, Speed Control of Induction Motors, Single phase induction motor revolving field theory, starting of split phase (capacitor start ant run) and shaded pole single phase induction motors, Characteristics of single phase ac series motor.

<u>Course Objectives</u>:

In this subject students will learn about the following points:

1. To learn about the constructional features of different energy conversion devices.

2. To learn about the operating principles of each individual electrical machine.

3. To learn about different types of starter used in DC motor.

4. To familiar with different characteristics of DC machines and ac machines.

5. To make students familiar with the Phasor diagrams of a single phase transformer and synchronous motor.

6 To calculate the losses and efficiency of various electrical machines.

7. To make the students understand the methods of starting of different induction motors.

8. To learn about the speed control of DC motor and induction motors.

9. To know about the synchronization of alternators.

Course Outcome

After completion of this course:

c) Graduate will be able to understand the role and need of electrical machines in different fields.

b) Graduate will demonstrate an ability to design the different electrical machines.

c) Graduate will demonstrate an ability to visualize and work on laboratory.

d) Graduate will able to work on different industries.

f) Graduate will understand the starting and sped control of dc and induction motor.

g) Graduate will understand the economic aspects of design of electrical machines.

h) Graduate will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.

i) Graduate will develop confidence for self education and ability for lifelong learning.

j) Graduate can participate and succeed in competitive examination like GATE, GRE.

k) Graduate will show the impact of engineering solution.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√
2		√	√	√						√	
3		√	√							√	√
4				√	√					√	
5			√							√	
6		√	√	√			√			√	√
7			√	√		√			√	√	

8			√	√		√		√				
9			√	√			√					√

Contribute to the outcome:

Contribution can be done -

n. By providing lectures.

o. By performing Lab work.

p. By providing references for white papers and articles.

q. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

35. By regular and surprise class tests.
36. By mid term and semester exams.
37. By small quiz and tutorials.
38. Expert lecture from industries
5. By assignments

Course: Physics of Semiconductor Devices

Class: B. Tech – 4^{th} semester

<u>Course Description</u> : Energy bands, K-space diagram, Silicon crystal structure, Electron effective mass, Density of states, Fermi-Dirac distribution function, Equilibrium distribution of electrons &holes, complete ionization, partial ionization and freeze-out, Variation of EF
with doping concentration and temperature, Drift current and conductivity, Carrier drift, diffusion current, Einstein relationship between diffusion coefficient and mobility, PN Junction, Depletion layer model, Junction breakdown, Quasi-equilibrium boundary condition, current continuity equation, , PN diode I-V characteristic, The Bipolar Transistor, Modes of operation, Breakdown mechanism, Ebers -Moll Model, Schottky Diodes, Built-in potential, Energy-band diagram, I-V characteristics, MOS Capacitor, Energy band diagrams, Flat-band condition and voltage,su rface accumulation & depletion, MOS C-V characteristics, Introduction to the MOSFET, Complementary MOS (CMOS) technology, V-I Characteristics, Surface mobilities and high-mobility FETs, JFET.

<u>Course Objectives</u>:

In this subject Graduates will learn about the following points:

1. To give fundamental concepts of Quantum Mechanics to identify different types of solids based on Band theory.
2. To find out the concentration of carriers in Semiconductor under different states.

3. To understand the mechanism of careers inside the Semiconductor.

4. To give the fundamental concepts like building potentials, base width modulation, break down mechanism, Flat band condition, Surface accumulation, Surface depletion, Specific Contact resistance & Pinch off voltages in PN Junction, BJT.
5. To understand the mechanism of Schotky Diodes, MOS Capacitors, MOS Transistors, MOSFET, FET & JFET.

Course Outcome

After completion of this course:

a) Graduates will draw different band diagrams indicating position of Fermi levels.

b) Graduates will draw & explain E ~ k diagrams (1d & 3d).

c) Graduates will to solve problem on intrinsic & extrinsic carrier concentrations.

d) Graduates will find out np product for different semi conductor in different states

e) Graduates will explain & solve problem from drift diffusion, thermal generation, electron hole recombination & scattering.

f) Graduates will find out excess minority carrier concentration for forward & reverse biased modes.

g) Graduates will draw v ~ i characteristics of pn junction, bjt, schotky diodes & mosfet.

h) Graduates will to solve problems from questions related to semiconductors.

i) Graduates will to to operate semiconductor devices in laboratory

j) Graduates will develop confidence for self education and ability for lifelong learning.

k) Graduates can participate and succeed in competitive examination like GATE,GRE.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**G**	**h**	**i**	**j**	**k**
1	√	√							√	√	√
2			√	√							
3					√	√					
4							√	√	√		√
5							√	√	√		√

Contribute to the outcome:

Contribution can be done -

r. By providing lectures.

s. By performing some Lab work.

t. By providing references for articles.

u. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

39. By regular and surprise class tests.
40. By mid term and semester exams.
41. By evolution of their programming approach for a specific task or operation.
42. By small quiz and tutorials.
43. Expert lecture from industries

6. Video lectures through NPTEL.

<u>Text Book:</u>

1. Semiconductor Physics and Devices. 3rd edition, Donald.A. Neamen,
2. Modern Semiconductor Devices for Integrated Circuits, Chenming Calvin Hu.

Course:object oriented programming using c++
Class:B.Tech-3rd /4th semester

<u>Course description</u>

1.In this course students are introduced to the basics of programming logic and to algorithm design and development, using the C++ programming language.

2.Students will learn the basic constructs of programming in C++, starting with reviews of previously learned topics common with the C programming language, such as variables, constants, expressions, control structures, functions pointers and arrays.

3.In parallel, students will be introduced to C++ programming specifies, such as object-oriented I/O, references (pointers) and C++ memory allocation, the string C++ class, ADTs (abstract data types, including unions and structs), classes, inheritance, polymorphism and virtual functions.

Course objectives

In this subject student will learn about the following points:

Introduction to C++ Programming

1.C Programming Concepts Review

2.The beginning of the course will cover a review of basic C programming concepts, such as variables, variable types, and simple C input/output instructions.

3.It will also introduce students to C++ I/O, and to the cin and cout objects. It will also give a review of decision structures, looping structures,functions, arrays and pointers, already familiar from C, while emphasizing the differences, where they apply, that appear in C++.

Program Implementation Using C++

4.This part of the course will introduce students to user-defined variable types, such as structs and unions, which will enable them to make an easy transition to the concept of object-oriented programming, and to classes.

5.More advanced object-oriented programming concepts,such as static members, friends, inheritance, polymorphism andvirtual functions,error handling will be introduced, depending on the progress of the class.

Course outcome

a.When graguates are working with C++, they are working with various aspects like individual bits, pointers, and bytes. This will allow you understand the various optimization techniques for the computer system.

b. It's always good to know, what is happening with regards to the components of the system that you are using. While working with higher level languages this is extremely useful, if something does not work or is slower than they thought it would be.

c. Graduates write system-level models using programming languages, such as C++, to estimate the system performances and verify the functional correctness of the design.

d.C++ have been often used to accelerate the design process.C++ can be efficiently compiled onto today's architectures and thus are used to develop fast simulation models (e.g. to model microprocessors and microcontrolers).

e.Graduates creat object oriented databases using class concept.

f.They can use it in artificial intelligence and expert system using memory management and error handling concept of c++

g.Using concepts of object oriented approach ,gradutes can built high performance embedded and real –time system

h.Graduates used in web base design such as hypertext ,hypermedia using c++ class library

i.They can use c++ in game programming and animation using graphical concept.

j.Using c++ graduates can build decision support and office automation system

k.In c++ ,graduates builds abstraction with compiler –only things like templates which moves computation from run time to compile time.

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Mapping of Course Objective and Course Outcomes:

objective	**Course outcome**										
		b	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1											√
2			√								
3	√			√		√	√			√	
4		√		√	√	√	√	√	√	√	

5						√	√		√		

Contribution to the Outcome:

Contribution can be enhanced;-

(a) By class room demonstration.
(b) By performing programming and logical skill.
(c) By providing references for white papers and published articles.
(d) Class room solutions
(e) Class-room interaction
(f) Seminar presentation
(g) Small project preparation

Assessment:

Students assessment can be judged:-

(1) By regular class tests
(2) By mid-term and semester exams
(3) By home assignment for specific task
(4) Quiz and tutorial classes.
(5) Expert lecture for academic and industries.
(6) Video lectures through NPTEL.

Text books:

1.object oriented programming with c++ by E.Balagurusamy,McGraw-Hill Education(India)

2.ANSI and Turbo C++ BY Ashok N Kamthane pearson Education

Course: Organizational Behaviour

Class: B. Tech – 3rd/4th semesters

Course Description : The study of organizational Behaviour, How learning occurs, Foundation of individual behavior, i.e. Personality, Perception & Motivation. Communication as a tool for improving interpersonal effectiveness. Group, Group cohesiveness and Group decision-making managerial implications.

Effective team building, How to be an effective Leader, Nature of conflict & Conflict resolution, Culture & Organizational effectiveness, Introduction to Human resource Management, Organization Change, Individual & Organizational Behaviour in global Perspective.

Course Objectives:

In this subject students will learn about the following points:

6) To understand the Organizational Behavior.
7) To know how learning occurs in Organization.

8) To know how to improve personality & its effectiveness.
9) To know the motivational factors & how it affect the Organization.
10) To realize the communication as a tool for interpersonal effectiveness.

Course Outcome

After completion of this course:

d) Students will understand the behavior of organization. i.e. the individual and group behavior.

e) Students will be able to understand, how learning occurs and how it helps them to grow.

c) Students will understand the perception level of the individuals and how to react to the situations.

d) Students will understand the motivational factors and how to use it to make individuals to the action for attaining the organizational goal.

e) Students will know how to communicate properly inside the organization to develop interpersonal relationship.

f) Students will understand the benefits of group work and the decision made by the group.

g) Students will be able to understand how to be a good leader and leadership qualities.

h) Students will understand to manage the conflict and making solutions to the conflicts.

i) Students will understand the organization's culture and the benefits of implication.

j) Students will understand how to manage the Human resources and motivate them towards the organizational goal.

k) Students will understand the organization's change and how to handle the changes towards improving the organization.

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√					√		√			
2		√								√	
3				√	√		√		√		√
4	√		√	√				√			
5				√			√			√	

Contribute to the outcome:

Contribution can be done -

v. By providing lectures.

w. By providing references for white papers and articles.

x. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed -

44. By regular and surprise class tests.
45. By mid term and semester exams.
46. By evolution of their programming approach for a specific task or operation.
47. By small quiz and tutorials.
48. Expert lecture from industries

Text Book:

1. Organization theory and Behaviour (V S P Rao & P S Narayana)

2. Organizational Behaviour (Stephen P. Robbins & Timothy A. Judge)

3. Organizational Behaviour (K. Aswathappa)

Sub/Course :DIGITAL ELECTRONICS CIRCUIT

Course Description :

Number System, Logic Gates , Boolean Algebra, K-Map, Logic circuits, Combinational logic circuit Analysis and Design. Memory Elements, Sequential logic circuit Analysis and Design. CMOS circuit. Application of CMOS in Logic Circuits. VLSI AND VHDL Programming and Simulation.

Course Objectives: In this subject students will learn about the following points:

a. Convert between hex, decimal, and binary numbering systems.
b. Apply the laws of Boolean algebra for circuit reduction.
c. Understand and construct combinational logic circuits, Boolean algebra & K-map.
d. Understand and construct sequential digital logic circuits.
e. Understand CMOS and Construct Logic circuit using CMOS.
f. Understand about VHDL Programming .

Course Outcomes: Upon completion of this course Students will able to :

1. Convert various number bases and apply mathematical laws to hex, decimal, and binary numbering systems.
2. Impotence of Boolean algebra in Logic circuit.
3. Apply various techniques for logic circuit reduction.
4. Design and troubleshoot combinational logic circuits.
5. Construct logic circuits using various prototyping techniques

6. Construct arithmetic circuits
7. Use Memory Circuit to Design the Logic Circuit.
8. Construct and Design FF-Circuit for Logic Design.
9. Design and construct digital counter circuits and registers.
10. State digram and state table analysis.
11. Basic circuit layout and construction Logic circuit Using CMOS.
12. Apply VLSI technique to construct Logic circuit .

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
A	√											
b		√	√									
c				√								√
d								√	√	√		
e												√
f											√	√

Contribute to the outcome: Contribution can be done –
Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By presenting coding of some program being use in general instruments working.
c. By providing references for white papers and articles.
d. By showing the step wise working and execution of a circuit implementation.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By evolution of their programming approach for a specific task or operation.
4. By small quiz and tutorials

Text Books:

1. A First Course in Digital System Design: An Integrated Approach, India Edition, John P. Uyemura, PWS Publishing Company, a division of Thomson Learning Inc.

2. Digital Systems – Principles and Applications, 10th Edition, Ronald J. Tocci, Neal S. Widemer and Gregory L. Moss, Pearson Education.

3. Digital Design, Robert K. Dueck, CENGAGE Learning.

Sub/Course : ***Electromagnetic Fields and Waves***

Course Description :

Vectors and Fields, Maxwell's Equations in Integral Form, Maxwell's Equation in Differential Form, Wave propagation in Free Space, Wave Propagation in Material media, Transmission Line Analysis, Wave Guide Principles.

Course Objectives : In this subject students will learn about the following points:

b. To learn about vector functions and the dependence on space time co ordinates.
c. To learn the basic principles of vector calculus, such as line, surface and volume integrals and divergence & curl operations.
d. To get a clear picture of the experimental laws such as Gauss's laws for electric field and magnetic fields & Faraday's law and Ampere's law.
e. To learn the generalization of Ampere's experimental laws pointed out by Maxwell which led to merger of theory of light with electromagnetic theory.
f. To learn how electromagnetic waves are generated through time variation of electric currents as well as electric charge distributions.
g. To understand how energy and momentum are transported by electromagnetic field.
h. To learn how electromagnetic fields are modified when they pass through material medium such as conductor, dielectric and magnetic substances.
i. To learn the behavior of electromagnetic waves at the boundary of two material medium.

j. To learn how the properties of electromagnetic waves at low frequencies can be developed from the behaviour of electromagnetic fields under static conditions.
k. To learn the basics of electromagnetic wave transmission from antenna as space waves and to understand the basics of wave guides and transmission of electromagnetic waves through them.
l. To learn the basic principle of cavity resonator.

Course Outcome : Upon completion of this course:

1. Student will be able to understand the coordinate system and vector algebra and how to use them in the electromagnetic theory.
2. Student will be able to use different integrals in solving problems.
3. Student will be able to understand the relation between electric and magnetic field .
4. Student will be able to co-relate optical science and electromagnetic theory.
5. Student will be able to understand how the generation of electromagnetic wave occurs.
6. Student will be able to know how electromagnetic waves carry energy and momentum.
7. Student will be able to demonstrate how the variation of electromagnetic wave occurs in different media of propagation.
8. Student will be able to nderstand the properties of electromagnetic waves at the boundary of two medium.
9. Student will be able demonstrate the properties of electromagnetic waves at low frequency of operation.
10. Student will be able to understand the generation of space waves from antennas and the propagation of EM wave through wave guide.
11. Student will be able to learn about cavity resonators.

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
a	√	√									
b			√					√			
c				√							
d					√	√	√				

e					√	√	√				
f								√			
g		√						√		√	
h									√		
i		√									√

Contribute to the outcome: Contribution can be done -

a. By providing lectures.

b. By presenting the wave guide antennas in practice.

c. By providing references for white papers and article.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By evolution of their programming approach for a specific task or operation.
4. By small quiz and tutorial

Text Book(s):

5. Fundamentals of Electromagnetics for Engineering, First Impression – 2009, N. N. Rao, Pearson Education, New Delhi.
6. Introduction to Electromagnetic Fields, 3rd Edition, Clayton R. Paul, Keith W. Whites and Syed A. Nasar, Tata McGraw Hill Publishing Company Ltd., New Delhi.
7. Electromagnetics, 2nd Edition, Joseph A. Edminister, adapted by Vishnu Priye, Tata McGraw Hill Publishing Company Ltd., New Delhi. (For Problem Solving)

Course: Relational Database Management System

Class :B.Tech-4th Sem

Course Design : Database Management System, Levels Of abstraction in database, Relations, RDBMS, Schemas and Instances, Data Independence, Functional Dependency, Functional and Non functional Modules in database, Structure of database management System, Entity, Attribute, Key, Cardinality, Degree, Domain, E-R Diagram, Mapping E-R Model to Relational Model, Storage Spaces and types of Storage in database, Relational Calculus and relational Algebra, SQL for creating tables and performing Different operations in the Tables in the database, Normal Forms, Dependency Preservation, Query Processing, Transaction Processing, Recovery and Concurrency Control,Locking Time stam based Scheduler, Database Failuer.

Course Objective

In this Subject the students will Learn about the following points

1. The concept of Database Designing and their Structure

2. Technical details of the creation of the tables and Different operations in it such as insertion, deletion, up gradation.

3. Storage area of the tales it's management procedures.

4. Easily understand the technical complexity in the database in any project.

5. Can able to implement the concept in a programming language

6. Identifies the problems if any in a particular section of the database within a program and can technically solve it.

7. if there is any complexity in the tables the can be solved by using normalization concept.

Course Outcome

After Completion of this course:

a) A graduate will demonstrate the knowledge of database maintenance and management in banking sector.
b) In the core sectors such as steel industries, iron industries, in maintaining the daily sequence of data such as (temp, raw materials, processed materials, delivery reports etc.)
c) In organizations who provides the software and their maintenance Railway, Airline, Bus ticket reservation(either manually or by online)
d) In educational sectors for maintaining the records of the students.
e) In information and broadcasting sector in order to maintain the daily incidents and their further report.
f) Uses the concept in competitive exams both in public and private sectors such as GATE for example.
g) Also it can be used in the share market software data updating.

<u>Mapping Of Course</u> objective and the outcomes

Course Objective	Course Outcomes						
	a	b	c	d	E	f	g
1	√	√	√	√	√	√	√
2		√					√
3		√					
4			√				
5			√			√	
6						√	
7	√					√	

Contribute to the Outcome

Contribution can be done -

y. By providing lectures.

z. By performing some Lab work.

aa. By providing references for white papers and articles.

bb. By solving problems

e Daily class room interaction

Assessment:

Assessment of a Student can be performed -

49. By regular and surprise class tests.
50. By mid term and semester exams.
51. By evolution of their programming approach for a specific task or operation.
52. By small quiz and tutorials.
53. Expert lecture from industries

6. Video lectures through NPTEL.

<u>Text Book</u>

1. Database System Concepts by Sudarshan, Korth (McGraw-Hill Education)
2. Fundamentals of Database System By Elmasari &Navathe- Pearson Education
3. An introduction to Database System – Bipin Desai, Galgotia Publications

Sub/Course: ANALOG COMMUNICATION TECHNIQUES

Course Description : Signals and Spectra, Random Variables and Processes, Amplitude Modulation Systems, Angle Modulation, Pulse Modulation and Digital Transmission Of Analog Signal, Mathematical Representation Of Noise, Noise in Amplitude Modulation System, Noise in Frequency Modulation System.

Course Objectives : In this subject students will learn about the following points:

a. To learn about signal and its properties, Fourier series expansion and its use and the Fourier transform.
b. To learn about the random variables and probability density functions.
c. To understand the need of Modulation.
d. To learn different types of Amplitude Modulation Techniques.
e. To understand modulated FM signal, FM modulators and demodulators.
f. To distinguish in between Pulse Amplitude Modulation and Concept of Time division multiplexing, Pulse Width Modulation and Pulse Position Modulation.
g. To understand the different types of noise sources and framework for Amplitude Demodulation, Single Sideband Suppressed Carrier(SSB-SC), Double Sideband Suppressed Carrier(DSB-SC), Double Sideband With Carrier(DSB-C).

Course Outcome : Upon completion of this course:

1. Student will be able to understand the role and need of analog communication (AM & FM) in the communication field.
2. Student will be able to understand how many types of noise & to reduce the noise.
3. Student will be able to understand signal and relation of Fourier series with it.
4. Student will be able to solve probability problems.
5. Student will be able to understand what exactly happened in AM.
6. Student will be able to understand modulation & demodulation of AM.
7. Student will be able to understand modulation & demodulation of FM.
8. Student will be able to understand the need and concept of analog to digital conversion.
9. Student will be able demonstrate Pulse Amplitude Modulation and Time division multiplexing.

10. Student will be able to understand how to remove the noise.
11. Student will be able to understand proper application of AM & FM communication.

Mapping:

	1	2	3	4	5	6	7	8	9	10	11
a			√								
b				√							
c	√				√						
d					√	√					
e							√				
f									√		
g		√								√	

Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By presenting practical knowledge about AM & FM.
c. By providing references for white papers and articles.
d. By showing the how noise add with signal and by which process it remove.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By thinking practically what happened in the communication.
4. By small quiz and tutorials.

Essential Reading:

1. H. Taub, D. L Schilling, G. Saha; *Principles of Communication System, 3rd Edition; 2008, Tata McGraw Hill, India;* ISBN**:** 0070648115. (**Selected portions from chapters**: Chapter-1,Chapter-2, Chapter-3, Chapter-4, Chapter-5, Chapter-7, Chapter-8, Chapter-9)

Sub/Course :***FIBER OPTICS AND OPTOELECTRONICS DEVICES***

Course Description : Fundamental of fiber optics, Ray propagation, Wave propagation in a cylindrical wave guides, attenuation and dispersion in fiber, Fiber fabrication, Fiber optic cables, Optoelectronic sources, Optoelectronic Detector, Optoelectronic Modulators, Optical Amplifier, Solar cells, Schottky Barrier cells, WDM components-couplers, isolators, circulators, filters. Optical switching-self electro optic effect Device

Course Objectives : In this subject students will learn about the following points:

a. To learn about different generations of optical fiber communication systems and Optical fiber structure
b. To learn about total internal reflection, Numerical Aperature, acceptance angle.
c. To understand the modal concept, power flow in step index fiber and graded index fiber.
d. To learn different types attenuation and dispersion in fiber.
e. To develop an understanding of Double crucible method with Fiber fabrication technique.
f. To explain connector, splice and losses during coupling between source to fiber, fiber to fiber.
g. To explain the LED, ILD as Optoelectronic Sources.
h. To explain PIN & APD as Optoelectronic Detector.
i. To learn the basic principle of Electro optic and Acousto optic modulators.
j. To learn the Semiconductor optical Amplifier and Erbium Doped Fiber Amplifier.
k. To understand the basic principle, Schottky Barrier cells, WDM components-couplers, isolators, circulators, filters, solar cell.

Course Outcome : Upon completion of this course:

1. Student will be able to understand the need of optical fiber in communication.
2. Student will be able to know the structure of optical fiber.
3. Student will be able to distinguish different types of optical fiber.
4. Student will be able to understand the propagation of wave.
5. Student will be able to understand power flow in step index fiber and graded index fiber.
6. Student will be able to demonstrate about the losses in optical fiber.
7. Student will be able to understand the fiber fabrication.
8. Student will be able to understand the losses at the time when optical fiber cables are connected together.

9. Student will be able demonstrate the working principal of LED & ILD.
10. Student will be able to understand the need of PIN & ADP.
11. Student will be able to understand the basic principal of Optoelectronic Modulators.
12. Student will be able to understand working principal of Optical Amplifier.
13. Student will be able to understand working principal of solar cell.
14. Student will be able to distinguish different types of optoelectronic device.
15. Student will be able to understand working principal of Schottky Barrier cells, WDM components-couplers, isolators, circulators, filters.

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
a	√	√	√												
b				√											
c					√										
d						√									
e							√								
f								√							
g									√						
h										√					
i											√				
j												√			
k													√	√	√

Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By presenting LED as a light source and discusses the working principal.
c. By providing references for white papers and articles.
d. By showing the structure of the optical fiber.

Assessment: Assessment of a Student can be performed -

5. By regular and surprise class tests.
6. By mid term and semester exams.
7. By evolution of their programming approach for a specific task or operation.
8. By small quiz and tutorials

Text Books

1. Fiber optics and Optoelectronics, R.P.Khare, Oxford University Press(selected sections from chapters 1,2,3,4,5,6,7,8,9and10)
2. Semiconductor Optoelectronic Devices, Pallab Bhatttacharya, second edition, Pearson Education (selected sections from chapters 10 and 11)

Sub/Course:*Microprocessor*

Course Description : 8085 Microprocessor Architecture and Operations, Memory Organization, CISC and RISC architecture overview, 8085 microprocessor instructions, Programming techniques, Basic interfacing Concepts, Interfacing Output Displays, Input Keyboards, Interfacing Data Converters, , 8279, 8253, 8255, 8257, 8259 Programmable peripherals devices,8086 microprocessor Architecture and operations,80386 Architecture and operations,8051 microcontroller and operations. 8051 interfacing.,Interfacing of static RAM
With 8085 microprocessor,ADC,DAC interfacing with microprocessor.8251
USART,RELAY,PWM,DC,Stepper Motors.

Course Objectives : In this subject students will learn about the following points:

a. To learn about architecture and operation of Microprocessor 8085
b. To learn types of memory and memory organization.
c. To understand the basic of CISC and RISC architecture.
d. To learn different types and/or groups of instructions for µP 8085.
e. To relate the working of different pin with study of pin configuration and need of interfacing with peripherals.
f. To develop an understanding to co-relate the working of different types of programmable device and their interfacing with µP 8085.
g. To learn about the operation of microcontroller in real life.

Course Outcome : Upon completion of this course:

1. Student will be able to understand the role and need of microprocessor 8085 in instrumentation.
2. Student will be able to correlate working of different working blocks of µP 8085 internal architecture.
3. Student will be able to understand and co-relate the design and memory that can be use for µP 8085.
4. Student will be able to co-relate CISC and RISC architecture.
5. Student will be able to understand a program and instructions use in it
6. Student will be able to demonstrate the selection of specific instruction for a program.
7. Student will be able to demonstrate the ability to write program for microprocessor 8085 operations.

8. Student will be able to understand the need and concept of peripheral interfacing with µP 8085.
9. Student will be able demonstrate the data converter interfacing with µP 8085.
10. Student will be able to understand the need of programmable peripheral device in interfacing with µP 8085.
11. Student will be able to co-relate the working of different types of programmable devices and their interfacing with microprocessor 8085.

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
a	√	√									
b			√					√			
c				√							
d					√	√	√				
e								√			
f		√									√

Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By presenting coding of some program being use in general instruments working.
c. By providing references for white papers and articles.
d. By showing the step wise working and execution of a program along with the changes in different registers on simulators for µP 8085.

Assessment: Assessment of a Student can be performed -

5. By regular and surprise class tests.
6. By mid term and semester exams.
7. By evolution of their programming approach for a specific task or operation.
8. By small quiz and tutorials

<u>Text Books:</u>

1.The 8088 and 8086 Microprocessors Programming, Interfacing, Softw, Hardware and Application; by Walter A. Triebel & Avtar Singh ; Pearson India.

2. Microprocessors and Interfacing; by Douglas V Hall ; McGraw Hill.

Course: Principle of management

Class: B. Tech – 6th semester

Course Description: concept of management, management as an Art or Science, The process of Management , management skills, Levels & types of Management ,Evolution of management Thought: Managerial Environment , The Process of Management - Planning , organizing, Directing, Staffing, Controlling . Modern concept of marketing, function of a marketing management, marketing mix, fundamental need of customers, Role of distribution channels in marketing, advertising, Marketing, Consumerism, &Environmentalism. Financial Concept, concept of financial management, Project appraisal, Tools of Financial decisions making, Overview of Working Capital. HRM Function of management Human resource management , human resource development , importance of HRM Overview of job Analysis, Job Description, job specification, Labour Turnover. Manpower planning, recruitment, selection, Induction, Training &Development, Placement, wage & salary Administration, Performance Appraisal, Grievance Handling, Welfare Aspects.

Course Objectives:

Understand fundamental concepts and principles of management, including the basic roles, skills, and functions of management;

1) To acquire knowledge of historical development, theoretical aspects and practice application of managerial process;
2) To be familiar with interactions between the environment, technology, human resources, and organizations in order to achieve high performance;
3) To be aware of the ethical dilemmas faced by managers and the social responsibilities of businesses.
4) It will help in manpower planning & recruitment

The material covered will be relevant to you, regardless of your career objectives. In all likelihood, you will either be a manager or work with one in any occupation you choose. In the final analysis, we are all managers of our own lives and can benefit by studying to be better managers.

Course Outcomes

After completion of this course:

a) Graduate will able to understand the fundamental concept of principal of management.
b) Students will understand the basic role, skills & function of management.
c) Students will be able to generate the theoretical aspects and practice application of managerial process.
d) Students will be familiar with interactions between the environment, technology, human resources, how and organizations in order to achieve high performance.
e) Students must be aware of the ethical dilemmas faced by managers and the social responsibilities of businesses.
f) It will help the students in understanding the concept of financial management & also give an overview look on working capital.

g) Student will come to know about the salary structure which will help them to calculate their worth in any organization.
h) Student will be able to know about the manpower planning.
i) Student will be able to understand about the importance of recruitment, selection, induction & training & development program.
j) Student will be able to know about the importance of performance appraisal & **other welfare aspect of employee.**

k) They will be able to understand the important grievance handling.

<u>Mapping of course </u>objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√	√									√
2				√						√	
3			√	√					√		
4					√		√	√			
5						√					

Contribute to the outcome:

Contribution can be done -

cc. By providing lectures.

dd. By providing references for white papers and articles.

ee. By solving problems

e Daily class room interaction

Assessment: Assessment of a Student can be performed –

By regular and surprise class tests.

54. By mid term and semester exams.

3. By small quiz and tutorials.

5. Expert lecture from industries

<u>Text Book:</u>

1.Business Organisation & Management, CR Basu, TMH
2. Business Organisation & Management, Tulsia, pandey, Pearson
3.marketing management, Kotler, Keller,Koshi, Jha, Pearson
4. Financial Management, I.m. Pandey, Vikas
5. Human Resource Management, Aswasthapa, TMH
6. Modern Business Organisation& Management By Sherlekar, Himalaya Publishing House

Course: CONTROL SYSTEM ENGINEERING

B. Tech - 4^{th} semester

Course Description : Basic Concepts of Control Systems, Open loop and closed loop systems, Servo Mechanism/Tracking System, Regulators, Mathematical Models of Physical Systems: Differential Equations of Physical Systems: Mechanical Translational Systems, Rotational systems, Gear Trains, Electrical Systems, Analogy between Mechanical and electrical quanties, Thermal systems, fluid systems, Derivation of Transfer functions, Block Diagram Algebra, Signal flow graph.
Synchros, Stepper Motors. Standard Test Signals: Time response of first order systems to unit step and unit ramp inputs. Time Response of Second order systems to unit step input, Time Response specifications, Steady State Errors and Static Error Constants of different types of systems. Generalized error constant Root locus concepts, Rules of Construction of Root locus, Determination of Roots from Root locus for a specified open loop gain, Root contours, Systems with transportation lag. Effect of adding open loop poles and zeros on Root locus. Frequency domain specifications correlation between Time and Frequency Response with respect to second order system
Stability in frequency domain: Principle of argument, Nyquist stability criterion, Application of Nyquist stability criterion for linear feedback system.
Closed loop frequency response: Constant Mcircles, Constant N-Circles, Nichol's chart.
Controllers: Concept of Proportional, Derivative and Integral Control actions, P, PD, PI, PID controllers. Zeigler-Nichols method of tuning PID controller

Course Objectives: In this subject students will learn about the following points:

1.To learn about different types of control system.

2.To learn about regulator and tracking system.

3.To learn about different model of physical system.

4.To learn the block diagram algebra and signal flow graph.

5. To learn about Mechanical and electrical quanties, Thermal systems, fluid systems.

6.To draw the block diagram of thermal power plant.

7.To learn about Root locus concepts, Rules of Construction of Root locus

Course Outcome : After the completion of this course:

a.Student will be able to co-relate different types of control system.

b.Student will be able to draw the block diagram from differential equation.

c.Student will be able to understand and distinguish between types of electrical, fluid, thermal &mechanical system.

d.Student will be able to solve the problems related to mason gain formula.

e.Student will be able to understand the difference between static error constant and generalized error constant.

f. Student will be able to understand the Rules of Construction of Root locus

g.Student will be able to understand Root contours, Systems with transportation lag

h.Student will be able to know the different types of controller.

i.Student will be able to understand the Constant Mcircles, Constant N-Circles

j.Student will be able to understand the. Nyquist stability criterion Nichol's chart

k.Student will be able to understand the Zeigler-Nichols method of tuning PID controller

Mapping of course objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√								√	√	√
2		√	√	√						√	
3		√	√							√	√
4				√	√					√	
5			√							√	
6		√	√	√			√			√	√
7			√	√		√			√	√	

IMPORTANT TOPICS COVERED

a. Types of control system

b. Basic concept of electrical system

c. Basic concept of time signal

d. Types of controller

e. Brief idea about root locus

Contribute to the outcome: Contribution can be done -

a. By providing lectures.

b. By solving some mathematical problems.

c. By providing references for white papers and articles.

Assessment: Assessment of a Student can be performed -

55. By regular and surprise class tests.
56. By mid term and semester exams.
57. By small quiz and tutorials

Text book:

1. Modern Control Engineering by K. Ogata, 5th edition PHI.
2. Control Systems Engg. by I.J. Nagrath and M.Gopal, 5th Edition, New Age International Publishers (2010).
3. Modern Control Systems by Richard C.Dorf and Robert H. Bishop, 11th Ed (2009), Pearson

Reference:

1. Design of Feedback Control Systems by R.T. Stefani, B. Shahian, C.J. Savator, G.H. Hostetter, Fourth Edition (2009), Oxford University Press.
2. Control Systems (Principles and Design) by M.Gopal 3rd edition (2008), TMH.
3. Analysis of Linear Control Systems by R.L. Narasimham, I.K. International Publications
4. Control Systems Engineering by S.P. Eugene Xavier and J. Josheph Cyril Babu, 1st Edition (2004), S. Chand Co. Ltd.
5. Problems and solutions in Control System Engineering by S.N. Sivanandam and S.N. Deepa, Jaico Publishing House.

Sub/Course: Mobile Communication

<u>Program educational objectives:</u>

The educational objectives of a program can be describe by the expected achievement of graduates in their graduation session from the program.

Five major objectives of data structure are:

a. Graduates will learn about different versions of mobile communication development.
b. Graduates will learn about radio wave propagation and propagation path loss models.
c. Graduates will learn about different communication techniques used in mobile communication.
d. Graduates will learn about different access technique used in mobile communication.
e. Graduates will, learn about traffic engineering in mobile communication.

<u>Course Outcomes:</u>

1. Graduates will learn how to design a mobile cell structure using propagation path loss models.
2. Graduates will analyze the mobile communication complexity.
3. Graduates will demonstrate the basics of modulation techniques and its use..
4. Graduates will demonstrate mobile communication complexity based on multipath propagation.
5. Graduates will understand the concept of cell structure and frequency reuse.
6. Graduates will choose the efficient method of mobile system design.
7. Graduates will comprehend an ability to analyze and interpret data.
8. Graduates will demonstrate knowledge of multiple access techniques.

Course Objectives	Course Outcomes							
	1	2	3	4	5	6	7	8
a	√		√		√			
b				√			√	
c		√	√	√				
d						√	√	√
e	√	√				√		

(4) <u>Important topics covered:</u>

- An Overview of Wireless Systems

- Radio Propagation and Propagation Path-Loss Models
- Fundamentals of Cellular Communications
- Multiple Access Techniques
- An Overview of Digital Communication and Transmission
- Traffic c Engineering

Contribute to the outcome: Contribution can be done

a. By providing lectures.
b. By presenting graphically the merits and demerits of different multiple access technique.
c. By providing references for white papers and articles.
d. By showing the step wise calculations of different methods of design of a mobile communication systems.

Assessment: Assessment of a graduates can be performed -

58. By regular and surprise class tests.
59. By mid term and semester exams.
60. By evolution of their programming approach for a specific task or operation.
61. By small quiz and tutorials

Text Books:

1. Essential Reading: Selected portions from V K Garg, Wireless Communication and Netwrking; Morgan Kaufman Publishers India; 2008

2. T S Rappaport, Wireless Communications, Pearson Education, India

Sub/Course: DIGITAL COMMUNICATION TECHNIQUE

Course Description :Sampling, Quantization, pulse code modulation ,multiplexing, Companding, scrambling, Reconstruction of signal , Delta modulation, Differential PCM, ASK, PSK, FSK, QPSK, MSK, Information theory & coding, Noise, Probability density function, channel capacity theorem, matched filter receiver, band width consideration.

Course Objectives : In this subject students will learn about the following points:

a. To learn about different signals & their reconstruction.
b. To learn about the coding of information.
c. To learn the different types of Noise & their probability of error.
d. To learn the bandwidth & efficiency issues related to orthogonal signals.
e. To learn about signal space concepts with application to digital transmission & reception.
f. To learn the advent of digital communication.

Course Outcome : Upon completion of this course:

1. Student will be able to correlate the performance standards & requirements for communication.
2. Student will be able to select the channel for electronic tuning.
3. Student will be able to understand the procedure of original signal extraction.
4. Student will be able to learn the transmission of binary data over antenna.
5. Student will be able to learn the usage of complex & expensive transmitting & receiving equipment.
6. Student will be able to manage an engg. Project.
7. Student will be able to apply communication knowledge & skills to solve a significant problem.
8. Student will be able to do a entrepreneurship research.
9. Student will be able to know the performance of system components.
10. Student will be able to compute the probability of error for digital data communication.

MAPPINGS:

	1	2	3	4	5	6	7	8	9	10	11
a	√		√			√					
b								√			
d					√	√	√				
e					√	√	√				
f								√			
g		√		√				√		√	
h									√		

Contribute to the outcome:

a.By providing lectures.

a. By providing fundamentals of use & care of digital equipments.
b. By providing references of articles & journals.
c. By showing the stepwise working principles & advantages & disadvantages of digital components.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By giving regular assignment to them .
4. By small quiz and doubt clearing classes.
5. By asking the need & practical applications of a specific device.
6. By doing a minor project based on digital communication

Course: Operating system

Class: B. Tech - 6th semester

Course Description :Introduction to operating system and its types, operating system structure , Process , threads, process scheduling , Thread Scheduling, process synchronization, Deadlock, Memory Management . Virtual Memory concepts,. File System Concept,file system implementation ,Input output system , Mass Storage Structure.

CASE STUDIES: The LINUX System, Windows XP, Windows Vista.

Course Objectives:

The students will able to know

1. How the concept of operating system has developed, what the common features of operating system are,what an operating system does for the user and what it does for the computer system operator.

2. The methods for process scheduling,,interprocess communication,,process synchronization and deadlock handling.

3. To improve utilization of CPU and speed of it's response to it's users,different approaches to memory management and the effectiveness of different algorithims depends on the situation.

4 The mechanism for online storage of and access to both data and programs residing on the

Disk and the classic internal algorithim and structures of storage management.

5. The I/O system design ,interfaces and internal system structure and functions.

Course Outcome

After completion of this course:

a)Graduate will understand the importance of an operating system.

b) Graduate will understand how the operating systems are designed and constructed .

c) Graduate could realize the services of an operating system for computation of problems.

d) Graduate will able to evaluate the performance of the processor under a system.

e) Graduate will able to know different memory management schemes.

f)Graduate will able to know the mechanism of file system .

g) Graduate will able to know the disk structure and disk scheduling algorithms.

Mapping of course objective and the outcomes

Course Objectives	a	b	c	d	e	f	g
1	√	√					
2			√				
3				√	√		
4						√	
5							√

Contribute to the outcome:

Contribution can be done -

ff. By providing lectures.

gg. By performing some Lab work..

hh. By solving problems

ii. Daily class room interaction

Assessment: Assessment of a Student can be performed -

62. By regular and surprise class tests.
63. By mid term and semester exams.
64. By evolution of their programming approach for a specific task or operation.
65. By small quiz and tutorials.

Text Book:

1. Operating System Concepts – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne,

   8th edition, Wiley-India, 2009.

2. Mordern Operating Systems – Andrew S. Tanenbaum, 3rd Edition, PHI

3. Operating Systems: A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition

Course:Envirnment Engineering

Class: B. Tech – 6th /8th semester

Course Description : Ecological concepts,ecosystem process,env. Laws, environmental gradients & tolerance range,env.audit,hydrology,air pollution,water pollution,noise pollution,aair emission control,solid & hazardous waste management,environmental impact assessment,life cycle assessment,water treatment,waste water treatment,occupational safety

Objective

Teaching environmental topics can bring out unexpected responses in your students. For example, when you cover the topic of Earth's resources in a physical geology course, you may find previously mild-mannered students become impassioned about the topics, or otherwise attentive and hard-working pupils dig in their heels and resist the information. Doing rock and mineral identification may elicit little emotional response from most students. But when the subject matter seems to confront one's personal lifestyle, political leanings or economic situation, then the topic may be perceived in a very different light.

What are some strategies to teach environmental topics, particularly controversial ones, without coming up against affective barriers to learning? How can you help students learn the science and the policy without getting weighed down by feeling guilty or defiant?

a. Teach the science first:-

Even though most environmental topics are a blend of science, policy, economics and human impacts, it may be helpful to separate these into three distinct sub-topics. First, present the science objectively, using data and relevant examples. Next, discuss the policy and economic issues related to this topic. Once those subjects are covered thoroughly, students will often be interested to learn what their own personal stake may be. By setting the stage deliberately, students are more likely to be receptive to the information and are less likely to get turned off.

b.Teach with data:-

Statements like *"species are going extinct at an alarming rate," "wetlands are being turned into strip malls,"* and *"the climate is getting hotter* “are emotional statements (even if true) and will elicit emotional responses in your students. Rather than risk sounding like an alarmist, let the data speak for itself. Have students work through data sets, and they can discover for themselves the rate and extent of environmental change. In some cases, they still may end up being surprised or emotional, but it's because they reached their own conclusion, not because you told them to be alarmed. Use active learning techniques

Students learn better when the can learn it for themselves, and this is especially true for topics that are potential turn-offs for students. Environmental issues lend themselves to teaching techniques like using local examples, gathering data from the field, using role-playing or debates, or participating in environmental projects.

Controversy, ambiguity, and topics with incomplete or missing evidence can be used constructively (but need to be introduced judiciously)
Engaging controversial topics, or topics that have no clear-cut answers, can create an environment where students are motivated to learn more out of curiosity or imminent need Students can be encouraged to review what is known, to identify what additional information is needed to solve the problem, and to continue the search to find and critically examine new information. Learning goals for students can include development of "scientific habits of the mind" to be critical consumers of information, and to be able to create, present and rebut arguments based on evidence. A supportive environment needs to be created to encourage scholarly and open review of the arguments and ideas, and provisions need to be put in place to prevent interpersonal (ad hominem) attacks in reporting results in class activities.

c.It's not all doom and gloom:-

Certain environmental topics can be downright depressing. However, there are also many environmental success stories. Strive for a balance in which students do not feel overwhelmed by a preponderance of "bad news." After all, environmental successes provide relevant examples of how problems can be overcome.

d.Clearly define your role and your teaching approach:-

There are many ways to teach environmental issues. Before jumping into your curriculum, consider what your desired outcomes are and what approach you will take. Is your intent to teach just the relevant scientific processes, to promote an awareness of environmental issues, or to lead students toward a shift in their own environmental behavior? In the classroom, do you assume the role of environmental guardian, a free-marketeer, or a devil's advocate? There are advantages to various approaches, but it's important to consciously consider what your goals are and how you can best achieve them.

e.Lead by example, but don't preach:-

We all know the stereotype that college professors drive tiny, efficient cars and live an eco-minded lifestyle. Regardless of whether or not this describes you, it's best to avoid talking down to your students for their own personal choices. Preaching to the class about what's "good" and what's "bad" will likely have the opposite effect than you intended; it can be a major turn-off for students. If your goal is to promote environmentally-favorable behavior in your students, consider a hands-on project that will challenge students to consider the environmental impacts of their own actions.

An introduction to environmental studies stressing a scientific approach toward understanding the nature and scope of contemporary problems in the human environment. The course reflects applications of physical, chemical, biological and geological principles to define ecological change both natural and anthropogenic.

OUTCOMES:-

To investigate the relationship between human life and the environment from a scientific perspective, illustrating current and emerging problems and potential solutions, while increasing students' awareness of their individual impacts on environmental systems.

To develop measurable Intended Learning Outcomes consistent with the course description and purpose, we (Scott Brennan and Jillian Martin) first reviewed recent course evaluations to identify the course's strengths and weaknesses. Several themes emerged from this analysis.

Course strengths:

1. The course makes scientific subject matter relevant to them on a personal level.

2. The course's subject matter illustrates the connection between individual choices of contemporary problems in the human environment

3. The course's subject matter is diverse and varied

4. The course uses a variety of media and diverse means of presenting material that are suitable for students of all learning styles

5. The course provides students with opportunities to be involved in class discussions and projects as well as community-based solutions to environmental problems.

Course weaknesses:

6. The course did not provide enough of an introduction to basic science and scientific reasoning

7. The course did not adequately emphasize the systemic nature of environmental problems

8. The course did not provide enough information regarding solutions to environmental problems.

9.The course did not provide enough opportunity to critically evaluate divergent views of environmental issues.

10. The course did not provide enough opportunity for students to apply scientific principles and knowledge of environmental interrelationships to their own lives and their community.

Upon successful completion of this course <u>you should be able to</u>:

- Describe the structure and function of significant environmental systems.

- Use scientific reasoning to identify and understand environmental problems and evaluate potential solutions. Critically evaluate arguments regarding environmental issuesSee the impact your way of life has on the environment.
- Apply your understanding of environmental issues to your own choices**.**

Mapping of course objective and the outcomes:-

	1	2	3	4	5	6	7	8	9	10
a	✓		✓			✓				
b	✓	✓		✓	✓					
c		✓					✓		✓	
d					✓					
e	✓	✓						✓		✓

Contribute to the outcome:

Contribution can be done -

jj. By providing lectures.

kk. By providing real life examples

ll. By performing some Lab work.

mm. By providing references

nn. By solving problems

f. Daily class room interaction

Assessment: Assessment of a Student can be performed -

66. By regular and surprise class tests.
67. By mid term and semester exams.
68. By evolution of their programming approach for a specific task or operation.
69. By small quiz and tutorials.
70. Expert lecture from industries

6. Video lectures through NPTEL.

Text Book: Gerard kiely,L.M. Desmukh ,Prof. B.K. Mohapatra

Sub/Course:RADAR AND TV ENGINEERING

Course Description :

Basic Television System And Scanning Principles, TV pick up tubes, Vidicon, CCD camera, Color and Digital TV Technology, NTSC & PAL system, fundamentals of Flat panel displays, Plasma displays, Introduction to Radar, RADAR Equation, system losses, MTI, CW, FMCW RADAR, Tacking by RADAR,

Course Objectives : In this subject students will learn about the following points:

a. To learn about Block diagram of TV transmitter & receiver
b. To learn about Sound and picture transmission,
c. To learn about TV pick up tubes, Vidicon, CCD.
d. To learn about mixing of colors and colors perception, chromaticity diagram, color TV signals & transmission
e. To learn about Basic radar, radar blocks diagram, radar frequencies & applications, Radar Indicators.
f. To learn about delay line cancellers, Doppler filter banks, limitation of MTI, Staggered PRF, Pulse Doppler radar, Tacking by RADAR, mono pulse, sequential lobbing, & conical scan of targets.

Course Outcome : Upon completion of this course:

16. Student will be able to understand the transmission and reception of a TV system
17. Student will be able to know how to transmit sound and picture to a long distance.
18. Student will be able to know the different types of scanning concepts.
19. Student will be able to know different types of control signals used for proper transmission and reception.
20. Student will be able to know different types of TV camera used in TV systems.
21. Student will be able to learn about persistence of vision
22. Student will be able to know mixing of colors and colors perception
23. Student will be able to understand color TV signals & transmission
24. Student will be able to understand fundamentals of Flat panel displays, Plasma displays, Liquid crystal displays, and Large screen displays
25. Student will be able to understand the radar range equation, radar frequencies & applications, Radar Indicators.
26. Student will be able to know Doppler filter banks, limitation of MTI, Staggered PRF, Pulse Doppler radar,
27. Student will be able to know Tacking by RADAR, mono pulse, sequential lobing, & conical scan of targets.

Mapping:

	1	2	3	4	5	6	7	8	9	10	11	12
a	√	√		√								
b	√	√										
c					√		√					
d								√	√			
e										√		
f											√	√

Contribute to the outcome: Contribution can be done -

oo. By providing lectures.
pp. By providing class notes.
qq. By providing reference articles on different concepts.

Assessment: Assessment of a Student can be performed -

71. By regular and surprise class tests.
72. By semester exams.
73. By encourage them to reading text book .
74. By small quiz and tutorials
75. By asking the need & practical applications of a specific device

Text Book :

1. Television and Video Engineering by AMD hale, 2nd edition Tata Mcgraw Hill
Selected portion from Chapter 2,3,4,8,7,9, and 10

Sub/Course: Digital Signal Processing

Course Description : The Z-Transform, Properties of the Z-Transform, Inverse Z-Transform Discrete Fourier Transform ,Properties and applications, Discrete Cosine Transform, Inverse DCT, Implementation of Discrete-Time System, Structure for FIR Systems and IIR Systems, Design of Digital filters, Design of FIR Filter and IIR Filter, Fast Fourier Transform, Decimation-in-Time (DIT), Decimation-in-Frequency (DIF), Application of FFT Algorithms, Use of FFT Algorithm in Linear Filtering and Correlation, Adaptive Filters, System Identification, Channel Equalization, Adaptive line Enhancer, Adaptive Noise Cancelling , LMS Algorithm

Course Objectives : In this subject students will learn about the following points:

a. To learn about different types of Signals and Systems, z-transform, DFT and DCT.
b. To develop an understanding of Structure for FIR Systems and IIR system:
c. To design Digital filters: Design of FIR Filter and IIR Filter.
d. To know about Fast Fourier Transform, Decimation-in-Time (DIT), Decimation-in-Frequency (DIF) algorithmsand application of FFT in linear filtering and correlation. To understand the use of FFT Algorithm in Linear Filtering and Correlation.
e. To learn about Adaptive Filters, System Identification, Channel Equalization, Adaptive line Enhancer, Adaptive Noise Cancelling and LMS Algorithm.

Course Outcome : Upon completion of this course:

1. Student will be able to know the different types of Signals and Systems.
2. Student will be able to understand the importance of Digital Signal Processing and its application area and Z-Transform.
3. Student will be able to know about Discrete Fourier Transform and its properties and IDFT.
4. Student will be able to understand Discrete Cosine Transform, Inverse DCT and DCT as an Orthogonal Transform.
5. Student will be able to know about the Structure for FIR Systems: Direct form structures, Cascade form structures, Frequency–Sampling Structures.
6. Student will be able to know about the Structure for IIR Systems: Direct form structures, Cascade form structures, Signal flow graphs and Transposed structures, Cascade-Form Structures, Parallel form Structures.
7. Student will be able to design Digital filters (FIR Filter and IIR Filter).
8. Student will be able to understand Fast Fourier Transform, Decimation-in-Time (DIT) and Decimation-in-Frequency (DIF) algorithms.
9. Student will be able to understand the use of FFT Algorithm in Linear Filtering and Correlation.

10. To know about the basic concept of Adaptive Filters, System Identification, Channel Equalization, Adaptive line Enhancer, Adaptive Noise Cancelling and LMS Algorithm.

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
a	√										
b	√	√									
c	√	√	√								
d			√	√							
e					√	√					

Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By providing class notes.
c. By providing reference articles on different concepts.
d. By presenting Practical examples related to the subject.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By semester exams.
3. By encouraging them for their involvement in Discussions regarding the subject.
4. By small quiz and tutorials.

Text Books

1. Digital Signal Processing – Principles, Algorithms and Applications by J. G. Proakis and D. G. Manolakis, 4th Edition, Pearson.

Course: Operating system

Class: B. Tech - 6th semester

Course Description :Introduction to operating system and its types, operating system structure , Process , threads, process scheduling , Thread Scheduling, process synchronization, Deadlock, Memory Management . Virtual Memory concepts,. File System Concept,file system implementation ,Input output system , Mass Storage Structure.

CASE STUDIES: The LINUX System, Windows XP, Windows Vista.

Course Objectives:

The students will able to know

4. How the concept of operating system has developed, what the common features of operating system are,what an operating system does for the user and what it does for the computer system operator.

5. The methods for process scheduling,,interprocess communication,,process synchronization and deadlock handling.

6. To improve utilization of CPU and speed of it's response to it's users,different approaches to memory management and the effectiveness of different algorithims depends on the situation.

4 The mechanism for online storage of and access to both data and programs residing on the Disk and the classic internal algorithim and structures of storage management.

5. The I/O system design ,interfaces and internal system structure and functions.

Course Outcome

After completion of this course:

a)Graduate will understand the importance of an operating system.

b) Graduate will understand how the operating systems are designed and constructed .

c) Graduate could realize the services of an operating system for computation of problems.

d) Graduate will able to evaluate the performance of the processor under a system.

e) Graduate will able to know different memory management schemes.

f)Graduate will able to know the mechanism of file system .

g) Graduate will able to know the disk structure and disk scheduling algorithms.

Mapping of course objective and the outcomes

Course Objectives	a	b	c	d	e	f	g
1	√	√					
2			√				
3				√	√		
4						√	
5							√

Contribute to the outcome:

Contribution can be done -

rr. By providing lectures.

ss. By performing some Lab work..

tt. By solving problems

uu. Daily class room interaction

Assessment: Assessment of a Student can be performed -

76. By regular and surprise class tests.
77. By mid term and semester exams.
78. By evolution of their programming approach for a specific task or operation.
79. By small quiz and tutorials.

Text Book:

2. Operating System Concepts – Abraham Silberschatz, Peter Baer Galvin, Greg Gagne,

   8th edition, Wiley-India, 2009.

2. Mordern Operating Systems – Andrew S. Tanenbaum, 3rd Edition, PHI

3. Operating Systems: A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition

Course:Envirnment Engineering

Class: B. Tech – 6th /8th semester

Course Description : Ecological concepts,ecosystem process,env. Laws, environmental gradients & tolerance range,env.audit,hydrology,air pollution,water pollution,noise pollution,aair emission control,solid & hazardous waste management,environmental impact assessment,life cycle assessment,water treatment,waste water treatment,occupational safety

Objective

Teaching environmental topics can bring out unexpected responses in your students. For example, when you cover the topic of Earth's resources in a physical geology course, you may find previously mild-mannered students become impassioned about the topics, or otherwise attentive and hard-working pupils dig in their heels and resist the information. Doing rock and mineral identification may elicit little emotional response from most students. But when the subject matter seems to confront one's personal lifestyle, political leanings or economic situation, then the topic may be perceived in a very different light.

What are some strategies to teach environmental topics, particularly controversial ones, without coming up against affective barriers to learning? How can you help students learn the science and the policy without getting weighed down by feeling guilty or defiant?

b. Teach the science first:-

Even though most environmental topics are a blend of science, policy, economics and human impacts, it may be helpful to separate these into three distinct sub-topics. First, present the science objectively, using data and relevant examples. Next, discuss the policy and economic issues related to this topic. Once those subjects are covered thoroughly, students will often be interested to learn what their own personal stake may be. By setting the stage deliberately, students are more likely to be receptive to the information and are less likely to get turned off.

b.Teach with data:-

Statements like *"species are going extinct at an alarming rate," "wetlands are being turned into strip malls,"* and *"the climate is getting hotter* “are emotional statements (even if true) and will elicit emotional responses in your students. Rather than risk sounding like an alarmist, let the data speak for itself. Have students work through data sets, and they can discover for themselves the rate and extent of environmental change. In some cases, they still may end up being surprised or emotional, but it's because they reached their own conclusion, not because you told them to be alarmed. Use active learning techniques

Students learn better when the can learn it for themselves, and this is especially true for topics that are potential turn-offs for students. Environmental issues lend themselves to teaching techniques like using local examples, gathering data from the field, using role-playing or debates, or participating in environmental projects.

Controversy, ambiguity, and topics with incomplete or missing evidence can be used constructively (but need to be introduced judiciously)
Engaging controversial topics, or topics that have no clear-cut answers, can create an environment where students are motivated to learn more out of curiosity or imminent need Students can be encouraged to review what is known, to identify what additional information is needed to solve the problem, and to continue the search to find and critically examine new information. Learning goals for students can include development of "scientific habits of the mind" to be critical consumers of information, and to be able to create, present and rebut arguments based on evidence. A supportive environment needs to be created to encourage scholarly and open review of the arguments and ideas, and provisions need to be put in place to prevent interpersonal (ad hominem) attacks in reporting results in class activities.

c.It's not all doom and gloom:-

Certain environmental topics can be downright depressing. However, there are also many environmental success stories. Strive for a balance in which students do not feel overwhelmed by a preponderance of "bad news." After all, environmental successes provide relevant examples of how problems can be overcome.

d.Clearly define your role and your teaching approach:-

There are many ways to teach environmental issues. Before jumping into your curriculum, consider what your desired outcomes are and what approach you will take. Is your intent to teach just the relevant scientific processes, to promote an awareness of environmental issues, or to lead students toward a shift in their own environmental behavior? In the classroom, do you assume the role of environmental guardian, a free-marketeer, or a devil's advocate? There are advantages to various approaches, but it's important to consciously consider what your goals are and how you can best achieve them.

e.Lead by example, but don't preach:-

We all know the stereotype that college professors drive tiny, efficient cars and live an eco-minded lifestyle. Regardless of whether or not this describes you, it's best to avoid talking down to your students for their own personal choices. Preaching to the class about what's "good" and what's "bad" will likely have the opposite effect than you intended; it can be a major turn-off for students. If your goal is to promote environmentally-favorable behavior in your students, consider a hands-on project that will challenge students to consider the environmental impacts of their own actions.

An introduction to environmental studies stressing a scientific approach toward understanding the nature and scope of contemporary problems in the human environment. The course reflects applications of physical, chemical, biological and geological principles to define ecological change both natural and anthropogenic.

OUTCOMES:-

To investigate the relationship between human life and the environment from a scientific perspective, illustrating current and emerging problems and potential solutions, while increasing students' awareness of their individual impacts on environmental systems.

To develop measurable Intended Learning Outcomes consistent with the course description and purpose, we (Scott Brennan and Jillian Martin) first reviewed recent course evaluations to identify the course's strengths and weaknesses. Several themes emerged from this analysis.

Course strengths:

1. The course makes scientific subject matter relevant to them on a personal level.

2. The course's subject matter illustrates the connection between individual choices of contemporary problems in the human environment

3. The course's subject matter is diverse and varied

4. The course uses a variety of media and diverse means of presenting material that are suitable for students of all learning styles

5. The course provides students with opportunities to be involved in class discussions and projects as well as community-based solutions to environmental problems.

Course weaknesses:

6. The course did not provide enough of an introduction to basic science and scientific reasoning

7. The course did not adequately emphasize the systemic nature of environmental problems

8. The course did not provide enough information regarding solutions to environmental problems.

9.The course did not provide enough opportunity to critically evaluate divergent views of environmental issues.

10. The course did not provide enough opportunity for students to apply scientific principles and knowledge of environmental interrelationships to their own lives and their community.

Upon successful completion of this course you should be able to:

- Describe the structure and function of significant environmental systems.
- Use scientific reasoning to identify and understand environmental problems and evaluate potential solutions. Critically evaluate arguments regarding environmental issuesSee the impact your way of life has on the environment.
- Apply your understanding of environmental issues to your own choices.

Mapping of course objective and the outcomes:-

	1	2	3	4	5	6	7	8	9	10
a	✓		✓			✓				
b	✓	✓		✓	✓					
c		✓					✓		✓	
d					✓					
e	✓	✓						✓		✓

Contribute to the outcome:

Contribution can be done -

vv. By providing lectures.

ww. By providing real life examples

xx. By performing some Lab work.

yy. By providing references

zz. By solving problems

f. Daily class room interaction

Assessment: Assessment of a Student can be performed -

80. By regular and surprise class tests.
81. By mid term and semester exams.
82. By evolution of their programming approach for a specific task or operation.
83. By small quiz and tutorials.
84. Expert lecture from industries
6. Video lectures through NPTEL.

Text Book: Gerard kiely,L.M. Desmukh ,Prof. B.K. Mohapatra

COMPUTER NETWORKING

Course Description:Overview of Data Communications and Networking.
Physical Layer : Analog and Digital Signal
Digital Transmission: Analog Transmission:
Transmission Media
Circuit switching and Telephone Network

Data Link Layer
Error Detection and correction
Data Link Control and Protocols: Flow and Error Control
Point-to –Point Access: PPP
Multiple Access
Random Access, Controlled Access, Channelization.
Local area Network: Ethernet.
. Host to Host Delivery: Internetworking, addressing and Routing
Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6
Transport Layer: Process to Process Delivery: UDP; TCP congestion control and Quality of service

Application Layer :
Client Server Model, Socket Interface, Domain Name System (DNS),WWW

Course Objectives : *In this subject students will learn about the following points*:

i. To understand the basic concepts of signals used in Physical layer.

b To understand the basic concepts of switching techniques used in data link layer

c. To study addressing and routing in networking layer.

d. To study the transport layer delivery

e. To learn about application layer .

Course Outcome : *Upon completion of this course*:

Student will be able to learn the following

28. data communication techniques
29. physical layer data communication
30. the different layers of Networking
31. basic concepts of signals & different types of Transmission media
32. the basic concepts of switching techniques
33. the types of Error & it's detection technique
34. the Error correction mehods & the protocols used in flow and error control
35. the protocols used in point to point and multiple acess
36. the basic local area net working concepts & addressing , routing

37. transport layer delivery
38. application layer & user interfacing

Mapping:

	1	2	3	4	5	6	7	8	9	10	11
a	√	√									
b			√	√							
c					√	√	√				
d								√	√	√	
f											√

Contribute to the outcome: Contribution can be done -

a. By providing lectures.

b. By providing class notes.

c. By providing reference articles on different concepts .

Assessment: Assessment of a Student can be performed -

85. By regular and surprise class tests.
86. By semester exams.
87. By encourage them to reading text book .
88. By small quiz and tutorials

Course Description

Optical fiber, Fiber Materials, attenuation, Optical Sources, photo detector ,optical receiver ,Photo Detectors ,Optical Receiver ,Time Budget and Power Budget ,Design of Fiber Optic link,Orbital Mechanics, Satellite Subsystems ,. Satellite Antennas: Satellite Link Design , Satellite antennas, multiple access, propagation effect and their effect on satellite

Course Objectives : In this subject students will learn about the following points:

a. To understand major elements of an optical fiber communication link and the basic concepts of light ray propagation through Optical fiber.
b. To understand the basic concept of electromagnetic theory of wave propagation through step index fiber and signal degradation in optical fiber
c. To understand regarding optical sources, Photo Detectors ,Optical Receiver and Design of Fiber Optic link.
d. To understand regarding Orbital Mechanics,Satellite Subsystems and Satellite Link Design.
e. To understand regarding FDMA, TDMA and CDMA and details of Spread Spectrum Transmission and Reception, Satellite TV and Radio System.

Course Outcomes: (Optical Communication System)

Upon completion of this course:

1. Student will be able to understand the major elements of an optical fiber communication link and attenuation.
2. Student will be able to know and light ray propagation through Optical fiber, Mode theory for Circular waveguide, Monomode fiber .
3. Student will be able to understand the Power flow in step index and Graded index fiber.
   and fiber Fabrication.
4. Eventually students will be able know PIN and APD Photodetectors and optical receiver.
5. Student will able to design fiber optic link and the concept of WDM.
6. To learn Orbinal Parameters and develop an idea of placing Satellite into geo-stationary orbit and brief idea regarding satellite subsystems
7. To understand about satellite Antennas and Satellite Link Design.

8. To get an idea regarding FDMA, TDMA and CDMA and details of Spread Spectrum transmission and reception.
9. To understand the propagation effects and their impactor Satellite.
10. To understand the typical features of Vsat and Direct Broadcast Satellite TV and Radio System.

Mapping (Optical Communication System)

	1	2	3	4	5	6	7	8	9	10
a	√	√								
b		√	√							
c				√						
d						√	**√**			
e									√	**√**

Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By providing class notes.
c. By providing reference articles on different concepts.

Assessment: Assessment of a Student can be performed -

89. By regular and surprise class tests.
90. By semester exams.

91. By encourage them for reading text book and by small quiz and tutorials.

Sub/Course:VLSI DESIGN

Course Description:

VLSI Design methodologies, VLSI Design Flow, Fabrication of MOSFETS, Fabrication processes, NMOS Fabrication, Layout Design rules, Stick Diagrams, Review of structure and operation of MOSFET (n-MOS enhancement type), CMOS, MOSFET v-I characteristics, Modeling of MOS Transistors

MOS Inverters : Basic NMOS inverters, characteristics , CMOS inverter and characteristics, Switching characteristics and interconnect effects,
Combinational MOS logic circuits, CMOS logic circuits , state style, complex logic circuits, pass transistor logic, sequential logic circuit.
Dynamics logic circuits : Dynamic logic, basic principles, high performance dynamics CMOS circuits, Dynamic Ram, SRAM, flash memory.

Systems Design method, design strategies, concept of FPGA, standard cell based design, design capture tools, hardware definition languages such as VHDL and packages. Xlinx (introduction), introduction to IRSIM and GOSPL (open source packages) , design verification and testing , simulation at various levels including timing verification, faults models. Design strategies for testing chip level and system level test techniques.

Course Objectives : To give an exposure to followings

1. Understand MOS device behaviour and modelling.
2. Exposure to state-of-the-art MOS digital techniques.
3. Understand advanced issues of VLSI design including transistor scaling, timing, and process variation.
4. to impart education in high speed digital circuits.
5. Design a moderately complex circuit and be able to articulate the design process and prove that it functions properly using CMOS and VHDL .
6. Understand the functionality and algorithms of the modern VLSI CAD tools, and complexity of tool development.

Course Outcome : upon completion of the course

a. Graduates will be able to learn the role and need of VLSI design.
b. Graduates will be able to correlate working of different working principle of MOS Design.

c. Graduates will be able to understand and co-relate the design of digital circuits using MOS circuits using CAD tools.
d. Graduates will be able understand VHDL coding style used for high speed digital circuit design.
e. Graduates will know about structural design methods so that complex digital circuits can be carried out using VHDL.
f. Graduates will be able to design different high speed digital circuits like memory, ALU, register etc.
g. Graduates will learn tools like Mentor graphics or IRSIM for layout and its simulation of MOS digital circuits.
h. Graduates will be able to model different digital circuits using spice level 1, level 2 and level 3 MOS equations.

Mapping:

Outcomes / Objectives	a	b	c	d	e	f	g	h
1	√	√	√					
2		√	√					
3			√				√	√
4				√	√	√		
5			√	√	√	√		√
6			√				√	

Contribute to the outcome: Contribution can be done -

a. By providing lectures.
b. By presenting coding of some program being use in general design of digital circuits.
c. By providing references for white papers and articles.
d. By showing the step wise working and execution of a program along with the changes using CAD tools for deign of digital circuits.

Assessment: Assessment of graduates can be performed -

1. By regular and surprise class tests.
2. By mid term and semester exams.
3. By evolution of their programming approach for a specific task or operation.
4. By small quiz and tutorials

Text Books :

1. CMOS Digital integrated Circuits – Analysis & Design – Sung Mo-Kang & Yussuf Leblebici, TMH.
2. VHDL Programming by example –Perry TMH.

Sub/Course:*Digital Image & Speech Processing*

Course Description :

Digital Image, Introduction to image processing, Mathematical Transform , Fuzzy sets Mathematical Morphology, Image Formation , Image Digitization , Image Enhancement, Restoration , Image Compression ,Image Registration.

The Fundamentals Of Digital Speech Processing , Time Domain Methods for Speech Processing , Digital Representation of speech waveform ,Linear Predictive coding of Speech , Digital Speech Processing for Man-Machine Communication .

Course Objectives : In this subject students will learn about the following points:

a. To learn about different mathematical tools & transforms , used for image processing.
b. To understand the basic concepts of image enhancement and Restoration such are image smoothing , sharpening , contrast intensification.
c. To learn different types of compression techniques and coding-Lossless and Lossy coding, concept behind image registration
d. To know the time domain methods – zero-crossing rate , short time-energy ,short-time average magnitude.
e. To know the LPC analysis of speech signal by auto correlation method

Course Outcome : Upon completion of this course:

1. Student will be able to understand the role and need of image processing and speech processing.
2. Student will be able to know different types of Transforms of image processing.
3. Student will be able to understand image formation and digitization concepts.
4. Student will be able to co-relate different image enhancement techniques with image restoration.
5. Student will be able to understand the image compression techniques with coding.
6. Student will be able to learn different techniques of image registration.
7. Student will be able to know the basic tools of speech processing.
8. Student will be able to understand the time domain methods of speech processing .
9. Student will be able to understand the digitization concepts of speech signal.
10. Student will be able to understand speaker verification. and speaker identification.

Mapping:

	1	2	3	4	5	6	7	8	9	10
a	√	√								
b			√					√		
c				√						
d					√	√	√			
e					√	√	√			
f							√	√	√	
g		√							√	√

Contribute to the outcome: -

a. By providing lectures.
b. By providing class notes.
c. By providing reference articles on different concepts .

Assessment: Assessment of a Student can be performed -

1. By regular and surprise class tests.
2. By semester exams.
3. By encourage them to reading text book .
4. By small quiz and tutorials
5. By asking the need & practical applications of a specific device

Sub/Course: Mobile Communication

Program educational objectives:

The educational objectives of a program can be describe by the expected achievement of graduates in their graduation session from the program.

Five major objectives of data structure are:

f. Graduates will learn about different versions of mobile communication development.
g. Graduates will learn about radio wave propagation and propagation path loss models.
h. Graduates will learn about different communication techniques used in mobile communication.
i. Graduates will learn about different access technique used in mobile communication.
j. Graduates will, learn about traffic engineering in mobile communication.

Course Outcomes:

9. Graduates will learn how to design a mobile cell structure using propagation path loss models.
10. Graduates will analyze the mobile communication complexity.
11. Graduates will demonstrate the basics of modulation techniques and its use..
12. Graduates will demonstrate mobile communication complexity based on multipath propagation.
13. Graduates will understand the concept of cell structure and frequency reuse.
14. Graduates will choose the efficient method of mobile system design.
15. Graduates will comprehend an ability to analyze and interpret data.
16. Graduates will demonstrate knowledge of multiple access techniques.

Course Objectives	Course Outcomes							
	1	2	3	4	5	6	7	8
a	√		√		√			
b				√			√	
c		√	√	√				
d						√	√	√
e	√	√				√		

(4) Important topics covered:

- An Overview of Wireless Systems

- Radio Propagation and Propagation Path-Loss Models
- Fundamentals of Cellular Communications
- Multiple Access Techniques
- An Overview of Digital Communication and Transmission
- Traffic c Engineering

Contribute to the outcome: Contribution can be done

e. By providing lectures.
f. By presenting graphically the merits and demerits of different multiple access technique.
g. By providing references for white papers and articles.
h. By showing the step wise calculations of different methods of design of a mobile communication systems.

Assessment: Assessment of a graduates can be performed -

92. By regular and surprise class tests.
93. By mid term and semester exams.
94. By evolution of their programming approach for a specific task or operation.
95. By small quiz and tutorials

Text Books:

3. Essential Reading: Selected portions from V K Garg, Wireless Communication and Netwrking; Morgan Kaufman Publishers India; 2008
4. T S Rappaport, Wireless Communications, Pearson Education, India

Sub/Course:RADAR AND TV ENGINEERING

Course Description :

Basic Television System And Scanning Principles, TV pick up tubes, Vidicon, CCD camera, Color and Digital TV Technology, NTSC & PAL system, fundamentals of Flat panel displays, Plasma displays, Introduction to Radar, RADAR Equation, system losses, MTI, CW, FMCW RADAR, Tacking by RADAR,

Course Objectives : In this subject students will learn about the following points:

g. To learn about Block diagram of TV transmitter & receiver
h. To learn about Sound and picture transmission,
i. To learn about TV pick up tubes, Vidicon, CCD.

j. To learn about mixing of colors and colors perception, chromaticity diagram, color TV signals & transmission

k. To learn about Basic radar, radar blocks diagram, radar frequencies & applications, Radar Indicators.

l. To learn about delay line cancellers, Doppler filter banks, limitation of MTI, Staggered PRF, Pulse Doppler radar, Tacking by RADAR, mono pulse, sequential lobbing, & conical scan of targets.

Course Outcome : Upon completion of this course:

39. Student will be able to understand the transmission and reception of a TV system
40. Student will be able to know how to transmit sound and picture to a long distance.
41. Student will be able to know the different types of scanning concepts.
42. Student will be able to know different types of control signals used for proper transmission and reception.
43. Student will be able to know different types of TV camera used in TV systems.
44. Student will be able to learn about persistence of vision
45. Student will be able to know mixing of colors and colors perception
46. Student will be able to understand color TV signals & transmission
47. Student will be able to understand fundamentals of Flat panel displays, Plasma displays, Liquid crystal displays, and Large screen displays
48. Student will be able to understand the radar range equation, radar frequencies & applications, Radar Indicators.
49. Student will be able to know Doppler filter banks, limitation of MTI, Staggered PRF, Pulse Doppler radar,
50. Student will be able to know Tacking by RADAR, mono pulse, sequential lobing, & conical scan of targets.

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
a	√	√		√								
b	√	√										
c					√		√					
d								√	√			
e										√		
f											√	√

Contribute to the outcome: Contribution can be done -

d. By providing lectures.

e. By providing class notes.

f. By providing reference articles on different concepts.

Assessment: Assessment of a Student can be performed -

96. By regular and surprise class tests.
97. By semester exams.
98. By encourage them to reading text book .
99. By small quiz and tutorials
100. By asking the need & practical applications of a specific device

Text Book :

1. Television and Video Engineering by AMD hale, 2nd edition Tata Mcgraw Hill
Selected portion from Chapter 2,3,4,8,7,9, and 10

Course: Marketing Management

Class: B. Tech – 7th / 8th semesters

Course Description :

Marketing Management : Concept, Process, Functions and relevance in the current context.

Marketing Environment : Socio-economic forces. Competition : national and global, Technology, Competition Analysis : Factors contributing to competition, Competition analysis tools, Competitive arena mapping, Segmentation matrix.

Market Planning : Exploring Opportunity, Product –market selection, Approaches to Market Planning, Market Planning Process. Market Research and Information Systems : Research Process, The Internet and World Wide Web based Information collection and processing, Database, Data Warehouses and Data Mining, Global Market Research, Competitive Intelligence.

Consumer Behaviour : Importance of buyer and his/ her role in purchasing. Influence of buyer behaviour, Buyer behaviour study tools. Organizational buying behaviour.

Market Segmentation, Targeting and Positioning : Market Positioning.

Market Demand Forecasting Product Planning : Product Life Cycle, Packaging and Labeling, Product-mix and Product Line, Product-Mix strategies, Promotion Decisions

Channels of Distributions : Designing Distribution Channels, Wholesaling and Physical Distribution, Retailing. Supply Chain Management (Basic only). Personal selling, Direct Marketing, Managing Sales Force. Trends in Marketing : Global Marketing, Customer Services, Customer Relationship Management, Rural Marketing and Service Marketing.

Course Objectives:

In this subject students will learn about the following points:

Objective of the Course : The course aims at introducing the basic concepts of marketing to the undergraduate students in engineering. The learning shall help the students in better designing, manufacturing and selling product/ service packages keeping competitive market, customers and cost in view.

1) To understand the Market, especially the global market.
2) To understand competition strategies.
3) To understand Consumer behavior in the modern market.
4) To use knowledge for product development.
5) To study different promotional techniques.

<u>Course Outcome</u>

After completion of this course:

a) Students will understand regarding the environmental factors which influence the marketing system.

b) Students will be able to understand competition and make them effective in tackling competition.

c) Students will understand the behavior and needs of consumer properly.

d) This knowledge will help in new cost effective product development.

e) Students will be interested in rendering their services in rural area .

f) Quality will be imparted in tangible & intangible way in service market.

g) Market research & market interpretation system will reach at new height which will introduce new product in an integral way increasing utility .

h) Promotional business will create new employment.

i) Students as managers will understand the concept of future trading.

j) Their will be a big revolution in retail market bringing prices down & increasing employment.

k) Students will be able to understand the actual role of price in the market.

<u>Mapping of course;</u> objective and the outcomes

Course Objectives	Course Outcomes										
	a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
1	√	√									
2		√			√				√	√	
3	√						√			√	
4			√								√
5				√		√		√			

Contribute to the outcome:

Contribution can be done -

g. By providing lectures.
h. By providing references for white papers and articles.
i. By solving problems
e Daily class room interaction

Assessment: Assessment of a Student can be performed -

101. By regular and surprise class tests.
102. By mid term and semester exams.
3. By small quiz and tutorials.
6. Expert lecture from industries

Text Book:

References :

1. M. J. Etazel , B. J. Walker and W. J. Stanton, Marketing, Tata McGraw Hill, 13th Edition, 2004.
2. R. Saxena, “Marketing Management” Tata McGraw Hill, second Edition, 2003.
3. Philips Kotler : Marketing Management
4. Ramswamy & Namkumari: Marketing Management

ANALOG COMMUNICATION LAB

COURSE DESCRIPTION:

1. Amplitude Modulation.
2. Frequency Modulation.
3. Detector circuits.
4. Design and study of low pass, high pass, band pass and band reject filters.
5. Sampling and quantization of sinusoidal signal.
6. Generation of PCM signal.
7. Generation of Gaussian Noise (Simulation by MAT Lab.) study on PSD of noise.
8. Study on SNR of AM, FM and PCM by MAT LAB. Simulation.

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COURSE OBJECTIVES

In this lab students will learn about the following points.

1.To learn how generate Amplitude Modulation and compare the demodulated signal with original modulating signal by the CRO.

2.To learn how generate Frequency Modulation and compare. the demodulated signal with original modulating signal by the CRO.

3. To know about different Detector circuit.

4 To know about different types of filters.

5. To learn how to code communication techniques in mat lab

OUTCOME COURSE

a.Student'll able to amplitude modulate and demodulated signal on the CRO..

b.Student'll able to frequency modulate and demodulated signal on the CRO and calculate the modulation index, bandwidth.

c.Student'll able to design different detector circuits by the proper trainer kit

d.Student'll able to establish different types of filter such low pass, band pass, high pass and bands reject filters

e.Student'll able to code & simulate of different communication techniques by using MATLAB.

f.Student'll able to generation of Gaussian Noise by using MAT LAB

g.Student 'll able to design balanced modulator & demodulator ckt.

h.Student'll be able to measure amplitude & frequency of diff. signals with the help of CRO.

i.Student 'll be able to handle minor projects based on analog communication.

j.Student'll be able to produce diff. shapes of waveform according their requirement.

MAPPING:

	a	b	c	d	e	f	g	h	i	j
1	√						√	√	√	
2		√						√	√	
3			√						√	
4				√					√	√
5					√	√			√	

CONTRIBUTE TO THE OUTCOME

1.By performing different experiments by the students.

2.By demonstrating the related theory behind the experiments.

3.By giving adequate trainer kit and components to the students for performing the experiments.

ASSESSMENT

1.By examining the experiments output.

2.By examining the knowledge about the experiments through the vivavous.

3.By giving some platform for implementation of the experiment's objectives in real field.

BASIC ELECTRONICS LAB.

COURSE DESCRIPTION

1-- Familiarization of electronics components and equipments.

2-- Study and use of Oscilloscope and Signal generator.

3-- Study of V-I characteristics of semiconductor Diode.

4-- Study of Full wave and half wave rectifier circuits with and without capacitor.

5-- Study of V-I characteristics of an n-p-n or p-n-p transistor and DC biasing in common-emitter configuration.

6-- Study of Op-Amp application.

7-- Study of different Logic gates.

8-- Study of gain frequency response of BJT common-emitter RC coupled amplifier.

COURSE OBJECTIVES

In Basic Electronics Laboratory students will learn

1-- To identify different types of electronics components and equipments.

2-- The working operation of CRO and Function generator to view different types signals like sinusoidal, square wave, triangular signal.

3-- V-I characteristics of P-N junction Diode and to measure DC and AC resistance.

4-- Half wave and Full wave rectifier using filter circuits.

5-- The operating point of transistor (i.e., various voltages and currents)

6-- Input and output waveforms for Inverting, Non inverting integrating and differentiating configuration of op-amp.

7-- About various logic gates and truth tables for NAND, AND, OR, NOR, INVERTER, EX-OR.

8-- The frequency response of common emitter BJT at low frequency, high frequency and mid frequency.

COURSE COMPLETION

After completion of laboratory

a-- Students will be able to identify different electronics components like resistors, capacitors, potentiometer, transistors, and diodes

and electronics equipments like cathode ray oscilloscope, multimeter, universal trainer kit.

b-- Students will be able to view and also to measure amplitude, frequency, time period of different types signals like sinusoidal, square wave, triangular signal.

c-- Students will be able to know the properties of diode to plot the V-I characteristics for measurement of DC and AC resistance.

d-- Students will be able to view input and output waveforms for half wave and Full wave rectifier using filter circuits.

e-- Students will be able to plot the V-I characteristics of a p-n-p or n-p-n transistor for common emitter amplifier.

f-- Students will be able to plot input and output waveforms for Inverting, Non inverting integrating and differentiating configuration of op-amp.

g-- Students will be able to design logic circuits like adder, subtractor using various logic gates.

h-- Students will be able to study the frequency response of common emitter BJT at low frequency, high frequency and mid frequency.

i-- Students will be able to design minor circuits like dc power supply, amplifier circuits etc.

j-- Students will be able to design various biasing circuits.

MAPPING

	a	b	c	d	e	f	g	h	i	j
1	√								√	
2		√								
3			√							
4				√					√	
5					√				√	√
6						√				
7							√			
8								√		√

CONTRIBUTE TO OUTCOME

- By performing different experiment by the students.
- By providing the demos of each experiment.
- By providing suitable components & Trainer kit to the student.

ASSESSMENT: Assessment of a student can be

Assessment of a student can be performed-

- By verifying the experiment output.
- By examining the knowledge of the students in each experiment by taking viva-voce.
- How students can apply the experimental work in the real field.

DIGITAL COMMUNICATION TECHNIQUE LAB

COURSE DESCRIPTION

1. Study the functioning of PCM and Delta modulator

2. To study Time division multiplexing.

3. To study PCM.

4. To study the different channel coding and decoding technique.

5. Generation and reception of different types of signals like ASK, PSK, FSK.

6. To transmit and receive three separate signal audio, video, tone simultaneously through satellite link.

7. To transmit PC data through satellite link using a satellite communication demonstration unit.

8. Experimentally compare different forms of BPSK, QPSK, and OQPSK and analyze their spectrum with spectrum analyzer.

9. Spreading and dispreading using additive white Gaussian noise generation/Gold code and other forms of spreading techniques.

10. Transmit different types of signals suing a ISDN system.

11. Analyze the process of data communication in LAN using LAN trainer and compare the performance different media access techniques.

COURSE OBJECTIVES

In this subject students will learn about the following points:

1 To learn about functioning of PCM and Delta modulator & TDM.

2.To know the coding and decoding of different channels.

3.To know about the different digital modulation techniques such as ASK, PSK, FSK.

4.compare different signals such as BPSK, QPSK, OQPSK.

5..To know about the spreading by the spreading techniques.

6.To know about ISDN system and understand different type signals are transmitted.

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COURSE OUTCOME: Upon completion of this course:

a. Student will be able to understand PCM modulation and Delta modulation.

b. Student will be able to understand TDM.

c. Student will be able to understand PCM modulation.

d. Student will be able to understand coding and decoding technique.

e. Student will be able to know different types of signals like ASK, PSK, FSK,

f. Student will be able to know transmit and receive three separate signal audio, video, and tone simultaneously through satellite link.

g. Student will be able to understand transmit PC data by satellite communication.

h. Student will be able to understand compare different forms of BPSK, QPSK, OQPSK, and analyze their spectrum with spectrum analyzer.

i. Student will be able to learn transmit different types of signals using an ISDN system.

j. Student will be able to code different digital communication techniques by using MATLAB.

MAPPING

	a	b	c	d	e	f	g	h	i	j
1	√	√								√
2				√		√				√
3					√					√
4								√		√
5							√	√		√
6									√	

CONTRIBUTE TO THE OUTCOME

1.By performing different experiments by the students.

2.By demonstrating the related theory behind the experiments.

3.By giving adequate trainer kit and components to the students for performing the experiments.

ASSESSMENT

1.By examining the experiments output.

2.By examining the knowledge about the experiments through the vivavous.

3.By giving some platform for implementation of the experiment's objectives in real field.

DIGITAL ELECTRONICS CIRCUIT LAB.

COURSE DESCRIPTION:

1. Investigate logic behavior of AND, OR,, NAND,NOR,EX-OR,EX-NOR,INVERT & BUFFER gates, use of universal NAND gate
2. Gate level minimization: Two level & multilevel implementation of Boolean functions
3. Design, construct & test of adder & subs tractor, code converters, gray code to binary & seven segment display.
4. Design, implement & test a given example with
   i. NAND gates only
   ii. NOR gates only
5. Design with Multiplexers & Demultiplexers
6. Construct & test, Investigate operation of SR, D & JK flip-flops
7. Investigate the operation of all types of shift registers with parallel load design

COURSE OBJECTIVES

In this lab students will learn about the following points.

a. To learn & verify the truth tables of NAND, NOR, EX-OR, EX-NOR, INVERTER & BUFFER gates.
b. To learn & verify truth table of two level & Multilevel Boolean functions.
c. To learn how to design seven segment display system.
d. To learn how to convert a digital circuit into Universal gate based circuit.
e. To learn the design procedure of Multiplexers & Demultiplexers circuits.
f. To learn coding and simulating of digital circuits using VHDL language.

OUTCOME COURSE

1. Students will able to know use of different ICs for different gates.
2. Students will able to learn about minimization technique of different Boolean functions.
3. Students will able to learn seven segment display system.
4. Students will able to learn about code converter.
5. Students will able to know the basic concept of Multiplexers & Demultiplexers circuits.
6. Students will able to understand the VHDL language.

MAPPING

	1	2	3	4	5	6
a	√					
b		√				
c			√			
d				√		
e					√	
f						√

CONTRIBUTE TO THE OUTCOME

a. By performing different experiments by the students.
b. By demonstrating the related theory behind the experiments.
c. By giving adequate trainer kit and components to the students for performing the experiments.

ASSESSMENT

1. By examining the experiments output.
2. By examining the knowledge about the experiments through the vivavous.
3. By giving some platform for implementation of the experiment's objectives in real field.

DIGITAL SIGNAL PROCESSING LAB

COURSE DESCRIPTIPON

1. Generation of various types of continuous signals (sine, cosine, square, triangular) &discrete signals (unit step, unit impulse, ramp sequence).
2. Linear convolution between two sequences with &without using inbuilt function.
3. Circular convolution between two sequences with &without using inbuilt function.
4. Auto correlation of a sequence & cross correlation of two sequences using MATLAB.
5. Comparison between linear convolution &circular convolution.
6. Compute DFT & IDFT of a sequence without using MATLAB.
7. Convolution of two sequences using DFT & IDFT.
8. Implementation of FFT using DIT & DIF algorithm.
9. Convolution of long sequences using overlap add & overlap save using MATLAB.
10. Design & implementation of FIR filters using MATLAB.
11. Design & implementation of IIR filters in MATLAB.
12. Implementation of noise cancellation using adaptive filters.

COURSE OBJECTIVES

In this lab students will learn about the following points:

a. To know about different types of signals.
b. b.To understand the basic concept regarding Auto correlation & Cross correlation.
c. To learn different types of convolutions.
d. To compare between linear convolution & circular convolution.
e. To learn DFT & IDFT method.
f. To compute circular convolution between two sequence using DFT & IDFT.
g. To know how to implement FFT using DIT & DIF algorithm.
h. To perform the convolution of a long data sequence using overlap add & overlap save method.

i. To learn about different types of FIR filters & IIR filters.
j. To learn how the noise can be reduced by using adaptive filters.

COURSE OUTCOMES

Upon completion of this course:

1. Student will be able to know different signals.
2. Student will be able to know the concept of auto correlation & cross correlation.
3. Student will able to learn different types of convolutions.
4. Student will be able to understand the basic comparison between linear convolution & circular convolution.
5. Student will able to know the DFT & IDFT method.
6. Student will able to learn how to compute convolution of a sequence using DFT & IDFT method.
7. Student will able to learn about FFT using DIT & DIF method.
8. Student will be able to know about different types of FIR & IIR filters.
9. Student will be able to understand the overlap add & overlap save method for convolution of a long sequence.
10. Student will be able to know how to reduce noise by using adaptive filters.

MAPPING

	1	2	3	4	5	6	7	8	9	10
a	√									
b		√								
c			√	√						
d				√						
e					√	√				
f						√				
g							√			

h									√	
i								√		
j										√

CONTRIBUTE TO THE OUTCOMES:

a. By performing different experiment by the students.
b. By providing latest version of software used.
c. By providing the demos of each experiment related to theory.
d. By providing a suitable system to the student.

ASSESMENT:

Assessment of a student can be performed-

1. By verifying the experiment output.
2. By examining the knowledge of the students in each experiment by taking viva-voce.
3. How students can apply the experimental work in the real field.

ANALOGUE ELECTRONICS CIRCUIT LAB

COURSE DESCRIPTIPON

1. Design a class-A power amplifier using fixed bias & voltage divider bias circuit.
2. Design, construction & test of a JFET using voltage divider circuit.
3. Design & build a BJT common–emitter circuit and test of dc & ac performance, voltage gain, i/p & o/p impedance. .
4. Design & build BJT emitter-follower circuit and test of dc & ac performance, voltage gain, i/p & o/p impedance.
5. Design &build JFET common source & common drain amplifier and test of dc & ac performance, voltage gain, i/p & o/p impedance.
6. To study the frequency response of a common emitter amplifier at low, high & mid frequency.
7. DC bias & AC operation with & without current source of differential amplifier circuits.
8. Study of Darlington connection & current mirror circuits.
9. Op-amp frequency response and compensation.
10. Application of Op-amp as differentiator, integrator and square wave generator.

COURSE OBJECTIVES

In this lab students will learn the following points:

a. To know about different types of biasing circuits.
b. To know how a JFET works in voltage divider circuit.
c. To know about the working principle of BJT common emitter circuit and its dc ac analysis.
d. To learn about the working principle of BJT emitter follower circuit and its dc & ac analysis.

e. To learn about the working principle of JFET common source & common drain amplifier and its dc& ac analysis.
f. To learn how a common emitter amplifier circuit works under different frequency ranges.
g. To learn the basic concept of Darlington connection & Current mirror circuit.
h. To learn how an Op-amp behaves like differentiator, integrator and square wave generator.

COURSE OUTCOMES

Upon completion of this course:

1. Student will be able to know the concept of biasing & different types of biasing circuit.
2. Student will be able to understand how a FET works.
3. Student will be able to learn by BJT common emitter circuit that a signal will well amplified.
4. Student will be able to understand that i/p is same with the o/p in BJT emitter follower circuit.
5. Student will be able to learn the basic concept of JFET common source and common drain amplifier.
6. Student will be able to learn the frequency response curve, bandwidth, lower cutoff and upper cutoff frequency.
7. Student will be able to understand the concept of Darlington pair transistor & in current mirror circuit the current flowing in 1st transistor is the mirror image of 2nd transistor.
8. Student will be able to understand the application of Op-amp.

APPING

	1	2	3	4	5	6	7	8
a	√							
b		√						
c			√	√				

d				√				
e					√			
f						√		
g							√	
h								√

cONTRIBUTE TO THE OUTCOMES:

a. By performing different experiment by the students.
b. By providing the demos of each experiment.
c. By providing suitable components & Trainer kit to the student.

ASSESMENT:

Assessment of a student can be performed-

1. By verifying the experiment output.
2. By examining the knowledge of the students in each experiment by taking viva-voce.
3. How students can apply the experimental work in the real field.

Microprocessor &Microcontroller Lab
[5th Sem El&Tc Engg,6th Sem Comp.Sc Engg,6th Sem Electrical Engg]

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Course Description :

A: Using 8085 microprocessor

1. Addition,subtraction,multiplication and division of two 8-bit numbers
2. Smallest / largest number among n numbers among a given data array
3. Binary to Gray code & Hexadecimal to decimal conversion
4. Generate square wave on all lines of 8255 with different frequencies.
5. Study of stepper motor & its operation
6. Study of traffic light controller.
7. Study of elevator & simulator
8. Generation of square,triangular and sawtooth wave using DAC
9. Study of 8253 and its operation(mode-0,mode-1,mode-2)
10. Study of mode-0,mode-1,BSR mode of 8255
11. Study of 8279(key board & display) & of 8259(programmable interrupt controller)

B: Using 8086 microprocessor

12. Addition,subtraction,multiplication and division of 16-bit numbers
13. To find the 2's complement of a 16 bit number
14. To find a particular data element in a given data array
15. To mask a specific bit of a number using alook-up table
16. To find the smallest / largest number of a given data array
17. To separate odd / even numbers from a given data array
18. To arrange a given data array in ascending / descending order

C: Using 8051 microcontroller microprocessor

19. Initialize data to registers & memory using immediate,register,direct and indirect addressing modes
20. Addition,subtraction,multiplication and division of two 16-bit numbers

21. transfer of a block of data to another memory location using indexing
22. Operation of 8255 using 8051 microcontroller

Course Objectives : In this subject students will learn about the following points:

a. To learn about architecture and operation of Microprocessor 8085,Microprocessor 8086 & Microcontroller 8051
b. To learn types of memory and memory organization.
c. To learn different types and/or groups of instructions for µP 8085.µP 8086,µC 8051
d. To develop an understanding of programming for microprocessors (8085 & 8086) and µC 8051 with programming techniques.
e. To relate the working of different pin with study of pin configuration and need of interfacing with peripherals.
f. To explain interfacing with input and output device.
g. To distinguish in between different types data converter interfacing.
h. To develop an understanding to co-relate the working of different types of programmable device and their interfacing with µP 8085.

Course Outcome : Upon completion of this course:

1. Student will be able to understand the role and need of µP 8085.µP 8086,µC 8051 in instrumentation.
2. Student will be able to correlate working of different working blocks of µP 8085 internal architecture.
3. Student will be able to understand and co-relate the design and memory that can be use for µP 8085.
4. Student will be able to understand a program and instructions use in it
5. Student will be able to demonstrate the selection of specific instruction for a program.
6. Student will be able to demonstrate the ability to write program for µP 8085.µP 8086,µC 8051operations.
7. Student will be able to understand the need and concept of peripheral interfacing with µP 8085.

8. Student will be able demonstrate the data converter interfacing with µP 8085.
9. Student will be able to understand the need of programmable peripheral device in interfacing with µP 8085.
10. Student will be able to co-relate the working of different types of programmable devices and their interfacing with microprocessor 8085.

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
a	√	√									
b			√					√			
c				√							
d					√	√	√				
e					√	√	√				
f								√			
g		√						√		√	
h									√		
i		√									√

Contribute to the outcome: Contribution can be done -

a. By providing lectures on programing .
b. By presenting coding of some program being use in general instruments working.
c. By providing references for white papers and articles.
d. By showing the step wise working and execution of a program along with the changes in different registers on simulators for µP 8085.

Assessment: Assessment of a Student can be performed -

1. By regular and surprise laboratory tests.
2. By evolution of their programming approach for a specific task or operation.
3. By small quiz and tutorials

COMMUNICATION ENGINEERING LAB.

COURSE DESCRIPTION:

1. Radiation pattern of Dipole, Yagi, Helical and Slot Antenna.
2. Measurement of Refractive Index profile, Numerical Aperature, attenuation and bending loss in a optical fiber.
3. Measurement of Gain of a fiber communication link using optical fiber.
4. Establishing and testing an optical fiber communication link.
5. Simulation of an pn sequence generator using MATLAB.
6. Simulation of direct sequence spread spectrum technique using MATLAB.
7. Simulation of TDM using MATLAB.
8. Study of different blocks of colour TV receiver such as RF amplifier, IF amplifier, sync separator, vertical oscillator,colour picture tube etc and measurement of various voltage signal waveform.

COURSE OBJECTIVES

In this lab students will learn about the following points.

a. To learn about radiation pattern of different antenna by using polar plots.
b. To learn different properties of optical fiber and getting knowledge about different communication link.
c. To learn how to code communication techniques in mat lab.
d. To learn fault finding in TV receivers.

OUTCOME COURSE

1. Student will be able to know use of different antenna at the required places.
2. Student will be able to calculate different antenna parameters by using polar plot.
3. Student will be able to measure N.A.,refractive index of a given fiber optic cable.
4. Student will be able to establish different communication link using fiber optic channel.
5. Student will be able to code & simulation of different communication techniques by using MATLAB.

6. Student will be able to repair the color TV receiver and tracing out faults of different section of TV receiver.

MAPPING:

	a	b	c	d	e	f
1	√	√				
2			√	√		
3					√	
4						√

CONTRIBUTE TO THE OUTCOME

a. By performing different experiments by the students.
b. By demonstrating the related theory behind the experiments.
c. By giving adequate trainer kit and components to the students for performing the experiments.

ASSESSMENT

1. By examining the experiments output.
2. By examining the knowledge about the experiments through the vivavous.
3. By giving some platform for implementation of the experiment’s objectives in real field.

VLSI LAB

COURSE DESCRIPTION

1. Design of adder circuits using VHDL & simulation of it.
2. Design of 2:1,4:1 and 8:1 mux in structural method using VHDL & simulation of it.
3. Design of Decoder BCD to 7 segment using case structure using VHDL & simulation of it.
4. Design of all types flip flops using VHDL coding.
5. Interfacing 2 bit full adder to 7 segment decoder.
6. Study of NMOS characteristics.
7. Layout of NMOS or CMOS inverter.
8. Layout of 2 input NOR or NAND gate.

COURSE OBJECTIVES

In this lab students will learn about the following points.

a. To expert the students in VHDL coding.
b. To expert in designing complex digital circuits using VHDL coding.
c. To learn the layout procedure of different digital gates and inverter circuits.
d. To learn the synthesis and technology schematic view for different digital circuits.

OUTCOME COURSE

1. Studentwill able how to code digital circuits in VHDL language.
2. Studentwill expert himself in designing complex digital circuits by using simple circuits as its component.
3. Studentwill able to design different sequential circuits and simulation of it by using VHDL.
4. Studentwill able to design the layout of a digital circuit.
5. Students can design a digital circuit by defining its different parameters according to their requirement.

6. Students can design digital IC's internal platform and also test it by dumping it into the adequate kit.

MAPPING:

	a	b	c	d	e	f
1	√	√				
2		√	√			
3				√	√	
4						√

CONTRIBUTE TO THE OUTCOME

a. By performing different experiments by the students.
b. By demonstrating the related theory behind the experiments.
c. By giving adequate trainer kit for performing the experiments.

ASSESSMENT

a. By examining the experiments output.
b. By examining the knowledge about the experiments through the vivavous.
c. By giving some platform for implementation of the experiment's objectives in real field.

Sub/Course: Microwave ENGG.

Course Description :

Microwave band & sources, Transmission modes, waveguide & Transmission, line, Microwave devices-Reflex klystron, Magnetron, TWT, Gunn diode, Tunnel diode, Horn antenna, Parabolic reflector antenna, Wave propagation, Fading, Isolator, Resonator, Circulator.

Course Objectives : In this subject students will learn about the following points:

a. To understand the basic of waveguide.
b. To learn different types of transmission lines.
c. To learn different types of polarization techniques.
d. To learn the Radiation pattern,Gain of different antenna.
e. To know the applications of different microwave devices.
f. To learn the advent of communication via satellites in space.
g. To learn industrial application of microwaves.

Course Outcome : Upon completion of this course:

1. Student will be able to understand the master transmission line & waveguide theory & develop a working knowledge of circuit design.
2. Student will be able to know antenna design for comm.. & sensing systems.
3. Student will be able to be familiar with computer aided microwave design tools.
4. Student will be able to understand impedance matching,amplifier & filter design techniques.
5. Student will be able to learn fundamentals of laboratory safty,use & care of microwave instruments.
6. Student will be able to understand the role of microwave oven for very fast cooking.
7. Student will be able to learn about the long distance telephone transmission lines.
8. Student will be able to know the mathematical modeling of different antennas.
9. Student will be able to understand the use of microwave in television for relaying signal from a remote location.
10. Student will be able to understand the use of microwave for distance measuring equipment in air navigation.
11. Student will be able to know the structures of different transmission lines & waveguides.

Mapping:

	1	2	3	4	5	6	7	8	9	10	11
a			√					√			
b				√							
c					√	√	√				
d					√	√	√				
e								√			
g									√		
h		√									√

Contribute to the outcome: Contribution can be done -

a. By providing lectures.

b. By providing the specific references for commercial microwave equipment.

c. By providing references for white papers and articles.

d. By showing the stepwise working principles & advantages & disadvantages of the devices.

Assessment: Assessment of a Student can be performed -

7. By regular and surprise class tests.
8. By mid term and semester exams.
9. By giving regular assignment to them .
10. By small quiz and doubtclearing classes.
5. By asking the need & practical applications of a specific device.

Sub/Course: Communication Engineering

Course Description : Brief introduction to Communication .Fourier Representation of signals- Fourier Series and Fourier Transform, Analog communication systems and digital communication systems and technique. Channel characterstics , Effect of interference and noise.

Modulation process-Amplitude modulation ,Frequency modulation, Phase modulation and Pulse analog modulation.

Course Objectives :In this subject students will learn about the following points:

a. To learn about the importance of fourier representation in facilitating frequency domain analysis.
b. To develop an understanding of characteristics of different communication channels.
c. To relate the basic concepts of amplitude modulation- DSB-SC, DSB-FC, SSB, VSB.
d. To know the basic concept of frequency and phase modulation.
e. To know the basic concept Pulse analog modulation – PPM ,PCM, PWM ,PAM.
f. To understand the effect of Noise and Interference in Communication.

Course Outcome : Upon completion of this course:

1. Student will be able to know the importance of fourier representation in presenting frequency domain analysis.
2. Student will be able to know about TDM and FDM.
3. Student will be able to know about technique of modulation & Demodulation Process.
4. Student will be able to know about Channel characterstics and types of channels.
5. Student will be able to understand the effect of Noise and Interference in Communication.
6. Student will be able to understand the modulation & demodulation technique of AM ,FM and PM.
7. Student will be able to understand the modulation technique PPM,PWM and PAM.
8. Student will be able to understand the digital modulation technique i.e PCM, DM, DPCM, S-Array.
9. To know about the basic concept of Radio and Television Broadcasting.

Mapping:

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
a	√										
b		√	√			√					
c					√			√			
d								√			
e									√	√	

f					√		√	√			

Contribute to the outcome: Contribution can be done -

1. By providing lectures.
2. By providing class notes.
3. By providing reference articles on different concepts .
4. By presenting Practical examples related to the subject.

Assessment: Assessment of a Student can be performed -

6. By regular and surprise class tests.
7. By semester exams.
8. By encouraging them for their involvement in Discussions regarding the subject.
9. By small quiz and tutorials.

Text Book:

1. John G.Proakis,M. Salehi, *COMMUNICATION SYSTEMS ENGINEERING*, 2nd ed. New Delhi,India: PHI Learning Private Limited, 2009.; Selected portion from Chapter 1,2 and 3 for module MODULE-I and MODULE-II of the course.

2. R.P Singh and S.D Sapre, *COMMUNICATION SYSTEMS Analog & Digital*, 2nd ed. New Delhi, India: Tata McGraw Hill Education Private Limited, 2009; Selected portions from Chapter 7 and 8 of the book for MODULE-III.

Department Of Computer Science and Engineering

Synergy Institute of Engineering and Technology, Dhenkanal

Vision

To build healthy academic ambiences aligned with frontline research, quality teaching and competitive environment responding swiftly to the cutting age technologies of the 21st century.

Mission

- Provide quality education in both theory and practice and building science and engineering, and train students to effectively apply this knowledge to solve real-world problems , thereby amplifying their potential for lifelong high-quality careers and give them a competitive edge in the ever changing & challenging global work environment of the 21st century
- Conduct research to advance the state of the art in computer science and integrate research results and innovations into other science and engineering disciplines.
- Provide computer science education and training to students in other departments
- Provide computer awareness to the rural youths living in the periphery.

Programme Educational Objectives(PEO)

1. **Expertise:** Graduated students should have the ability to establish peer-recognized expertise in the discipline. They should have the ability to articulate this expertise by formulating and solving problems of interest, by creating or deriving value through the application of technology, and by using mathematical foundations, designing, implementing and evaluating the best developed system in the industry which meets the desired needs of their employers.
2. **Engagement:** Graduated students should have the ability to be engaged in the profession through their fundamental technical knowledge in Computer Science engineering in the various industries, academia, or the public sector. They should demonstrate effective team spirit and commitment to work with others by applying communications skills and professional knowledge.
3. **Learning:** Graduated students should have the ability to engage in sustained learning through project work, professional improvement opportunities, and self study so that they can adapt in the process of ever-changing areas of science, technology and society.
4. **Professionalism**: Graduated students should have the ability to demonstrate the professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, etc.
5. **Core Competence**: Graduated students should have fundamental knowledge in mathematics, science and engineering required to solve various industrial problems.

Programme Outcomes(PO)

(a) Graduates will demonstrate knowledge of differential equations, optimization theory, vector calculus, complex Variables, matrix theory, probability theory, physics, chemistry, Thermodynamics, electrical and Electronics engineering.
(b) Graduates will demonstrate an ability to identify, formulate and solve computational problems using basic programming skills.
(c) Graduate will demonstrate an ability to handle different computational problems.
(d) Graduate will demonstrate an ability to design of different analytical, computational and information system design to conduct experiments using different computational tools and languages to develop analyze and interpret data.
(e) Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.
(f) Graduate will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.
(g) Graduates will demonstrate knowledge of professional and ethical responsibilities.
(h) Graduate will be able to communicate effectively in both verbal and written form.
(i) Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.
(j) Graduate will develop confidence for self education and ability for life-long learning.
(k) Graduate who can participate and succeed in competitive examinations like GATE, GRE.

Course Outcomes(CO)

Department: - ENGLISH
Course Number:-HM3101
Title of Course: - English Communication Skills
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

a) Students will be able to communicate effectively in both verbal and written form which is ability most sought after in the professional sphere.
b) Students will be able to demonstrate effective interpersonal communication skills which would further their chances of employability.
c) Students will be able to distinguish the different sounds of the English Language along with the Stress and Intonation patterns.
d) Students will be able to find out the correct pronunciation of words with the help of a dictionary

e) Students will be able to know the different varieties of English such as British, American and Standard Indian etc.
f) Students will be able to develop their skills of communication in listening, speaking and writing.
g) Students will develop confidence for self-education and ability for life-long learning.
h) Students will be able to participate and succeed in competitive examinations like GATE, GRE.
i) Students will be able to eliminate the common errors in the different aspects of communication.
j) Students will be able to participate effectively in Group discussion and other such team based activities where soft skills play a major role.
k) Students will be able to achieve clarity and fluency in all communicative activities both in personal and professional sphere.

Topics Covered:-

The elements of communication

1.1 the importance of communication through English at the present time
1.2 the process of communication and factors that influence communication : sender, receiver, channel, code, topic, message, context, feedback, 'noise', filters and barriers
1.3 the importance of audience and purpose
1.4 the information gap principle : given and new information ; information overload
1.5 verbal and non-verbal communication : body language
1.6 comparing general communication and business communication

The sounds of English

2.1 vowels, diphthongs, consonants, consonant clusters
2.2 the International Phonetic Alphabet (IPA) ; phonemic transcription
2.3 problem sounds
2.4 syllable division and word stress
2.5 sentence rhythm and weak forms
2.6 contrastive stress in sentences to highlight different words
2.7 intonations: falling, rising and falling-rising tunes
2.8 varieties of Spoken English: Standard Indian, American and British

Review of English grammar

3.1 stative and dynamic verbs
3.2 the auxiliary system ; finite and non-finite verbs
3.3 time, tense and aspect
3.4 voice: active and passive
3.5 modality
3.7 negation

3.8 Interrogation ; reported and tag questions
3.9 conditionals
3.10 concord
3.11 Phrasal verbs

Text Books and/or Reference Material:-

An Introduction to Professional English and Soft Skills by B.K.Das et al., Cambridge University Press. (Facilitated by BPUT).

Department:- MATHEMATICS
Course Number:- BS1101
Title of Course:- Mathematics-I
Designation: - Required
Pre-requisites:-
Contact Hour:-45
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
a) Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems.

b) Graduate will demonstrate an ability to trace various functions .

c) Graduate will learn how to measure the bendness of a street by the concept of angle of contingence as in curvature .

d) Graduate will learn the piecewise continuity behavior of a function by using concept of vertical asymptotes .

e) Students will be able to understand about the linear transformations that is basic concept of computer science background

f) Students will understand regarding the dimensions of a complex vector space and real vector space with the concept of linear independence which is a basic concept of matrix theory

g) Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differential equation

Topics Covered:-
Module -1 (15 Hours)
Differential Equation: First order differential equations, Separable equation, exact differential equation, Linear differential equation, Bernoulli's equation and application to Electrical circuits. Linear differential equation of second and higher order, Homogeneous equation with constant co-efficient, Euler-Cauchy equations, Solution by undetermined co-effficient, Solutions by variation of parameters, Modeling of electric circuits
Module-II (15Hours)
Calculus: Asymptote, Curvature
Series solution of differential equations, Power series method, Legendres equation and Lagenders polynomials, Bessels equation , Bessels function and its application
Module-III (15 Hours)
Linear algebra, Matrices, Vectors, Determinants, System of linear equations, eigen values and eigen vectors, Symmetric and skew-symmetric matrices, Orthogonal matrices, Complex matrices, Hermitian and skew-hermitian matrices, Unitary matrices and similarity of matrices.

Text Books and/or Reference Material:-
1.Differential Calculus by Santi Narayan and Mittal, Chapters 14, 15 Publisher: S. Chand
2. Advanced Engineering Mathematics by E. Kreyszig Publisher: John Willey & Sons Inc- 8th Edition
3. Higher Engineering Mathematics by B. V. Ramana

Department: - PHYSICS
Course Number: - BS1102
Title of Course: - Physics – I
Designation: - Elective
Pre-requisites: -
Contact Hour: -36
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

a) Graduate will demonstrate knowledge on the application of principles of science in the respective branches of Engineering & Technology
b) Graduate will solve application oriented problems easily.
c) Graduate will Gain knowledge about the advanced subjects of Physics, like Relativity, Astrophysics so that they can pursue Space research to serve India.
d) Graduates can apply principle of Quantum Mechanics in Semiconductor Physics.
e) Graduate will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.
f) Students will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.
g) Graduate will develop confidence for self education and ability for lifelong learning.
h) Graduate can participate and succeed in competitive examination like GATE,GRE.

Topics Covered:-

Oscillatory systems: Simple harmonic oscillation, damped harmonic oscillation, forcedvibration, resonance, coupled oscillation.
Waves as periodic variation quantity in space and time, wave equation,
Reflection and transmission of waves at boundary of two media.
Superposition of waves: Two beam superposition, Multiple-beam superposition, coherent and incoherent superposition.
Two source interference pattern, Intensity distribution, Biprism, Determination ofwavelength of light. Newton's rings: Determination of wavelength of light, refractive indexof liquid
Huygen's principle, Fresnel and Fraunhofer diffraction, zone plate.
Fraunhofer diffraction due to a single slit, Plane transmission grating- diffraction spectra, determination of wave length of light.
Polarization of transverse waves, plane, circular and elliptically polarized light. Polarization by reflection, refraction and scattering.

Double refraction; Nicol prism, Quarter – wave plate, half – wave plate-construction and use.
Production and analysis of circular and elliptically polarized light, Optical rotation

Text Books and/or Reference Material:-

1. Engineering Physics by D.R. Joshi, Mc Graw Hill
2. Engineering Physics by H.K. Malik and A.K. Singh, Mc Graw Hill.

Department:- COMPUTER SCIENCE AND ENGINEERING
Course Number:-BE2105
Title of Course:- Programming in 'C'
Designation: - Required
Pre-requisites:-
Contact Hour:-36
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

a) Graduate will be able to learn object oriented programming and any other programming languages.
b) Graduate will be able to debug the programs written in C language.
c) Students will be able to write programs for large applications.
d) Students will be able to maintain software written in C
e) Graduate can participate and succeed in competitive examinations like GATE, PSU.
f) Graduate can face interview in software companies.
g) Students can do projects using C programming.
h) Students will understand how to modularize a problem.
i) Students will be able to face interviews in software companies.
j) Students will be able to write programs using command line arguments.

Topics Covered:-
Algorithm, flowchart, Structured Programming Approach, structure of C program (header files, C pre- processor, standard library functions, etc.),identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit- wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation. Input-output statements, statements and blocks, if and switch statements, loops:-while, do-while and for statements, break, continue, goto, programming examples.

Designing structured programs: - Functions, parameter passing, storage classes- extern, auto, register, static, scope rules, user defined functions, recursive functions. Arrays- concepts, declaration, definition, accessing elements, and functions, two-dimensional and multi-dimensional arrays, applications of arrays. pointers- concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory management functions, command line arguments,

Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, C program examples. Input and output – concept of a file, text files and binary files, streams, standard I/O, Formatted I/O, file I/O operations, error handling, C program examples.

Text Books and/or Reference Material:-

1.Balagurusamy : “C Programming” Tata McGraw-Hill
2. P. Dey & M. Ghosh, “Computer Fundamental & Programming in C”- Oxford University Press
3. Deitel -“C How to programme” PHI publication/ Pearson Publication
4.Y. Kanitkar – “Let us C” BPB Publisher

Department:- Electronics and Telecommunication
Course Number:-BE2101
Title of Course:- Basic Electronics
Designation: - Elective
Pre-requisites:-
Contact Hour:-32
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Student will be able to know signals and sprectrum of signals.
2. Student will be able to understand about amplifiers and digital inverters
3. Student will be able to know about op amp and its applications.
4. Student will be able to understand semiconductors, zener diodes and rectifiers.
5. Student will be able to know about the BJTs and biasing of BJTs.
6. Student will be able to know about feedback amplifiers and oscillators.
7. Student will be able to know about basic principle of sinusoidal oscillators
8. Student will be able to know about Electronics instruments like AF sine and square wave generator
9. Student will be able to understand the logic gates and Boolean algebra.
10. To know about the basic concept of combinational logic and their function

Topics Covered:-

Introduction to Electronics: Signals, Frequency spectrum of signals, Analog and digital signals, Amplifiers, Digital logic inverters.

The Operational Amplifier (Op-Amp): The ideal Op-Amp, Inverting and non-inverting configurations, Difference amplifier, CMRR, Application of Op-Amp

Semiconductor Diodes: Introduction, Physical operation of p-n junction diodes, Characteristics of p-n junction diodes, Zener diode, Rectifier circuits (half-wave, full-wave, bridge and peak rectifiers), Diode clipper and clamper circuits, Light emitting diodes

Bipolar Junction Transistors (BJTs): Simplified structure and physical operation of n-p-n and p-n-p transistors in the active region, Current-voltage characteristics of BJT, BJT as an amplifier and as a switch.

Bipolar Junction Transistors (BJTs): BJT Circuits at DC, Biasing in BJT amplifier circuits, Small Signal Operation of BJT: Simplified hybrid-π model and its application to single stage BJT amplifiers (Common-Emitter, Common-Base and Common-Collector configurations).

Feedback Amplifiers and Oscillators: General feedback structure, Properties and advantages of negative feedback, Basic principles of sinusoidal oscillators, The Barkhausen criterion, Op-Amp Oscillator circuits

Electronic Instruments: Basic principle of Oscilloscope, Function of the sweep generator, Block diagrams of oscilloscope, Simple CRO, Measurement of frequency and phase by Lissajous method, Application of oscilloscope for measurement of voltage, period and frequency, Block diagram of standard signal generator, AF sine and square wave generator, and Function generator

Logic Gates and Boolean Algebra: The inverter, The AND, OR, NAND NOR, Exclusive-OR and Exclusive-NOR gate, Boolean operations and expressions, Laws and Rules of Boolean algebra, DeMorgan's theorem, Boolean analysis of logic circuits, Standard forms of Boolean expressions, Boolean expression and truth table

Combinational Logic and Their Functions: Basic combinational logic circuits, Implementation of combinational logic, The universal properties of NAND and NOR gates, Basic adders, Multiplexers and Demultiplexers. Elementary treatment of Latches, Basic concepts of Memory (RAMs)

Text Books and/or Reference Material:-

1. Microelectronic Circuits (Fifth Edition), Adel S. Sedra and Kenneth C. Smith, Oxford University Press, YMCA Library Building Jai Singh Road, New Delhi – 110 001.
2. Digital Fundamentals (Eighth Edition), Thomas L. Floyd and R.P. Jain, Pearson Education, 482 FIE, Patparganj, Delhi – 110 092.
3. Electronic Instrumentation, H.S. Kalsi, Tata McGraw-Hill Publishing Company Limited, New Delhi.

4. Electronic Devices (Seventh Edition), Thomas L. Floyd, Pearson Education, 482 FIE, Patparganj, Delhi – 110 092 (Selected Portions).
5. Electronic Devices and Circuit Theory (Ninth Edition), Robert L. Boylestad and Louis Nashelsky, Pearson Education, 482 FIE, Patparganj, Delhi – 110 092.
6. Electronics Principles (7^{th} Edition), Albert Malvono and David J. Bates, Tata McGraw-Hill Publishing Company Limited, New Delhi.

Department:- Mechanical Engineering
Course Number:-BE2103
Title of Course:- Thermodynamics
Designation: - Elective
Pre-requisites:-
Contact Hour:-35
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Know the basic s of thermodynamics
2. Prepare examples of properties, process, systems, functions etc.
3. Have idea about temp., pressure, enthalpy, Internal energy, sp.heat etc.
4. Verify energy principle in control volumes
5. Identify heat transfer in different mediums
6. Compute the performance of I. c. engine, refrigerator, heat pump
7. Know about generation, types, utilization of steam.

Topics Covered:-

Basic concepts and definition: Scope of Thermodynamics, Macroscopic and Microscopic approaches; Definition of Fixed mass (closed systems) and Control volume(open system), Properties (extensive and Intensive), State and its representation on a property diagram, Process and its representation, Cyclic process (or cycle) and its representation, Characteristics of properties (point and path function);Reversible and Irreversible processes; Thermal, mechanical and Chemical equilibrium, Thermodynamic equilibrium, Zeroth

Law of Thermodynamics and temperature, Measurement of temperature and calibration of thermometers, the ideal gas temperature scale, Measurement of pressure, Bourdon pressure gage and manometers, gage and absolute pressure.

Ideal gages and their P-V-T relations, Gas mixtures

Energy Transfer: Work Transfer (definition and calculation), Different modes of work, Displacement Work for various process, Heat Transfer; Modes of heat transfer, Basic laws in conduction, convection and radiation, combined modes of heat transfer with examples.

First Law of Thermodynamics:
i Formal statement (using cyclic processes), First law for processes of fixed masses(closed systems) and introduction of internal energy as a thermodynamics property, Introduction of enthalpy as a thermodynamic property; Definition of specific heats and their use in calculation of internal energy and enthalpy with emphasis on ideal gages.
ii Application of First Law to control volumes; Nozzle, Diffuser, Compressor, Turbine, Throttling device, Heat Exchanger.(only steady flow need be considered)

Second Law of Thermodynamics: Kelvin- Planck and Clausius statements of Second Law, Reversible and irreversible engines and their efficiency, Entropy concepts and the principle of entropy increase.

Properties of pure substances: p-v, p-T, T-S, h-S diagram for steam, different types of steam, Introduction to steam tables with respect to specific volume, pressure, temperature, enthalpy and entropy

Application of thermodynamics: Air compressors, steam power plant, Refrigerators and Heat pump, I.C. Engines (Brief Description of different components of above mentioned systems and working principles with Schematic diagram only)

Text Books and/or Reference Material:-

1. Engineering Thermodynamics by P.K.Nag, Publisher: TMH
2. Basic Engineering Thermodynamics by Rayner Joel, Pearson Education
3. Engineering Thermodynamics by Van Wylen and Sontang, John Wiley
4. 2. Engineering Thermodynamics by M.Achuthan, Publisher: PHI
5. Applied Thermodynamics by Eastop and McConkey, Publisher: Pearson
6. Fundamental of Engineering Thermodynamics by E. Rathakrishnan, publisher. PHI
7. Engineering Thermodynamics by Russel and Adebiyi, publisher, Oxford
8. Steam Tables in SI Units by Ramalingam, Scitech.

Department:- Mechanical Engineering
Course Number:- BE7101
Title of Course:- Engineering Drawing
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous

Course Outcomes:-

Topics Covered:-

Sheet Lay-out & Sketching, Line Drawing, Lettering & Dimensioning; Concept of Orthographic Projection, First-angle Projection, Projections of Points, Projection of straight line, Projection of planes, Projection of Solids, Intersection of surfaces, Development of surfaces, Isometric Projection, Sectional Views of solids, Full section, Introduction to computer-Aided Drafting.

Text Books and/or Reference Material:-

1. Engineering Drawing by N.D.Bhatt & V.M.Panchal, Charotar publishing House, Anand
2. Engineering Drawing with an Introduction to AutoCAD by Dhanjay A. Johle, Tata McGraw Hill
3. Machine Drawing by Junarkar, Pearson Education.
4. 2. Machine Drawing (Includes AutoCAD) by Ajeet Singh, Tata McGraw Hill.
5. 3. Machine Drawing with AutoCAD by Pohit and Ghosh, Pearson Education.
6. 4. Text Book on Engineering Drawing by Narayana / Kannaiah, Scitech.
7. 5. Engineering Drawing by Shah and Rana, Pearson Education
8. 6. Engineering Drawing and Graphics using AutoCAD by T.Jeyapoovan, Vikas Publishing
9. Engineering Drawing and Graphics by K.Venugopal, New Age International.

Department:- Physics
Course Number:- BE7103
Title of Course:- Physics Laboratory
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Graduate will apply the experimental knowledge in various subjects of Engineering & Technology, such as Mechanics, Thermodynamics, BEE, BE etc
2. Graduate will solve application oriented problems easily.
3. Graduate will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks.
4. Students will demonstrate skill to visualize and work on laboratory on safety in electrical equipments.
5. Graduate will develop confidence for self education and ability for lifelong learning.
6. Graduate can be conceptually clear about the theory part of some physics topics like Wave-Oscillations, Optics, and Electromagnetism.

Topics Covered:-

1. Determination of Young's modulus by Searle's methods.
2. Determination of Rigidity modulus by static methods.
3. Determination of surface tension by capillary rise method.
4. Determination of acceleration due to gravity by Bar / Kater's pendulum.
5. Determination of thermal conductivity by Lee's method.
6. Determination of wave length of light of light by Newton's ring apparatus.
7. Determination of grating element of a diffraction grating.
8. Determination of wave length of light of light by Biprism.
9. Plotting of characteristic curves of a PN junction diode.
10. Plotting of characteristic curves of BJT.
11. Verification of laws of verification of strings using sonometer.
12. Determination of wavelength of laser source by diffraction rating methods.
13. Study of Hall effect.
14. Study of RC circuit.
15. Study of a power source- output imedence.

Text Books and/or Reference Material:-

Engineering Practical Physics by S.Panigrahi & B.Mallick –S.Pub. 5

Department:- Electronics and Telecommunication
Course Number:- BE7105
Title of Course:- Basic Electronics Laboratory
Designation: - Elective
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. To identify different electronics components like resistors, capacitors, potentiometer, transistors, and diodes and electronics equipments like cathode ray oscilloscope, millimeter, universal trainer kit.
2. To measure amplitude, frequency, time period of different types signals like sinusoidal, square wave, triangular signal.
3. To plot the V-I characteristics of P-N junction Diode and to measure DC and AC resistance.
4. To view input and output waveforms for half wave and Full wave rectifier using filter circuits.
5. To plot the V-I characteristics of a p-n-p or n-p-n transistor for common emitter amplifier.
6. To plot input and output waveforms for Inverting, Non inverting integrating and differentiating configuration of op-amp.
7. To verify truth table of various logic gates.
8. To study frequency response of common emitter BJT at low frequency, high frequency and mid frequency.
9. To know the properties and use of multiplexer and demultiplexer.
10. To know the properties of CMOS and circuit configuration of inverter using CMOS.

Topics Covered:-

1. Familiarization of electronic components and devices (Testing of semiconductor diodes and transistors using digital multimeter)
2. Study and use of Oscilloscope, signal generator to view waveforms and measure amplitude and frequency of a given waveform.
3. V-I characteristics of semiconductor diode and determining its DC and AC resistance.
4. Studies on half-wave and full-wave rectifier circuits without and with capacitor filter; recording of the waveforms and measurement of average and rms values of the rectifier output.
5. V-I characteristic of an n-p-n or p-n-p transistor, DC biasing the transistor in common-emitter configuration and determination of its operating point (i.e., various voltages and currents).
6. Studies on Op-Amp applications (Inverting, non-inverting integrating and differentiating configurations); recording of the input-output waveforms.
7. Studies on Logic gates (Truth table verification of various gates).
8. Gain-frequency response studies of a BJT common-emitter RC coupled amplifier.

9. Studies and experiments using MUX-DEMUX ICs.
10. Study on CMOS logic inverter.

Text Books and/or Reference Material:-

Department: - Computer Science & Engineering
Course Number: - BE7107
Title of Course: - 'C' Programming Laboratory
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. C has been used by design process. C can be efficiently compiled onto today's architectures and thus are used to develop fast simulation models
2. Students can use c concept in application domains which include systems software, application software, device drivers, embedded software, high-performance server and client applications, and entertainment software such as video games
3. Due to its thin layer of abstraction and low overhead, C allows graduates in efficient implementations of algorithms and data structures, which is useful for programs that perform a lot of computations.
4. C language concept can be used by graduates for creating computer applications and also used a lot in writing embedded software/firmware for various electronics, industrial and communications products. It is also used in developing verification software, test code, simulators etc. for various applications and hardware products.
5. C can also be used by students for website programming using CGI
6. C has greatly influenced many other popular programming languages, most notably C++, which began as an extension to C. so through c , graduates clear about c++.
7. C's design can be used by students as a portable systems implementation language. It provides simple, direct access to any addressable object (for example, memory-mapped device control registers), and its source-code expressions can be translated in a straightforward manner to primitive machine operations in the executable code.
8. Students can use c concept in various application area like UNIX operating system developing computer games.

Topics Covered:-

1. Write a C program to find the sum of individual digits of a positive integer.
2. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
3. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
4. Write a C program to calculate the following Sum:
   Sum=1-x2/2! +x4/4!-x6/6!+x8/8!-x10/10!
5. Write a C program to find the roots of a quadratic equation.
6. Write C programs that use both recursive and non-recursive functions
   i) To find the factorial of a given integer.
   ii) To find the GCD (greatest common divisor) of two given integers.
   iii) To solve Towers of Hanoi problem.

7. Write a C program to find both the larges and smallest number in a list of integers.
8. Write a C program that uses functions to perform the following:
    i) Addition of Two Matrices
    ii) Multiplication of Two Matrices
9. Write a C program that uses functions to perform the following operations:
    i) To insert a sub-string in to given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
10. Write a C program to determine if the given string is a palindrome or not
11. Write a C program to construct a pyramid of numbers.
12. Write a C program to count the lines, words and characters in a given text.
13. Write a C program that uses functions to perform the following operations:
    i) Reading a complex number
    ii) Writing a complex number
    iii) Addition of two complex numbers
    iv) Multiplication of two complex numbers
14. Write a C program which copies one file to another.
15. Write a C program to reverse the first n characters in a file.

Text Books and/or Reference Material:-

PVN. Varalakshmi, Project Using C Scitech Publisher

Department:- English
Course Number:- MH7101
Title of Course: - Communicative English Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Students will be able to transcribe words and short sentences in normal English writing into their IPA equivalents.
2. Students will be able to transcribe words presented orally.
3. Students will be able to convert words presented through IPA symbols into normal writing.
4. Students will be able to do syllable division and stress marking.
5. Students will be exposed to Standard Indian. British and American English.
6. Students will able to read aloud dialogues, poems, excerpts from plays, speeches etc.
7. Students will be able to identify and eliminate the common errors in general grammar and its usage.

Topics Covered:-
Lab sessions will be devoted to practice activities based on all three modules of theory.

1. Students will be trained to find out the correct pronunciation of words with the help of a dictionary, to enable them to monitor and correct their own pronunciation.
    a. transcription of words and short sentences in normal English orthography (writing) into their IPA equivalents ;
    b. transcription of words presented orally ;
    c. conversion of words presented through IPA symbols into normal orthography
    d. syllable division and stress marking (in words presented in IPA form)
2. listening with a focus on pronunciation (ear-training) : segmental sounds, stress, weak forms, intonation
3. Students should be exposed, if possible, to the following varieties of English during listening practice: Standard Indian, British and American.
4. pronunciation practice (for accent neutralization), particularly of problem sounds, in isolated words as well as sentences
5. practicing word stress, rhythm in sentences, weak forms, intonation
6. reading aloud of dialogues, poems, excerpts from plays, speeches etc. for practice in pronunciation
7. Grammar and usage: -The focus will be on the elimination of common errors. Some writing activities (e.g. writing of short paragraphs on assigned topics) can be used to identify these errors.

Text Books and/or Reference Material:-

Department:- Department of Mathematics
Course Number:- BS1104
Title of Course:- Mathematics-II
Designation: - Required
Pre-requisites:-
Contact Hour:-45
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Graduate will demonstrate knowledge of formulating the physical problems into mathematical modeling and they can give the inference on the physical problems.
2. Graduate will demonstrate an ability to trace various functions.
3. Graduate will learn how to find a sum of series of constant terms by Fourier series.
4. Graduate will know how to find the areas, volume, length and path of a particle.
5. Students will be able to understand about the rate of change of a function in arbitrary direction ,to find normal to surface , to find maximum increase or decrease of a function in a direction
6. Students will understand regarding the concept divergence and curl as it has a lot of application in fluid mechanics
7. Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differential equation and able to give their inference by using Laplace transformation

Topics Covered:-

Laplace transformation and its use in getting solution to differential equations, Convolution , Integral equations
Fourier series, Fourier expansion of functions of any period, Even and odd functions, Half range expansion
Fourier transform and Fourier Integral, Gamma, Beta functions, error function
Vector differential calculus: vector and scalar functions and fields, Derivatives, Curves, tangents and arc length, gradient, divergence, curl
Vector integral calculus: Line Integrals, Green Theorem, Surface integrals, Gauss theorem and Stokes theorem

Text Books and/or Reference Material:-

1. Advanced Engineering Mathematics by E. Kreyszig Publisher: John Willey & Sons Inc- 8th Edition
2. Higher Engineering Mathematics by B. V. Ramana Publisher: TMH
3. Mathematical Methods by Potter and Goldberg Publisher: PHI

Department:- Department of Electrical Engineering
Course Number:- BE2102
Title of Course:- Basic Electrical Engineering
Designation: - Elective
Pre-requisites:-
Contact Hour:-40
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course students of all branches engineering.

1. Will understand about electric charge current, voltage, power and electrical circuit elements and their characteristics.
2. Will understand the difference between ideal and practical source of voltage and current and measuring devices like voltmeter, ammeter, wattmeter.
3. Will understand the dc network analysis using ohm's law, kirchoff's current and voltages laws.
4. Will be able to analysis the DC network using nodal analysis, maxwells loop analysis, superposition theorems.
5. Will be able to analysis AC network and solve the problems of AC circuits containing energy storage elements like inductance and capacitance.
6. Will be able to solve the circuits with sinusoidal excitation with phasor method.
7. Will be able to formulate first order and second order differential equations and find the transient response.
8. Will understand residential wiring, earthing and safety measures to be taken for saving human being from shock hazard.
9. Will understand about AC complex power (Active power, Reactive power, Apparent Power, Power Factor)
10. Will learn about AC 3-Phase network Analysis.
11. Will understand about generation and distribution of AC Power.
12. Will understand about measurement systems, Transducers, wiring, grounding, noise and signal conditioning.
13. Will learn about A/D and D/A conversion.
14. Will learn about electricity and magnetism, magnetic circuits, transformers and electromechanical energy conversion.
15. Will learn about AC motors, AC generators (Alternator), DC motor, DC generator.

Topics Covered:-

Fundamentals of Electric Circuits: -Charge, current, KCL, Voltage and KVL, Electric Power and sign conventions, circuit elements and their characteristics, Resistance and Ohm's Law Practical voltage and current sources, Measuring devices
Resistive Network Analysis :-Node voltage analysis, Mesh current analysis, node and mesh current analysis with controlled sources, principle of superposition, maximum power transfer

AC Network analysis : -Energy Storage elements, time-dependent signal sources, solution of circuits containing energy storage elements, phasor solutions of circuits with sinusoidal excitations, AC circuit analysis methods
Transient Analysis : -Transient Analysis, Writing differential equations for circuits, DC steady state solutions of circuits, Transient Response of second order circuits
AC Power : -Power in AC circuits, Complex Power, Transformers, Three-phase power, Residential Wiring: Grounding and safety, Generation and distribution of AC Power
Electronic Instrumentation and Measurements : -Measurement Systems and Transducers, Wiring, Grounding and noise, signal conditioning, A/D and D/A Conversion
Principles of Electro mechanics: -Electricity and Magnetism, Magnetic Circuits, Magnetic Materials and B-H curves, Transformers, Electromechanical Energy Conversion
Introduction to Electric Machines: -Rotating Electric machines, DC Machines, DC Generators, DC Motors, AC machines, Alternator

Text Books and/or Reference Material:-

1. Principles and Applications of Electrical Engg., Rizzoni, McGrawHill
2. Electrical & Electronic Technology, E. Huges, Pearson, 9th Edition
3. Basic Electrical Engineering, A. Fitzerlad, D. E.Higginbotham and A.Grabel, TMH, 5th Ed.
4. Electrical Engineering Fundamentals, Vincent Del Toro, 2nd Edition, PHI

Department: - Department of Mechanical Engineering
Course Number: - BE2104
Title of Course: - Mechanics
Designation: - Elective
Pre-requisites:-
Contact Hour:-40
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. An ability to apply fundamental knowledge of mathematics, science and engineering.
2. An ability to design and conduct mechanical experiments.
3. An ability to analyze and interpret mechanical experiments.
4. An ability to design a system, component or process to meet desired needs by synergistically combining mechanics of materials, fluid mechanics and dynamics when necessary.
5. An ability to effectively function as the leader or member of a multi disciplinary team.
6. An ability to identify, formulate and solve engineering problems involving mechanics of materials, fluid mechanics and/or dynamics.
7. An understanding of professional and ethical responsibility to communicate effectively- orally, graphically and in writing.
8. The board education necessary to understand the impact of engineering solution on society and environment.

Topics Covered:-

Concurrent forces on a plane – Composition and resolution of forces and equilibrium of concurrent coplanar forces, Method of projections, Methods of moment, Friction.
Parallel forces in a plane- Two parallel forces, General case of parallel forces, Center of parallel forces in a plane and center of gravity- centroids of composite plane figure and curves, Distributed parallel forces in a plane. General case of forces in a plane- composition of forces in a plane and equilibrium of forces in a plane.

Plane trusses- method of joints and method of sections, Principle of virtual work – equilibrium of ideal systems.
Moments of Inertia- Plane figure with respect to an axis in its plane and perpendicular to the plane- parallel axis theorem, Moment of Inertia of material bodies.
Rectilinear Translation- Kinematics- Principles of Dynamics- D'Alemberts Principles.

Momentum and impulse, Work and Energy- impact
Curvilinear translation- Kinematics- equation of motion- projectile- D'Alemberts Principle in curvilinear motion, Moment of momentum, Work- Energy in curvilinear motion.
Kinetics of Rotation of rigid body

Text Books and/or Reference Material:-

1. Engineering Mechanics by S Timoshenko, D.H Young and J.V.Rao, Revised 4th edition (Special Indian Edition), McGraw Hill.
2. Fundamental of Engineering Mechanics(2nd Edition) by S. Rajesekharan & G.Sankara Subramanium, Vikash Publishing House Pvt. Ltd.
3. Engineering Mechanics by Shames and Rao, Pearson Education.
4. Engineering Mechanics, Statics and Dynamics by Boresi and Schmidt, Thomson.
5. Engineering Mechanics by I.S.Gunjal, Laxmi publications.

Department:- Department of Computer Science & Engineering
Course Number:- BE2106
Title of Course:- Data Structure using 'C'
Designation: - Required
Pre-requisites:-
Contact Hour:-36
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Student will understand the implementation of different data structures namely stack, queue
2. Student will understand the concept of Dynamic storage management
3. Student will understand to use conversion and evaluation of infix and postfix
4. Student will get the knowledge about Tree terminology
5. Student will understand the complete implementation of the graph
6. Student will implement and able to understand the sorting Techniques
7. Student will get searching Technique namely linear search and binary search
8. Student will get knowledge To understand the Hashing Techniques and Hash function
9. Students will be able to develop software by choosing appropriate data structure.
10. Students will be able to appear competitive examinations.
11. Student will be able to choose the data structure for any application.

Topics Covered:-

Introduction to data structures: storage structure for arrays, sparse matrices, Stacks and Queues: representation and application. Linked lists: Single linked lists, linked list representation of stacks and Queues. Operations on polynomials, Double linked list, circular list.

Dynamic storage management-garbage collection and compaction, infix to post fix conversion, postfix expression evaluation. Trees: Tree terminology, Binary tree, Binary search tree, General tree, B+ tree, AVL Tree, Complete Binary Tree representation, Tree traversals, operation on Binary tree-expression Manipulation.

Graphs: Graph terminology, Representation of graphs, path matrix, BFS (breadth first search), DFS (depth first search), topological sorting, Warshall's algorithm (shortest path algorithm.) Sorting and Searching techniques – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort, Heap sort, Radix sort. Linear and binary search methods, Hashing techniques and hash functions.

Text Books and/or Reference Material:-

1. Gilberg and Forouzan: "Data Structure- A Pseudo code approach with C" by Thomson publication
2. "Data structure in C" by Tanenbaum, PHI publication / Pearson publication.
3. Pai: "Data Structures & Algorithms; Concepts, Techniques & Algorithms "Tata McGraw Hill.
4. "Fundamentals of data structure in C" Horowitz, Sahani & Freed, Computer Science Press.
5. "Fundamental of Data Structure" (Schaums Series) Tata-McGraw-Hill.

Department:- English
Course Number:- HM3102
Title of Course:- Business Communication
Designation: - Required
Pre-requisites:-
Contact Hour:-
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Students will be able to communicate effectively in both verbal and written form which is an ability most sought after in the professional sphere.
2. Students will be able to demonstrate effective interpersonal communication skills which would further their chances of employability.
3. Students will be able to distinguish the different sounds of the English Language along with the Stress and Intonation patterns.
4. Students will be able to find out the correct pronunciation of words with the help of a dictionary
5. Students will be able to know the different varieties of English such as British, American and Standard Indian etc.
6. Students will be able to develop their skills of communication in listening, speaking and writing.
7. Students will develop confidence for self-education and ability for life-long learning.
8. Students will be able to participate and succeed in competitive examinations like GATE, GRE.
9. Students will be able to eliminate the common errors in the different aspects of communication.
10. Students will be able to participate effectively in Group discussion and other such team based activities where soft skills play a major role.
11. Students will be able to achieve clarity and fluency in all communicative activities both in personal and professional sphere.

Topics Covered:-

Patterns of communication in the business world: upward, downward, horizontal, grapevine etc , internal and external channels of communication; formal and informal channels, Introduction to cross-cultural communication.
Avoiding gender, racial and other forms of bias in communication, common forms of oral and written communication in the business world: , Oral presentations, interviews and group discussions , Memos, reports, summaries and abstracts, e-mails

The importance of developing reading skills

The sub-skills of reading:

a. understanding the main idea and supporting details
b. reading between the lines : inferential reading
c. understanding the writer's point of view
d. making predictions
e. guessing the meanings of unfamiliar words
f. skimming and scanning
g. note-making

The importance of writing skills, the differences between speech and writing, the qualities of effective writing: coherence, cohesion, logical structuring and organization, clarity of language, stylistic variation etc.

The writing process: pre-writing, drafting, re-writing

Soft skills: becoming a good leader and team-player
Inter-relating soft skills and communication skills

Text Books and/or Reference Material:-

1. Business Communication Today by Bovee et al (Pearson)
2. 2 Business Communication by Meenakshi Raman and Prakash Singh (Oxford)
3. 3 Crash Course in Personal Development by Brian Clegg (Kogan Page)
4. 4 Activities for Developing Emotional Intelligence by Adele B.Lynn (HRD Press)
5. 5 Lateral Thinking by Edward De Bono (Penguin)

Department: - Chemistry
Course Number: - BS1103
Title of Course: - Chemistry-I
Designation: - Elective
Pre-requisites:-
Contact Hour: - 39
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Molecules can be compared based on their bond order, bond strength, and stability of the molecules can also be stated.
2. The equilibrium existing between different phases of a heterogeneous system can be predicted.
3. Quality of water & lubricating oil can be known.
4. The fundamental of catalysis & transport will be applied in the analysis & design of reacting system.
5. The procedures necessary to deduce chemical & phase equilibria from readily available physical properties data (T, P, and C) &state equation can be known and the conventional symbols, reference, states & standard conditions used.
6. Fundamental understanding of the principles of electrochemical processes & competence in analysis of industrial system.

Topics Covered:-
Structure & Bonding: Dual nature of matter, Schrodinger equation (need not be derived), interpretation of wave functions, molecular orbital theory of diatomic molecules, metallic bonding.
Phase rule: Phase diagram of one & two component systems,H_2O, S, Cd-Bi and Fe-C systems
Solid State: Crystal systems, Bravais lattices, closed packed structures, ionic solids, and crystal defects including Schottky and Frenkel defects

Reaction Kinetics & Catalysis: Rate law, Order & Molecularity, Determination of order of reaction, Kinetics of Zero, 1st and 2nd order reactions, Collision theory, theory of absolute reaction rates, Energy of activation, Homogeneous & Heterogeneous catalysis (a general idea)
Electrochemistry: Electrochemical cells, EMF, Measurement of EMF, Relation between EMF & free energy change of cell reactions, Electrode potentials and measurements with reference to standard hydrogen electrode, calomel electrodes, determination of pH, dry cells, storage cells and fuel cells.

Chemical thermodynamics: Thermo chemistry, Thermo-chemical calculations based on Hess's law and Born-Haber cycle, second law of thermodynamics, Entropy.
The free energy concepts, applications to gases, Gibbs Helmholtz equation, free energy change and criterion of spontaneity and equilibrium of chemical reactions, chemical equilibrium, Maxwell's relations.

Text Books and/or Reference Material:-

1. Physical Chemistry by G.M. Barrow, 6th edition, Tata McGraw Hill, New Delhi.
2. Physical Chemistry by P.W. Atkins, 5th / 6th edition Oxford.
3. Principles of Physical Chemistry by Puri, Sharma and Pathania.
4. Physical Chemistry by Bahl and Tuli.
5. Engineering Chemistry by Jain and Jain (15th edition).
6. Physical Chemistry-Thomas Engel, Philip Reid by Pearson Education.

Department:- Mechanical Engineering
Course Number:- BE7102
Title of Course:- Workshop Practice
Designation: - Elective
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

Topics Covered:-

Fitting Practice: Use of hand tools in fitting, preparing a male and female joint of M.S. or making a paper weight of M.S.
Welding Practice: Gas welding & Electric Arc welding Practice.
A joint such as a Lap joint, a T-joint or a Butt joint is to be prepared or to make furniture.
Machining:
(i) Stepped cylindrical Turning of a job and Thread-cutting in lathe.
(ii) Shaping
(iii) Milling

Text Books and/or Reference Material:-

1. Elements of Workshop Technology, Vol. I and II by Hajra choudhary, Khanna Publishers
2. Workshop Technology by WAJ Chapman, Viva Books
3. Workshop Manual by Kannaiah/ Narayana, Scitech

Department:- Chemistry
Course Number:- BE7104
Title of Course:- Chemistry Laboratory
Designation: - Elective
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Caustic embrittlement and deposition of precipitates and sludges in boiler tubes and pipes can be avoided
2. Softening of water is very essential for many industrial uses. In order to use any softening process, type and extent of hardness must be known as prerequisite
3. Suitable choice of indicator in acid-base titration depends upon the pH value of the solution at the end point
4. Amount of DO provides a safeguard for industrial boilers
5. DO test is helpful in determining the pollution extent of sewage
6. Determination of flash and fire points of lubricating oil to provide safeguard against fire hazards during transportation and storage

Topics Covered:-

1. Determination of amount of sodium hydroxide and sodium carbonate in a mixture.
2. Determination of total hardness of water by EDTA method.
3. Estimation of calcium in limestone.
4. Determination of percentage of available chlorine in a sample of bleaching powder.
5. Preparation of Phenolphthalein.
6. Preparation of Aspirin.
7. Preparation of buffer solution and determination of pH of a buffer solution.
8. Standardization of $KMnO_4$ using sodium oxalate.
9. Determination of Ferrous iron in Mohr's salt by potassium permanganate.
10. Determination of partition coefficients of iodine between benzene and water.
11. Determination of rate constant of acid catalysed hydrolysis reaction.
12. Determination of concentration of a coloured substance by spectrophotometer.
13. Determination of dissolved Oxygen in a sample of water.
14. Determination of Viscosity of a lubricating oil by Red wood viscometer.
15. Determination of Flash point of a given oil by Pensky_Marten's flash point approach.

Text Books and/or Reference Material:-

Department:- Electrical Engineering
Course Number:- BE7106
Title of Course:- Basic Electrical Engineering Lab.
Designation: - Elective
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

Topics Covered:-

1. Connection and measurement of power consumption of a fluorescent lamp.
2. Measurement of armature and field resistances of a DC compound machine.
3. Starting and speed control of a DC shunt motor by (a) field flux control method, and (b) armature voltage control method.
4. V-I characteristics of incandescent lamps and time-fusing current characteristics of a fuse.
5. Connection and testing of a single-phase energy meter.
6. Starting of three-phase induction motor by star-delta starter.
7. Determination of open circuit characteristics (OCC) of DC shunt generator.
8. Calculation of current, voltage and power in series R-L-C circuit excited by single-phase AC supply and calculation of power factor.
9. Calculation of no load losses of a single-phase transformer.
10. Study of single-phase induction motors/ fan motors.

Text Books and/or Reference Material:-

Department:- English
Course Number: - HM7102
Title of Course: - Business Communicative Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

a. Students will be able to communicate effectively in both verbal and written form which is an ability most sought after in the professional sphere.
b. Students will be able to demonstrate effective interpersonal communication skills which would make their transition into the corporate sector easy.
c. Students will be able to participate effectively in Group discussion and other such team based activities where soft skills play a major role.
d. Students will be able to cultivate leadership skills and other soft skills which will enable them to participate effectively in team based activities in their professional domain.
e. Students will be able to demonstrate effective interpersonal skills in a multi-cultural workforce.
f. Students will be able to develop an understanding of the dynamics of cross-cultural communication and bias-free communication.
g. Students will develop reading and writing skills along with the sub-skills of reading and the qualities of effective writing.
h. Students will develop comprehension skills, study skills and reference skills along with vocabulary enrichment.
i. . Students will demonstrate an understanding of their professional and ethical responsibilities.
j. Students will be able to achieve clarity and fluency in all communicative activities both in personal and professional sphere.
k. Students will develop confidence for self-education and ability for life-long learning.

Topics Covered:-

Speaking : oral communication in social and work-related situations, e.g.:
Greeting an acquaintance/ friend, introducing oneself, introducing a friend to another friend, breaking off a conversation politely, leave-taking; making and responding to inquiries; expressing an opinion;
expressing agreement/ disagreement, contradicting/ refuting an argument; expressing pleasure, sorrow, regret, anger, surprise, wonder, admiration, disappointment etc. Narrating or reporting an event;

Describing people, objects, places, processes etc. Ordering / directing someone to do something
Making requests; accepting / refusing a request Expressing gratitude; responding to expressions of gratitude Asking for or offering help; responding to a request for help ,Asking for directions (e.g. how to reach a place, how to operate a device etc.) and giving directions ,asking for and granting/ refusing permission ,prohibiting someone from doing something ,suggesting, advising, persuading, dissuading, making a proposal ,praising, complimenting, felicitating ,expressing sympathy (e.g. condolence etc.)
Complaining, criticizing, reprimanding

Students will be given practice in reading and comprehending 6-8 simple passages of 100-300 words each, on topics of general as well as professional interest. The texts will be supported by suitable exercises designed to foster comprehension skills and vocabulary enrichment, together with study skills (note making) and reference skills (using a dictionary).

Writing short paragraphs on given topics or topics of one's choice; social and business letters; reports; applications ; resumes ; summaries
The principles of 'Process Writing' should be used to teach writing skills.
i pre-writing : generating ideas, brain-storming, idea mapping, outlining
ii writing : generating a first draft ; reviewing, redrafting, editing
iii post-writing : making a presentation ; discussion and feedback, preparing the final draft

Activities designed to highlight leadership and 'team' skills ; Group discussion

Text Books and/or Reference Material:-

Department:- Computer Science & Engineering
Course Number:- BE2106
Title of Course:- Data Structure Using 'C' Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

a) Student will implement matrix multiplication
b) Student will implement the push and pop operation
c) Student will implement the conversion and evaluation of infix and postfix
d) Student will implement Creation, Insertion & Deletion function of the Single linked list
e) Student will implement Creation, Insertion & Deletion function of the Double linked list
f) Student will implement the Creation, Insertion & Deletion function Binary Tree
g) Student will implement recursive and non recursive functions of Linear search
h) Student will implement recursive and non recursive functions of Binary search
i) Student will implement the bubble sort of integer values of descending order
j) Student will implement the quick sort of integer values of descending order
k) Students will be able to appear any competitive examination.

Topics Covered:-

Experiment No.1

Write a C program to perform matrix multiplication using array.

Experiment No.2

(a) Write a C program to create a stack using an array and perform
(i) push operation (ii) pop operation
(b) Write a C program to create a queue and perform
i) Push ii) pop iii) Traversal

Experiment No. 3

Write a C program that uses Stack operations to perform the following:
i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

Experiment No. 4

Write a C program that uses functions to perform the following operations on Single linked list:
i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways

Experiment No. 5

Write a C program that uses functions to perform the following operations on Double linked list:
i) Creation ii) Insertion iii) Deletion

Experiment No. 6

Write a C program that uses functions to perform the following operations on Binary Tree:
i) Creation ii) Insertion iii) Deletion

Experiment No. 7

Write C programs that use both recursive and non recursive functions to perform the Linear search operation for a Key value in a given list of integers:

i) Linear search

Experiment No. 8

Write C program that use both recursive and non recursive functions to perform the Binary search operation for a Key value in a given list of integers:

Experiment No.9

Write a C program that implement Bubble Sort method to sort a given list of integers in descending order.

Experiment No.10

Write a C program that implement Quick Sort method to sort a given list of integers in ascending order

Text Books and/or Reference Material:-

"Data structure using C" by Sudipta Mukherjee, TMH Publication

Department:- Mathematics
Course Number:- BSCM1205
Title of Course:- Mathematics – III
Designation: - Required
Pre-requisites:-
Contact Hour:-40
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

After completion of this course:

1. Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems.
2. Graduate will demonstrate an ability to trace various functions.
3. Graduate will learn how to measure the bendness of a street by the concept of angle of contingence as in curvature .
4. Graduate will learn the piecewise continuity behavior of a function by using concept of vertical asymptotes .
5. Students will be able to understand about the linear transformations that is basic concept of computer science background
6. Students will understand regarding the dimensions of a complex vector space and real vector space with the concept of linear independence which is a basic concept of matrix theory
7. Students will learn regarding the variation of between voltage and current with the help of RLC and RC with the basic concept of differential equation

Topics Covered:-

Partial differential equation of first order, Linear partial differential equation, Non-linear partial differential equation, Homogenous and non-homogeneous partial differential equation with constant co-efficient, Cauchy type, Monge's method, Second order partial differential equation. The vibrating string, the wave equation and its solution, the heat equation and its solution, Two dimensional wave equation and its solution, Laplace equation in polar, cylindrical and spherical coordinates, potential.

Complex Analysis:
Analytic function, Cauchy-Riemann equations, Laplace equation, Conformal mapping, Complex integration: Line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions

Power Series, Taylor's series, Laurent's series, Singularities and zeros, Residue integration method, evaluation of real integrals.

Text Books and/or Reference Material:-

1. E. Kreyszig," Advanced Engineering Mathematics:, Eighth Edition, Wiley India
   Reading Chapters: 11,12(except 12.10),13,14,15
2. B.V. Ramana, " Higher Engineering Mathematics", McGraw Hill Education, 2008
3. Reading chapter: 18
4. E.B. Saff, A.D.Snider, " Fundamental of Complex Analysis", Third Edition, Pearson Education, New Delhi
5. 2. P. V. O'Neil, "Advanced Engineering Mathematics", CENGAGE Learning, New Delhi

Department:- Electrical Engineering
Course Number:- BEES2211
Title of Course:- Network Theory
Designation: - Required
Pre-requisites:-
Contact Hour:-40
Type of Course: - Lecture
Course Assessment: -Semester-End assessment with internal
Course Outcomes:-

Topics Covered:-

1. NETWORK TOPOLOGY: Graph of a network, Concept of tree, Incidence matrix, Tie-set matrix, Cut-set matrix, Formulation and solution of network equilibrium equations on loop and node basis.
2. NETWORK THEOREMS & COUPLED CIRCUITS: Substitution theorem, Reciprocity theorem, Maximum power transfer theorem, Tellegen's theorem, Millman's theorem, Compensation theorem, Coupled Circuits, Dot Convention for representing coupled circuits, Coefficient of coupling, Band Width and Q-factor for series and parallel resonant circuits.

3. LAPLACE TRANSFORM & ITS APPLICATION: Introduction to Laplace Transform, Laplace transform of some basic functions, Laplace transform of periodic functions, Inverse Laplace transform, Application of Laplace transform: Circuit Analysis (Steady State and Transient).
4. TWO PORT NETWORK FUNCTIONS & RESPONSES: z, y, ABCD and h-parameters, Reciprocity and Symmetry, Interrelation of two-port parameters, Interconnection of two-port networks, Network Functions, Significance of Poles and Zeros, Restriction on location of Poles and Zeros, Time domain behaviour from Pole-Zero plots.

5.FOURIER SERIES & ITS APPLICATION: Fourier series, Fourier analysis and evaluation of coefficients, Steady state response of network to periodic signals, Fourier transform and convergence, Fourier transform of some functions, Brief idea about network filters (Low pass, High pass, Band pass and Band elimination) and their frequency response.
6. NETWORK SYNTHESIS: Hurwitz polynomial, Properties of Hurwitz polynomial, Positive real functions and their properties, Concepts of network synthesis, Realization of simple R-L, R-C and L-C functions in Cauer-I, Cauer-II, Foster-I and Foster-II forms.

Text Books and/or Reference Material:-

1. Network Theory – P K Satpathy, P Kabisatpathy, S P Ghosh and A K Chakraborty – Tata McGraw Hill, New Delhi.
2. Network Analysis – M E Van Valkenburg – Pearson Education.
3. Network Synthesis – M E Van Valkenburg – Pearson Education.
4. Network Analysis and Synthesis – Franklin F. Kuo – Wiley Student Edition.
5. Fundamentals of Electric Circuits – Alexander & Sadiku – Tata McGraw Hill.

6. Linear Circuits Analysis and Synthesis – A Ramakalyan – Oxford University Press.
7. Problems & Solutions in Electric Circuit Analysis – Sivananda & Deepa – Jaico Book.
8. Network Theory, Smarajit Ghosh, PHI.

Department:- Physics
Course Number:- BSCP 1207
Title of Course:- Physics of Semiconductor Devices
Designation: - Required
Pre-requisites:-
Contact Hour:- 33
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduates will draw different band diagrams indicating position of Fermi levels.
2. Graduates will draw & explain E ~ k diagrams (1d & 3d).
3. Graduates will to solve problem on intrinsic & extrinsic carrier concentrations.
4. Graduates will find out np product for different semi conductor in different states
5. Graduates will explain & solve problem from drift diffusion, thermal generation, electron hole recombination & scattering.
6. Graduates will find out excess minority carrier concentration for forward & reverse biased modes.
7. Graduates will draw v ~ i characteristics of pn junction, bjt, schotky diodes & mosfet.
8. Graduates will to solve problems from questions related to semiconductors.
9. Graduates will to to operate semiconductor devices in laboratory
10. Graduates will develop confidence for self education and ability for lifelong learning.
11. Graduates can participate and succeed in competitive examination like GATE,GRE.

Topics Covered:-

1. **Introduction to the quantum theory of solids**: Formation of energy bands, The k-space diagram (two and three dimensional representation), conductors, semiconductors and insulators.
2. **Electrons and Holes in semiconductors:** Silicon crystal structure, Donors and acceptors in the band model, electron effective mass, Density of states, Thermal equilibrium, Fermi-Dirac distribution function for electrons and holes, Fermi energy. Equilibrium distribution of electrons & holes: derivation of *n* and *p* from D(E) and f(E), Fermi level and carrier concentrations, The *np* product and the intrinsic carrier concentration. General theory of *n* and *p*, Carrier concentrations at extremely high and low temperatures: complete ionization, partial ionization and freeze-out. Energy-band diagram and Fermi-level, Variation of EF with doping concentration and temperature.
3. **Motion and Recombination of Electrons and Holes:** Carrier drift: Electron and hole mobilities, Mechanism of carrier scattering, Drift current and conductivity.

4. **Motion and Recombination of Electrons and Holes (continued):** Carrier diffusion: diffusion current, Total current density, relation between the energy diagram and potential, electric field. Einstein relationship between diffusion coefficient and mobility. Electron-hole recombination, Thermal generation.

5. **PN Junction:** Building blocks of the pn junction theory: Energy band diagram and depletion layer of a pn junction, Built-in potential; Depletion layer model: Field and potential in the depletion layer, depletion-layer width; Reverse-biased PN junction; Capacitance-voltage characteristics; Junction breakdown: peak electric field. Tunneling breakdown and avalanche breakdown; Carrier injection under forward bias-Quasi-equilibrium boundary condition; current continuity equation; Excess carriers in forward-biased pn junction; PN diode I-V characteristic, Charge storage.
6. **The Bipolar Transistor:** Introduction, Modes of operation, Minority Carrier distribution, Collector current, Base current, current gain, Base width Modulation by collector current, Breakdown mechanism, Equivalent Circuit Models - Ebers -Moll Model.

7. **Metal-Semiconductor Junction:** Schottky Diodes: Built-in potential, Energy-band diagram, I-V characteristics, Comparison of the Schottky barrier diode and the pn-junction diode. Ohmic contacts: tunneling barrier, specific contact resistance**.**
8. **MOS Capacitor:** The MOS structure, Energy band diagrams, Flat-band condition and flat-band voltage, Surface accumulation, surface depletion, Threshold condition and threshold voltage, MOS C-V characteristics, Qinv in MOSFET.
9. **MOS Transistor:** Introduction to the MOSFET, Complementary MOS (CMOS) technology, V-I Characteristics, Surface mobilities and high-mobility FETs, JFET, MOSFET Vt, Body effect and steep retrograde doping, pinch-off voltage,

Text Books and/or Reference Material:-

1. Modern Semiconductor Devices for Integrated Circuits, Chenming Calvin Hu, Pearson Education/Prentice Hall, 2009.
2. Semiconductor Physics and Devices, 3rd Edition, Donald A. Neamen, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Fundamentals of Semiconductor Devices, M.K. Achuthan and K.N. Bhatt, Tata McGraw Hill Publishing Company Limited, New Delhi.
4. Solid State Electronics Devices, 6th Edition, Ben. G. Stretman and Sanjay Banarjee, Pearson Education, New Delhi.
5. Physics of Semiconductor Devices, 3rd Edition, S.M. Sze and Kwok K. Ng, Wiley India Pvt. Limited, New Delhi.
6. Physics of Semiconductor Devices, 2nd Edition, Dillip K. Roy, University Press (India) Pvt. Ltd., Hyderabad.
7. Solid State Electronics Devices, D.K. Bhattacharya and Rajnish Sharma, Oxford University Press, New Delhi.

Department:- Computer Science & Engineering
Course Number:- PCCS2207
Title of Course:- Object Oriented Programming
Designation: - Required
Pre-requisites:-
Contact Hour:- 40
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. When graguates are working with C++, they are working with various aspects like individual bits, pointers, and bytes. This will allow you understand the various optimization techniques for the computer system.
2. It's always good to know, what is happening with regards to the components of the system that you are using. While working with higher level languages this is extremely useful, if something does not work or is slower than they thought it would be.
3. Graduates write system-level models using programming languages, such as C++, to estimate the system performances and verify the functional correctness of the design.
4. C++ have been often used to accelerate the design process.C++ can be efficiently compiled onto today's architectures and thus are used to develop fast simulation models (e.g. to model microprocessors and microcontrolers).
5. Graduates creat object oriented databases using class concept.
6. They can use it in artificial intelligence and expert system using memory management and error handling concept of c++
7. Using concepts of object oriented approach ,gradutes can built high performance embedded and real –time system
8. Graduates used in web base design such as hypertext ,hypermedia using c++ class library
9. They can use c++ in game programming and animation using graphical concept.
10. Using c++ graduates can build decision support and office automation system
11. In c++ ,graduates builds abstraction with compiler –only things like templates which moves computation from run time to compile time.

Topics Covered:-

Introduction to object oriented programming, user defined types, structures, unions, polymorphism, encapsulation. Getting started with C++ syntax, data-type, variables, strings, functions, default values in functions, recursion, namespaces, operators, flow control, arrays and pointers.

Abstraction mechanism: Classes, private, public, constructors, destructors, member data, member functions, inline function, friend functions, static members, and references. Inheritance: Class hierarchy, derived classes, single inheritance, multiple, multilevel, hybrid inheritance, role of virtual base class, constructor and destructor execution, base initialization using derived class constructors.

Polymorphism: Binding, Static binding, Dynamic binding, Static polymorphism: Function Overloading, Ambiguity in function overloading, Dynamic polymorphism: Base class pointer, object slicing, late binding, method overriding with virtual functions, pure virtual functions, abstract classes.
Operator Overloading: This pointer, applications of this pointer, Operator function, member and non member operator function, operator overloading, I/O operators.
Exception handling: Try, throw, and catch, exceptions and derived classes, function exception declaration, unexpected exceptions, exception when handling exceptions, resource capture and release.

Dynamic memory management, new and delete operators, object copying, copy constructor, assignment operator, virtual destructor.
Template: template classes, template functions.
Standard Template Library: Fundamental idea about string, iterators, hashes, iostreams and other types.
Namespaces: user defined namespaces, namespaces provided by library.
Object Oriented Design, design and programming, role of classes.

Text Books and/or Reference Material:-

1. Object Oriented Programming with C++ by E. Balagurusamy, McGraw-Hill Education (India)
2. ANSI and Turbo C++ by Ashoke N. Kamthane, Pearson Education
3. Big C++ - Wiley India
4. C++: The Complete Reference- Schildt, McGraw-Hill Education (India)
5. C++ and Object Oriented Programming – Jana, PHI Learning.
6. Object Oriented Programming with C++ - Rajiv Sahay, Oxford
7. Mastering C++ - Venugopal, McGraw-Hill Education (India)

Department:- Electronics and Telecommunication
Course Number:- PCEC4201
Title of Course:- Analog Electronics Circuit
Designation: - Required
Pre-requisites:-
Contact Hour:-41
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Upon completion of this course Student will be able to :

1. understand the physical construction & operation of BJTs(npn & pnp), FETs,MOSFETs(n-ch & p-ch).
2. analyze VI characteristics of different biasing configuration, operating point selection by load line anlysis.
3. design Fixed biased, Self_biased & Voltage divider configuration of BJTs & FETs.
4. understand Bias Stabilization, Design Operation of different biasing configurations.
5. determine h-parameters by Small Signal Analysis of CE, CC, CB Amplifier with and without RE.
6. understand Small Signal Analysis of CS, CD, CG Amplifier with and without RS.,
7. understand effect of RS and RL on CE Amplifier, Effect of RSIG and RL on CS Amplifier,
8. Analyze Cascade, Darlington Connection and Current .mirror circuit and Cascaded System.
9. understand Low and High Frequency Response of CS & CE Amplifier, Miller Effect Capacitance.
10. understand Basic Principle of Sinusoidal Oscillator, Wein-Bridge, Phase Shift and Crystal Oscillator Circuits.
11. understand Slew rate, effect of Finite Open-loop and Closed-loop Gain, Differentiator and Integrator, Instrumentation amplifier circuits,
12. get some idea about Class-A and Class-B Amplifier Circuits,Power Dissipation and Conversion Efficiency of Power Amplifiers .

Topics Covered:-

1. **MOS Field-Effect Transistor:** Principle and Physical Operation of FETs and MOSFETs. P-Channel and N-Channel MOSFET, Complimentary MOS, V-I Characteristics of E- MOSFETS and D-MOSFETS, MOSFETS as an Amplifier and a Switch (4 Hours)
2. **Biasing of BJTs:** Load lines (AC and DC), Operating Points, Fixed Bias and Self Bias, DC Bias with Voltage Feedback, Bias Stabilization, Design Operation. (4 Hours)
3. **Biasing of FETs and MOSFETs:** Fixed Bias Configuration and Self Bias Configuration, Voltage Divider Bias and Design (4 Hours)

4. **Small Signal Analysis of BJTs:** Small-Signal Equivalent-Circuit Model, Graphical Determination of h-parameters Small Signal Analysis of CE, CC, CB Amplifier with and without RE. Effect of RS and RL on CE Amplifier, Emitter Follower, Analysis of Cascade, Darlington Connection and Current Mirror Circuits using BJTs. (6 Hours)

5. **Small Signal Analysis of FETs:** Small-Signal Equivalent-Circuit Model, Small Signal Analysis of CS, CD, CG Amplifier with and without RS. Effect of RSIG and RL on CS Amplifier, Analysis of Source Follower and Cascaded System using FETs. (6 Hours)
6. **High Frequency Response of FETs and BJTs:** Low and High Frequency Response of BJTs and FETs, The Unit gain – frequency (ft), Frequency Response of CS Amplifier, Frequency Response of CE Amplifier, Multistage Frequency Effects, Miller Effect Capacitance, Square Wave Testing. (5 Hours)

7. **Feedback and Oscillators:** Feedback Concepts, Four Basic Feedback Topologies, Practical Feedback Circuits, Feedback Amplifier Stability using Nyquist Plot, Basic Principle of Sinusoidal Oscillator, Wein-Bridge, Phase Shift and Crystal Oscillator Circuits. (4 Hours)
8. **Operational Amplifier:** Ideal Op-Amp, Differential Amplifier, Op-Amp Parameters, Slew rate, Non-inverting Configurations, Effect of Finite Open-loop and Closed-loop Gain, Differentiator and Integrator, Instrumentation amplifier, μA 741-Op-Amp . (5 Hours)
9. **Power Amplifier:** Classifications, Class-A and Class-B Amplifier Circuits, Transfer Characteristics, Power Dissipation and Conversion Efficiency of Power Amplifiers. (3 Hours)

Text Books and/or Reference Material:-

1. Electronic Devices and Circuits theory, 9th/10th Edition, R.L. Boylestad and L.Nashelsky (Selected portions of Chapter 4, 5, 6, 7, 8, 9, 10, 11, 12, and 14), Pearson Education, New Delhi.
2. Microelectronics Circuits, 5th Edition, International Student Edition Sedra and Smith (Selected portion of Chapter 2,4, 5, 6, 8, 13, and 14), Oxford University Press, New Delhi.
3. Electronic Devices and Circuits, 3rd Edition, Jimmie J. Cathey adapted by Ajay Kumar Singh, Tata McGraw Hill Publishing Company Ltd., New Delhi. **(*For Problem Solving*)**
4. Electronics Circuits Analysis and Design, 3rd Edition, Donald A. Neamen, Tata McGraw Hill Publishing Company Ltd., New Delhi.
5. Milliman's Electronics Devices and Circuits, 2nd Edition, J. Milliman, C. Halkias, S. Jit., Tata McGraw Hill Education Pvt. Ltd., New Delhi
6. Integrated Electronics: Analog and Digital Circuits and Systems, J. Milliman, C. Halkias, Tata McGraw Hill Publishing Company Ltd., New Delhi.
7. Microelectronic Circuits: Analysis and Design, India Edition, M.H. Rashid, PWS
8. Publishing Company, a division of Thomson Learning Inc.

Department:- Management
Course Number:- HSSM3204
Title of Course:- Engineering Economics and Costing
Designation: - Elective
Pre-requisites:-
Contact Hour:- 36
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduate will able distinguish between present value and future value.
2. Students will be able to understand the equivalent situations in the market at the time of purchasing different products.
3. Graduate will understand the demand and supply conditions in the market.
4. Students will able to understand the general price determination in the market.
5. Students will be able to understand the evaluation of investment proposals
6. Students will understand the different markets in the economy.
7. Students will be able to calculate the Break-even point
8. Students will understand the functions of the commercial bank and the central bank
9. Graduate will acquire knowledge about Indian Money market and capital market.
10. Graduate will have knowledge about loss of the value of the asset.
11. Graduate will be able to understand the different cost concepts in the production.

Topics Covered:-

Engineering Economics – Nature and scope, General concepts on micro & macro economics. The Theory of demand, Demand function, Law of demand and its exceptions, Elasticity of demand, Law of supply and elasticity of supply. Determination of equilibrium price under perfect competition (Simple numerical problems to be solved). Theory of production, Law of variable proportion, Law of returns to scale.

Time value of money – Simple and compound interest, Cash flow diagram, Principle of economic equivalence. Evaluation of engineering projects – Present worth method, Future worth method, Annual worth method, internal rate of return method, Cost-benefit analysis in public projects. Depreciation policy, Depreciation of capital assets, Causes of depreciation, Straight line method and declining balance method.

Cost concepts, Elements of costs, Preparation of cost sheet, Segregation of costs into fixed and variable costs. Break-even analysis-Linear approach. (Simple numerical problems to be solved)
Banking: Meaning and functions of commercial banks; functions of Reserve Bank of India. Overview of Indian Financial system.

Text Books and/or Reference Material:-

1. Riggs, Bedworth and Randhwa, “Engineering Economics”, McGraw Hill Education India.
2. M.D. Mithani, Principles of Economics.
3. Sasmita Mishra, “Engineering Economics & Costing “, PHI
4. Sullivan and Wicks, “ Engineering Economy”, Pearson
5. R.Paneer Seelvan, “ Engineering Economics”, PHI
6. Gupta, “ Managerial Economics”, TMH
7. Lal and Srivastav, “ Cost Accounting”, TMH

Department:- English
Course Number:- HSSM7203
Title of Course:- Communication and Interpersonal Skills for Corporate Readiness Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Students will be able to communicate effectively in both verbal and written form which is an ability most sought after in the professional sphere
2. Students will be able to cultivate leadership skills and other soft skills which will enable them to participate effectively in team based activities in their professional domain.
3. Students will be able to welcome new entrants to the organization and introduce the workplace culture.
4. Students will demonstrate an understanding of their professional and ethical responsibilities.
5. Students will be able to explain duties and responsibilities to juniors.
6. Students will develop confidence for self education and ability for life-long learning.
7. Students will be able to participate and succeed in competitive examinations like GATE,GRE etc.
8. Students will be able to motivate subordinates.
9. Students will be able to instruct, direct, appreciate, praise, reward, reprimand, correct and discipline a subordinate.
10. Students will be able to report problems, difficulties, deficiencies and offer suggestions.

Topics Covered:-

Some typical forms of work-related communication, oral or written, are listed below. Practice activities for all four skills can be designed around these or similar situations.

1. Gaining entry into an organization
   a. Preparing job-applications and CVs
   b. Facing an interview
   c. Participating in group discussion (as part of the recruitment process)
2. In-house communication
   a. Superior/ Senior □ subordinate / junior (individual □ individual / group)

3. Welcoming new entrants to the organization, introducing the workplace culture etc
    a. Briefing subordinates / juniors : explaining duties and responsibilities etc.
    b. Motivating subordinates / juniors ('pep talk')
    c. Instructing/ directing subordinates/ juniors
    d. Expressing / recording appreciation, praising / rewarding a subordinate or junior
4. Reprimanding / correcting / disciplining a subordinate/junior (for a lapse) ; asking for an explanation etc.
5. Subordinate / Junior Superior / Senior
    a. Responding to the above
    b. Reporting problems / difficulties / deficiencies
6. Offering suggestions

Text Books and/or Reference Material:-

Department:- Electronics & Telecommunication
Course Number:- PCEC7201
Title of Course:- Analog Electronics Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Student will be able to know the concept of biasing & different types of biasing circuit.
2. Student will be able to understand how a FET works.
3. Student will be able to learn by BJT common emitter circuit that a signal will well amplified.
4. Student will be able to understand that i/p is same with the o/p in BJT emitter follower circuit.
5. Student will be able to learn the basic concept of JFET common source and common drain amplifier.
6. Student will be able to learn the frequency response curve, bandwidth, lower cutoff and upper cutoff frequency.
7. Student will be able to understand the concept of Darlington pair transistor & in current mirror circuit the current flowing in 1st transistor is the mirror image of 2nd transistor.
8. Student will be able to understand the application of Op-amp.

Topics Covered:-
(At least 10 out of 13 experiments should be done)

1. BJT bias circuit – Design, assemble and test.
2. JEET/MOSFET bias circuits – Design, assemble and test.
3. Design, assemble and test of BJT common-emitter circuit – D.C and A.C performance: Voltage gain, input impedance and output impedance with bypassed and un-bypassed emitter resistor.
4. Design, assemble and test of BJT emitter-follower – D.C and A.C performance: A.C. voltage gain, input impedance and output impedance.
5. Design, assemble and Test of JFET/MOSFET common-source and common-drain amplifiers – D.C and A.C performance: Voltage gain, input impedance and output impedance.
6. Frequency response of a common-emitter amplifier: low frequency, high frequency and mid frequency response.
7. Differential amplifiers circuits: D.C bias and A.C operation without and with current source.
8. Study of Darlington connection and current mirror circuits.
9. OP-Amp Frequency Response and Compensation.
10. Application of Op-Amp as differentiator, integrator, square wave generator.
11. Square wave testing of an amplifier.
12. R.C phase shift oscillator/Wien-Bridge Oscillator using OP-Amp/Crystal Oscillator.

13. Class A and Class B Power Amplifier.

Text Books and/or Reference Material:-

Department: - Computer Science & Engineering
Course Number: - BECS7207
Title of Course: - Object Oriented Programming Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Through inheritance students should eliminate redundant code.
2. They use principle of data hiding ie class concept to avoid accidental modification of data.
3. Students can build software from standard working module.
4. Graduates write system-level models using programming languages, such as C++, to estimate the system performances and verify the functional correctness of the design.
5. Graduates create object oriented databases using class concept
6. In C++ , graduates builds abstraction with compiler –only things like templates which moves computation from run time to compile time.
7. Using concepts of object oriented approach , graduates can built high performance embedded and real –time system.
8. The student will be able to analyze, develop, code and execute solutions for a variety of problems using the ANSI/ISO standard C++ programming language.

Topics Covered:-

1. Programs on concept of classes and objects.(1 class)
2. Programs using inheritance.(1 class)
    a. Single inheritance (ii) Multiple inheritance
    b. Multi level inheritance
    c. Use of virtual base classes
3. Programs using static polymorphism.(1 class)
    a. Function overloading
    b. Ambiguities while dealing with function overloading
4. Programs on dynamic polymorphism.(1 class)
    a. Use of virtual functions
    b. Use of abstract base classes
5. Programs on operator overloading.(1 class)
    a. Operator overloading using member operator functions.
    b. Operator overloading using non member operator functions.
    c. Advantages of using non member operator functions.
6. Programs on dynamic memory management using new, delete operators.(1 class)
7. Programs on copy constructor and usage of assignment operator.(1 class)
8. Programs on exception handling .(1 class)
9. Programs on generic programming using template function and template class.(1 class)

10. Programs on file handling.(1 class)

Text Books and/or Reference Material:-

Department:- Management
Course Number: - HSSM3205
Title of Course: - Organizational Behavior
Designation: - Elective
Pre-requisites:-
Contact Hour:-
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Students will understand the behavior of organization. i.e. the individual and group behavior.
2. Students will be able to understand, how learning occurs and how it helps them to grow.
3. Students will understand the perception level of the individuals and how to react to the situations.
4. Students will understand the motivational factors and how to use it to make individuals to the action for attaining the organizational goal.
5. Students will know how to communicate properly inside the organization to develop interpersonal relationship.
6. Students will understand the benefits of group work and the decision made by the group.
7. Students will be able to understand how to be a good leader and leadership qualities.
8. Students will understand to manage the conflict and making solutions to the conflicts.
9. Students will understand the organization's culture and the benefits of implication.
10. Students will understand how to manage the Human resources and motivate them towards the organizational goal.
11. Students will understand the organization's change and how to handle the changes towards improving the organization.

Topics Covered:-

The study of Organizational Behavior : Defination and Meaning, Why Study OB
Learning – Nature of Learning, How Learning occurs, Learning and OB.
Foundations of Individual Behaviour : Personality – Meaning and Defination, Determinants of Personality, Personality Traits, Personality and OB.
Perception – Meaning and Definition, Perceptual Process, Importance of Perception in OB.
Motivation – Nature and Importance, Herzberg's Two Factor Theory, Maslow's Need Hierarchy Theory, Alderfer's ERG Theory, Evaluations.

Organizational Behaviour Process : Communication – Importance, Types, Gateways and Barriers to Communication, Communication as a tool for improving Interpersonal

Effectiveness, Groups in Organizations – Nature, Types, Why do people join groups, Group Cohesiveness and Group Decision-making Managerial Implications, Effective Team Building. Leadership-Leadership & Management, Theories of Leadership-Trait theory, Leader Behaviour theory, Contingency Theory, Leadership and Followership, How to be an effective Leader, Confict-Nature of Conflict and Conflict Resolution. An Introduction to Transactional Analysis (TA).

Organization : Organizational Culture – Meaning and Definition, Culture and Organizational Effectiveness. Introduction to Human Resource Management-Selection, Orientation, Training and Development, Performance Appraisal, Incentives Organizational Change – Importance of Change, Planned Change and OB techniques. International Organisational Behaviour – Trends in International Business, Cultural Differences and Similarities, Individual and Interpersonal Behaviour in Global Perspective.

Text Books and/or Reference Material:-

1. Keith Davis, Organisational Behaviour, McGraw-Hill.
2. K.Aswathappa, Organisational Behaviour, Himalaya Publishing House.
3. Stephen P. Robbins, Organisational Behaviour, Prentice Hall of India
4. Pradip N. Khandelwal, Organizational Behaviour, McGraw-Hill, New Delhi.
5. Uma Sekaran, "Organizational Behaviour", TATA McGraw-Hill, New Delhi.
6. Steven L McShane, Mary Ann Von Glinow, Radha R Sharma" Organizational
7. Behaviour" , TATA McGraw- Hill.
8. D.K. Bhattachayya, "Organizational Behaviour", Oxford University Press
9. K.B.L.Srivastava & A.K.Samantaray, "Organizational Behaviour" India Tech

Department:- Mathematics
Course Number:- BSCM1211
Title of Course:- Discrete Mathematics
Designation: - Required
Pre-requisites:-
Contact Hour:-40
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduate will demonstrate knowledge of formulating the mathematical logic which serves as the foundations for the subsequent discussions of methods of proof
2. Graduate will demonstrate to analyze algorithms not applying formulae.
3. c)Graduate can demonstrate the basic counting techniques .
4. Graduate will learn how to develop the artificial neurons
5. Students will be able to understand the concept of data structure by using graph theory
6. Students will understand regarding the probability of occurring and non occurring of some events using combinatoics
7. Students will learn regarding the lexical analysis in compiler designing using finite state machines or Turing machines etc.

Topics Covered:-

Propositional logic, Propositional Equivalence, Predicates and Quantifiers, Nested Quantifiers, Rules of Inference, Proof methods and Strategies, Sequences and Summations, Mathematical Induction, Recursive definition and structural induction, Program Correction Recurrence relation, Solution to recurrence relation, Generating functions, Inclusion and exclusion, Application of Inclusion and Exclusion Principle, Relation and their properties, Closure of relations, Equivalence relations, Partial orderings.

Introduction to graph theory, Graph terminology, Representation of graphs, Isomorphism, Connectivity, Euler and Hamiltonian paths, Shortest path problems, Planar graph, Graph coloring, Introduction to trees, Application of trees, Tree Traversal, Minimum Spanning tree.

Semi groups, Monoids, Groups, Subgrorups, Cosets, Lagrange theorem, Permuation groups, Group codes, isomorphism, Homomorphisms, Normal subgroups, Rings, Integral Domain and Fields.
Algebraic systems, Lattices, Distributive and Complemented Lattices, Boolean Lattices and Boolean Algrebra, Boolean Functions and Boolean Expressions.

Text Books and/or Reference Material:-

1. **Kenneth H. Rosen**, "*Discrete Mathematics and its Applications*", Sixth Edition, 2008, Tata McGraw Hill Education , New Delhi. Chapters: 1, 2(2.4), 4, 6(6.1, 6.2, 6.4-6.6), 7, 8, 9
2. **C. L. Liu and D. Mohaptra**, "*Elements of Discrete Mathematics*", Third Edition, 2008, Tata McGraw Hill Education, New Delhi ,Chapters: 10 (10.1- 10.10), 11(11.1 – 11.7)
3. Ralph P. Grimaldi, "Discrete and Combinatorial Mathematics", Fifth Edition, 2005, Pearson
   Education, New Delhi.
4. Kolman, Busby, Ross, "Discrete Mathematics", Fifth Edition, PHI Publication.
5. J.L. Gersting, " Mathematical Structure for Computer Science: A modern treatment to Discrete Mathematics' Sixth Edition, W. H. Freeman and Macmillan (India).
6. Eric Gossett, ' Discrete Mathematics with Proof, Second Edition, Wiley India Pvt Ltd
7. Thomas Koshy, " Discrete Mathematics and Applications:, Second Edition, Elsevier Publication (India), New Delhi.
8. J.L. Mott, A.Candell & I. Bekar, Discrete Mathematics for Computer Scientists and Mathematicians, PHI.

Department:- Computer Science & Engineering
Course Number:- PCCS4203
Title of Course:- System Programming
Designation: - Required
Pre-requisites:-
Contact Hour:-32
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Students will demonstrate knowledge on system and application s/w, oprating system.
2. The course material will help the student to learn about IBM 360/370 machine, data format for the system.
3. The students will visualize practical knowledge on assembly language, detail design of pass1 &pass2 assemblers.
4. The student will know about linear & binary search ,and different searching techniques i.e interchange sort, bucket sort, address calculation sort etc .
5. The students learn about macro, macro instructions ,two pass macro processor .
6. The students learn details about loader, different types of loader ,implementation of different loaders ,
7. Students will learn data types , data structure ,storage allocation and scope of names.
8. Students will know the uses of formal systems in programming languages, provide an informal introduction t o formal systems and grammars .present formal systems and terminology that are commonly used in literature..
9. They accrue knowledge for programming language specification i.e Backus naur form and canonic system, difference between formal system and canonic system
10. Students will know the general model of a compiler that may be used as a basis for designing and studying compiler.
11. This paper is very important for the computer science students.

Topics Covered:-

Introduction: System Software, Application Software, Machine Structure, Evolution of components of a programming system (Assembler, Loader, Macros, Compiler, Formal Systems), Evolution of Operating Systems, Functions of Operating System.
Machine Structure: General Machine Structure, Approach to a new machine, Memory Registers, Data, Instructions, special features.
Machine Language: Long Way, No looping, Address Modification, Looping
Introduction to Assembly Language Program

Assemblers: Design Procedure, Design of Assembler, Table Processing.
Macros Language and Macro Processor: Macro Instructions, Features of a Macro Facility, Implementation.

Loaders: Loader Schemes, Design of an Absolute Loader, Direct Linking loader, Bootstrap Loader.

Programming Languages: Importance of High Level Languages, Features, Data Types and Data Structures, Storage Allocation and Scope Name, Accessing Flexibility, Functional Modularity, Asynchronous Operations, Extensibility and Compile time Macros.
Formal Systems: Uses of Formal Systems, Formal Specification, Formal Grammars, Backus-Naur Form, Canonic Systems, Canonic Systems vs Formal Systems
Compilers: Introduction to Compilers, Phases of a compiler(Lexical Phase, Syntax Phase, Interpretation Phase, Optimization, Code Generation, Assembly, passes of a compiler), Intermediate Form, Storage Allocation, Code Generation, Data Structure

Text Books and/or Reference Material:-

1. Systems Programming by John J Donovan (McGraw-Hill Education)
2. System Software: An Introduction to systems programming by Leland Beck (Pearson)
3. System Software : Nityashri,(McGraw-Hill Education)
4. Operating System and System Programming – Dhamdhere (McGraw-Hill Education)
5. System Programming with C and Unix.- Hoover (Pearson Education)

Department:- Computer Science & Engineering
Course Number: - PCCS4204
Title of Course: - Design and Analysis of Algorithm
Designation: - Required
Pre-requisites:-
Contact Hour:-40
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

a. Students will know which problem is solved on which algorithm.
b. Student will understand the searching technique. This helps to search the data from the database efficiently.
c. Students will be able to understand how to reduce the operation in matrix multiplication.
d. Students will be able to understand how find longest common subsequences from given two string and the knowledge about DNA testing.
e. Students will know how compress the data file.
f. Students will know what is the shortest path in case of single-source and multi-source graph.
g. Students will know how execute maximum no of activity in a fixed period of time out of N no of activity in real life.
h. Students will know how to use the cutting of raw materials in real world decision making process.
i. Students will know how solve N-queens problem.
j. Students will know how a salesman will cover all the city in a geometric area (each city visit once a time) and return to the starting point.
k. Graduate will develop confidence for self education and ability for life long learning.
l. Graduate can participate and succeed in competitive examination like GATE, GRE, DRDO, Software Company.
m. Graduate will show of impact of engineering solution.

Topics Covered:-

Introduction to design and analysis of algorithms, Growth of Functions (Asymptotic notations, standard notations and common functions), Recurrences, solution of recurrences by substitution, recursion tree and Master methods, worst case analysis of Merge sort, Quick sort and Binary search, Design & Analysis of Divide and conquer algorithms.
Heapsort : Heaps, Building a heap, The heapsort algorithm, Priority Queue, Lower bounds for sorting.

Dynamic programming algorithms (Matrix-chain multiplication, Elements of dynamic programming, Longest common subsequence)
Greedy Algorithms - (Assembly-line scheduling, Achivity- selection Problem, Elements of Greedy strategy, Fractional knapsac problem, Huffman codes).

Data structure for disjoint sets:- Disjoint set operations, Linked list representation, Disjoint set forests.

Graph Algorithms: Breadth first and depth-first search, Minimum Spanning Trees, Kruskal and Prim's algorithms, single- source shortest paths (Bellman-ford and Dijkstra's algorithms), All-pairs shortest paths (Floyd – Warshall Algorithm). Back tracking, Branch and Bound.
Fast Fourier Transform, string matching (Rabin-Karp algorithm), NP - Completeness (Polynomial time, Polynomial time verification, NP - Completeness and reducibility, NP-Complete problems (without Proofs), Approximation algorithms (Vertex-Cover Problem, Traveling Salesman Problem).

Text Books and/or Reference Material:-

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest, C.Stein : Introduction to algorithms -2nd edition, PHI,2002. 1. Algorithms – Berman, Cengage Learning
2. Computer Algorithms: Introduction to Design & Analysis, 3rd edition-by Sara Baase,
3. Allen Van Gelder, Pearson Education
4. Fundamentals of Algorithm-by Horowitz & Sahani, 2nd Edition, Universities Press.
5. Algorithms By Sanjay Dasgupta, Umesh Vazirani – McGraw-Hill Education
6. Algorithm Design – Goodrich, Tamassia, Wiley India.

Department:- Computer Science & Engineering
Course Number:- PCCS4205
Title of Course:- Database Engineering
Designation: - Required
Pre-requisites:-
Contact Hour:-40
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After Completion of this course:

1. A graduate will demonstrate the knowledge of database maintenance and management in banking sector.
2. In the core sectors such as steel industries, iron industries, in maintaining the daily sequence of data such as (temp, raw materials, processed materials, delivery reports etc.)
3. In organizations who provides the software and their maintenance Railway, Airline, Bus ticket reservation(either manually or by online)
4. In educational sectors for maintaining the records of the students.
5. In information and broadcasting sector in order to maintain the daily incidents and their further report.
6. Uses the concept in competitive exams both in public and private sectors such as GATE for example.
7. Also it can be used in the share market software data updating.

Topics Covered:-

Introduction to database Systems, Basic concepts &Definitions, Data Dictionary, DBA, File-oriented system vs. Database System, Database Language.
Database System Architecture-Schemas, Sub Schemas & Instances, 3-level database architecture, Data Abstraction, Data Independence, Mappings, Structure, Components & functions of DBMS, Data models, Mapping E-R model to Relational, Network and Object Oriented Data models, types of Database systems,
Storage Strategies**:** Detailed Storage Architecture, Storing Data, Magnetic Disk, RAID, Other Disks, Magnetic Tape, Storage Access, File & Record Organization, File Organizations & Indexes, Order Indices, B+ Tree Index Files, Hashing

Relational Algebra, Tuple & Domain Relational Calculus, Relational Query Languages: SQL and QBE.
Database Design :-Database development life cycle(DDLC),Automated design tools, Functional dependency and Decomposition, Dependency Preservation & lossless Design, Normalization, Normal forms:1NF, 2NF,3NF,and BCNF, Multi-valued Dependencies, 4NF & 5NF.
Query processing and optimization: Evaluation of Relational Algebra Expressions, Query optimization.

Transaction processing and concurrency control: Transaction concepts, concurrency control, locking and Timestamp methods for concurrency control.
Database Recovery System: Types of Data Base failure & Types of Database Recovery, Recovery techniques
Advanced topics: Object-Oriented & Object – Relational Database, Parallel & Distributed Database, Introduction to Data warehousing & Data Mining

Text Books and/or Reference Material:-

1. Database System Concepts by Sudarshan, Korth (McGraw-Hill Education)
2. Fundamentals of Database System By Elmasari &Navathe- Pearson Education
3. An introduction to Database System – Bipin Desai, Galgotia Publications
4. Database System: concept, Design & Application by S.K.Singh (Pearson Education)
5. Database management system by leon &leon (Vikas publishing House).
6. Database Modeling and Design: Logical Design by Toby J. Teorey, Sam S. Lightstone, and Tom Nadeau, “”, 4th Edition, 2005, Elsevier India Publications, New Delhi
7. Fundamentals of Database Management System – Gillenson, Wiley India

Department:- Electronics & Telecommunication
Course Number:- PCEC4202
Title of Course:- Digital Electronics Circuit
Designation: - Required
Pre-requisites:-
Contact Hour:-42
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Upon completion of this course Students will able to:

1. Convert various number bases and apply mathematical laws to hex, decimal, and binary numbering systems.
2. Impotence of Boolean algebra in Logic circuit.
3. Apply various techniques for logic circuit reduction.
4. Design and troubleshoot combinational logic circuits.
5. Construct logic circuits using various prototyping techniques
6. Construct arithmetic circuits
7. Use Memory Circuit to Design the Logic Circuit.
8. Construct and Design FF-Circuit for Logic Design.
9. Design and construct digital counter circuits and registers.
10. State digram and state table analysis.
11. Basic circuit layout and construction Logic circuit Using CMOS.
12. Apply VLSI technique to construct Logic circuit .

Topics Covered:-

1. **Number System:** Introduction to Binary Numbers, Data Representation, Binary, Octal, Hexadecimal and Decimal Number System and their Conversion.
2. **Boolean Algebra and Logic Gates:** Basic Logic Operation and Identities, Algebraic Laws, NOR and NAND Gates, Useful Boolean Identities, Algebraic Reduction, Complete Logic Sets, Arithmetic Operation using 1's and 2`s Compliments, Signed Binary and Floating Point Number Representation.
3. **Combinational Logic Design:** Specifying the Problem, Canonical Logic Forms, Extracting Canonical Forms, EX-OR Equivalence Operations, Logic Array, K-Maps: Two, Three and Four variable K-maps, NAND and NOR Logic Implementations.

4. **Concepts in VHDL:** Basic Concepts, Using a Hardware Description Language, Defining Module in VHDL, Structural and Combinational Modelling, Binary Words, Libraries, Learning VHDL.
5. **CMOS Logic Circuits:** Voltages as Logic Variables, Logic Delay Times: Output Switching Times, Propagation Delay, Fan-In and Fan-out, Extension to other Logic Gate. C-MOS Electronics, MOSFETS, The NOT Function in C-MOS: Complimentary Pairs and the C-MOS Invertors, Logic Formation Using MOSFETS: the NAND and NOR Gate, C-MOS Logic Connection, Complex Logic Gates in C-MOS: 3-input Logic Gates, A general 4-input Logic Gate, Logic Cascades.

6. **Introduction to VLSI:** Introduction, Lithography and Patterning, MOSFET Design Rules, Basic Circuit Layout, MOSFET Arrays and AOI Gates, Cells, Libraries, and Hierarchical Design, Floor Plans and Interconnect Wiring.

7. **Logic Components:** Concept of Digital Components, An Equality Detector, Line Decoder, Multiplexers and De-multiplexers, Binary Adders, Subtraction and Multiplication. 8. **Memory Elements and Arrays:** General Properties, Latches, Clock and Synchronization, Master-Slave and Edge-triggered Flip-flops, Registers, RAM and ROMs, C-MOS Memories.
9. **Sequential Network:** Concepts of Sequential Networks, Analysis of Sequential Networks: Single State and Multivariable Networks, Sequential Network Design, Binary Counters, Importance of state machine.

Text Books and/or Reference Material:-

1. A First Course in Digital System Design: An Integrated Approach, India Edition, John P. Uyemura, PWS Publishing Company, a division of Thomson Learning Inc.
2. Digital Systems – Principles and Applications, 10th Edition, Ronald J. Tocci, Neal S. Widemer and Gregory L. Moss, Pearson Education.
3. Digital Design, Robert K. Dueck, CENGAGE Learning.
4. Digital Principles and Applications, 6th Edition, Donald P. Leach, Albert Paul Malvino and Goutam Saha, Tata McGraw Hill Publishing Company Ltd., New Delhi.
5. Digital Fundamentals, 5th Edition, T.L. Floyd and R.P. Jain, Pearson Education, New Delhi.
6. Digital Electronics, Principles and Integrated Circuit, Anil K. Jain, Wiley India Edition.
7. Digital Design, 3rd Edition, Moris M. Mano, Pearson Education.

Department:- Electronics & Telecommunication
Course Number:- PCEC7202
Title of Course:- Digital Electronics Circuit Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Students will able to know use of different ICs for different gates.
2. Students will able to learn about minimization technique of different Boolean functions.
3. Students will able to learn seven segment display system.
4. Students will able to learn about code converter.
5. Students will able to know the basic concept of Multiplexers & Demultiplexers circuits.
6. Students will able to understand the VHDL language.

Topics Covered:-

1. Digital Logic Gates: Investigate logic behavior of AND, OR, NAND, NOR, EX-OR, EX-NOR, Invert and Buffer gates, use of Universal NAND Gate.
2. Gate-level minimization: Two level and multi level implementation of Boolean functions.
3. Combinational Circuits: design, assemble and test: adders and subtractors, code converters, gray code to binary and 7 segment display.
4. Design, implement and test a given design example with (i) NAND Gates only (ii) NOR Gates only and (iii) using minimum number of Gates.
5. Design with multiplexers and de-multiplexers.
6. Flip-Flop: assemble, test and investigate operation of SR, D & J-K flip-flops.

7. Shift Registers: Design and investigate the operation of all types of shift registers with parallel load.
8. Counters: Design, assemble and test various ripple and synchronous counters - decimal counter, Binary counter with parallel load.
9. Memory Unit: Investigate the behaviour of RAM unit and its storage capacity – 16 X 4 RAM: testing, simulating and memory expansion.
10. Clock-pulse generator: design, implement and test.
11. Parallel adder and accumulator: design, implement and test.
12. Binary Multiplier: design and implement a circuit that multiplies 4-bit unsigned numbers to produce a 8-bit product.
13. Verilog/VHDL simulation and implementation of Experiments listed at Sl. No. 3 to 12.

Text Books and/or Reference Material:-

Department:- Computer Science & Engineering
Course Number:- PCCS7204
Title of Course:- Design and Analysis of Algorithm Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

Students implement the following programs.

1. Using a stack of characters, convert an infix string to postfix string.
2. Implement binary search and linear search in a program
3. Implement a heap sort using a max heap.
4. Write a program on Quick sort algorithm.
5. Write a program on merge sort algorithm.
6. Implement matrix multiplication algorithm.
7. Using dynamic programming implement LCS.
8. Implement DFS/ BFS for a connected graph.
9. Implement Dijkstra's shortest path algorithm using BFS.
10. Write a program to implement Huffman's algorithm.
11. Implement MST using Kruskal/Prim algorithm.
12. Write down a program to find out a solution for fractional Knapsack problem.
13. Find out the solution to the N-Queen problem.

Topics Covered:-

1. Using a stack of characters, convert an infix string to postfix string.(1 class)
2. Implement insertion, deletion, searching of a BST. (1 class)
3. (a) Implement binary search and linear search in a program
   (b) Implement a heap sort using a max heap.
4. (a) Implement DFS/ BFS for a connected graph.
   (b) Implement Dijkstra's shortest path algorithm using BFS.
5. (a) Write a program to implement Huffman's algorithm.
   (b) Implement MST using Kruskal/Prim algorithm.
6. (a) Write a program on Quick sort algorithm.
   (b) Write a program on merge sort algorithm.
   Take different input instances for both the algorithm and show the running time.
7. Implement Strassen's matrix multiplication algorithm.
8. Write down a program to find out a solution for 0 / 1 Knapsack problem.
9. Using dynamic programming implement LCS.
10. (a) Find out the solution to the N-Queen problem.
    (b) Implement back tracking using game trees.

Text Books and/or Reference Material:-

Department:- Computer Science & Engineering
Course Number:- PCCS7205
Title of Course:- Database Engg. Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-
After Completion of this course:

1. A graduate will demonstrate the knowledge of creating the tables during the developments of the software.
2. can able to wok both in development section and maintanance do the tables.
3. can able to maintain the database also.
4. can perform multiple works efficiently mostly used in industries.
5. can do import and export of the tables if the same table is required in multiple places without hampering the current execution of the program related to the tables used in database maintenance.
6. Insurance and transportation.

Topics Covered:-

1. Use of SQL syntax: insertion, deletion, join, updation using SQL. (1 class)
2. Programs on join statements and SQL queries including where clause. (1 class)
3. Programs on procedures and functions. (1 class)
4. Programs on database triggers. (1 class)
5. Programs on packages. (1 class)
6. Programs on data recovery using check point technique. (1 class)
7. Concurrency control problem using lock operations. (1 class)
8. Programs on ODBC using either VB or VC++. (1 class)
9. Programs on JDBC. (1 class)
10. Programs on embedded SQL using C / C++ as host language. (1 class)

Text Books and/or Reference Material:-

Department:- Management
Course Number:- HSSM3301
Title of Course:- Principles Of Management
Designation: - Elective
Pre-requisites:-
Contact Hour:-
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

Topics Covered:-

Concept of Management, Management as an Art or Science, The Process of Management, Managerial Skills, Good Managers are Born, not Made, Management is concerned with Ideas, Things and People, How a Manager Induces Workers to Put in Their Best, Levels and Types of Management, **Evolution of Management Thought**: Managerial Environment, The process of Management-Planning, Organizing, Directing, Staffing, Controlling.

Modern Concept of Marketing, The Functional Classification of Marketing, Functions of a Marketing Management, Marketing Mix, Fundamental Needs of Customers, The Role of Distribution channels in Marketing, Advertising, Marketing, Consumerism and Environmentalism.

Financial Functions, Concept of Financial Management, Project Appraisal, Tools of Financial decisions making, Overview of Working Capital.
HRM Function of Management: Human Resource Management, Human Resource Development, Importance of HRM, Overview of Job Analysis, Job Description, Job Specification, Labour Turnover. Manpower Planning, Recruitment, Selection, Induction, Training and Development, Placement, Wage and Salary Administration, Performance Appraisal, Grievance Handling, Welfare Aspects.

Text Books and/or Reference Material:-

1. Business Organization & Management, CR Basu, TMH
2. Business Organization & Management, Tulsia, Pandey, Pearson
3. Marketing Management, Kotler, Keller, Koshi, Jha, Pearson
4. Financial Management, I.M. Pandey, Vikas
5. Human Resource Management, Aswasthapa, TMH.
6. 6.Modern Business Organisation & Management by Sherlekar, Himalaya Publishing House.

Department:- Computer Science & Engineering
Course Number:- PCCS4301
Title of Course:- Computer Organization
Designation: - Required
Pre-requisites:-
Contact Hour:-36
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. The students will able to understand how a computer system designed and also can distinguish the hardware and s/w of a computer.
2. The learner will able to characterize the role of a system s/w & able to evaluate performance of a system.
3. The learner will able to illustrate various machine instruction formats, addressing techniques &sequence of their execution.
4. The learners could able to experiment programs in assembly language.
5. The students could able to exemplify various IO units present in a system.
6. The students could able to conclude the complexities lies in a computer IO structures & also comprehend the various IO data transfer methods including interrupt & DMA method.
7. The learners will be able to distinguish various bus protocols and standards with respect to commercial use.
8. The students will be able to comprehend memory types with their management techniques.
9. They will able to know the techniques for different memory operations.
10. The student can able to implement various techniques to enhance the performance of memory.
11. The students will able to evaluate fixed point & floating point arithmetic's in various different methods.
12. The students will able to know how instructions are fetched and executed in a processor with various methods.
13. The students will realize the design implementation of control unit through hardwired control and micro programmed control technique.
14. The students can compare between different processor architectures.

Topics Covered:-

Basic structures of Computers: Functional units, operational concepts, Bus structures, Software, Performance, Computer Architecture vs Computer Organization.
Machine Instruction and Programs: Memory location and addresses, Big-endian and Little-endian representation. Memory Operations, Instructions and instruction Sequencing, Addressing modes, Assembly Language, Basic Input/output operations, subroutine, additional Instructions.

Arithmetic : Addition and subtraction of signed Numbers, Design of Fast Adders, Multiplication of positive Numbers, Signed-operand multiplication , Fast multiplication, Integer Division, Floating- point Numbers, (IEEE754 s…) and operations.

Basic Processing units: Fundamental concepts, execution of complete Instructions, Multi bus organization, Hardwired control, Micro programmed control, RISC vs CISC architecture. Memory System: Basic Concepts, cache Memory, Cache memory mapping policies, Cache updating schemes, performance consideration, Virtual memories, Paging and Page replacement policies, Memory Management requirement, secondary storage.

Text Books and/or Reference Material:-

1. Computer Organization: Carl Hamacher, Zvonkovranesic, Safwat Zaky,Mc Graw Hill,5th Ed
2. Computer Organization and Design Hardware/ Software Interface: David A. Patterson, John L. Hennessy, Elsevier, 4th Edition.
3. Computer Architecture and Organization: William Stallings, Pearson Education.
4. Computer Architecture and Organizations, Design principles and Application: B. Govinda Rajalu, Tata McGraw-Hill Publishing company Ltd.
5. Computer Architecture: Parhami, Oxford University Press
6. Computer system Architecture: Morris M. Mano PHI NewDelhi.
7. Computer Architecture and Organization: John P. Hayes Mc Graw Hill introduction.
8. Structured Computer Organization: A.S. Tanenbum, PHI
9. Computer Architecture And Organization: An Integrated Approach, Murdocca, Heuring Willey India, 1st Edition.

Department:- Computer Science & Engineering
Course Number:- PCCS4302
Title of Course:- Data Communication & Computer Network
Designation: - Required
Pre-requisites:-
Contact Hour:-36
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Graduate will

1. Understand the fundamental concept of data communication and networking.
2. Able to know the telecommunication aspects of physical layer.
3. Understands the transmission media and switching concept.
4. Understands how to detect the error and correct the error during transmission.
5. Know about IP address and different protocols present in network layer.
6. Understands the delivery ,forwarding and routing of packets in the internet.
7. Know the services and duties of transport layer.
8. Understands two issues related to transport layer and othe previous layers such as quality of service and congestion control.
9. Understands the application program that is used by other application programs to map application layer address to network layer address.

Topics Covered:-

Overview of Data Communications and Networking.
Physical Layer : Analog and Digital, Analog Signals, Digital Signals, Analog versus Digital, Data Rate Limits, Transmission Impairment, More about signals.
Digital Transmission: Line coding, Block coding, Sampling, Transmission mode.
Analog Transmission: Modulation of Digital Data; Telephone modems, modulation of Analog signals. Multiplexing : FDM , WDM , TDM ,
Transmission Media: Guided Media, Unguided media (wireless)
Circuit switching and Telephone Network: Circuit switching, Telephone network.

Data Link Layer
Error Detection and correction: Types of Errors, Detection, Error Correction
Data Link Control and Protocols:
Flow and Error Control, Stop-and-wait ARQ. Go-Back-N ARQ, Selective Repeat ARQ, HDLC.
Point-to –Point Access: PPP
Point –to- Point Protocol, PPP Stack,
Multiple Access
Random Access, Controlled Access, Channelization.
Local area Network: Ethernet.
Traditional Ethernet, Fast Ethernet, Gigabit Ethernet. Token bus, token ring
Wireless LANs: IEEE 802.11, Bluetooth virtual circuits: Frame Relay and ATM.

Network Layer:

Host to Host Delivery: Internetworking, addressing and Routing
Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6
Transport Layer: Process to Process Delivery: UDP; TCP congestion control and Quality of service.

Application Layer :

Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Mail (SMTP) and file transfer (FTP) HTTP and WWW.

Text Books and/or Reference Material:-

1. Data Communications and Networking: Behrouz A. Forouzan, Tata McGraw-Hill, 4^{th} Ed
2. Computer Networks: A. S. Tannenbum, D. Wetherall, Prentice Hall, Imprint of Pearson 5^{th} Ed
3. Computer Networks:A system Approach:Larry L, Peterson and Bruce S. Davie,Elsevier, 4^{th} Ed
4. Computer Networks: Natalia Olifer, Victor Olifer, Willey India
5. Data and Computer Communications: William Stallings, Prentice Hall, Imprint of Pearson, 9^{th} Ed.
6. Data communication & Computer Networks: Gupta, Prentice Hall of India
7. Network for Computer Scientists & Engineers: Zheng, Oxford University Press
8. **8.** Data Communications and Networking: White, Cengage Learning

Department: - Computer Science & Engineering
Course Number: - PCIT4303
Title of Course: - Java Programming
Designation: - Required
Pre-requisites:-
Contact Hour:-36
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Student will understand the object oriented programming concepts
2. Student will understand the features of java in real world
3. Student will understand to use the existing code using inheritance
4. Student will get the knowledge about to use package for code optimization
5. Student will get the knowledge how to handle the exception
6. Student will understand the concept of multi threading
7. Student will get the knowledge about Socket programming for communication
8. Student will understand the event handling with MVC architecture
9. Student will get knowledge database connection with JDBC
10. Student will get knowledge to design page using AWT/SWING
11. Graduate will be able to develop software using JAVA.

Topics Covered:-

Introduction to Java and Java programming Environment. Object Oriented Programming. Fundamental Programming Structure: Data Types, variable, Typecasting Arrays, Operators and their precedence.
Control Flow: Java's Selection statements (if, switch, iteration, statement, while, do-while, for, Nested loop).
Concept of Objects and Classes, Using Exiting Classes building your own classes, constructor overloading, static , final, this keyword .
Inheritance: Using Super to Call Super class constructor, Method overriding, Dynamic method Dispatch, Using Abstract Classes, Using final with inheritance. The Object Class.
Packages & Interfaces : Packages, Access Protection, Importing package, Interface, Implementing Interfaces, variables in Interfaces, Interfaces can be extended.
Exception Handling: Fundamentals, Types Checked , Unchecked exceptions, Using try & catch, Multiple catch, throw , throws, finally, Java's Built in exceptions, user defined exception.

Multi Threading: Java Thread Model, Thread Priorities, Synchronization, Creating a thread, Creating Multiple threads, Using isAlive ( ) and join ( ), wait () & notify ( ).
String Handling: String constructors, String length, Character Extraction, String Comparison, Modifying a string.
Java I/O: Classes & Interfaces, Stream classes, Byte streams, Character streams, Serialization.
JDBC: Fundamentals, Type I, Type II, Type III, Type IV drivers.

Networking: Basics, Socket overview, Networking classes, & interfaces, TCP/IP client sockets, whois, URL format, URL connection, TCP/IP Server Sockets.

Applets: Basics, Architecture, Skeleton, The HTML APPLET Tag, Passing Parameters to Applets, Applet context and show documents ().
Event Handing: Delegation Event model, Event Classes, Event Listener Interfaces, Adapter classes.
AWT: AWT Classes window fundamentals, component, container, panel, Window, Frame , Canvas, Creating a frame window in an Applet , working with Graphics , Control Fundamentals , Layout managers, Handling Events by Extending AWT components.
Core java API package, reflection, Remote method Invocation (RMI)
Swing: J applet, Icons & Labels, Text fields, Buttons, Combo boxes, Tabbed panes, Scroll panes, Trees, Tables.
Exploring Java-lang: Simple type wrappers, Runtime memory management, object (using clone () and the cloneable Interface), Thread, Thread Group, Runnable.

Text Books and/or Reference Material:-

1. Introduction to Java Programming: Liang, Pearson Education, 7^{th} Edition.
2. Java The complete reference: Herbert Schildt, TMH, 5^{th} Edition.
3. Balguruswamy, Programming with JAVA, TMH.
4. Programming with Java*:* Bhave &. Patekar, Pearson Education.
5. Big Java: Horstman, Willey India, 2^{nd} Edition.
6. Java Programming Advanced Topics: Wigglesworth, Cengage Learning.
7. Java How to Program: H.M. Deitel & Paul J. Deitel, PHI, 8^{th} Edition

Department:- Computer Science
Course Number:- PECS5304
Title of Course:- Theory of Computation
Designation: - Required
Pre-requisites:-
Contact Hour:-36
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Students will demonstrate knowledge on automata, low memory machine &their application.
2. The course material will help the student in soft computation, state transition configuration.
3. The students will visualize practical knowledge on syntax , semantics, languages, and the utility of different languages.
4. The conversion of NFA to DFA would help them to visualize the logic behind the conversion.
5. The students learn about pumping lemma & its application help the students to accrue regular language testing
6. The students learn about PDA, acceptance of PDA,
7. Students will learn and convince a TM is exactly as powerful as conventional computer.
8. Students will distinguish between different types of problems and its categorization.
9. They accrue higher knowledge on performance of an algorithm based on classification and enrich their knowledge for research and innovation.
10. Graduate will participate and succeed in competitive examination

Topics Covered:-

Alphabet, languages and grammars. Production rules and derivation of languages. Chomsky hierarchy of languages. Regular grammars, regular expressions and finite automata (deterministic and nondeterministic). Closure and decision properties of regular sets. Pumping lemma of regular sets. Minimization of finite automata. Left and right linear grammars.

Context free grammars and pushdown automata. Chomsky and Griebach normal forms. Parse trees, Cook, Younger, Kasami, and Early's parsing algorithms. Ambiguity and properties of context free languages. Pumping lemma, Ogden's lemma, Parikh's theorem. Deterministic pushdown automata, closure properties of deterministic context free languages.

Turing machines and variation of Turing machine model, Turing computability , Type 0 languages. Linear bounded automata and context sensitive languages. Primitive recursive functions. Cantor and Godel numbering. Ackermann's function, mu-recursive functions, recursiveness of Ackermann and Turing computable functions. Church Turing hypothesis.

Recursive and recursively enumerable sets.. Universal Turing machine and undecidable problems. Undecidability of Post correspondence problem. Valid and invalid computations of Turing machines and some undecidable properties of context free language problems. Time complexity class P, class NP, NP completeness.

Text Books and/or Reference Material:-

1. Introduction to Automata Theory, Languages and Computation: J.E. Hopcroft and J.D Ullman, Pearson Education, 3rd Edition.
2. Introduction to the theory of computation: Michael Sipser, Cengage Learning
3. Theory of computation by Saradhi Varma, Scitech Publication
4. Introduction to Languages and the Theory of Computation: Martin, Tata McGraw Hill, 3rd Edition
5. Introduction to Formal Languages, Automata Theory and Computation: K. Kirthivasan, Rama R, Pearson Education.
6. Theory of computer Science (Automata Language & computations) K.L. Mishra N. handrashekhar, PHI.
7. Elements of Theory of Computation: Lewis, PHI
8. Theory of Automata and Formal Languages: Anand Sharma, Laxmi Publication
9. Automata Theory: Nasir and Srimani , Cambridge University Press.
10. Introduction to Computer Theory: Daniel I.A. Cohen, Willey India, 2nd Edition.

Department:- Electronics & Engineering
Course Number:- PCBM4302
Title of Course:- Signal & Systems
Designation: - Elective
Pre-requisites:-
Contact Hour:-35
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

Topics Covered:-

Discrete-Time Signals and Systems:

Discrete-Time Signals: Some Elementary Discrete-Time signals, Classification of Discrete-Time Signals, Simple Manipulation; Discrete-Time Systems : Input-Output Description, Block Diagram Representation, Classification, Interconnection; Analysis of Discrete-Time LTI Systems: Techniques, Response of LTI Systems, Properties of Convolution, Causal LTI Systems, Stability of LTI Systems; Discrete-Time Systems Described by Difference Equations; Implementation of Discrete-Time Systems; Correlation of Discrete-Time Signals: Crosscorrelation and Autocorrelation Sequences, Properties.

Properties of Continuous-Time Systems:

Block Diagram and System Terminology, System Properties: Homogeneity, Time Invariance, Additivity, Linearity and Superposition, Stability, Causality.

The Continuous-Time Fourier Series:

Basic Concepts and Development of the Fourier Series, Calculation of the Fourier Series, Properties of the Fourier Series.

The Continuous-Time Fourier Transform:

Basic Concepts and Development of the Fourier Transform, Properties of the Continuous-Time Fourier Transform.

The Z-Transform and Its Application to the Analysis of LTI Systems:

The Z-Transform: The Direct Z-Transform, The Inverse Z-Transform; Properties of the Z-Transform; Rational Z-Transforms: Poles and Zeros, Pole Location and Time-Domain Behavior for Causal Signals, The System Function of a Linear Time-Invariant System; Inversion of the Z-Transforms: The Inversion of the Z-Transform by Power Series Expansion, The Inversion of the Z-Transform by Partial-Fraction Expansion; The One-sided Z-Transform: Definition and Properties, Solution of Difference Equations.

The Discrete Fourier Transform: Its Properties and Applications:

Frequency Domain Sampling: The Discrete Fourier Transform; Properties of the DFT: Periodicity, Linearity, and Symmetry Properties, Multiplication of Two DFTs and Circular Convolution, Additional DFT Properties.

Text Books and/or Reference Material:-

1. Digital Signal Processing – Principles, Algorithms and Applications by J. G. Proakis and D. G. Manolakis, 4th Edition, Pearson.
2. Fundamentals of Signals and Systems - M. J. Roberts, TMH
3. Signals and Systems - P. R. Rao, TMH.
4. Signals and Systems – A Nagoor Kani, TMH
5. Signals and Systems by Chi-Tsong Chen, Oxford
6. Principles of Signal Processing and Linear Systems, by B.P. Lathi, Oxford.
7. Principles of Linear Systems and Signals, by B.p. Lathi, Oxford

Department:- Computer Science & Engineering
Course Number:- PCCS7301
Title of Course:- Computer Organization Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

After completion of this course the learner will able to:
1. Demonstrate the several functional units of a PC physically.
2. Assemble a PC.
3. Dismantle a PC.
4. Comprehend the working principle of each hardware units of a PC.
5. Tackle the problems regarding h/w equipments.
6. Understand the bus structures of a PC.
7. Design the program for simple fundamental units and can assess their operations by using VHDL code.

Topics Covered:-

1. To recognize various components of PC.
2. Dismantling and assembling a PC.
3. Some experiments using Hardware trainer kits for SMPS, CPU , Hard disk , Motherboard, printer, real time clock etc.
4. Simulation of simple fundamental units like half adder, full adder, multiplexer, de-multiplexer, Arithmetic logic Unit, Simple processor (CPU) etc using VHDL code.

Text Books and/or Reference Material:-

Department:- Computer Science & Engineering
Course Number:-PCCS7302
Title of Course:- Computer Network Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-
After completion of this course graduate will

1. Evaluate the performance of Ethernet LAN.
2. Differentiate the performance between bus & star switch for Ethernet LAN.
3. Analyzing performance of token ring.
4. Compare the throughput and normalized throughput for token ring and token bus.
5. Compare the CSMA/CD vs. CSMA/CA protocols.
6. Analyze the difference between unicast and broadcast transmission.
7. Verify stop & wait protocol, go back –n, selective repeat protocols.
8. Verification of distance vector, link state routing algorithm.
9. students will able to do socket programming
10. Able to know the use of NetSim & NS2 simulators.

Topics Covered:-

1. Some Network protocol simulation using NetSim, NS2, etc. for
   - i) Analysing number of transmitting nodes vs. collision count, mean delay for Ethernet LAN .
   - ii) Analysing bus vs. star-switch with respect to number of collisions (for a fixed number of transmitting nodes) for Ethernet LAN
   - iii) Analysing performance of token ring with number of nodes vs. response time, mean delay using NetSim.
   - iv) Comparing the throughput and normalized throughput for token ring and token bus for different transmitting nodes.
   - v) Comparing the CSMA/CD vs. CSMA/CA protocols (for a fixed number of transmitting nodes).
   - vi) Analysing the difference between unicast and broadcast transmission (for a fixed number of transmitting nodes).
   - vii) Verification of stop-and-wait protocol.
   - viii) Verification of Go-back-N protocol.
   - ix) Verification of Selective repeat protocol.
   - x) Verification of distance vector routing algorithm.
   - xi) Verification of link state routing algorithm.
2. Some programming techniques in socket programming.

Text Books and/or Reference Material:-

Department:- Computer Science & Engineering
Course Number:-PCCS7303
Title of Course:- JAVA Programming Lab
Designation: - Required
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Student will get knowledge to compilation and execution of the java program.
2. Student will execute the program using different control structure like if, if-else ,Nested if etc
3. Student will execute the program using different loop like do, while etc
4. Student will understand the execution of the program with the help of class and object
5. Student will implement the program of inheritance & polymorphism concept
6. Student will implement Multithreading program.
7. Student will understand the use of Try and catch clause in Exception Handing
8. Student will implement To implement the multiple inheritance using Interface
9. Student will implement the program using wrapper classes
10. Student will implement the program using inner class
11. Student will be able to develop and maintain software.

Topics Covered:-

various JAVA programs on:

1. Introduction, Compiling & executing a java program.
2. data types & variables, decision control structures: if, nested if etc.
3. loop control structures: do, while, for etc.
4. classes and objects.
5. data abstraction & data hiding, inheritance, polymorphism.
6. threads, exception handlings and applet programs
7. interfaces and inner classes, wrapper classes, generics

Text Books and/or Reference Material:-

Department:- Mathematics
Course Number:- HSSM3302
Title of Course:- Optimization In Engineering
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

After completion of this course:

1. Graduate will demonstrate knowledge of formulating the physical problems into mathematical models and they can give the inference on the physical problems .
2. Graduate will demonstrate an ability to optimize the cost in various industry jobs
3. Graduate will learn how to optimize the assignment task in various resourses
4. Graduate will learn the machine servicing model . power supply model , economic cost profit model etc. in various technology
5. Students will be able to understand about the basic concept of computer science background

Topics Covered:-

Idea of Engineering optimization problems, Classification of optimization algorithms, Modeling of problems and principle of modeling.
Linear programming: Formulation of LPP, Graphical solution, Simplex method, Big-M method, Revised simplex method, Duality theory and its application, Dual simplex method , Sensitivity analysis in linear programming

Transportation problems: Finding an initial basic feasible solution by Northwest Corner rule, Least Cost rule, Vogel's approximation method, Degeneracy, Optimality test, MODI method, Stepping stone method
Assignment problems: Hungarian method for solution of Assignment problems
Integer Programming: Branch and Bound algorithm for solution of integer Programming Problems
Queuing models: General characteristics, Markovian queuing model, M/M/1 model, Limited queue capacity, Multiple server, Finite sources, Queue discipline.

Non-linear programming: Introduction to non-linear programming.
Unconstraint optimization: Fibonacci and Golden Section Search method.
Constrained optimization with equality constraint: Lagrange multiplier, Projected gradient method
Constrained optimization with inequality constraint: Kuhn-Tucker condition, Quadratic programming
Introduction to Genetic Algorithm.

Text Books and/or Reference Material:-

1. A. Ravindran, D. T. Philips, J. Solberg, *“ Operations Research- Principle and Practice*”, Second edition, Wiley India Pvt Ltd
2. Kalyanmoy Deb, “ *Optimization for Engineering Design*”, PHI Learning Pvt Ltd

3. **S**tephen G. Nash, A. Sofer, *“ Linear and Non-linear Programming*”, McGraw Hill
4. A.Ravindran, K.M.Ragsdell, G.V.Reklaitis,” *Engineering Optimization*”, Second edition, Wiley India Pvt. Ltd
5. H.A.Taha,A.M.Natarajan, P.Balasubramanie, A.Tamilarasi, “*Operations Research*”, Eighth Edition, Pearson Education
6. F.S.Hiller, G.J.Lieberman, *“ Operations Research*”, Eighth Edition, Tata McDraw Hill
7. P.K.Gupta, D.S.Hira, “*Operations Research*”, S.Chand and Company Ltd.

Department:- Electronics & Telecommunication
Course Number:- PCEL4303
Title of Course:- Microprocessor& Micro controllers
Designation: - Required
Pre-requisites:-
Contact Hour:-40
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

Topics Covered:-

Microprocessor Architecture: Microprocessor and Microcomputer Architecture, Pins & Signals, Register Organization, Timing & Control Module, 8085 Instruction Timing & Execution.
Assembly Language Programming of 8085: Instruction set of 8085, Memory & I/O Addressing, Assembly language programming, Stack & Subroutines.
Interfacing EPROM & RAM Memories: 2764 & 6264, 8085 Interrupts

8086 Microprocessor: Architectures, Pin Diagrams and Timing Diagrams: Register Organisation, Architecture, Signal Description, Physical Memory Organisations, Bus Operation, I/O Addressing Capability, Special Processor Activities, Minimum Mode System and Timings, Maximum Mode System and Timings
8086 Instruction Set and Assembler Directives: Machine Language Instruction Formats, Addressing Modes, Instruction Set, Assembler Directives and Operators
Assembly Language Programming with 8086: Machine Level Programs, Machine Coding the Programs ,Programming with an Assembler
Special Architectural Features and Related Programming: Stack, Interrupts and Interrupt Service Routines, Interrupt Cycle,Non Maskable Interrupt, Maskable Interrupt, Interrupt Programming, Passing Parameters to Procedures, Handling Programs of Size More than 64k,MACROS, Timings and Delays
Basic Peripherals and Their Interfacing with 8086: Semiconductor Memory Interfacing, Dynamic RAM Interfacing, Interfacing I/O Ports, PIO 8255],Modes of Operation of 8255, Interfacing Analog to Digital Data Converters, Interfacing Digital to Analog to Converters, Stepper Motor Interfacing ,
Special Purpose Programmable Peripheral Devices and Their Interfacing
Programmable Interval Timer 8253, Programmable Interrupt Controller 8259A, The Keyboard/Display Controller 8279, Programmable Communication Interface 8251USART
DMA, Floppy Disk and CRT Controllers
DMA Controller 8257,DMA Transfers and Operations, Programmable DMA Interface 8237, Floppy Disk Controller 8272, CRT Controller 8275
80386 Microprocessor: Introduction, Architecture, Pins & Signals, Memory System, Registers, Memory Management, Paging Technique, Protected Mode Operation.

8051 Microcontrollers: Microcontrollers and embedded processors, Overview of the 8051 family

8051 Hardware Connection: Pin description of the 8051
8051 Assembly Language Programming: Inside the 8051, Assembly, Programming Assembling and Running an 8051 Program, The Program Counter and ROM Space in the 8051
8051 data types and Directives, PSW Register, register Banks and Stack
Jump, loop, and Call Instructions: Loop and Jump Instructions, Call Instructions, Time Delay for Various 8051 chips
8051 I/O Port Programming: I/O Programming, I/O Bit Manipulation Programming,
8051 Addressing Modes: Immediate and register Addressing Modes, Accessing memory using various Addressing Modes, Bit Addresses for I/O and RAM
Arithmetic & Logic Instructions and Programs: Arithmetic Instructions, Signed number concepts and Arithmetic Operations, Logic and Compare Instructions, Rotate Instruction and data Serialization, BCD, ASCII, and other Application Programs
8051 Serial Port Programming in Assembly: Basic of Serial communication, 8051 connection to RS232, 8051 Serial port Programming in Assembly, Programming the second Serial port
Interrupts Programming in Assembly: 8051 Interrupts, Programming timer Interrupts, Programming external hardware Interrupts, Programming the Serial Communication interrupt, Interrupt Priority in the 8051
ADC, DAC, and Sensor Interfacing: Parallel and Serial ADC, DAC Interfacing
Sensor Interfacing and Signal Conditioning
Interfacing to External Memory: Semiconductor Memory, Memory Address Decoding, Interfacing with External ROM, 8051 Data Memory space, Accessing External data Memory
8051 Interfacing with the 8255: 8255 Interfacing, Pogramming for the 8255
Motor Control: RELAY, PWM, DC, and Stepper Motors: Relays and Opto-isolations, Stepper Motor Interfacing, DC Motor Interfacing and PWM

Text Books and/or Reference Material:-

1. Ghosh & Sridhar,0000 to 8085–Introduction to Microprocessor for Scientists & Engineers, PHI
2. A.K. Roy & K.M. Bhurchandi, Advanced Microprocessor and Peripherals (Architecture, Programming & Interfacing)– TMH Publication
3. Mazidi & Mazidi, The 8051 Microcontroller & Embedded Systems– Pearson / PHI publication
4. M. Rafiqzzaman, Microprocessor – Theory & Applications. (Intel & Motorola), PHI
5. 2.The 8086 Microprocessor: Programming & Interfacing the PC by Keneeth J. Ayela
6. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware", TMH
7. R.S. Gaonkar, Microprocessor architecture, programming & application with 8085, Penram International Publishing. (India) Pvt. Ltd.
8. 5.W.A.Triebel and Avtar Singh, The 8088 and 8086 Microprocessors, Pearson Education
9. Barry B. B The Intel Microprocessor – (Architecture, Programming & Interfacing) by Pearson

Department: - Computer Science & Engineering
Course Number: - PCCS4304
Title of Course: - Operating System
Designation: - Required
Pre-requisites:-
Contact Hour:-35
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

After completion of this course:

1. Graduate will understand the importance of an operating system.
2. Graduate will understand how the operating systems are designed and constructed .
3. Graduate could realize the services of an operating system for computation of problems.
4. Graduate will able to evaluate the performance of the processor under a system.
5. Graduate will able to know different memory management schemes.
6. Graduate will able to know the mechanism of file system .
7. Graduate will able to know the disk structure and disk scheduling algorithms.

Topics Covered:-

INTRODUCTION TO OPERATING SYSTEM:
What is an Operating System? Simple Batch Systems, Multiprogramming and Time Sharing systems. Personal Computer Systems, Parallel Systems, Distributed Systems and Real time Systems.
Operating System Structures: Operating System Services, System components, Protection system, Operating System Services, system calls
PROCESS MANAGEMENT:
Process Concept, Process Scheduling, Operation on Processes, Interprocess communication, Examples of IPC Systems, Multithreading Models, Threading Issues, Process Scheduling Basic concepts, scheduling criteria, scheduling algorithms, Thread Scheduling.

PROCESS COORDINATION: Synchronization: The Critical section problem, Peterson's solution, Synchronization hardware, Semaphores, Classical problems of synchronization, Monitors.
Deadlocks: System model, Deadlock Characterization Methods for Handling Deadlocks, Deadlock Prevention, Deadlock avoidance, Deadlock Detection, recovery from Deadlock.
MEMORY MANAGEMENT: Memory Management strategies, Logical versus Physical Address space, swapping, contiguous Allocation, Paging, Segmentation.
Virtual Memory: Background, Demand paging, performance of Demand paging, Page Replacement, Page Replacement Algorithms. Allocation of frames, Thrashing, Demand Segmentation.

STORAGE MANAGEMENT:

File System Concept, Access Methods, File System Structure, File System Structure, File System Implementation, Directory implementation, Efficiency and Performance, Recovery, Overview of Mass Storage Structure, Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, I/O System Overview, I/O Hardware, Application I/O Interface, Kernel I/O Subsystem, Transforming I/O Request to Hardware Operation.
CASE STUDIES: The LINUX System, Windows XP, Windows Vista

Text Books and/or Reference Material:-

1. **Operating System Concepts –** Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 8^{th} edition, Wiley-India, 2009.
2. **Mordern Operating Systems –** Andrew S. Tanenbaum, 3^{rd} Edition, PHI
3. **Operating Systems:** A Spiral Approach – Elmasri, Carrick, Levine, TMH Edition
4. **Operating Systems –** Flynn, McHoes, Cengage Learning
5. **Operating Systems –** Pabitra Pal Choudhury, PHI
6. **Operating Systems –** William Stallings, Prentice Hall
7. **Operating Systems –** H.M. Deitel, P. J. Deitel, D. R. Choffnes, 3^{rd} Edition, Pearson

Department: - Computer Science & Engineering
Course Number: - PCCS4305
Title of Course: - Compiler Design
Designation: - Required
Pre-requisites:-
Contact Hour:-35
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduate will demonstrate knowledge on language ,Regular language and Context Free Grammar.
2. Graduate will demonstrate an ability design of the compiler
3. Graduate will demonstrate an ability to visualize and work on laborotary and multidisciplinary tasks.
4. Students will able to understand the concepts of scanner,parser,their development tools like FLEX & BYACC.
5. Students will be able to understand the grammar and hence can design the corresponding dictionary for a language.
6. Students will understand the bootstrapping process to design a compiler by its own language.
7. Students will understand how to define a token,sentence,grammar for each sentence ,Recognizer for token and sentence,implementation of Recognizers by the tools FLEX and BYACC.
8. Graduate will develop confidence for self education and ability for life long learning.
9. Graduate can participate and succeed in competitive examination like GATE,GRE.
10. Graduate will show of impact of engineering solution.
11. Graduate can choose a Research job other than software.

Topics Covered:-

Introduction: Overview and phases of compilation.
Lexical Analysis: Non-deterministic and deterministic finite automata (NFA & DFA), regular grammar, regular expressions and regular languages, design of a lexical analyser as a DFA, lexical analyser generator.
Syntax Analysis: Role of a parser, context free grammars and context free languages, parse trees and derivations, ambiguous grammar.
Top Down Parsing: Recursive descent parsing, LL(1) grammars, non-recursive predictive parsing, error reporting and recovery.
Bottom Up Parsing: Handle pruning and shift reduces parsing, SLR parsers and construction or SLR parsing tables, LR(1) parsers and construction of LR(1) parsing tables, LALR parsers and construction of efficient LALR parsing tables, parsing using ambiguous grammars, error reporting and recovery, parser generator.

Syntax Directed Translation: Syntax directed definitions (SDD), inherited and synthesized attributes, dependency graphs, evaluation orders for SDD, semantic rules, application of syntax directed translation.
Symbol Table: Structure and features of symbol tables, symbol attributes and scopes.
Intermediate Code Generation: DAG for expressions, three address codes - quadruples and triples, types and declarations, translation of expressions, array references, type checking and conversions, translation of Boolean expressions and control flow statements, back patching, intermediate code generation for procedures.

Run Time Environment: storage organizations, static and dynamic storage allocations, stack allocation, handlings of activation records for calling sequences
Code Generations: Factors involved, registers allocation, simple code generation using stack allocation, basic blocks and flow graphs, simple code generation using flow graphs.
Elements of Code Optimization: Objective, peephole optimization, concepts of elimination of local common sub-expressions, redundant and un-reachable codes, basics of flow of control optimization.

Text Books and/or Reference Material:-

1. Compilers – Principles, Techniques and Tools ,Authors: Alfred V. Aho, Monica S. Lam, Ravi Sethi and Jeffrey D. Ullman ,Publisher: Pearson

Department:- Computer Science & Engineering
Course Number: - PCIT4301
Title of Course: - Internet & Web Technology
Designation: - Elective
Pre-requisites:-
Contact Hour:-35
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduate will demonstrate the knowledge of protocols in all fields.
2. They will demonstrate an ability to design their own web site & used in all applications.
3. Students will able to perform client side validation work in real world project.
4. Graduate will demonstrate the knowledge of hyper linking, all tags of HTML in a lab efficiently.
5. Students will be able to understand utilization of style sheets in real environment.
6. Graduate will be worked as web developer in much multinational software company.
7. Graduate will develop confidence for self education and ability for lifelong learning.
8. Students will be able to solve the problems in testing and debugging of real world project in PERL.
9. They can design the DOM (Document Object Model) of current situation in web.
10. Students will demonstrate skill to visualize and work on software farm to produce the best solutions
11. Graduate will show of impact of engineering solution in web technology.
12. Graduate can participate and succeed in competitive examination like GATE, GRE and Software Company's interview.

Topics Covered:-

The Internet and WWW
Understanding the WWW and the Internet, Emergence of Web, Web Servers, Web Browsers, Protocols, Building Web Sites
HTML
Planning for designing Web pages, Model and structure for a Website, Developing Websites, Basic HTML using images links, Lists, Tables and Forms, Frames for designing a good interactive website

JAVA Script
Programming Fundamentals, Statements, Expressions, Operators, Popup Boxes, Control Statements, Try…. Catch Statement, Throw Statement, Objects of Javascript: Date object, array object, Boolean object, math object
CSS
External Style Sheets, Internal Style Sheets, Inline Style, The class selector, div & span tag

DOM
HTML DOM, inner HTML, Dynamic HTML (DHTML), DHTML form, XML DOM

CGI/PERL
Introduction to CGI, Testing & Debugging Perl CGI Script, Using Scalar variables and operators in Perl
Java Applet
Introduction to Java, Writing Java Applets, Life cycle of applet

Text Books and/or Reference Material:-

1. Web Warrior Guide to Web Design Technologies, Don Gosselin, Joel Sklar & others, Cengage Learning
2. Web Programming: Building Internet Applications, Chris Bates, Wiley Dreamtech
3. Programming the World Wide Web, Robert W Sebesta, Pearson
4. Web Technologies, Uttam K Roy, Oxford
5. Web Technology: A developer perspective, Gopalan & Akilandeswari, PHI

Department:- Electrical Engineering
Course Number:- PCEE4304
Title of Course:- Communication Engineering
Designation: - Elective
Pre-requisites:-
Contact Hour:-
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Topics Covered:-

INTRODUCTION: Elements of an Electrical Communication System, Communication Channels and their Characteristics, Mathematical Models for Communication Channels

FREQUENCY DOMAIN ANALYSIS OF SIGNALS AND SYSTEMS: Fourier series, Fourier Transforms, Power and Energy, Sampling and Band limited signals, Band pass signals

ANALOG SIGNAL TRANSMISSION AND RECEPTION: Introduction to modulation, Amplitude Modulation (AM), Angle Modulation, Radio and Television broadcasting

PULSE MODULATION SYSTEMS: Pulse amplitude modulation, Pulse Time Modulation

PULSE CODE MODULATION: PCM system, Intersymbol interference, Eye patterns, Equalization, Companding, Time Division Multiplexing of PCM signals, Line codes, Bandwidth of PCM system, Noise in PCM systems, Delta Modulation (DM), Limitations of DM, Adaptive Delta Modulation, Noise in Delta Modulation, Comparison between PCM and DM, Delta or Differential PCM (DPCM), S-Ary System

Text Books and/or Reference Material:-

1. John G.Proakis,M. Salehi, *COMMUNICATION SYSTEMS ENGINEERING*, 2nd ed. New Delhi,India: PHI Learning Private Limited, 2009.; Selected portion from Chapter 1,2 and 3 for module MODULE-I and MODULE-II of the course.
2. R.P Singh and S.D Sapre, *COMMUNICATION SYSTEMS Analog & Digital*, 2nd ed. New Delhi, India: Tata McGraw Hill Education Private Limited, 2009; Selected portions from Chapter 7 and 8 of the book for MODULE-III.
3. Taub, Schilling, Saha, Taub's Principles of Communication Systems, TMH.
4. Modern Digital and Analog Communication Systems, by B.P. Lathi, Oxford

Department: - Electronics & Telecommunication
Course Number: - PCEL7303
Title of Course: - Microprocessor and Microcontroller Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: -Sessional
Course Assessment: - Continuous
Course Outcomes:-
Topics Covered:-

8085

1. Addition, subtraction, multiplication and division of two 8 bit numbers
2. Smallest/largest number among n numbers in a given data array, Binary to Gray code, Hexadecimal to decimal conversion

Interfacing

1. Generate square wave on all lines of 8255 with different frequencies
2. Study of stepper motor and its operations

Optional (any two)

1. Study of traffic light controller
2. Study of elevator simulator
3. Generation of square, triangular and saw tooth wave using D to A Converter
4. Study of 8253 and its operation(Mode0, Mode2, Mode3)
5. Study of Mode0,Mode1 and BSR Mode operation of 8255
6. Study of 8279 (keyboard and display interface)
7. Study of 8259 Programmable Interrupt Controller

8051 Microcontroller

1. Initialize data to registers and memory using immediate, register, direct and indirect Addressing mode.

Optional (any one)

1. Addition and subtraction of 16 bit numbers
2. Multiplication and division of two 16 bit numbers
3. Transfer a block of data to another memory location using indexing
4. Operation of 8255 using 8051 microcontroller

8086

1.Addition , subtraction ,multiplication and division of 16 bit numbers, 2's complement of a 16 bit number

Optional (any one)

1. Finding a particular data element in a given data array
2. Marking a specific bit of a number using look-up table
3. Largest/smallest number of a given data array
4. To separate the odd and even numbers from a given data array

5. Sorting an array of numbers in ascending/descending order

Text Books and/or Reference Material:-

Department: - Computer Science & Engineering
Course Number: - PCCS7304
Title of Course: - Operating System Lab.
Designation: - Required
Pre-requisites:-
Contact Hour:-
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

After completion of this course:

1. Graduate will able to know the basic unix commands.
2. Graduate will able to know the shell programming..
3. Graduate could solve the different concurrency problems.
4. Graduate will able to know the use of system call in process management.
5. Graduate will able to calculate the performance of different scheduling algorithms.
6. Graduate will able to know how to avoid and prevent from deadlock.
7. Graduate will able to know the performance of page replacement algorithm
8. Graduate will able to appear for GATE,GRE,DRDO,SOFTWARE companies.

Topics Covered:-

1. Basic UNIX Commands.
2. UNIX Shell Programming.
3. Programs on process creation and synchronization, inter process communication including shared memory, pipes and messages.(Dinning Philosopher problem / Cigarette Smoker problem / Sleeping barber problem)
4. Programs on UNIX System calls.
5. Simulation of CPU Scheduling Algorithms. (FCFS, RR, SJF, Priority, Multilevel Queuing)
6. Simulation of Banker's Algorithm for Deadlock Avoidance, Prevention
7. Program for FIFO, LRU, and OPTIMAL page replacement algorithm.

Text Books and/or Reference Material:-

Department: - Computer Science & Engineering
Course Number: - PCCS7307
Title of Course: - Seminar
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-
After presentation of seminars:

1. Graduate will be able to present ideas through visual aids.
2. Graduate will be able to make connections across courses and disciplines
3. Graduate will have completed a self-assessment of their personal and professional skills
4. Graduate will possess the tools needed to conduct an effective search for a career.
5. Graduate will be able to have in-depth knowledge on a topic.
6. Graduate will have an exposure to different types of journals.
7. Graduates will learn how to search, analyze, accumulate and communicate scientific ideas and information and/or research findings in a short, precise and scientific manner.
8. Graduate will learn to share best practices and tools related to the topic.
9. Graduates will have knowledge of seminar documentation.

Topics Covered:-

Text Books and/or Reference Material:-

Department: - Management
Course Number: - HSSM3401
Title of Course: - Entrepreneurship Development
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduate will demonstrate knowledge on entrepreneurships.
2. Graduate will able to understand the role of Self, Bank, Government and society for entrepreneurship.
3. Graduate will be able to monitor or guide for a day to day activities of an entrepreneur.
4. Graduate will understand the importance of decision making, leadership.
5. Graduate will prepare a preliminary project report.
6. Graduate can became an entrepreneur and help the society by generating more job.

Topics Covered:-
Understanding Entrepreneurship
Concept of Entrepreneurship, Motivation for Economic Development and Entrepreneurial Achievement, Enterprise and Society
Why and how to start Business – Entrepreneurial traits and skills, Mind Vrs Money in Commencing New Ventures, Entrepreneurial success and failures, Environmental dynamics and change.
Entrepreneurial Process
Step by step approach to entrepreneurial start up
Decision for Entrepreneurial start up.

Setting up of a small Business Enterprise.
Identifying the Business opportunity - Business opportunities in various sectors, formalities for setting up small enterprises in manufacturing and services, Environmental pollution and allied regulatory and non-regulatory clearances for new venture promotion in SME sector.
Writing a Business plan, components of a B-Plan, determining Bankability of the project.

Institutional Support for SME
Central / State level Institution promoting SME.
Financial Management in small business.
Marketing Management, problems & strategies
Problems of HRM – Relevant Labour – laws.
Sickness in Small Enterprises.
Causes and symptoms of sickness – cures of sickness.

Govt. policies on revival of sickness and remedial measures.

Text Books and/or Reference Material:-

1. Entrepreneurship Development, Small Business Enterprises, Chavantimath, Pearson.
2. Entrepreneurial Development, S.S. Khanka, S Chand
3. Entrepreneurship, Barringer BR, Ireland R.D., Pearson
4. Entrepreneurship, David H Holt, PHI
5. Entrepreneurship, Kurilko, D.F. and Attodgets RM, Cengage
6. The Dynamics of Entrepreneurial Development & Management, Vasant Desai, HPH.
7. Entrepreneurship, Roy, Oxford
8. Entrepreneurship, Hisrich, Peters, Shepherd, TMH

Department: - Computer Science & Engineering
Course Number: - PCCS4401
Title of Course: - Computer Graphics
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduate students would acquire basic knowledge for research and innovation.
2. They would be attracted for higher research in the recent developed field of Computer Graphics.
3. Students can design and implement an application which illustrates the use of a 3D viewing model.
4. Graduate can create 3D objects using modeling software and explain Fractal Geometry Methods.
5. Students Understand scene graph architectures, their benefits and the rendering from a scene graph and can implement an illumination model for rendering 3D objects.
6. Use correct lighting and shading and know how it works.
7. Apply aesthetic judgments and critical thinking skills to art and graphics related issues.
8. The Graduate will develop self confidence and innovative attitude in applied science
9. Graduate can participate and succeed in competitive examination like GATE,
10. Graduate will show the impact of engineering solution.

Topics Covered:-

Overview of Graphics System: Video Display Units, Raster-Scan and Random Scan Systems, Graphics Input and Output Devices.
Output Primitives: Line drawing Algorithms: DDA and Bresenham's Line Algorithm, Circle drawing Algorithms: Midpoint Circle Algorithm and Bresenham's Circle drawing Algorithm.
Two Dimensional Geometric Transformation: Basic Transformation (Translation, rotation, Scaling) Matrix Representation, Composite Transformations, Reflection, Shear, Transformation between coordinate systems.
Two Dimensional Viewing: Window-to- View port Coordinate Transformation.

Line Clipping (Cohen-Sutherland Algorithm) and Polygon Clipping (Sutherland-Hodgeman Algorithm).
Aliasing and Antialiasing, Half toning, Thresholding and Dithering, Scan conversion of Character.
Polygon Filling: Seed Fill Algorithm, Scan line Algorithm.

Two Dimensional Object Representation: Spline Representation, Bezier Curves and B-Spline Curves.
Fractal Geometry: Fractal Classification and Fractal Dimension.
Three Dimensional Geometric and Modeling Transformations: Translation Rotation, Scaling, Reflections, shear, Composite Transformation.
Projections: Parallel Projection and Perspective Projection.

Visible Surface Detection Methods: Back-face Detection, Depth Buffer, A- Buffer, Scan- line Algorithm and Painters Algorithm.
Illumination Models: Basic Models, Displaying Light Intensities.
Surface Rendering Methods: Polygon Rendering Methods: Gouraud Shading and Phong Shading.
Computer Animation: Types of Animation, Key frame Vs. Procedural Animation, methods of controlling Animation, Morphing.
Virtual Reality: Types of Virtual reality systems, Input and Output Virtual Reality devices.

Text Books and/or Reference Material:-

1. Computer Graphics with Virtual Reality System, Rajesh K.Maurya, Wiley-Dreamtech.
2. Computer Graphics, D. Hearn and M.P. Baker (C Version), Pearson Education
3. Computer Graphics Principle and Practice , J.D. Foley, A.Dam, S.K. Feiner, Addison, Wesley
4. Procedural Elements of Computer Graphics- David Rogers (TMH)
5. Computer Graphics: Algorithms and Implementations – D.P Mukherjee & Debasish Jana (PHI)
6. Introduction to Computer Graphics & Multimedia – Anirban Mukhopadhyay & Arup Chattopadhyay (Vikas)

Department: - Computer Science & Engineering
Course Number: - PCCS4402
Title of Course: - Principles and practices in software engineering
Designation: - Required
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduate will learn to work together in organized groups.
2. Students will be able to define a project management plan.
3. Students will reconcile conflicting project objectives, finding acceptable compromises within limitations of cost, time, knowledge, existing systems, and organizations.
4. Students will demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for problem identification and analysis, software design, development, implementation, verification and documentation.
5. Students will learn new models, techniques, and technologies as they emerge.
6. Students will gain an understanding of the limitations of current SE knowledge, and how SE knowledge seems to be developing.
7. Students will understand the relationship between software engineering and system engineering and will be able to apply.
8. Students will understand the importance of feasibility analysis, negotiation, leadership, and good communication with stakeholders in a typical software development environment.
9. The course contents would have good impact on their mind for higher research.
10. The students would develop self-confidence and innovative attitude in application of Software engineering.
11. Graduate students would acquire basic knowledge for research and innovation.

Topics Covered:-

Evolution and impact of Software engineering, software life cycle models; Feasibility study, Functional and Non-functional requirements, Requirement analysis and specification.

Basic issues in software design, modularity, cohesion, coupling and layering, function-oriented software design, object modeling using UML, Object-oriented software development, user interface design. Coding standards and Code review techniques.

Fundamentals of testing, White-box, and black-box testing, Test coverage analysis and test case design techniques, mutation testing, Static and dynamic analysis, Reliability and Quality management, ISO and SEI CMMI, PSP and Six Sigma. Computer aided software engineering, software maintenance, software reuse, Component-based software development.

Text Books and/or Reference Material:-

1. Fundamentals of Software Engineering – Rajib Mall. (PHI-3rd Edition), 2009.
2. Ian Sommerville, “Software Engineering”, 8th Edition, 2007, Pearson Education Inc., New Delhi.
3. Roger S. Pressman, “Software Engineering: A Practitioner’s Approach”, 7th International Edition, McGraw-Hill Education (Asia), Singapore.
4. Shari Lawrence Pfleeger, Joanne M. Atlee, “Software Engineering”, 3rd Edition (2006) , Pearson Education, Inc. New Delhi.
5. Pankaj Jalote, “Software Engineering”, First Edition, 2009, Wiley India Pvt. Ltd., New Delhi.

Department:- Computer Science & Engineering
Course Number:- PECS5402
Title of Course:- Cryptography & Network Security
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

Topics Covered:-

Introduction to Information Security: Security Goals, Attacks, Security Services and Mechanisms, **Mathematical Background**: Integer and Modular Arithmetic, Matrices, Linear Congruence. Groups, Rings, and Fields, GF(p), Euclidean and Extended Euclidean Algorithms, Polynomial Arithmetic, GF(2n). Random Number Generation, Prime Numbers, Fermat's and Euler's Theorems, Primality Testing Methods, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Discrete Logarithms.

Traditional Encryption Methods: Symmetric Cipher Model, Substitution Ciphers, Transposition Ciphers, Block and Stream Ciphers, Rotor Cipher, Steganography. **Symmetric Key Ciphers**: Data Encryption Standard, Advanced Encryption Standard. **Asymmetric Key Ciphers**: RSA Cryptosystem, ElGamal Cryptosystem, Elliptic Curve Cryptosystem.**Message Integrity, Authentication**: Message Integrity, Random Oracle Model, Message Authentication, MAC Algorithms. Cryptographic Hash Functions: MD Hash Family, Whirlpool, Secure Hash Algorithm. Digital Signature and Authentication: Digital Signature Schemes, Variations and Applications, Entity Authentication.Key Management: Diffie-Hellman Key Exchange.

Network and System Security:Security at the Application Layer: e-mail security, PGP and S/MIME. Security at the Transport Layer: Secure Socket Layer (SSL) and Transport Layer Security (TLS). Security at the Network Layer: IP Security. **System Security**: Malicious Software, Malicious Programs, Viruses, Worms, Malware, Intrusion Detection System, Firewalls.

Text Books and/or Reference Material:-

1. B. A. Forouzan & D Mukhopadhyay ,Cryptography and Network Security., McGraw Hill, 2nd ed.2010
2. B. Menezes ,Network Security and Cryptography., Cengage Learning, 1st ed.2010
3. **3.** Stallings ,Cryptography and Network Security., PHI, 4th ed.2010

Department: - Computer Science & Engineering
Course Number: - PECS5403
Title of Course: - Real Time System
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

Topics Covered:-

Introduction: What is real time, Applications of Real-Time systems, A basic model of Real-time system, Characteistics of Real-time system, Safety and Reliability, Types of Real-time tasks, timing constraints, Modelling timing constraints
Real-Time Task Scheduling: Some important concepts, Types of Real-time tasks and their characteristics, Task scheduling, Clock-Driven scheduling, Hybrid schedulers, Event-Driven scheduling, Earliest Deadline First (EDF) scheduling, Rate monotonic algorithm (RMA). Some issues Associated with RMA. Issues in using RMA practical situations.

Handling Resource Sharing and dependencies among Real-time Tasks: Resource sharing among real-time tasks. Priority inversion. Priority Inheritance Protocol (PIP), Highest Locker Protocol (HLP). Priority Ceiling Protocol (PCP). Different types of priority inversions under PCP.Important features of PCP. Some issues in using a resource sharing protocol. Handling task dependencies.
Scheduling Real-time tasks in multiprocessor and distributed systems: Multiprocessor task allocation, Dynamic allocation of tasks. Fault tolerant scheduling of tasks. Clock in distributed Real-time systems, Centralized clock synchronization

Commercial Real-time operating systems: Time services, Features of a Real-time operating system, Unix as a Real-time operating system, Unix-based Real-time operating systems, Windows as a Real-time operating system,POSIX-RT, A survey of contemporary Real-time operating systems. Benchmarking real-time systems.
Real-time Databases: Example applications of Real-time databases. Review of basic database concepts, Real-time databases, Characteristics of temporal data. Concurrency control in real-time databases. Commercial real-time databases. Real-time Communication: Basic concepts, Examples of applications, Real-time communication in a LAN and Real-time communication over packet switched networks.

Text Books and/or Reference Material:-

1. Real-time Systems Theory and Practice by Rajib Mall, Pearson Publication, 2008.
2. Jane W. S. Liu, Real-Time Systems, Pearson Education, 2000.
3. C.M. Krishna and K.G. Shin, Real-Time Systems, TMH.

Department: - Computer Science & Engineering
Course Number: - PECS5404
Title of Course: - Advanced computer Architecture
Designation: - Elective
Pre-requisites: -
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Topics Covered:-

Processor Architecture
Evolution of Microprocessors, Instruction set processor design, Principles of processor performance, Instruction-level Parallelism, RISC and CISC architectures, Pipelining fundamentals, Arithmetic and instruction pipelining, Pipeline hazards, Minimizing pipeline stalls, Branch Prediction, superscalar and super pipelined architectures.
Memory and I/O Architecture
Hierarchical memory technology; Multi-level caches, Data and Instruction caches, Cache optimizations, Memory Management hardware, I/O systems: Peripheral and Processor-Memory buses, Split transaction buses, USB.
Multiprocessor Architecture
Basic multiprocessor architecture, Cache coherence, multithreaded processors, VLIW processor architectures. Array and vector processors. Case studies: MIPS architecture, Intel Series of processors, Pentium's Internally RISC and externally CISC, Hyper threading, SPARC and ARM processors.

Text Books and/or Reference Material:-

1. David A. Patterson and John L. Hennessy, Computer Organization and Design, Elsevier, Fourth Edition
2. John Paul Shen and Mikko Lipasti, Modern Processor Design, Tata McGraw Hill.
3. Dezso *Sima*, Terence Fountain, and Peter Kacsuk, *Advanced Computer Architecture*: A Design Space Approach, by Addison Wesley
4. John L. Hennessy & David A. Patterson, Computer Architecture, A Quantitative Approach 4th Edition, Morgan Kaufmann.
5. Hwang & Jotwani, Advance Computer Architecture, TMH

Department:- Computer Science & Engineering
Course Number:- PCIT4402
Title of Course:- Software project Management
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Topics Covered:-

Project Evaluation and Planning
Activities in Software Project Management, Overview Of Project Planning, Stepwise planning, contract management, Software processes and process models. Cost Benefit Analysis, Cash Flow Forecasting, Cost-Benefit Evaluation Techniques, Risk Evaluation. Project costing, COCOMO 2, Staffing pattern, Effect of schedule compression, Putnam's equation, Capers Jones estimating rules of thumb, Project Sequencing and Scheduling Activities, Scheduling resources, Critical path analysis, Network Planning, Risk Management, Nature and Types of Risks, Managing Risks, Hazard Identification, Hazard Analysis, Risk Planning and Control, PERT and Monte Carlo Simulation techniques.
Monitoring And Control
Collecting Data, Visualizing Progress, Cost Monitoring, review techniques, project termination review, Earned Value analysis, Change Control, Software Configuration Management (SCM), Managing Contracts, Types Of Contracts, Stages In Contract Placement, Typical Terms of A Contract, Contract Management and Acceptance.
Quality Management and People Management
Introduction, Understanding Behavior, Organizational Behaviour, Selecting The Right Person For The Job, Motivation, The Oldman – Hackman Job Characteristics Model , Working in Groups, Organization and team structures, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety. ISO and CMMI models, Testing, and Software reliability, test automation, Overview of project management tools.

Text Books and/or Reference Material:-

1. Bob Hughes, Mike Cotterell, "Software Project Management", Fifth Edition, Tata McGraw Hill, 2011.
2. Royce, "Software Project Management", Pearson Education, 1999.
3. Robert K. Wysocki, Effective Software Project Management, Wiley, 2009.

Department:- Electronics & Telecommunication
Course Number:- FECS6401
Title of Course:- Introduction to Digital Signal Processing
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Topics Covered:-

Discrete Time Signals and System
Discrete Time Signals (Elementary examples, classification : periodic and a periodic Signals energy and Power signals, Even and Odd Signals) .
Discrete Time System :
Block diagram representation of discrete time systems, classification of discrete time systems –static and dynamic, time variant and time – invariant, linear and non-linear, casual and anti-casual, stable and unstable.
Analysis and response (convolution sum) of discrete - time linear LTI system, Recursive and Non-recursive discrete time system. Constant coefficient differences equations and their solutions, impulse response of LTI system , structures of LTI systems Recursive and Non-recursive realization of FIR system. Correlation of dispute time Signal.
The Z transform
The Z-transform and one-sided Z-transform, properties of Z-transform , inverse of the Z-transform , Solution of difference equations.
The Discrete Fourier Transform
The DFT and IDFT, relationship , DFT with Z- transform , the DFT as a linear transformation Relationship of DFT with Z-transform , properties of DFT: periodicity, linearity, summery and time reversal of a sequence. Circular convolution, circular correlation, circular correction by convolution, method linear convolution by overlap save methods and by overlap add method, Circular convolution and correlation by DFT method, Overlap add and save filtering by DFT method.
Fast Fourier Transform :
Operation counts by direct copulation of DFT, Radix – 2 FFT algorithm- Decimation –in-time (DIT) and Decimation – in frequency (DIF) algorithm, Efficient computation DFT of Two real sequences , Efficient Computation of DFT of a 2 N-pt real sequences.
Design and Digital Filters:
Casually and its implication, Design of linear phase FIR filters using different windows. Design of IIR filters – Impulse Invariance Method and Bilinear transformation method.

Text Books and/or Reference Material:-

1. Digital Signal Processing – Principles, Algorithms and Applications by J. G. Proakis and D. G. Manolakis, 4th Edition, Pearson.

Department:- Computer Science & Engineering
Course Number:- PCCS7402
Title of Course:- Minor Project
Designation: - Required
Pre-requisites:-
Contact Hour:-60
Type of Course: - Project
Course Assessment: - Continuous
Course Outcomes:-

1. Graduate will be able to understand the characteristics of a project
2. Graduate will know the different project management principles
3. Graduate will be able to do analysis of different risks in environment and the management challenges for effective project management.
4. Graduate will be able to understand and use the project management principles across all phases of a project
5. Graduate will be able to monitor and control a project schedule and budget; they will be able to track project progress
6. Graduate will be able to understand how to work as team member and as individual without affecting the quality of project
7. Graduate will learn to share best practices and tools related to project management
8. Graduates will have a real experience of a workplace where they would start their career.
9. Graduates will have knowledge of project documentation.
10. Graduates will develop problem solving skills.

Topics Covered:-

Text Books and/or Reference Material:-

Department: - Computer Science & Engineering
Course Number: - PCCS7401
Title of Course: - Software Engineering Lab.
Designation: - Required
Pre-requisites:-
Contact Hour: - 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

Topics Covered:-
Experiment 1: Develop requirements specification for a given problem (The requirements specification should include both functional and non-functional requirements)
Experiment 2: Develop DFD Model (Level 0, Level 1 DFD and data dictionary) of the sample problem (Use of a CASE tool required)
Experiment 3: Develop structured design for the DFD model developed
Experiment 4: Develop UML Use case model for a problem (Use of a CASE tool any of Rational rose, Argo UML, or Visual Paradigm etc. is required)
Experiment 5: Develop Sequence Diagrams
Experiment 6: Develop Class diagrams
Experiment 7: Develop code for the developed class model using Java
Experiment 8: Use testing tool such as Junit
Experiment 9: Use a configuration management tool
Experiment 10: Use any one project management tool such as Microsoft Project or Gantt Project, etc.

Text Books and/or Reference Material:-

Department:- Chemistry
Course Number: - HSSM3402
Title of Course: - Environmental Engineering
Designation: - Required
Pre-requisites:-
Contact Hour:-
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course Student will be able:-

1. To investigate the relationship between human life and the environment from a scientific perspective, illustrating current and emerging problems and potential solutions, while increasing students' awareness of their individual impacts on environmental systems.
2. To develop measurable Intended Learning Outcomes consistent with the course description and purpose, we (Scott Brennan and Jillian Martin) first reviewed recent course evaluations to identify the course's strengths and weaknesses. Several themes emerged from this analysis.

Topics Covered:-

Ecological Concepts and Natural Resources: Ecological perspective and value of environment. Environmental auditing, Biotic components, Ecosystem Process: Energy, Food Chain, Water cycle, Oxygen cycle, Nitrogen cycle etc., Environmental gradients, Tolerance levels of environment factor, EU, US and Indian Environmental Law, Global Perspective.
Chemistry in Environmental Engineering: Atmospheric chemistry, Soil chemistry, Material balances and Reactor configurations.

Water Pollution: water quality standards and parameters, Assessment of water quality, Aquatic pollution, Estuarine water quality, Marine pollution, Organic content parameters, Ground water Contamination, Water table and Aquifer, Ground water recharge. Water quality parameter and standards.
Water Treatment: Water treatment processes, Pre-treatment of water, Conventional process, Advanced water treatment process.
Waste Water Treatment: DO and BOD of Waste water treatment process, pretreatment, primary and secondary treatment of waste water, Activated sludge treatment: Anaerobic digestion and its microbiology, Reactor configurations and methane production. Application of anaerobic digestion.
Air Pollution : Air pollution and pollutants, criteria pollutants, Acid deposition, Global climate change –green house gases, non-criteria pollutants, emission standard form industrial sources, air pollution metereology, Atmospheric dispersion.
Industrial Air Emission Control:

Characterization of air stream, Equipment selection, Equipment design, Special Methods: Flue gas desulphurization, NOx removal, Fugitive emissions.

Solid Waste Management Source classification and composition of MSW: properties and separation, storage and transportation, MSW Management, Waste minimization of MSW, Reuse and recycling,
Hazardous Waste Management, Hazardous waste and their generation, Transportation and treatment of hazardous waste: Incinerators, Inorganic waste treatment, handling of treatment plant residue. Waste minimization techniques.
Noise Pollution: Physical Properties of sound, Noise criteria, Noise Standards, Noise measurement, Noise control.
Environment impact Assessment, Origin and procedure of EIA, Project Screening for EIA, Scope studies, Preparation and review of EIS.

Text Books and/or Reference Material:-

1. Environmental Engineering Irwin/ McGraw Hill International Edition, 1997, G. Kiely,
2. 2.Environmental Engineering & Safety by Prof B.K. Mohapatra, Seven Seas Publication, Cuttack
3. Environmental Engineering by Arcadio P. Sincero & Gergoria A.Sincero PHI Publication
4. Principles of Environmental Engineering and Science, M. L. Davis and S. J. Masen, McGraw Hill International Edition, 2004
5. Environmental Science, Curringham & Saigo, TMH,
6. Man and Environment by Dash & Mishra
7. An Introduction to Environmental Engineering and Science by Gilbert M. Masters & Wendell P. Ela - PHI Publication.

Department:- Computer Science & Engineering
Course Number:- PECS5407
Title of Course:- Wireless Sensor Networks
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Topics Covered:-

Sensor Network Concept: Introduction, Networked wireless sensor devices, Advantages of Sensor networks, Applications, Key design challenges.
Network deployment: Structured versus randomized deployment, Network topology, Connectivity, Connectivity using power control, Coverage metrics, Mobile deployment.

Localization and Tracking: Issues and approaches, Problem formulations: Sensing model, collaborative localization. Coarse-grained and Fine-grained node localization. Tracking multiple objects: State space decomposition.
Synchronization: Issues and Traditional approaches, Fine-grained clock synchronization, and Coarse-grained data synchronization.

Wireless Communications: Link quality, shadowing and fading effects
Medium-access and sleep scheduling: Traditional MAC protocols, Energy efficiency in MAC protocols, Asynchronous sleep techniques, Sleep-scheduled techniques, and Contention-free protocols.
Routing: Metric-based approaches, Multi-path routing, Lifetime-maximizing energy-aware routing techniques, Geographic routing.
Sensor network Databases: Data-centric routing, Data-gathering with compression, Querying, Data-centric storage and retrieval, the database perspective on sensor networks.
Security: Privacy issues, Attacks and countermeasures.

Text Books and/or Reference Material:-

1. Wireless Sensor Networks: An Information Processing Approach- by Feng Zhao, Leonidas Guibas , Morgan Kaufmann Series in Networking 2004.
2. Networking Wireless Sensors: Bhaskar Krismachari, Cambridge University Press
3. Wireless Sensor Networks: Edited by C.S Raghavendra, Krishna M, Sivalingam, Taieb Znati , Springer.
4. Wireless Sensor Networks: Technology, Protocols, and Applications: Kazem Sohraby, Daniel Minoli, Taieb Znati , Wiley Inter Science.

Department:- Computer Science & Engineering
Course Number:- PECS5408
Title of Course:- Embedded System Development
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
After completion of this course:

1. Graduate will demonstrate knowledge of detail design of An Embedded System
2. Graduate will demonstrate an ability to design processor and other hardware units of an embedded system.
3. Graduate will demonstrate an ability to visualize and work on multidisciplinary embedded system.
4. Students will able to understand the software development process of embedded system.
5. Students will be able to understand the software hardware co design.
6. Students will understand the detailed design of device driver.
7. Students will understand the real time operating system.
8. Students will demonstrate skill to visualize and work on various embedded systems
9. Graduate will develop confidence for self education and ability for lifelong learning.
10. Graduate can participate and succeed in competitive examination like GATE, GRE.
11. Graduate will show of impact of engineering solution.

Topics Covered:-

Application and characteristics of embedded systems, Overview of Processors and hardware units in an embedded system, General purpose processors, Microcontrollers, ARM-based Systems on a Chip (SoC), Application-Specific Circuits (ASICs), Levels of hardware modelling, VHDL, Sensors, A/D-D/A converters, Actuators, Interfacing using UART, USB, CAN bus, SRAM and DRAM, Flash memory.

Real-Time Task Scheduling: Some important concepts, Types of real-time tasks and their characteristics, Task scheduling, Clock-Driven scheduling, Hybrid schedulers, Event-Driven scheduling, Earliest Deadline First (EDF) scheduling, Rate monotonic algorithm (RMA). Commercial Real-time operating systems: Time services, Features of a Real-time operating system, Unix-based Real-time operating systems, POSIX-RT, A survey of contemporary Real-time operating systems, Microkernel-based systems.

Embedded system development life cycle, State charts, General language characteristics , Features of MISRA C for embedded programming, Hardware/Software Co-design**,** Hardware/software partitioning, Testing embedded systems, Design for testability and Self-test.

Text Books and/or Reference Material:-

1. Frank Vahid and Tony Givargis, Embedded Systems Design – A unified Hardware /Software Introduction, John Wiley, 2002.
2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
3. S. Chattopadhyay, Embedded System Design, PHI
4. Shibu KV, Introduction to Embedded Systems, TMH
5. Wayne Wolf, Computers as Components; Principles of Embedded Computing System Design – Harcourt India, Morgan Kaufman Publishers, 2001
6. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, 2003

Department:- Computer Science & Engineering
Course Number:-PECS5411
Title of Course:- Parallel & Distributed Systems
Designation: - Elective
Pre-requisites:-
Contact Hour:-30
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-

1. Graduates will understand the importance of parallel programming and use it in their practical life.
2. Graduates will be able to demonstrate basic knowledge on different parallel programming platforms and also be able to judge their limitations for implementation.
3. Graduates will be able to find the limitations of memory systems and also to improve upon them for enhanced performance in parallel and distributed system.
4. Graduates will be able to demonstrate the calculation of communication cost involved in parallel machines.
5. Graduates will be able to find the different parameters used for calculating communication cost and use them for low communication cost.
6. Graduates will be able to demonstrate knowledge on the different types of interconnection used in parallel and distributed system.
7. Graduates will be able to demonstrate knowledge on the different types of routing algorithm used in interconnection networks for communication.
8. Graduates will be able to design the method of decomposing the load so as to distribute them among various nodes efficiently.
9. Graduates will be able to demonstrate the method of migrating the load among various nodes.
10. Graduates will be able to demonstrate the way of communication through different system through message passing.
11. Graduates will be able to demonstrate analytically the model of parallel programs and programming through message passing paradigm.
12. Graduates will be able to demonstrate the working of different case study like dense matrix algorithm, bubble sort, minimum spanning tree and shortest path.

13. Graduates will be able to use the different case study to visualize the working of parallel and distributed system.
14. Graduates will be able to participate and succeed in competitive examination like GATE, GRE etc.

Topics Covered:-

Introduction to parallel computing.

Parallel programming platforms: Trends in microprocessor Architectures, Limitations of memory system performance, Dichotomy of parallel computing platforms, physical organization of parallel platforms, communication costs in parallel machines, Routing mechanisms for interconnection network, Impact of process processors mapping and mapping techniques.

Principles of parallel algorithm design: Preliminaries, Decomposition techniques, Characteristics of tasks and interactions, Mapping techniques for load balancing, Methods for containing. Interactions overheads, Parallel algorithm models. Basic communication operations: One-to-All Broadcast and All-to-One Reduction, All-to-All broadcast and reduction All-Reduce and prefix sum operations, scatter and gather, All-to-All personalized communication, circular shift, Improving the speed of some communication operation.

Analytical modeling of parallel programs: Performance metrics for parallel systems, Effect of granularity of performance, scalability of parallel system, Minimum execution time and minimum cost-optimal execution time, Asymptotic analysis of parallel programs, other scalability metrics. Programming using the message passing paradigm:

Principle of message – Passing programming, Send and receive operations, The message passing interface, Topologies and embedding, Overlapping communication with computation, collective communication and computation operations, Groups and communicators.

Dense matrix algorithm:

Matrix-vector multiplication, Matrix-matrix algorithm, Solving a system of linear equations.

Text Books and/or Reference Material:-

1. Introduction to Parallel Computing, Second Edition, Ananth Gram, Anshul Gupta, George Karypis, Vipin Kumar Person Education.
2. Parallel computing Theory and Practice, Second Edition, Michael J. Quinn, TMH.

Department:- Electronics & Telecommunication
Course Number:-PEEC5418
Title of Course:- Satellite communication
Designation: - Elective
Pre-requisites:-
Contact Hour:-34
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Topics Covered:-

Introduction to state of satellite communication: Orbital mechanics and parameters, look angle determination, Launches and Lunch vehicle, Orbital effects in communication system performance. Attitude and orbit control system(AOCS), TT&C , Description of spacecraft System – Transponders,
Equipment reliability and space qualification.
Satellite Link Design: Basics of transmission theory, system noise temperature and G/T ratio, Uplink and Downlink design, design of satellite links for specified (C/N) performance.

Analog telephone and television transmission: Energy dispersal, digital transmission
Multiple Access: Multiplexing techniques for satellite links, Comprehensive study on FDMA, TDMA and CDMA. Spread Spectrum Transmission and Reception. Estimating Channel requirements, SPADE, Random access
Application of Satellite communication: Network distribution and direct broad casting TV, fundamentals of mobile communication satellite

Propagation on satellite: Earth paths and influence on link design: Quantifying attenuation and depolarization, hydrometric & non hydrometric effects, ionosphere effects, rain and ice effects
Satellite Antennas: Types of antenna and relationships , Basic Antennas Theory – linear, rectangular & circular aperture. Gain, pointing loss,
Earth station Technology: Earth station design, Design of large antennas – Cassegrain antennas, optimizing gain of large antenna, antenna temperature, feed system for large cassegrain antennas,
Design of small earth station antennas: Front fed paraboloid reflector antennas, offset fed antennas, beam steering, Global Beam Antenna, equipment for earth station

Text Books and/or Reference Material:-

1. Satellite Communication by T. Pratt, C. Bostian. 2nd Edition, John Wiley Co.
2. Digital Communication with Satellite and Fiber Optic Application, Harlod Kolimbins, PHI
3. Satellite Communication by Robert M. Gagliardi, CBS Publishers

Department:-
Course Number:- PEEI5403
Title of Course:- Industrial instrumentation
Designation: - Elective
Pre-requisites:-
Contact Hour:-38
Type of Course: - Lecture
Course Assessment: - Semester-End assessment with internal
Course Outcomes:-
Topics Covered:-

Introduction: Functional Units, Classification, Performance characteristics, Dynamic Calibration, Errors: An Overview, Statistical Error Analysis, Reliability and Related Topics (Chapter 1 of Text book)
Instruments for Analysis: Introduction, Gas Analysers, Liquid Analysers, X-ray Methods, Chromatography

Telemetry: Introduction, Pneumatic Means, Electrical Means, Frequency Telemetring, Multiplexing, Modulation, Modulation of Digital Data, Transmission Channels, Briefing of a Telemetry System in Operation, Wireless I/O

Power Plant Instruments: Introduction, The Power Plant Scheme, Pressure, Temperature, Flow and Level, Vibration and Expansion, Analysis, Flue Gas Analysis
Hazard and Safety: Initial consideration, Enclosures, Intrinsic Safety, Prevention of Ignition, Methods of Production, Analysis Evaluation and Construction

Text Books and/or Reference Material:-

1. Principles of Industrial Instrumentation, Third Edition, D Patranabis, Tata McGraw Hill Education Private Limited, New Delhi
2. Process/Industrial Instruments and Controls Handbook, Gregory K. Mc Millian Editor-in-Chief, Douglas M. Considine Late Editor-in-Chief

Department:- Computer Science & Engineering
Course Number:- PCCS7403
Title of Course:- Major Project
Designation: - Required
Pre-requisites:-
Contact Hour:-60
Type of Course: - Project
Course Assessment: - Continuous
Course Outcomes:-

1. Graduate will be able to understand the characteristics of a project
2. Graduate will know the different project management principles
3. Graduate will be able to do analysis of different risks in environment and the management challenges for effective project management.
4. Graduate will be able to understand and use the project management principles across all phases of a project
5. Graduate will be able to monitor and control a project schedule and budget; they will be able to track project progress
6. Graduate will be able to understand how to work as team member and as individual without affecting the quality of project
7. Graduate will learn to share best practices and tools related to project management
8. Graduates will have a real experience of a workplace where they would start their career.
9. Graduates will have knowledge of project documentation.
10. Graduates will develop problem solving skills.

Topics Covered:-
Text Books and/or Reference Material:-

Department:- Computer Science & Engineering
Course Number:- PCCS7404
Title of Course:- Comprehensive Viva Voce
Designation: - Required
Pre-requisites:-
Contact Hour:- 30
Type of Course: - Sessional
Course Assessment: - Continuous
Course Outcomes:-

1. Graduate's thinking ability will improve.
2. Graduate's speed and mode of presentation will improve.
3. Graduate will show improved power of listening.
4. Graduate's convincing power will improve.
5. Graduate's communication skill will improve.
6. Graduate's in-depth knowledge will improve.
7. Graduates will develop a strong academic tone in their core subjects.
8. Graduates will develop an improved level of understanding.
9. Graduates will have improved personality.

Topics Covered:-
Text Books and/or Reference Material:-