Bapatla Engineering College

(*Autonomous*)

BAPATLA

ACADEMIC RULES & REGULATIONS and SYLLABUS
(R20 REGULATIONS)
(2020-2021)

FOUR Year B.Tech.

Bapatla Engineering College:: Bapatla

(Autonomous under Acharya Nagarjuna University)
(Sponsored by Bapatla Education Society)
BAPATLA-522102, Guntur District, A.P.
www.becbapatla.ac.in

BAPATLA ENGINEERING COLLEGE :: BAPATLA

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Department

of

Electrical and Electronics Engineering

COURSE STRUCTURE

AND

SYLLABUS FOR 1st YEAR B.TECH.

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Vision of the Institute

To build centers of excellence, impart high quality education and instill high standards of ethics and professionalism through strategic efforts of our dedicated staff, which allows the college to effectively adapt to the ever-changing aspects of education.

To empower the faculty and students with the knowledge, skills and innovative thinking to facilitate discovery in numerous existing and yet to be discovered the fields of engineering, technology and inter-disciplinary endeavors.

Mission of the Institute

To impart the quality education at par with global standards to the students from all over India and in particular those from the local and rural areas.

To maintain high standards so as to make them technologically competent and ethically strong individuals who shall be able to improve the quality of life and economy of our country.

Vision of the Department

The Department of Electrical & Electronics Engineering will provide programs of the highest quality to produce globally competent technocrats who can address challenges of the millennium to achieve sustainable socio - economic development.

Mission of the Department

1. To provide quality teaching blended with practical skills.
2. To prepare the students ethically strong and technologically competent in the field of Electrical and Electronics Engineering.
3. To motivate the faculty and students in the direction of research and focus to fulfill social needs.

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PROGRAM OUTCOMES (PO'S)

Program Outcomes		Engineering Graduates will be able to
PO1	Engineering knowledge	Apply the knowledge of mathematics, science, Engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of com plex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage	Create, select, and apply appropriate techniques, Resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and teamwork	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to com prehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

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PROGRAM SPECIFIC OUTCOMES (PSO'S)

PSO1	The Electrical and Electronics Engineering graduates are capable of applying the Knowledge of mathematics and sciences in modern power industry.
PSO2	Analyse and design efficient systems to generate, transmit, distribute and utilize electrical energy to meet social needs using power electronic systems.
PSO3	Electrical Engineers are capable to apply principles of management and economics for providing better services to the society with the technical advancements in renewable and sustainable energy integration.

PROGRAM EDUCATIONAL OBJECTIVES (PEO'S)

PEO1	Have a strong foundation in the principles of Basic Sciences, Mathematics and Engineering to solve real world problems encountered in modern electrical engineering and pursue higher studies/placement/research.
PEO2	Have an integration of knowledge of various courses to design an innovative and cost effective product in the broader interests of the organization & society.
PEO3	Have an ability to lead and work in their profession with multidisciplinary approach, cooperative attitude, effective communication and interpersonal skills by participating in team oriented and open-ended activities.
PEO4	Have an ability to enhance in career development, adapt to changing professional and societal needs by engage in lifelong learning.

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Department of Electrical and Electronics Engineering

Course Structure Summary

S.No	Category	Credits	% of Credits
1	Humanities & Social Science including Management Courses	10.5	6.5
2	Basic Science Courses	21	13.1
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.	24	15
4	Professional Core Courses	51	31.9
5	Professional Elective Courses	15	9.4
6	Open Elective Courses/Job Oriented Courses	12	7.5
7	Project work, seminar, and internship in industry or elsewhere	16.5	10.3
8	Skill Oriented Courses	10	6.3
9	Mandatory Courses [Environmental Science, PEHV, Indian Constitution, Essence of Indian Traditional Knowledge etc]	-	-
Total		160	100

Semester Wise Credits Summary

Semester	Credits	With Honor Credits
Semester-I	16.5	16.5
Semester-II	22.5	22.5
Semester-III	21	21
Semester-IV	21	21
Semester-V	22.5	26.5
Semester-VI	21.5	25.5
Semester-VII	23	31
Semester-VIII	12	16
Total	**160**	**180**

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electrical and Electronics Engineering

First Year B.Tech (SEMESTER – I)

for the Academic Year 2020-21

Code No.	Category Code	Subject	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EE101/MA01	BS	Linear algebra and differential equations	3	0	0	3	30	70	100	3
20EE102/PH01	BS	Waves and Modern Physics	3	0	0	3	30	70	100	3
20EE103/EL01	HS	Communicative English	3	0	0	3	30	70	100	3
20EEL101/PHL01	BS	Physics Lab	0	0	3	3	30	70	100	1.5
20EEL102/ELL01	HS	English Communication skills Lab	0	0	3	3	30	70	100	1.5
20EEL103/MEL02	ES	Workshop Practice Lab	0	0	3	3	30	70	100	1.5
20EEL104/MEL01	ES	Engineering Graphics	1	0	4	5	30	70	100	3
20EE104/MC01	MC	Environmental Studies	2	0	0	2	30	0	30	0
INDUCTION PROGRAM	First Three Weeks (Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Familiarization to Dept./Branch & Innovations)									
TOTAL			**12**	**0**	**13**	**25**	**240**	**490**	**730**	**16.5**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BS: Basic Science courses HS: Humanities and Social science ES: Engineering Science Courses

MC: Mandatory course

1 Hr. Lecture (L) per week - 1 credit
1 Hr. Tutorial (T) per week - 1 credit
1 Hr. Practical (P) per week - 0.5 credits
2 Hours Practical (Lab)/week - 1 credit

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electrical and Electronics Engineering

First Year B.Tech (SEMESTER – II)

for the Academic Year 2020-21

Code No.	Category Code	Subject	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EE201/MA02	BS	Numerical methods& Advanced Calculus	3	0	0	3	30	70	100	3
20EE202/PH03	BS	Semiconductor Physics and Nano Materials	3	0	0	3	30	70	100	3
20EE203/CY01	BS	Chemistry	3	0	0	3	30	70	100	3
20EE204/CS01	ES	Programming for Problem Solving	3	0	0	3	30	70	100	3
20EE205	PC	Circuit Theory	3	0	0	3	30	70	100	3
20EE206/CE03	ES	Engineering Mechanics	3	0	0	3	30	70	100	3
20EEL201/CYL01	BS	Chemistry Lab	0	0	3	3	30	70	100	1.5
20EEL202	PC	Circuit Theory Lab	0	0	3	3	30	70	100	1.5
20EEL203/CSL01	ES	Programming for Problem Solving Lab	0	0	3	3	30	70	100	1.5
NCC/NSS			0	0	3	3				0
TOTAL			**18**	**0**	**12**	**30**	**270**	**630**	**900**	**22.5**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BS: Basic Science courses HS: Humanities and Social science ES: Engineering Science Courses

MC: Mandatory course PC: Professional Core Course

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electrical and Electronics Engineering

Second Year B.Tech (SEMESTER – III)

for the Academic Year 2020-21

Code No.	Category Code	Subject	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EE301/MA03	BS	Probability and Statistics	3	0	0	3	30	70	100	3
20EE302	PC	Network Analysis	3	0	0	3	30	70	100	3
20EE303	PC	Electro Magnetic Fields	3	0	0	3	30	70	100	3
20EE304	PC	DC Machines and Transformers	3	0	0	3	30	70	100	3
20EE305/EL02	HS	Technical English	2	0	0	2	30	70	100	2
20EEL301/ SO01	SO	Software Tools to Electrical Engineering	1	0	2	3	30	70	100	2
20EEL302	ES	Measurement and Instrumentation Lab	2	0	2	3	30	70	100	3
20EEL303	ES	Data Structures and Algorithms Lab	1	0	2	4	30	70	100	2
20EE306/MC02	MC	Professional Ethics and Human Values	2	0	0	2	30	0	30	0
NCC/NSS			0	0	3	3	0	0	0	0
TOTAL			**20**	**0**	**9**	**29**	**270**	**560**	**830**	**21**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BS: Basic Science courses HS: Humanities and Social science ES: Engineering Science Courses

MC: Mandatory course PC: Professional Core Course SO: Skill Oriented Course

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electrical and Electronics Engineering

Second Year B.Tech (SEMESTER – IV)

for the Academic Year 2020-21

Code No.	Category Code	Subject	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EE401	PC	Analog Electronics	3	0	0	3	30	70	100	3
20EE402	PC	Digital Electronics	3	0	0	3	30	70	100	3
20EE403	PC	Induction Motors and Synchronous machines	3	0	0	3	30	70	100	3
20EE404	PC	Signals & Systems	3	0	0	3	30	70	100	3
20EE405	PC	Generation and Transmission	3	0	0	3	30	70	100	3
20EE406/ SO02	SO	Python	1	0	2	3	30	70	100	2
20EEL401	PC	Analog and Digital Electronics Lab	0	0	3	3	30	70	100	1.5
20EEL402	PC	DC Machines and Transformers Lab	0	0	3	3	30	70	100	1.5
20EEL403 /ELL02	HS	Soft Skills Lab	0	0	2	2	30	70	100	1
Internship during summer (2 months)										
TOTAL			**16**	**0**	**10**	**26**	**270**	**630**	**900**	**21**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BS: Basic Science Courses HS: Humanities and Social science ES: Engineering Science Courses

MC: Mandatory Course PC: Professional Core Course SO: Skill Oriented Course

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electrical and Electronics Engineering

Third Year B.Tech (SEMESTER – V)

for the Academic Year 2020-21

Code No.	Category Code	Subject	Scheme of Instruction (Hours per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EE501	ES	Micro Processor and Microcontroller	3	0	0	3	30	70	100	3
20EE502	PC	Power System Analysis	3	0	0	3	30	70	100	3
20EE503	PC	Control Systems	3	0	0	3	30	70	100	3
20EE504	PC	Power Electronics	3	0	0	3	30	70	100	3
20EE505/ PE_ _	PE	Professional Elective Course -I	3	0	0	3	30	70	100	3
20EEL501 /SO03	SO	Application of IOT in Electrical Engineering	1	0	2	3	30	70	100	2
20EEL502	ES	Micro Processor and Microcontroller Lab	0	0	2	2	30	70	100	1
20EEL503	PC	Induction Motors and Synchronous machines Lab	0	0	3	3	30	70	100	1.5
20EEL504	PC	Control Systems Lab	0	0	3	3	30	70	100	1.5
20EEL504 /INT01	INT	Internship	0	0	0	0	30	70	100	1.5
20EE506/ MC03	MC	Constitution of India	2	0	0	2	30	0	30	0
TOTAL			**21**	**0**	**10**	**31**	**330**	**700**	**1030**	**22.5**
20EEM51_/20EEH51_		**Minor/Honor Course**	**3**	**1**	**0**	**4**	**30**	**70**	**100**	**4**
Grand Total			**24**	**1**	**10**	**35**	**360**	**770**	**1130**	**26.5**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BS: Basic Science Courses HS: Humanities and Social science ES: Engineering Science Courses MC: Mandatory Course PC: Professional Core Course SO: Skill Oriented Course PE: Professional Elective Courses JE: Job oriented elective courses

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electrical and Electronics Engineering

Third Year B.Tech (SEMESTER – VI)

for the Academic Year 2020-21

Code No.	Category Code	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EE601	PC	Power System Protection	3	0	0	3	30	70	100	3
20EE602/ PE_ _	PE	Professional Elective Course -II	3	0	0	3	30	70	100	3
20EE603/ PE_ _	PE	Professional Elective Course -II	3	0	0	3	30	70	100	3
20EE604/ JO_ _	JO	Open Elective Course/Job Oriented Elective - I	2	0	2	4	30	70	100	3
20EE605/ JO_ _	JO	Open Elective Course/Job Oriented Elective - II	2	0	2	4	30	70	100	3
20EEL601/ SO04	SO	Placement Training	1	0	2	3	30	70	100	2
20EEL602	PC	Power Electronics Lab	0	0	3	3	30	70	100	1.5
20EEL603	PC	Power Systems Lab	0	0	3	3	30	70	100	1.5
20EEL604	PC	Electronics Design Lab	0	0	3	3	30	70	100	1.5
20EE606/MC04	MC	Indian Traditional Knowledge	2	0	0	2	30	0	30	0
Internship during summer (2 months)										
TOTAL			**16**	**0**	**15**	**31**	**300**	**630**	**930**	**21.5**
20EEM62_/ 20EEH62_	**Minor/Honor Course**		**3**	**1**	**0**	**4**	**30**	**70**	**100**	**4**
Grand Total			**19**	**1**	**15**	**35**	**330**	**700**	**1030**	**25.5**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BS: Basic Science Courses HS: Humanities and Social science ES: Engineering Science Courses MC: Mandatory Course PC: Professional Core Course SO: Skill Oriented Course PE: Professional Elective Courses JE: Job oriented elective courses

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electrical and Electronics Engineering

Fourth Year B.Tech (SEMESTER – VII)

for the Academic Year 2020-21

Code No.	Category code	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EE701	PC	Power System Operation Control and Stability	3	0	0	3	30	70	100	3
20EE702/ PE_ _	PE	Professional Elective Course - IV	3	0	0	3	30	70	100	3
20EE703/ PE_ _	PE	Professional Elective Course - V	3	0	0	3	30	70	100	3
20EE704/ JO_ _	JO	Open Elective Course/Job Oriented Elective - III	2	0	2	4	30	70	100	3
20EE705/ JO_ _	JO	Open Elective Course/Job Oriented Elective - IV	2	0	2	4	30	70	100	3
20EE706	HS	Industrial Management & Entrepreneurship Development	3	0	0	3	30	70	100	3
20EEL707/ SO05	SO	Industrial Automation	1	0	2	3	30	70	100	2
20EEL701/ INT02	INT	Internship					30	70	100	3
TOTAL			**17**	**0**	**6**	**23**	**240**	**560**	**800**	**23**
20EEM73_/ 20EEH73_	**Minor/Honor Course**		**3**	**1**	**0**	**4**	**30**	**70**	**100**	**4**
20EEM74_/ 20EEH74_	**Minor/Honor Course**		**3**	**1**	**0**	**4**	**30**	**70**	**100**	**4**
Grand Total			**20**	**1**	**6**	**27**	**270**	**630**	**900**	**31**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BS: Basic Science Courses HS: Humanities and Social science ES: Engineering Science Courses MC: Mandatory Course PC: Professional Core Course SO: Skill Oriented Course PE: Professional Elective Courses JE: Job oriented elective courses

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SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Electrical and Electronics Engineering

Fourth Year B.Tech (SEMESTER – VIII)

for the Academic Year 2020-21

Code No.	Category Code	Subject	Scheme of Instruction (Periods per week)				Scheme of Examination (Maximum marks)			No. of Credits
			L	T	P	Total	CIE	SEE	Total Marks	
20EE801/PW01	PW	Project Work	0	0	24	24	50	100	150	12
20EEM81M/ 20EEH81M	Minor/Honor Course (Through MOOC only)		0	0	0	0	0	0	0	2
20EEM82M/ 20EEH82M	Minor/Honor Course (Through MOOC only)		0	0	0	0	0	0	0	2
TOTAL			**0**	**0**	**24**	**24**	**50**	**100**	**150**	**16**

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture, T: Tutorial, P: Practical

BS: Basic Science Courses HS: Humanities and Social science ES: Engineering Science Courses

MC: Mandatory Course PE: Professional Elective Courses JE: Job oriented elective courses

Note: Any one course of Professional Elective courses is permitted to pursue through MOOC during four years of B.Tech course i.e., 3 credits shall be earned.

Professional Elective Courses (15 credits):

Professional Elective – I:
PE51: Power Distribution System
PE52: Renewable Energy Sources
PE53: Electrical Machine Design

Professional Elective – II & III:
PE61: Switched Mode Power Supply
PE62: Electrical Drives
PE63: HVDC & FACTS
PE64: Machine Modeling and Analysis
PE65: Digital Control Systems
PE66: Optimization Techniques

Professional Elective – IV & V:
PE71: High Voltage Engineering
PE72: Advanced Electrical Drives
PE73: Solar & Fuel cell Energy Systems
PE74: Smart Grid Technology and Applications
PE75: Adaptive Control Systems
PE76: AI Applications to Electrical Engineering

Job oriented/ Open elective courses (12 credits): Choose any two courses from POOL – 1 for sixth semester electives and any two courses from POOL – 2 for seventh semester electives.

POOL - 1:
JO61: Java programming
JO62: Data Analytics
JO63: Operations Research
JO64: Computer Applications in power systems
JO65: Solar PV and Wind Plant Design
JO66: Digital Signal Processing

POOL - 2:
JO71: Cyber Security
JO72: Analog VLSI
JO73: Embedded Systems
JO74: Power Quality
JO75: Digital Protection of Power System
JO76: Metaheuristic Techniques to Electrical Engineering

Minor Courses (20 Credits): Courses offered to non EEE branch B.Tech., students for obtaining Minor degree in Electrical and Electronics Engineering. Choose any four courses out of four tracks.

Track I: Power Systems
1. Power Generation and Transmission
2. Power System Distribution
3. Renewable Energy Sources

Track II: Power Electronics
1. Analog Electronics
2. Power Electronics
3. Electrical Drives

Track III: Control Systems
1. Linear Control System
2. Digital Control Systems

Track IV: Energy Systems
1. Energy Conservation & Audit
2. Utilization of Electrical Energy

Honour Courses (20 Credits): Additional courses offered to B.Tech., EEE students to obtain Honors degree in Electrical and Electronics Engineering

S.NO	Course Title	Prerequisite Course
A	Power Systems Dynamics and Control	Induction motors and Synchronous Machines (20EE403)
B	Advanced Power System Protection	Power System Protection (20EE601)
C	Advanced Electrical Drives	Electrical Drives (20EE602/603)
D	Smart Grid Technology and Applications	Generation and Transmission (20EE405) and Power System Analysis (20EE502)
E	Non-Linear Control Systems	Control Systems (20EE503)
F	Adaptive Control Systems	Control Systems (20EE503)
G	Energy Storage Systems	None
H	Electrical and Hybrid Vehicles	Induction motors and Synchronous Machines (20EE403) and Power Electronics (20EE504)
I	Power Plant Engineering	Generation and Transmission(20EE405)
J	Optimization Techniques	None
K	Machine Learning for Engineering Applications	Probability and Statistics (20EE301)
L	Big data Analytics for Smart Grid	Generation and Transmission (20EE405) and Power System Analysis (20EE502)
M	Extra High Voltage AC Transmission	PE77: High Voltage Engineering
N	Advances in UHV Transmission and Distribution	Generation and Transmission (20EE405)
O	Time Varying Electrical Networks	Circuit Theory (20EE205)
P	Design of photovoltaic systems	Analog Electronics (20EE401)

LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

I B.TECH – I SEMESTER (Code: 20EE101/MA01)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

Course Objectives: To make the students

CO1: To learn about solving a system of linear homogeneous and non-homogeneous equations, finding the inverse of a given square matrix and also its Eigen values and Eigen vectors.

CO2: Identify the type of a given differential equation and select and apply the appropriate. Analytical technique for finding the solution of first order and higher order ordinary differential equations.

CO3: Create and analyse mathematical models using first and second order differential equations to solve application problems that arises in engineering.

CO4: To learn about solving linear Differential equations with constant coefficients with the given initial conditions using Laplace transform technique.

Course Outcomes: By the end of the course the student will be able to

CLO1: Solve a system of linear simultaneous equations, finding the inverse of a given matrix and also its Eigen values and Eigen vectors.

CLO2: Apply the appropriate analytical technique for finding the solution of a first order ordinary differential equation and use these techniques to solve some real-life problems.

CLO3: Solve higher order linear differential equations with constant coefficients and apply them to solve the circuit problems

CLO4: Evaluate Laplace transform of a given function and apply Laplace transform techniques to solve linear differential equations with constant coefficients.

UNIT - I

Linear Algebra: Rank of a Matrix; Elementary transformations of a matrix; Gauss-Jordan method of finding the inverse; Consistency of linear System of equations: Rouches theorem, System of linear Non-homogeneous equations, System of linear homogeneous equations; vectors; Eigen values; properties of Eigen values(without proofs); Cayley-Hamilton theorem (without proof).

[Sections: 2.7.1; 2.7.2; 2.7.6; 2.10.1; 2.10.2; 2.10.3; 2.12.1; 2.13.1; 2.14; 2.15.]

UNIT - II

Differential Equations of first order: Definitions; Formation of a Differential equation; Solution of a Differential equation; Equations of the first order and first degree; variables separable; Linear Equations; Bernoulli's equation; Exact Differential equations; Equations reducible to Exact equations: I.F found by inspection, I.F of a Homogeneous equation, In the equation M dx+ N dy=0.

Applications of a first order Differential equations: Newton's law of cooling; Rate of decay of Radio-active materials.

[Sections: 11.1; 11.3; 11.4; 11.5; 11.6; 11.9; 11.10; 11.11; 11.12.1; 11.12.2; 11.12.4; 12.6; 12.8]

UNIT – III

Linear Differential Equations: Definitions; Theorem; Operator D; Rules for finding the complementary function; Inverse operator; Rules for finding the Particular Integral; Working procedure to solve the equation; Method of Variation of Parameters; Applications of Linear Differential Equations: Oscillatory Electrical Circuits.

[Sections: 13.1; 13.2.1; 13.3; 13.4; 13.5; 13.6; 13.7;13.8.1;14.1;14.5]

UNIT – IV

Laplace Transforms: Definition; conditions for the existence; Transforms of elementary functions; properties of Laplace Transforms; Transforms of derivatives; Transforms of integrals; Multiplication by t^n; Division by t; Inverse transforms- Method of partial fractions; Other methods of finding inverse transforms; Convolution theorem(without proof); Application to differential equations: Solution of ODE with constant coefficients using Laplace transforms.

[Sections:21.2.1; 21.2.2; 21.3; 21.4; 21.7; 21.8; 21.9; 21.10; 21.12; 21.13; 21.14; 21.15.1]

TEXT BOOK:

1. B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.
2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

NPTEL Course Links:

1. https://nptel.ac.in/courses/122/104/122104018/

CO, PO and PSO Mapping:

LINEAR ALGEBRA AND ODE (20EE101)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Solve a system of linear simultaneous equations, finding the inverse of a given matrix and also its Eigen values and Eigen vectors.	3	2	-	1	-	-	-	-	-	-	-	-	2	-	-
CO2	Apply the appropriate analytical technique for finding the solution of a first order ordinary differential equation and use these techniques to solve some real life problems.	3	2	-	1	-	-	-	-	-	-	-	-	2	-	-
CO3	Solve higher order linear differential equations with constant coefficients and apply them to solve the circuit problems	3	2	-	1	-	-	-	-	-	-	-	-	3	-	-
CO4	Evaluate Laplace transform of a given function and apply Laplace transform techniques to solve linear differential equations with constant coefficients.	3	2	-	1	-	-	-	-	-	-	-	-	2	-	-

WAVES AND MODERN PHYSICS

I B.TECH – I SEMESTER (CODE-20EE102/PH01)

(Common for ECE, EEE, EIE)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment			30	Semester End Examination (3hours)			70

COURSE OBJECTIVES

CO1: To familiarize the students in getting knowledge about modern optics and their Engineering applications.

CO2: To make aware of the students to obtain circuit knowledge regarding electrical, Electronics and Magnetism.

CO 3: To make the students to understand the quantum theory and solving the various Physical problems using quantum mechanics.

CO 4: To get the knowledge of various methods of analytical techniques for material testing.

Course outcomes: At the end of the course the students should be able to

CLO1: Learn about principle and working of different types of lasers and their applications.

CLO2: Know about principle, types of optical fibers of their importance in communication.

CLO3: Analyse the electromagnetic principles in electrical and electronic circuits and Maxwell's equations.

CLO4: Study about quantum mechanics and its applications.

CLO5: Read about properties and applications of ultrasonic's in various fields.

CLO6 : Know about radio isotopes and their applications.

UNIT-I

(ADVANCED OPTICS)

Lasers: Interaction of radiation with matter. Einstein co-efficients, Properties of laser, Population inversion, LASER principle, pumping schemes-Three level and four level laser, ypes of lasers: solid-state lasers (Ruby), gas lasers (He-Ne), Semiconductor lasers; applications of lasers in industry and medicine.

Fibre Optics: Importance of optical fibre, Structure and principle of optical fibre, acceptance angle and numerical aperture, Types of optical fibers based on modes and refractive index, V-number, losses associated with optical fibers, fibre optical communication, advantages of optical fiber.

UNIT-II

(ELECTRO-MAGNETIC INDUCTION AND MAXWELL'S EQUATIONS)

Maxwell's equations in vacuum and conducting medium. Velocity of electromagnetic wave in vacuum. Electromagnetic oscillations in LC circuit, LCR series resonance in A.C circuit and

resonant frequency, Quality factor. Concept of skin effect, Energy in an electromagnetic field; Flow of energy and Poynting vector. Principle of circulating charge and cyclotron, Hall Effect.

UNIT-III

(MODERN PHYSICS)

Dual nature of light, Debroglie concept of matter waves, Davission- Germer experiment, Heisenberg uncertainty principle and applications (non existence of electron in nucleus and finite width of spectral lines), one dimensional time independent and dependent Schrodinger wave equation, physical significance of wave function, application of Schrödinger wave equation to particle in a one dimensional potential box, concept of quantum tunneling and construction and working of Scanning Tunneling Electron Microscope.

UNIT-IV

(ANALYTICAL TECHNIQUES)

Ultrosonics: Properties of ultrasonic's, Production of ultrasonic waves by magneto striction andpiezo-electric method, Determination of velocity of ultrasonic wave in liquids by Ultrasonic interferometer. Medical applications, Ultrasonic Imaging technique (Doppler Ultrasound Imaging advantages and limitations), industrial applications, NDT : Pulse echo technique, Time of flight diffraction technique.

Nuclear Techniques: Radio isotopes and its applications (medical and Industrial), GM counter, Scintillation counter.

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TEXT BOOK:

1. M.V.Avadhanulu, P.G.Kshirsagar, "Engineering physics", S.Chand & Company Pvt. Ltd.

2. PalaniSwamy, "Engineering physics", Scitech publication

REFERENCE BOOKS:

1. Dr.P.srinivasaRao, Dr.K.Muralidhar, "Basic engineering physics" Himalaya Publication

2. Dr.P.SrinivasaRao, Dr.K.Muralidhar, "Applied physics" Himalaya publication

CO, PO and PSO Mapping:

Physics – I Waves and Modern Physics(20EE102)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Learn about principle and working of different types of LASERS and their applications.	3	–	3	3	3	3	2	–	–	–	–	2	–	2	–
CO2	Know about the principle, types of optical fibers and their importance in communication	3	–	3	3	3	3	2	–	–	–	–	2	–	–	1
CO3	Analyze electromagnetic principles in electrical and electronic circuits and Maxwell's equations	3	3	2	2	2	3	–	–	–	–	–	3	–	–	–
CO4	Study about quantum mechanics and its applications	3	3	–	2	2	2	–	–	–	–	–	3	–	2	–
CO5	Read about properties and applications of ultrasonic's in various fields	3	–	3	3	3	3	–	–	–	–	–	2	–	–	–
CO6	Know about radio isotopes and their applications	–	–	3	3	3	2	2	–	–	–	–	2	2	–	–

COMMUNICATIVE ENGLISH

I B.TECH – I SEMESTER (Code: 20EE103/EL01)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Course Objectives : The course aims

CO1:To enhance the vocabulary competency of the students
CO2:To enable the students to demonstrate proficiency in the use of written English, including proper spelling, grammar, and punctuation
CO3:To introduce corrective measures to eliminate grammatical errors in speaking and writing
CO4:To enhance theoretical and conceptual understanding of the elements of grammar.
CO5:To Understand and apply the conventions of academic writing in English
CO6:To enhance the learners' ability of communicating accurately and fluently

Course Outcomes : By the end of the course the student would be able to

CLO1: Build academic vocabulary to enrich their writing skills
CLO2: Make use of contextual clues to infer meanings of unfamiliar words from context
CLO3: Produce accurate grammatical sentences
CLO4: Skim for main idea(s) & scan for details
CLO5: Distinguish main ideas from specific details
CLO6: Identify author's purpose and tone
CLO7: Make inferences and predictions based on comprehension of a text
CLO8: Discuss and respond to content of the text in writing
CLO9: Produce coherent and unified paragraphs with adequate support and detail

UNIT-I

1.1 **Vocabulary Development**: Word formation-Formation of Nouns, Verbs & Adjectives from Root words-Suffixes and Prefixes
1.2 **Essential Grammar:** Prepositions, Conjunctions, Articles
1.3 **Basic Writing Skills**: Punctuation in writing
1.4 **Writing Practices**: Mind Mapping, Paragraph writing (structure-Descriptive, Narrative, Expository & Persuasive)

UNIT-II

2.1 **Vocabulary Development**: Synonyms and Antonyms
2.2 **Essential Grammar**: Concord, Modal Verbs, Common Errors
2.3 **Basic Writing Skills**: Using Phrases and clauses
2.4 **Writing Practices**: Hint Development, Essay Writing

UNIT III

3.1 **Vocabulary Development**: One word Substitutes
3.2 **Essential Grammar**: Tenses, Voices

3.3 **Basic Writing Skills**: Sentence structures (Simple, Complex, Compound)
3.4 **Writing Practices**: Note Making

UNIT IV

4.1 **Vocabulary Development**: Words often confused
4.2 **Essential Grammar**: Reported speech, Common Errors
4.3 **Basic Writing Skills**: Coherence in Writing: Jumbled Sentences
4.4 **Writing Practices**: Paraphrasing &Summarising

TEXT BOOKS/REFERENCE BOOKS:

1. Sanjay Kumar &PushpaLatha, "Communication Skills", Oxford University Press:2011.
2. Michael Swan, "Practical English Usage", Oxford University Press:1995.
3. F.T.Wood, "Remedial English Grammar", Macmillan:2007.
4. Liz Hamplyons& Ben Heasley, "Study Writing", Cambridge University Press:2006.

CO, PO and PSO Mapping:

Communicative English (20EE103/EL01)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	To Enhance the Vocabulary Competence of the Students	-	-	-	-	-	-	-	-	**2**	**3**	**2**	-	-	**2**	1
CO 2	To enable the students to demonstrate proficiency in the use of written English including proper spelling ,grammar and punctuation	-	-	-	-	-	-	-	-	**2**	**3**	**2**	-	-	**2**	1
CO 3	To introduce corrective measures to eliminate grammatical errors in speaking and writing	-	-	-	-	-	-	-	-	**2**	**3**	**2**	-	-	**2**	**1**
CO 4	To Understand and apply the conventions of academic writings in English	-	-	-	-	-	-	-	-	**2**	**3**	**2**	-	-	**2**	1
CO 5	To Enhance the Learners' ability of communicating accurately and fluently	-	-	-	-	-	-	-	-	**3**	**3**	**2**	-	-	**2**	1

PHYSICS LAB

I B.Tech– I Semester (Code: 20EEL101/PHL01)
(COMMON TO ALL BRANCHES)

Lectures	**0**	Tutorial	0	Practical	**3**	Credits	**1.5**
Continuous Internal Assessment			**30**	Semester End Examination (3hours)			**70**

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using
3. Stewart-Gee's apparatus.
4. Determination of thickness of thin wire using air wedge interference bands.
5. Determination of radius of curvature of a Plano convex lens using Newton's rings.
6. Determination of wavelengths of mercury spectrum using grating normal incidence method.
7. Determination of dispersive power of a given material of prism using prism minimum deviation method.
8. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
9. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
10. Verify the laws of transverse vibration of stretched string using sonometer.
11. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
12. Draw the load characteristic curves of a solar cell.
13. Determination of Hall coefficient of a semiconductor.
14. Determination of voltage and frequency of an A.C. signal using C.R.O.
15. Determination of Forbidden energy gap of Si &Ge.
16. Determination of wavelength of laser source using Diode laser.

Any three experiments are virtual

TEXT BOOK:

1. P.Srinivasarao & K.Muralidhar, "Engineering physics laboratory manual", Himalaya publications.

CO-PO Mapping

20EEL101/PHL01 - Physics Lab		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Acknowledge the important aspects of earth magnetic field, realize the use of Maxwells equations in various magnetic applications	2	2		1											
CO2	Applications of basic principles of optics to estimate physical parameters.	2	2	1												
CO3	Realization of material properties and parameters.	2	2	1												
CO4	Get hands on experience in various opto-electronic devices like Solar Cell, Photo Cell and their applications.	2	2	3		1										

ENGLISH COMMUNICATION SKILLS LAB

I B.TECH – I SEMESTER (Code: 20EEL102/ELL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

English Communication Skills (ECS) Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts. To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.

Course Objectives:

- to sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- to bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- to improve students' fluency in English and neutralize their mother tongue
- to make them use effective vocabulary both in formal and informal situations

Course Outcomes:

The student would be able to

- better understand the nuances of English language through audio- visual experience and group activities
- develop neutralization of accent for intelligibility
- build confidence to enhance their speaking skills
- use effective vocabulary both in formal and informal situations

UNIT-I

1.1 Listening Skills; Importance – Purpose- Process- Types
1.2 Barriers to Listening
1.3 Strategies for Effective Listening

UNIT-II

2.1 Phonetics; Introduction to Consonant, Vowel and Diphthong sounds
2.2 Stress
2.3 Rhythm
2.4 Intonation

UNIT-III

3.1 Formal and Informal Situations
3.2 Expressions used in different situations

3.3 Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking Permission-Giving Information- Giving Directions- Sympathizing- Convincing People- Complaining & Apologizing-Thanking Others- Shopping- Travelling- Conversational Gambits

UNIT-IV

4.1 JAM Session
4.2 Debates
4.3 Extempore

TEXT BOOKS/REFERENCE BOOKS:

1. Sanjay Kumar &PushpaLatha, "Communication Skills", Oxford University Press:2011.
2. J.D. O' Connor, "Better English Pronunciation", Cambridge University Press:1984
3. Jack C Richards, "New Interchange" (4rth Edition), Cambridge University Press:2015
4. Grant Taylor, "English Conversation Practice", McGraw Hill:2001

SOFTWARE:

1. Buzzers for conversations, New Interchange series
2. English in Mind series, Telephoning in English
3. Speech Solutions, A Course in Listening and Speaking

CO, PO and PSO Mapping:

ENGLISH COMMUNICATION SKILLS LAB (20EEL102/ELL01)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Better understand the nuances of English language through audio-visual experience and group activities	-	-	-	-	-	-	-	-	3	3	2	2	2	1	1
CO2	Develop neutralization of accent for intelligibility	-	-	-	-	-	-	-	-	2	3	2	2	2	1	1
CO3	Build confidence to enhance their speaking skills	-	-	-	-	-	-	-	-	3	3	2	2	2	1	1
CO4	Use effective vocabulary both in formal and informal situations	-	-	-	-	-	-	-	-	3	3	2	2	2	1	1

WORKSHOP PRACTICE LAB

I B.TECH – I SEMESTER (Code: 20EEL103/MEL02)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

Course Objectives: To make the students

1. To impart student knowledge on various hand tools for usage in engineering applications.
2. Be able to use analytical skills for the production of components.
3. Design and model different prototypes using carpentry, sheet metal and welding.
4. Make electrical connections for daily applications.
5. To make student aware of safety rules in working environments.

Course outcomes: At the end of the course the students should be able to

1. Make half lap joint, Dovetail joint and Mortise &Tenon joint
2. Produce Lap joint, Tee joint and Butt joint using Gas welding
3. Prepare trapezoidal tray, Funnel and T-joint using sheet metal tools
4. Make connections for controlling one lamp by a single switch, controlling two lamps by a single switch and stair case wiring.

Syllabus:

1. Carpentry
   a. Half Lap joint
   b. Dovetail joint
   c. Mortise &Tenon joint
2. Welding using electric arc welding process/gas welding
   a. Lap joint
   b. Tee joint
   c. Butt joint
3. Sheet metal operations with hand tools
   a. Trapezoidal tray
   b. Funnel
   c. T-joint
4. House wiring
   a. To control one lamp by a single switch
   b. To control two lamps by a single switch
   c. Stair-case wiring

TEXT BOOKS:

1. P.Kannaiah and K.L.Narayana, “Workshop Manual”, SciTech Publishers, 2009.
2. K. Venkata Reddy, “Workshop Practice Manual”, BS Publications, 2008.

ENGINEERING GRAPHICS

I B.Tech – I Semester (Code: 20EEL104/MEL01)

Lectures	1	Tutorial	0	Practical	4	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

Course Objectives: To make the students To learn

CO1: clear picture about the importance of engineering graphics in the field of engineering

CO2: the drawing skills and impart students to follow Bureau of Indian Standards

CO3: To give an idea about Geometric constructions, Engineering curves, orthographic projections and pictorial projections

CO4: imagination skills about orientation of points, lines, surfaces and solids

CO5: basic drafting skills of AutoCAD

Course Outcomes: By the end of the course the student will be able to

CLO-1: draw projections of points and projections of lines using Auto CAD

CLO-2: plot projections of surfaces like circle, square and rhombus

CLO-3: plot the Projections of solids like Prisms and pyramids

CLO-4: convert the of Orthographic views into isometric views of simple objects

CLO-5: generate the of pictorial views into orthographic views of simple castings

UNIT – I

INTRODUCTION: Introduction to Drawing instruments and their uses, geometrical construction procedures

INTRODUCTION TO AUTOCAD:

Basics of sheet selection, Draw tools, Modify tools, dimensioning

METHOD OF PROJECTIONS: Principles of projection - First angle and third angle projection of points. Projection of straight lines. Traces of lines.

UNIT II

PROJECTIONS OF PLANES: Projections of plane figures: circle, square, rhombus, rectangle, triangle, pentagon and hexagon.

UNIT – III

PROJECTIONS OF SOLIDS: Projections of Cubes, Prisms, Pyramids, Cylinders and Cones Inclined to one plane. .

UNIT –IV

ISOMETRIC PROJECTIONS: Isometric Projection and conversion of Orthographic views into isometric views. (Treatment is limited to simple objects only).

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings).

TEXT BOOK:

1. Dhananjay M. Kulkarni, "Engineering Drawing with AutoCAD" PHI publication
2. N.D. Bhatt & V.M. Panchal, "Engineering Drawing", Charotar Publishing House.

REFERENCE BOOKS:

1. Dhananjay AJolhe, "Engineering Drawing" Tata McGraw hill publishers
2. Prof.K.L.Narayana& Prof. R.K.Kannaiah, "Engineering Drawing"

CO,PO and PSO Mapping:

Engineering Graphics (20EEL104/MEL01)		**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Draw projections of points and projections of lines using Auto CAD	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO2	Plot projections of surfaces like circle, square and rhombus	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Plot the Projections of solids like Prisms and pyramids	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Convert the of Orthographic views into isometric views of simple objects	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-
CO5	Generate the of pictorial views into orthographic views of simple castings	3	2	-	-	-	-	-	-	-	-	-	-	-	2	-

ENVIRONMENTAL STUDIES

I B.TECH – I SEMESTER (Code: 20EE104/MC01)

Lectures	2	Tutorial	0	Practical	0	Credits	0
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	00		

Prerequisites: None

Course Objectives: The course aims

CO1: To develop an awareness, knowledge, and appreciation for the natural environment.
CO2: To understand different types of ecosystems exist in nature.
CO3: To know our biodiversity.
CO4: To understand different types of pollutants present in Environment.
CO5: To know the global environmental problems.

Course Outcomes: By the end of the course the student will be able to

CLO 1: Develop an appreciation for the local and natural history of the area.
CLO 2: Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.
CLO 3: Know how to manage the harmful pollutants.
CLO 4: Gain the knowledge of Environment.
CLO 5: Create awareness among the youth on environmental concerns important in the long-term interest of the society

UNIT – I

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic (Marine, pond and estuaries). 6 periods

Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation. Chipko movement case study

UNIT – II

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. **Forest**: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. **Water**: Uses, floods and drought, Dams - benefits and problems.

Energy: Importance of energy, Environmental Impacts of Renewable and Non-renewable energy resources. Silent Valley Project and Narmada Bachao Andolan case studies8 periods

Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management. Fieldwork on Rain water harvesting and Watershed management.

UNIT – III

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; Chernobyl Nuclear Disaster case study; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermin composting.

Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act.

UNIT – IV

Environmental issues: Green house effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment. Environmental Standards (ISO 14000, etc.)

Case Studies: Bhopal Tragedy, Mathura Refinery and TajMahal, and Ralegan Siddhi (Anna Hazare).

Field work: Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture.

TEXT BOOKS:

1. Benny Joseph, "Environmental Studies", Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. JP Sharma, "Comprehensive environmental studies", Laxmi Publications.
3. ErachBharucha, "Text Book of environmental Studies"

REFERENCE BOOKS:

1. R.Rajagopalan, "Environmental studies", Oxford University Press.
2. Anjaneyulu Y, "Introduction to Environmental Science", B S Publications
3. Jr. G. Tyler Miller, "Environmental Science", 11th Edition – Thomson Series.

CO, PO and PSO Mapping:

ENVIRONMENTAL STUDIES (20CE01)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Develop an appreciation for the local and natural history of the area.	-	-	-	1	-	2	3	-	-	1	-	2	-	-	-
CO2	Hope for the better future of environment in India which is based on many positive factors like Biodiversity, successive use of renewable energy resources and other resources, increasing number of people's movements focusing on environment.	-	-	-	-	2	2	3	-	-	1	-	2	-	-	1
CO3	Know how to manage the harmful pollutants.	-	-	-	-	-	-	3	-	-	1	1	2	1	-	-
CO4	Gain the knowledge of Environment.	-	-	-	1	-	2	3	-	-	1	-	2	1	-	-
CO5	Create awareness among the youth on environmental concerns important in the long-term interest of the society	-	-	-	-	-	2	3	2	-	1	-	2	-	-	1

NUMERICAL METHODS AND ADVANCED CALCULUS

I B.Tech –II Semester (Code: 20EE201/MA02)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: None

Course Objectives: To make the students

CO1: To learn about some advanced numerical techniques e.g. solving a nonlinear equation, linear system of equations, Interpolation and Approximation techniques.

CO2: To learn about evaluation of double and triple integrals and their applications.

CO3: To learn some basic properties of scalar and vector point functions and their applications to line, surface and volume integrals.

Course Outcomes: By the end of the course the student will be able to

CLO-1: Solve non-linear equations in one variable and system of linear equations using iteration methods.

CLO-2: Choose appropriate interpolation formulae based on the given data.

CLO-3: Compute the value of a definite integral using numerical integration techniques.

CLO-4: Predict the numerical solution of the derivative at a point from the given initial value problem using appropriate numerical method.

CLO-4: Evaluate the double and triple integrals using change of variables.

CLO-5: Transform line integrals to surface and surface to volume integrals and evaluate them.

UNIT - I

Numerical Solution of Equations: Introduction; Solution of algebraic and transcendental equations: Bisection method, Method of false position, Newton-Raphson method; Useful deductions from the Newton-Raphson formula; Solution of linear simultaneous equations; Direct methods of solution: Gauss elimination method, Gauss-Jordan method, Factorization method; Iterative methods of solution: Jacobi's iterative method, Gauss-Seidel iterative method.

[Sections: 28.1; 28.2; 28.3; 28.5; 28.6; 28.7.1;28.7.2]. [12 Hours]

UNIT - II

Finite differences and Interpolation: Finite differences: Forward differences, Backward differences; Newton's interpolation formulae: Newton's forward interpolation formula, Newton's backward interpolation formula; Interpolation with unequal intervals; Lagrange's interpolation formula; Divided differences; Newton's divided difference formula; Numerical integration; Trapezoidal rule; Simpson's one-third rule; Simpson's three-eighth rule; Numerical solution of ODE's: Introduction; Picard's method; Euler's method; Runge-Kutta method.

[Sections:29.1; 29.1-1; 29.1.2; 29.6; 29.9; 29.10; 29.11; 29.12; 30.4; 30.6; 30.7; 30.8; 32.1; 32.2; 32.4; 32.7]. [12 Hours]

UNIT – III

Multiple Integrals: Double integrals; Change of order of integration; Double integrals in polar coordinates; Area enclosed by plane curves; Triple integrals; Volumes of solids: Volume as Triple integrals, Change of variables.

[Sections: 7.1; 7.2; 7.3; 7.4; 7.5; 7.6.2; 7.7.2]. [12 Hours]

UNIT – IV

Vector calculus and its Applications: Scalar and vector point functions; Del applied to scalar point functions-Gradient: Definition, Directional derivative; Del applied to vector point functions: Divergence, Curl; Line integral; Surfaces: Surface integral, Flux across a surface; Green's theorem in the plane (without proof); Stokes theorem (without proof); Gauss divergence theorem(without proof).

[Sections: 8.4; 8.5.1; 8.5.3; 8.6; 8.11; 8.12; 8.13; 8.14; 8.16] [12 Hours]

TEXT BOOK:

1. B.S.Grewal, "Higher Engineering Mathematics", 44thedition, Khanna publishers, 2017.

REFERENCE BOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.
2. N.P.Bali and M.Goyal, "A Text book of Engineering Mathematics" Laxmi Publications, 2010.

NPTEL Course Links:

1. NPTEL :: Mathematics - NOC:Numerical methods
2. NPTEL :: Mathematics - NOC:Integral and Vector Calculus

CO, PO and PSO Mapping:

NUMERICAL METHODS AND ADVANCED CALCULUS (20EE201/MA02)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Solve algebraic, transcendental and system of linear equations with the help of numerical methods.	2	2	-	1	-	-	-	-	-	-	-	-	2	-	-
CO2	Apply the techniques of numerical integration whenever and wherever routine methods are not applicable and solve the first order ordinary differential equations numerically with the given initial condition using different methods.	2	2	-	1	-	-	-	-	-	-	-	-	2	-	-
CO3	Evaluate double and triple integrals and apply them to find areas and volumes.	3	2	-	1	-	-	-	-	-	-	-	-	2	-	-
CO4	Evaluate the line, surface and volume integrals and learn their inter-relations and applications.	3	3	-	1	-	-	-	-	-	-	-	-	3	-	-

SEMICONDUCTOR PHYSICS AND NANO MATERIALS

I B.Tech –II Semester (Code: 20EE202/PH03)

(Common for CSE, IT, EEE &EIE)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Course Objectives:

CO1: This unit aim to build the foundation and inspires interest of freshmen into electrical and electronics and to focus on fundamental concepts and basic principles regarding electrical conduction.

CO2: This unit provides various properties of semiconductor materials and their importance in various device fabrications.

CO3: This unit aim to educate the student on various opto-electronic devices and their applications.

CO4: This unit provide information about the principles of processing, manufacturing and characterization of nano materials, nanostructures and their applications.

Course outcomes: At the end of the course the students should be able to

CLO1: Understand concepts of band structure of solids, concept of hole and effective mass of electron in semiconductors.

CLO2: Know the concept of Fermi level and various semiconductor junctions.

CLO3: Familiar with working principles of various opto-electronic devices and their applications.

CLO4: Understand importance of nano-materials and their characteristic properties.

UNIT –I

ELECTRONIC MATERILAS: Somerfield free electron theory, Fermi level and energy, density of states, Failure of free electron theory (Qualitative), Energy bands in solids, E-K diagrams, Direct and Indirect band gaps. Types of Electronic materials: Metals, Semi-conductors and Insulators, Occupation Probability, effective mass, Concept of hole.

UNIT – II

SEMICONDUCTORS: Introduction to semiconductors, intrinsic and extrinsic semiconductors, carrier concentrations, Fermi level and temperature dependence, Continuity equation, Diffusion and drift, P-N junction (V-I characteristics), Metal – Semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for opto- electronic devices.

UNIT-III

OPTO-ELECTRONIC DEVICES AND DISPLAY DEVICES: Photo voltaic effect, principle and working of LED, Applications of Photo diode, Solar cell, PIN & APD Diode, Liquid crystal display, Opto electric effect: Faraday Effect and Kerr effect.

UNIT-IV

NANO-MATERIALS: Introduction to nano technology, quantum confinement, surface to volume ratio, properties of nano materials, synthesis of nano-materials: CVD, sol-gel methods, laser ablation. Carbon nano tubes: types, properties, applications. Characterization of nano materials: XRD, SEM, applications of nano materials.

TEXT BOOKS:

1. Avadhanulu and Kshirsagar, "A text book of engineering physics", S.Chand& Co. (2013)
2. Dr.*P.SrinivasaRao*. Dr.K.*Muralidhar*, "*Applied physics",*
3. Charles Kittel, "Introduction to solid state state physics", 8th edition
4. S.O. Pillai, "Solid state physics",

REFERENCE BOOKS:

1. B.S. Murty, P. Shankar, Baldev Raj, B.B. Rath and J. Murday, "Textbook on Nanoscience and Nanotechnology", Springer Science & Business Media, 2013.
2. Dr.*P.SrinivasaRao*. Dr.K.*Muralidhar.* "Basic Engineering Physics", Himalaya Publications, 2016

NPTEL COURSE LINKS:

1. NPTEL :: Physics - Fundamental concepts of semiconductors
2. NPTEL :: Metallurgy and Material Science - NOC:Fundamentals of electronic materials and devices
3. NPTEL :: Metallurgy and Material Science - Optoelectronic Materials and Devices

CO, PO and PSO Mapping:

SEMICONDUCTOR PHYSICS AND NANO MATERIALS (20EE202/PH03)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	The students able to understand the concepts of band structure of solids, concept of hole and effective mass of electron in semiconductors.	3	3	-	2	-	-	-	-	-	-	-	3	-	2	3
CO2	Students were able to know the concept of fermi level and various semiconductors junctions	3	3	-	2	-	-	-	-	-	-	-	3	-	-	3
CO3	Students were able to familiar with working principles of various optoelectronic devices and their applications	3	-	3	3	2	2	3	-	-	-	-	3	-	-	3
CO4	The students able to understand the importance of nano materials and their characteristic properties	3	3	2	2	2	-	-	-	-	-	-	3	-	2	3

ENGINEERING CHEMISTRY

(Common to all branches)

I B.Tech –II Semester (Code: 20EE203 /CY01)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

PREREQUISITES: None

COURSE OBJECTIVES: The student should be conversant:

CO1: With the principles of water characterization and treatment of water for industrial purposes and methods of producing water for potable purposes.

CO2: To understand the thermodynamic concepts, energy changes, concept of corrosion & its control.

CO3: With the conventional energy sources, solid, liquid and gaseous Fuels & knowledge of knocking and anti-knocking characteristics.

CO4: With aim to gain good knowledge of organic reactions, plastics, conducting polymers & biodegradable polymers.

COURSE OUTCOME: By the end of the course the student will be able to

CLO-1: Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.

CLO-2: Apply their knowledge in converting various energies of different systems and protection of different metals from corrosion.

CLO-3: Have the capacity of applying energy sources efficiently and economically for various needs.

CLO-4: Design economically and new methods of organic synthesis and substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution.

UNIT -I

Water Chemistry

Introduction: water quality parameters

Characteristics: Alkalinity, Hardness - Estimation & simple numerical problems,

Boiler Troubles - Sludges, Scales, Caustic embrittlement, boiler corrosion, Priming and foaming;

Internal conditioning- phosphate, calgon and carbonate methods.

External conditioning - Ion exchange process & Zeolite proess WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration. Disinfection methods: Chlorination, ozonization and UV treatment. Salinity – Treatment of Brackish water by Reverse Osmosis and Electrodialysis.

UNIT- II

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications.

Corrosion: Types of corrosion - Chemical or dry corrosion, Electrochemical or wet corrosion; Galvanic, stress, pitting and differential aeration corrosion; Factors effecting corrosion.

Corrosion control – Cathodic protection, and electro plating (Au)& electoless Ni plating.

UNIT- III

Fuels: Classification of fuels; Calorific value of fuels (lower, higher)

Solid fuels: Determination of calorific value (Bomb Calorimeter) & related problems, Coal ranking,

Liquid Fuels: Petroleum refining and fractions, composition and uses. Knocking and anti-knocking Agents, Octane number and Cetane number; Bio fuels- Biodiesel, general methods of preparation and advantages

Gaseous fuels: CNG and LPG, Flue gas analysis – Orsat apparatus.

UNIT- IV

Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution (SN^1, SN^2), addition (Markownikoff's and anti-Markwnikoff's rules) , elimination (E_1& E_2), Synthesis of a commonly used drug molecule.(Aspirin and Paracetamol)

Polymers: Conducting polymers: Classification, Intrinsic and Extrinsic conducting polymers and their applications**.** Plastics: Thermo plasts and thermosetting plastics, Bskelite and PVC. Bio degradable polymers: types, examples-Polyhydroxybuterate (PHB), Polyhydroxybuterate-co-β-hydroxyvalerate (PHBV), applications.

TEXT BOOKS:

1. P.C. Jain and Monica Jain, "Engineering Chemistry" DhanpatRai Pub, Co., New Delhi 17th edition (2017).
2. SeshiChawla, "Engineering Chemistry"DhanpatRai Pub, Co LTD, New Delhi 13 th edition, 2013.

REFERENCES:

1 Essential Of Physical Chemistry by ArunBahl, B.S. Bahl, G.D.Tuli, by ArunBahl, B.S. Bahl, G.D.Tuli, Published by S Chand Publishers, 12th Edition, 2012.

2 Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).

3 Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

CO, PO and PSO Mapping:

ENGINEERING CHEMISTRY (20EE203 /CY01)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Develop innovative methods to produce soft water for industrial use and able to solve the industrial problems	3	3	1	-	-	2	3	-	-	-	-	3	3	-	-
CO2	the students will be familiar with applications of polymers in domestic and engineering areas & the most recent surface characterization techniques	3	3	2	-	-	2	2	-	-	-	-	3	3	3	2
CO3	Have the capacity of classifying fuels, their calorific value determination and applying energy sources efficiently and economically for various needs.	3	3	0	-	-	2	3	-	-	-	-	3	3	3	2
CO4	Explain features, classification, applications of newer class materials like smart materials, refrocteries, abbrasives, lubriants and composite materials etc.	3	3	2	-	-	2	1	-	-	-	-	2	2	-	-

PROGRAMMING FOR PROBLEM SOLVING

(Common for all branches except Civil Engineering)

I B.Tech –II Semester (Code: 20EE204/CS01)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: BASIC MATHEMATICS

Course Objectives: To make the students

1. Understand basic concepts of C Programming such as: C-tokens, Operators, Input/output, and Arithmetic rules.
2. Develop problem-solving skills to translate 'English' described problems into programs written using C language.
3. Use Conditional Branching, Looping, and Functions.
4. Apply pointers for parameter passing, referencing and differencing and linking data structures.
5. Manipulate variables and types to change the problem state, including numeric, character, array, and pointer types, as well as the use of structures and unions, File.

Course outcomes: At the end of the course the students should be able to

1. Choose the right data representation formats based on the requirements of the problem.
2. Analyse a given problem and develop an algorithm to solve the problem.
3. Explain the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
4. Write the program on a computer, edit, compile, debug, correct, recompile and run it.
5. Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

UNIT- I

Overview of C, Constants, Variables and Data Types, Operators and Expressions, Managing I/O Operations. Decision Making and Branching.

Programming Exercises for Unit I:C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic and logical errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computation of discount amount on different types of products with different discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, finding given year is leap year or not, and conversion of lower case character to its upper case.

UNIT -II

Decision Making and Looping, Arrays, Character Arrays and Strings.

Programming Exercises for Unit II: To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number. To print graphic patterns of symbols and numbers. To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not with and without using String Handling Functions. Transpose of a matrix and sorting of names using arrays.

UNIT- III

User-defined Functions, Structures and Unions, Pointers

Programming Exercises for Unit - III: Functions - Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic. Swapping two variable values. Sorting a list of student records on register number using array of pointers

UNIT -IV

File Management in C, Dynamic Memory Allocation, Preprocessor

Programming Exercises for Unit - IV: Operations on complex numbers, and to read an input file of marks and generate a result file, sorting a list of names using command line arguments. Copy the contents of one file to another file. Allocating memory to variables dynamically.

TEXT BOOK:

1. E.Balaguruswamy, “Programming in ANSI C, Fifth Edition,.

REFERENCE BOOKS:

1. Kernighan BW and Dennis Ritchie M, “C programming language”, 2nded, Prentice Hall, .
2. Yashavant P. Kanetkar, “Let us C”, BPB Publications, .
3. Herbert Schildt, “C: The Complete Reference”, 4th edition, Tata Mcgraw-Hill, .
4. Ashok N.Kamthane, “Programming in C”, PEARSON 2nd Edition, .

NPTEL COURSE LINKS:

1. NPTEL :: Computer Science and Engineering - NOC:Problem Solving through Programming in C
2. NPTEL :: Computer Science and Engineering - NOC:Introduction to programming in C

CO, PO and PSO Mapping:

	PROBLEM SOLVING USING PROGRAMMING (20EE204/CS01)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understand basic concepts of C programming.	3	2	2	3	-	-	-	-	-	-	-	-	3	2	3
CO2	Understanding the controls and flow of C programming language	2	3	2	2	-	-	-	-	-	-	-	-	2	1	2
CO3	To handle the complex and heterogeneous data using C language	2	2	1	2	-	-	-	-	-	-	-	-	2	2	2
CO4	To develop useful and powerful user defined functions in C language	2	1	2	2	-	-	-	-	-	-	-	-	2	1	2
CO5	Develop problem solving skills and to translate real world problems into C language programs	3	2	2	3	-	-	-	-	-	-	-	-	3	2	3

CIRCUIT THEORY

I B.Tech –II Semester (Code: 20EE205)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment			30	Semester End Examination (3 Hours)			70

Prerequisites: Basic Mathematics, Basic Physics

Course Objectives: To make the students

CO1: Understand about basic Laws in circuits, circuit elements and sources and their characteristics.

CO2: Understand fundamental concepts of alternating current and voltages, power triangle and power factor.

CO3: Analyze circuits with different DC and AC sources.

CO4: Gain knowledge about statement and application of various theorems.

CO5: Understand concept of resonance in series and parallel circuits.

Course Outcomes: By the end of the course the student will be able to

CLO1: Explain about basic Laws, circuit elements and sources and their characteristics.

CLO2: Draw phasor diagrams, phase relations in elements and power triangle.

CLO3: Solve problems involving with different AC and DC sources in electrical circuits.

CLO4: Synthesis the circuits with various theorems.

CLO5: Demonstrate the series and parallel resonance circuits.

UNIT – I

CIRCUIT ELEMENTS: Basic definition of the unit of Charge, Voltage, Current, Power and Energy, Circuit concept, various circuit elements, Energy stored in Inductors and Capacitors, Kirchhoff's laws,
SOURCES: Ideal, Practical and dependent sources and their V-I characteristics, Source transformation, Voltage and Current division, series / parallel combination of elements, Star-Delta transformation, Instantaneous, Peak, Average and RMS values of various waveforms, Crest factor, Form factor. Concept of phase and phase difference in sinusoidal waveforms, Phase relation in pure resistor, Inductor and capacitor, Impedance diagram, phasor diagram, series and parallel circuits, compound Circuits, Computation of active, reactive and complex powers, power triangle, power factor.

UNIT – II

STEADY STATE ANALYSIS: Mesh and Nodal analysis of DC circuits with and without dependent sources, Mesh and Nodal analysis of AC circuits, Analysis of RL, RC, RLC series and parallel circuits with pulse and impulse excitations.

UNIT – III

NETWORK THEOREMS: Superposition theorem, Thevenin's and Norton's theorems, Reciprocity, Compensation, Maximum power transfer theorems, Tellegen's and Millman's theorems to both DC (with and without dependent) and AC circuits

UNIT – IV

RESONANCE: Series resonance, Impedance and phase angle, voltages and currents, bandwidth and Q factor and its effect on bandwidth, magnification, parallel resonance, resonant frequency, variation of impedance with frequency , Q factor, magnification, reactance curves in parallel resonance, Locus diagrams for series and parallel circuits.

TEXT BOOKS:

1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", 8th Edition,TMH, 2012.
2. M E Vanvalkenburg, "Network Analysis", 3rd Edition, PHI, 2006.
3. C L Wadhwa, "Network analysis and synthesis", New Age International, 2nd Edition, 2006.

REFERENCE BOOKS:

1. C K Alexander and M. N. O. Sadiku, "Electric Circuits", McGraw Hill Education, 5th Edition, 2016.
2. Abhijit chakrabarti, "Circuit theory analysis and synthesis" Dhanapatrai & co (p) Ltd, 2018.
3. A Sudhakar and Shyam Mohan SP, "Circuits and Networks: Analysis and Synthesis", 4th Edition, TMH, 2010.
4. J A Edminister, "Electric circuits", Schaum outline series.

NPTEL COURSE LINKS:

1. NPTEL :: Electrical Engineering - NOC:Network Analysis, https://nptel.ac.in/courses/108/105/108105159
2. NPTEL :: Electrical Engineering - NOC:Basic Electric Circuits, https://nptel.ac.in/courses/108/104/108104139/
3. NPTEL :: Electrical Engineering - NOC:Basic Electrical Circuits, https://nptel.ac.in/courses/108/106/108106172/

CO, PO and PSO Mapping:

	CIRCUIT THEORY (20EE205)	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Explain about basic Laws, circuit elements and sources and their characteristics.	3	-	-	-	-	-	-	-	-	-	-	-	2	2	-
CO2	Draw phasor diagrams, phase relations in elements and power triangle.	3	2	-	-	-	-	-	-	-	-	-	-	2	2	-
CO3	Solve problems involving with different AC and DC sources in electrical circuits.	3	2	-	-	-	-	-	-	-	-	-	-	3	3	-
CO4	Synthesis the circuits with various theorems.	3	2	-	2	-	-	-	-	-	-	-	-	3	3	-
CO5	Demonstrate the series and parallel resonance circuits.	3	2	-	2	-	-	-	-	-	-	-	-	2	3	-

ENGINEERING MECHANICS

I B.Tech –II Semester (Code: 20EE206/CE02)

Lectures	3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Prerequisites: Basic Physics

Course Objectives: To learn

CO1: The concepts Force systems, free body diagrams, resultant of forces and equations of equilibrium, Supports and support reaction sand calculation of Centroid
CO2: The Concept of moment of inertia of plane figures, Laws and applications of friction
CO3: The Analysis of the truss and determination of axial forces by Method of Joints
CO4: Motion of a body and their relationships and application of D Alembert's principle in rectilinear and curvilinear motions
CO5: About Mass moment of inertia of material bodies, Plane motion of a body about a fixed axis

Course Outcomes: Students will be able to

CLO-1: Construct free body diagrams and use appropriate equilibrium equations, Calculate unknown forces in a plane by resolution of force and equilibrium equations
CLO-2: Locate Centroid of composite figures and determine moment of plane figures
CLO -3: Analyze the systems with friction
CLO-4: Determine the axial forces in the members of determinate truss. Calculation of acceleration, velocity and displacement and forces
CLO-5: Determine moment of inertia of material bodies, Calculation of angular displacement, velocity and angular acceleration of rotational bodies.

UNIT – I

Concurrent Forces in a Plane

Principles of statics – composition and resolution of forces – equilibrium of concurrent forces in a plane –Method of moments.

Parallel Forces in a Plane

Two parallel forces – general case of parallel forces in a plane – center of parallel forces – Centroids of composite plane figures and curves.

UNIT – II

Moments of Inertia of Plane Figures

Moment of inertia of a plane figure with respect to an axis in its plane – Moment of Inertia with respect to an axis perpendicular to the plane of the figure – Parallel axis theorem.

Friction

Characteristics of friction – problems involving dry friction, ladder friction and wedge friction.

UNIT – III

Rectilinear Translation

Kinematics of rectilinear motion – principles of dynamics – Differential equations of rectilinear motion D'Alembertsprinciple .

Curvilinear Translation

Kinematics of curvilinear motion – Differential equations of curvilinear motion – D'Alembert's principle.

UNIT – IV

Moments of Inertia of Material Bodies

Moment of inertia of rigid body – Moment of inertia of a lamina – Moments of inertia of three – dimensionalbodies.

Rotation of a Rigid Body about a Fixed Axis

Kinematics of rotation – Equation of motion for a rigid body rotating about a fixed axis – D'Alembert's principle.

TEXT BOOKS:

1. S. Timoshenko and D. H. Young, "Engineering mechanics" Mc Graw-Hill International edition (For concepts and symbolic problems)
2. R. C. Hibbeler and Ashok Gupta, "Engineering mechanics statics and dynamics", Pearson (For numerical problems using S.I. system ofunits)

REFERENCE BOOKS:

1. Beer and Johnston, "Vector mechanics for engineers statics and dynamics" Tata Mc Graw-Hill publishing company, NewDelhi
2. A. K. Tayal, "Engineering mechanics statics and dynamics" Umesh publication, Delhi (For numerical problems using S.I. system of units)

NPTEL COURSE LINKS:

1. NPTEL :: Mechanical Engineering - NOC:Engineering Mechanics
2. NPTEL :: Basic courses-Sem 1 and 2 - Engineering Mechanics

ENGINEERING CHEMISTRY LAB
(Common to all branches)

I B.Tech –II Semester (Code: 20EEL201/CYL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals likeCalibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric titrations).

2. **Volumetric Analysis:**
   a. Estimation of Washing Soda.
   b. Estimation of Active Chlorine Content in Bleaching Powder
   c. Estimation of Mohr's salt by permanganometry.
   d. Estimation of given salt by using Ion-exchange resin using Dowex-50.
3. **Analysis of Water:**
   a. Determination of Alkalinity of Tap water.
   b. Determination of Total Hardness of ground water sample by EDTA method
   c. Determination of Salinity of water sample
4. **Estimation of properties of oil**:
   a. Estimation of Acid Value
   b. Estimation of Saponification value
5. **Preparations:**
   a. Preparation of Soap
   b. Preparation of Urea-formaldehyde resin
   c. Preparation of Phenyl benzoate
6. **Demonstration Experiments (Any two of the following):**
   a. Determination of $p^H$of given sample.
   b. Determination of conductivity of given sample by conduct meter.
   c. Potentiometric Determination of Iron.

TEXT BOOKS (for Chemistry 1 and 2):

1. K.Mukkanti, Etal, "Practical Engineering Chemistry" B.S. Publications, Hyderabad, 2009.
2. Vogel, "Inorganic quantitative analysis", 5th edition, Longman group Ltd. London, 1979.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R.n. Goyal and HarrmendraGoel.
2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

CIRCUIT THEORY LAB

I B.Tech –II Semester (Code: 20EEL202)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

Pre-requisites: Circuit theory, Mathematics

Course Objectives: To make the students

CO1: Understand and verify basic Kirchhoff's laws in circuits.

CO2: Understand and verify fundamental theorems of circuit theory.

CO3: Able to determine the parameters of a given choke coil.

CO4: Understand the locus diagrams of series RL, RC circuits.

CO5: Understand and verify fundamental theorems of circuit theory using software.

Course outcomes: At the end of the course the students should be able to

CLO1: Gain knowledge about basic Kirchhoff's laws in circuits.

CLO2: Verify fundamental theorems of circuit theory.

.CLO3: Analyze the parameters of a given choke coil.

CLO4: Draw the locus diagrams of series RL,RC circuits.

CLO5: Verify fundamental theorems of circuit theory using software.

LIST OF EXPERIMENTS

1. Verification of KCL and KVL
2. Verification of Superposition theorem
3. Verification of Thevenin's theorem
4. Verification of Norton's theorem
5. Verification of Reciprocity theorem
6. Verification of Maximum Power Transfer theorem
7. Parameters of Choke coil
8. Measurement of low and medium resistance using volt ampere method
9. Locus diagram of RL series circuit
10. Locus diagram of RC series circuit
11. Steady state analysis of RL, RC and RLC series circuits using software
12. Verification of Superposition theorem using software
13. Verification of Thevenin's and Norton's theorem using software
14. Verification of Maximum Power Transfer theorem DC and AC circuits using software
15. Locus diagram of RL and RC series circuit using software

Note: Minimum 10 experiments should be carried out.

PROGRAMMING FOR PROBLEM SOLVING LAB

I B.Tech –II Semester (Code: 20EEL203/CSL01)

Lectures	0	Tutorial	0	Practical	3	Credits	1.5
Continuous Internal Assessment	:	30	Semester End Examination (3 Hours)	:	70		

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if-else statement).

Domestic Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 200	0.50 per unit	
201 – 400	100 plus	0.65 per unit
401 – 600	230 plus	0.80 per unit
601 and above	390 plus	1.00 per unit
Commercial Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 100	0.50 per unit	
101 – 200	50 plus	0.6 per unit
201 – 300	100 plus	0.70 per unit
301 and above	200 plus	1.00 per unit

2. Write a C program to evaluate the following (using loops):
   a) $1 + x^2/2! + x^4 / 4!+ \ldots$up to ten terms
   b) $x + x^3/3! + x^5/5!+ \ldots$ up to ten terms
3. Write a C program to check whether the given numberis
   a) Prime ornot.
   b) Perfect or Abundant or Deficient.
4. Write a C program to display statistical parameters (using one – dimensional array).
   a) Mean
   b) Mode
   c) Median
   d) Variance.
5. WriteaCprogramtoreadalistofnumbersandperformthefollowingoperations
   a) Print the list.
   b) Delete duplicates from the list.
   c) Reverse the list.
6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message “Element not found in the List”.

7. Write a C program to read two matrices and compute their sum and product.

8. Write a C program to read list of student names and perform the following operations
a) To print the list of names.

b) To sort them in ascending order.
c) To print the list after sorting.

9. Write a C program that consists of recursive functions to

a) Find factorial of a given number
b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.

10. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author, and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and request for the number of copies required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message "required copies not in stock" is displayed. Write a program for the above in structures with suitable functions.

11. Write a C program to read a data file of students' records with fields(Regno, Name, M1,M2,M3,M4,M5) and write the successful students data (percentage > 40%) to a data file.

12. Write a C program to read a file as command line argument and count the given word frequency in a file.