ACADEMIC REGULATIONS

B. Tech, Four Year Degree Programme with CBCS
(For the batches admitted from the academic year 2015-16)
And
B. Tech. Lateral Entry Scheme
(For the batches admitted from the academic year 2016-17)

The following rules and regulations will be applicable for the batches of Four year B. Tech. degree admitted from the academic year 2015-16 onwards.

1. ADMISSION:

1.1 Admission into First year of Four year B. Tech. Degree programme of study in Engineering:

As per the existing stipulations of Andhra Pradesh State Council of Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year of four year B. Tech. Degree programme as per the following pattern.

a) Category-A seats will be filled by the Convener, AP-EAMCET.

b) Category-B seats will be filled by the Management as per the norms stipulated by Govt. of Andhra Pradesh.

1.2 Admission into the Second Year of Four year B. Tech. Degree programme (lateral entry).

As per the existing stipulations of Andhra Pradesh State Council of Higher Education (APSCHE), Government of Andhra Pradesh.

2. PROGRAMMES OF STUDY OFFERED BY AITS LEADING TO THE AWARD OF B.TECH DEGREE:

Following are the four year undergraduate Degree Programmes of study offered in various disciplines at Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) leading to the award of B. Tech. (Bachelor of Technology) Degree:

1. B. Tech. (Computer Science and Engineering)
2. B. Tech. (Electrical and Electronics Engineering)
3. B. Tech. (Electronics and Communication Engineering)
4. B. Tech. (Information Technology)
5. B. Tech. (Mechanical Engineering)
6. B. Tech. (Civil Engineering)

and any other programme as approved by the concerned authorities from time to time.

3. ACADEMIC YEAR:

The entire course of study is of four academic years and each year will have **TWO** Semesters (Total **EIGHT** Semesters). The minimum instruction days for each semester shall be 90.

4. COURSE STRUCTURE:

Each programme of study shall consist of:

4.1 General Courses comprising of the following :(5 to 10%)

a) Language / Communication Skills

b) Humanities and Social Sciences : Environmental Science

c) Economics and Accounting

d) Principles of Management

4.2 Basic Science Courses comprising of the following: (15 to 20%)

a) Computer Literacy with Numerical Analysis
b) Mathematics
c) Physics
d) Chemistry

4.3 Basic Engineering Courses comprising of the following (depending on the branch):(15 to 20%)

a) Engineering Drawing
b) Engineering and IT Workshop
c) Engineering Mechanics
d) Basic Mechanical Engineering
e) Electrical and Electronics Engineering
f) Basic Civil Engineering
g) Computer Programming

4.4 Compulsory Discipline Courses :(30 to 40%)

The lists of professional subjects are chosen as per the suggestions of the experts, to impart broad based knowledge needed in the concerned branch of study.

4.5 Professional subjects - Electives: (10 to 15%)

Electives will be offered to the students to diversify the spectrum of knowledge, based on the interest of the student to broaden his individual skill and knowledge.

4.6 Open Electives-(5 to 10%)

Open subjects will be offered from other technical and / or emerging subject areas

4.7 Project work, seminar and /or internship :(10-15%)

Project work, seminar and /or internship in industry or elsewhere.

4.8 Mandatory courses:

Environmental studies, Technical English and Technical Communication & Soft Skills are included as subjects under mandatory courses but with credit weightage.

4.9 There shall be a subject like comprehensive Computer Science and Engineering with 2 hours per week introduced in final year first semester.

4.10 Every programme of study shall be designed to have 42-44 theory courses and 19-22 laboratory/seminar/comprehensive courses.

4.11 Every programme has included foundation courses to the extent of 30%, programme core and programme elective subjects to the extent of 60%,open electives and mandatory courses to the tune of 10% approximately of the total credits.

4.12 Audit Courses (to be included in III B.Tech. I Sem & II Sem)

Interested students who want to supplement their knowledge can opt for audit courses namely Professional Ethics/Stress Management & Advanced English Communication laboratory and can appear/Pass in Continuous Internal Evaluation and Semester End Examination of these courses, will be included in marks memo only when they pass.

4.13 Open Elective

IV Year I Semester student has to necessarily select a subject from the list of open electives.

4.14 Contact Hours: Depending on the complexity and volume of the course, the number of contact hours per week will be assigned.

5. CREDIT SYSTEM:

Credits are assigned based on the following norms.

	Semester Pattern	
	Period(s) / Week	Credit(s)
Theory	01	01
Practical	3	02
Comprehensive Course	02	02
Seminar	–	02
Final Year Project	12	08

6. EXAMINATION SYSTEM: All components in any programme of study will be evaluated continuously through internal evaluation and an external evaluation component conducted as semester-end examination.

6.1 Distribution of Marks:

S. No.	Description	Marks	Examination and Evaluation	Scheme of Evaluation
1.	Theory	70	Semester-End examination.	The question paper shall be of subjective type with **Five** questions with internal choice to be answered in 180 Minutes duration.
		30	Mid-Examinations of 120 Minutes duration to be evaluated for 20marks. The question paper shall be of subjective type in which four questions with an internal choice are to be answered. Remaining 10 marks is for continuous evaluation. The method of allotting these marks will be decided by the teacher dealing that subject in consultation with the Head of the Department. Teacher has to announce the evaluation method in the beginning of the semester.	**Two** MID - Examinations are to be conducted for 20 marks each in a semester. 80% weightage for better performance and 20% for other shall be considered. **MID-I:** after first spell of instructions (I & II-Units). **MID-II:** after second spell of instructions (III, IV & V-Units). The student who has missed both the Mid examinations will be permitted to appear for a substitute examination covering the total syllabus. This substitute examination will be given a weightage of 80%. This is to be conducted before the commencement of end semester exams, can be even outside the working hours, can be even two mid exams a day also.

S. No.	Description	Marks	Examination and Evaluation	Scheme of Evaluation
2.	Laboratory or Drawing	70	Semester - End Lab Examination	**For laboratory courses: 180 minutes** duration – two examiners. For Drawing and /or Design: like for the theory examination.
		30	**20 Marks** for Day to Day evaluation	Performance in laboratory experiments
			10 Marks for Internal evaluation	Performance of one best out of two tests to be considered.
3	Seminar	100	Internal Evaluation 20 Marks for Report 20 Marks for subject content 40 Marks for presentation 20 Marks for Question and Answers	Continuous evaluation during a semester by the Departmental Committee (DC) consisting of two/three faculty members allotted by Head of the Department.
4	Comprehensive Course	100	The marks can be allotted based on the performance in viva-voce conducted by Head of the department and two senior faculty members in the department.	
5	Project Work	100	70 Marks for External evaluation	Semester-end Project Viva-Voce Examination by Committee as detailed under 6.2
			30 Marks for Internal evaluation	Continuous evaluation by the DC 15 Marks by DC as detailed under 6.2.1 15 Marks by Supervisor

6.2 Project Work Evaluation:

6.2.1 The Internal Evaluation shall be made by the Departmental Committee, on the basis of average of two seminars presented by each student on the topic of his project, the best one to be considered. The presentations shall be evaluated by the Departmental Committee (DC) consisting of Head of the Department, supervisor and a senior faculty member.

6.2.2 The Semester-End Examination (viva-voce) shall be conducted by a Committee consisting of External examiner nominated by the Chief Controller of Examinations, HOD and Supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester.

6.3 Eligibility to appear for the Semester-End examination:

6.3.1 A student shall be eligible to appear for end examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects in the semester.

6.3.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the Institute Academic Committee if the reason for shortage is convincing.

6.3.3 Shortage of Attendance below 65% in aggregate shall in no case be condoned.

6.3.4 A stipulated fee shall be payable towards Condonation of shortage of attendance to the Institute as per the following slab system.

1st Slab: Less than 75% attendance but equal to or greater than 70% a normal Condonation fee can be collected from the student.

2nd Slab: Less than 70% but equal to or greater than 65%, double the Condonation fee can be collected from the student.

6.3.5 Students whose shortage of attendance is not condoned in any semester are not eligible to take their End examination of that class and their registration for that semester shall stand cancelled.

6.3.6 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the current semester, as applicable.

6.3.7 A student detained due to shortage of attendance, will have to repeat that semester when offered next.

6.4 Revaluation / Recounting:

Students shall be permitted to request for recounting/ revaluation of the end theory examination answer scripts within a stipulated period after payment of prescribed fee.

After recounting or revaluation, records are updated with changes if any and the student will be issued a revised memorandum of marks. If there are no changes, the student shall be intimated the same through a letter or a notice.

6.5 Improvement of marks:

Students are permitted for improvement examinations once for a maximum of four subjects after completion of the study course but before applying for provisional certificate and consolidated marks memo after payment of prescribed fee.

6.6 Supplementary Examination:

All Regular examinations are understood as Regular/Supplementary examinations. The supplementary students have to appear for the supplementary examinations along with their regular examinations conducted at the end of each semester. However, separate supplementary examinations will be conducted for the II-Semester subjects at the end of I-Semester and vice-versa.

6.7 Internship Programme:

The weightage of two credits given for an internship of three weeks duration and more, when a student undergoes internship / industrial training from the specified industries / research organizations / Universities. In such a case, the student has to submit a report on that internship which will be evaluated by a team of three faculty members (decided by the HOD) of the department for those two credits. Student is given a chance to drop one seminar in place of a successful internship / industrial training.

6.8 Massive Open Online Course (MOOC):

MOOC is one of the courses introduced in IV year II semester. The list of subjects under MOOC will be intimated before commencement of class work.

7. ACADEMIC REQUIREMENTS FOR PROMOTION/ COMPLETION OF B.TECH PROGRAMME OF STUDY:

The following academic requirements have to be satisfied in addition to the attendance requirements for promotion/ completion of B. Tech. Programme of study.

7.1 For students admitted into B. Tech. (Four Year) programme:

7.1.1 A student shall be deemed to have satisfied the minimum academic requirements for each theory, practical, drawing subject if he secures not less than 35% of marks in the End examination and a minimum of 40% of marks in the sum total of the internal evaluation and End examination taken together.

7.1.2 For promotion from I B.Tech.to II B. Tech. a student must satisfy the attendance requirements in I year (two semesters).

7.1.3 A Student shall be promoted from II year to III year, if he fulfills the academic requirements of securing a minimum of **50** credits from I year I and II-Semesters, II year I and II Semesters examinations conducted till that time.

7.1.4 A student shall be promoted from III year to IV year if he / she fulfills the academic requirements of securing a minimum of **74** credits from I year I and II-Semesters, II year I and II-Semesters and the III year I and II- Semester examinations conducted till that time.

7.1.5 A student shall register for all the subjects and earn all the**195**credits. Marks obtained in all the credits shall be considered for the calculation of the class based on CCPA.

7.1.6 A student who fails to earn all the **195** credits as indicated in the course structure within **eight** academic years from the year of admission shall forfeit his seat in B. Tech. Programme and his admission stands cancelled.

7.2 For Lateral Entry Students (batches admitted from 2016-2017):

7.2.1 Academic requirements for pass in a subject are the same as in 7.1.1 and attendance requirements as in 6.3.

7.2.2 A student shall be promoted from II year to III year if he fulfills the academic requirements of securing a minimum of **22** credits from II year I and II-Semesters examinations conducted till that time.

7.2.3 A student shall be promoted from III year to IV year if he fulfills the academic requirements of securing a minimum of **46** credits from II year I and II-Semesters and the III year I and II-Semester examinations conducted till that time.

7.2.4 A student shall register for all the subjects and earn all **139** credits. Marks obtained in all such credits shall be considered for the calculation of the class based on CCPA.

7.2.5 A student who fails to earn all the **139** credits as indicated in the course structure within **six** academic years from the year of his admission shall forfeit his seat in B. Tech. Programme and his admission stands cancelled.

8. TRANSITORY REGULATIONS:

Students who got detained for want of attendance (or) who have not fulfilled academic requirements (or) who have failed after having undergone the course in earlier regulations (or) have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work for the next batch or later batches with the same (or) equivalent subjects as and when subjects are offered and they continue to be in the academic regulations of the batch he is joining later.

9. CREDIT POINT AVERAGE (CPA) AND CUMULATIVE CREDIT POINT AVERAGE (CCPA):

9.1 For a semester:

Credit Point Average [CPA] $= \frac{1}{10} \frac{\sum_i C_i T_i}{\sum_i C_i}$

Where C_i = Credits earned for Course i in any semester,

T_i = Total marks obtained for course i in any semester

9.2 For the entire programme:

Cumulative Credit Point Average [CCPA] $= \frac{1}{10} \frac{\sum_n \sum_i C_{ni} T_{ni}}{\sum_n \sum_i C_{ni}}$

Where *n*= the semester in which such courses were credited

9.3 Overall Performance:

CCPA	Classification of final result
7.0 & above	First class with distinction
6.0 & above but below 7.0	First class
5.0 & above but below 6.0	Second class
4.0 & above but below 5.0	Pass

10. TRANSCRIPTS:

After successful completion of the entire programme of study, a transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued, if required, after payment of requisite fee. Partial transcript will also be issued up to any point of study to a student on request.

11. ELIGIBILITY:

A student shall be eligible for the award of B. Tech. Degree if he fulfills all the following conditions:

(i) Registered and successfully completed all the components prescribed in the programme of study to which he is admitted.

(ii) Successfully acquired all **195/139 credits** as specified in the curriculum corresponding to the branch of study within the stipulated time.

(iii) No disciplinary action is pending against him.

12. AWARD OF B.TECH DEGREE:

12.1 A student is permitted to select one of the extracurricular / extension activities like NSS / Sports / Games / Cultural activities. A certificate in one of these activities is a must for the student to become eligible for the award of Provisional Certificate or Degree.

12.2 The B. Tech. Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendations of the Principal of Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous).

13. AMENDMENTS TO REGULATIONS:

The chairman, Academic Council of Annamacharya Institute of Technology and Sciences, Rajampet (Autonomous) reserves the right to revise, amend, or change the Regulations, Scheme of Examinations, and / or Syllabi or any other policy relevant to the needs of the society or industrial requirements etc., without prior notice.

14. Any legal issues are to be resolved in Rajampet Jurisdiction.

15. **GENERAL:**

Where the words "he", "him", "his", "himself" occur in the regulations, there include "she", "her", "herself".

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Regulations: **R15** Programme Code: **G3**

I Year B. Tech., I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC11	English through Literature	2	1	0	2
5GC13	Engineering Physics	4	1	0	4
5GC14	Engineering Mathematics-I	3	1	0	3
5G111	Problem solving techniques and introduction to C Programming	3	1	0	3
5G311	Electronic Devices and Circuits -I	3	1	0	3
5G513	Engineering Drawing- I	1	--	3	3
5GC16	English Language Communications Skills Lab-I	--	--	3	2
5GC18	Engineering Physics Lab	--	--	3	2
5G113	Problem Solving Through C Lab	--	--	3	2
5G312	Electronic Devices and Circuits Lab -I	--	--	3	2
5G114	IT Workshop	--	--	3	2
		17	5	18	28

I Year B. Tech., II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC21	Technical English	2	1	0	2
5GC22	Engineering Chemistry	4	1	0	4
5GC24	Engineering Mathematics-II	3	1	0	3
5G121	C programming and Data Structures	3	1	0	3
5G321	Electronic Devices and Circuits -II	3	1	0	3
5G523	Engineering Drawing- II	1	--	3	3
5GC26	English Language Communications Skills Lab-II	--	--	3	2
5GC27	Engineering Chemistry Lab	--	--	3	2
5G123	Programming in C and Data Structures Lab	--	--	3	2
5G322	Electronic Devices and Circuits Lab-II	--	--	3	2
5G524	Engineering workshop	--	--	3	2
	Total	**17**	**5**	**18**	**28**

Note: L - Lecture; T-Tutorial; P – Practical; C – Credits

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

Regulations: **R15** Programme Code: **G3**

II Year B. Tech. I Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC32	Mathematical Methods-III	3	-	-	3
5GC34	Environmental Science	3	-	-	3
5G235	Electrical Circuit Theory	3	1	-	3
5G331	Electronic Circuits	3	1	-	3
5G332	Digital Design	3	1	-	3
5G333	Signals and systems	3	1	-	3
5G334	Seminar – I	-	-	2	2
5G335	Electronic Circuits Lab	-	-	3	2
5G336	Basic Simulation lab	-	-	3	2
	Total	**18**	**4**	**8**	**24**

II Year B. Tech., II Semester

Subject Code	Subject Name	Hours / Week			C
		L	T	P	
5GC41	Complex variables and special functions	3	-	-	3
5G246	Electrical Technology	3	1	-	3
5G341	Random Variables and Random Processes	3	1	-	3
5G342	Pulse and Digital Circuits	3	1	-	3
5G343	Analog Communication	3	1	-	3
5G344	Field Theory and Transmission Lines	3	1	-	3
5GC44	Aptitude and Reasoning Skills	-	-	2	2
5G346	Pulse and Digital Circuits Lab	-	-	3	2
5G347	Analog Communication Lab	-	-	3	2
	Audit Course	2	-	-	-
	Total	**20**	**5**	**8**	**24**

Note: L - Lecture; T-Tutorial; P – Practical; C – Credits

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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B.Tech. I Year I Semester

(5GC11)ENGLISH THROUGH LITERATURE
(Common to all branches)

Course Objectives:

- To improve the language proficiency of the students in English through literature
- To enhance the vocabulary of the students in English through the use of diverse authentic materials
- To enable the students absorb the human values expressed in literature

Text Books:

For Detailed study: Texts from Open Sources (Available on Web)

For Non-detailed study: *Trailblazers* published by Orient Black Swan

- Texts from open sources are included in the syllabus to make the teaching-learning process more interesting and inspiring. Also, the literary texts from open sources will allow the student learn language through literature. The book for the non-detailed study allows the student to have an insight into the lives and careers of some legendary personalities.
- The text for non-detailed study is meant for extensive reading by the students. They may be encouraged to read some select topics on their own, which could lead into a classroom discussion. In addition to the exercises from the texts done in the class, the teacher can bring variety by using authentic materials such as newspaper articles, advertisements etc.

Unit I

Detailed Study: *Cabuliwallah* by Rabindranath Tagore; *the Road not Taken* by Robert Frost

Non-detailed Study: G. D. Naidu

Unit II

Detailed Study: *A Dog's Tale* by Mark Twain*; If* by Rudyard Kipling

Non-detailed Study: Sudha Murthy

Unit III

Detailed Study: *The Gift of Magi* by O. Henry; *Leisure* by W. H. Davies

Non-detailed Study: Vijay Bhatkar

Unit IV

Detailed Study: *An Astrologer's Day* by R. K. Narayan: *Night of the Scorpion* by Nissim Ezekiel*;*
Non-detailed Study: Jagadish Chandra Bose

Unit V

Detailed Study: *The Proposal* by Anton Chekhov

Non-detailed Study: Homi Jahangir Baba

Course Outcomes:

- The student will appreciate the significance of silent reading and comprehension
- The student develops critical thinking and creative writing skills through exposure to literary texts
- The student will understand the components of different forms of writing

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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B.Tech. I Year I Semester

(5GC13) ENGINEERING PHYSICS
(Common to EEE and ECE)

Course Objectives:

- The mission of the Engineering Physics course is to prepare students for careers in engineering where physics principles can be applied to the advancement of technology.
- The Engineering Physics course educates the principles of optical science and engineering necessary to understand optical systems.
- The Crystallography, X-ray diffraction of crystals and crystal defects explains how basic structure modulates properties of materials.
- The principles of quantum mechanics and electron theory of metals gives an idea on basic development of energy in metals.
- The main objective of this course is to provide basic understanding of different engineering materials (semiconductors, magnetic, superconducting and nano materials).

Unit I

PHYSICAL OPTICS, LASERS AND FIBRE OPTICS:

Physical Optics: Introduction - Interference in thin films by reflection – Newton's Rings – Fraunhofer diffraction due to single slit, double slit and diffraction grating.

Lasers: Introduction - Characteristics of laser – Spontaneous and stimulated emission of radiation – Einstein's coefficients - Population inversion – Ruby laser - He-Ne laser – Semiconductor laser - Applications of lasers. Holography: Construction and Re-Construction of hologram - Applications

Fiber optics**:** Introduction– Construction and working principle of optical fiber –Numerical Aperture and acceptance angle – Types of optical fibers – Optical fiber communication system – Applications of optical fibers in communications, sensors and medicine.

UNIT II

CRYSTALLOGRAPHY AND ULTRASONICS:

Crystallography: Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice – Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Interplanar spacing in cubic crystals – X-ray diffraction - Bragg's law – Powder method– Defects in solids: point defects and types.

Ultrasonics**:** Introduction – Properties – Production of ultrasonics by piezoelectric method and detection – Applications in non-destructive testing.

Unit III

QUANTUM MECHANICS AND FREE ELECTRON THEORY:

Quantum Mechanics: Introduction to matter waves – de-Broglie's hypothesis - Heisenberg's uncertainty principle - Schrodinger's time independent wave equation – Significance of wave function - Particle in a one dimensional infinite potential well.

Free electron theory: Classical free electron theory –- Sources of electrical resistance – Equation for electrical conductivity - Quantum free electron theory – Fermi-Dirac distribution – Kronig - Penny model (qualitative) – Origin of bands in solids – Classification of solids into conductors, semiconductors and insulators.

Unit IV

SEMICONDUCTORS AND MAGNETIC MATERIALS:

Semiconductors: Introduction – Intrinsic and extrinsic semiconductors – Drift &diffusion currents and Einstein's equation – Hall Effect - Direct and indirect band gap semiconductors – Working principle of p-n junction diode, LED and photodiode.

Magnetic materials: Introduction and basic definitions – Origin of magnetic moments – Bohr magneton – Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials – Hysteresis - Soft and hard magnetic materials and applications.

Unit V

SUPERCONDUCTIVITY AND NANOMATERIALS:

Superconductivity: Introduction –Properties of superconductors - Meissner effect – Type I and type II superconductors – Flux quantization – London penetration depth – BCS theory (qualitative) –ac and dc Josephson effects- Applications of superconductors.

***Nanomaterials*:** Introduction - Significance of nanoscale –Basic principles of nano materials (Surface area and quantum confinement) – Physical properties: optical, thermal, mechanical and magnetic properties –Synthesis of Nanomaterials: ball mill, chemical vapor deposition, sol-gel, plasma arcing methods – Carbon nanotubes (CNT) and properties – Applications of Nanomaterials.

Text Books:

1. Engineering physics –K.Thyagarajan, MacGraw Hill Publishers, 2013.
2. Engineering Physics – S. Mani Naidu, Pearson Education, I Edition, 2012.
3. Engineering physics –P.K.palanisamy, SciTech publisher, Edition, 2013.

Reference Books:

1. Engineering Physics – RV.S.S.N. Ravi Kumar and N.V. Siva Krishna, Maruthi Publications , 2013
2. Engineering Physics – D.K.Battacharya and A.Bhaskaran, Oxford Heigher Education I Edition 2010.
3. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning, I Edition, 2012.
4. Engineering Physics – D.K.Battacharya and A.Bhaskaran, Oxford University press.
5. Engineering Physics – M. Arumugam, Anuradha Publications II Edition, 1997.
6. Engineering physics – M.N. Avadhanulu and P.G. KrshiSagar, Chand and Co, Revised Edi 2013.
7. Solid State Physics – A.J. Dekkar, McMillan Publishers, Latest edition, 2012.
8. Engineering Physics – Gaur and Gupta, Dhanapat Rai Publishers, 7th Edition, 1992.
9. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B BRath, James Murday, University Press, I Edition, 2012.

Course Outcomes:

The student is able to

- Understand basic principles of optics, optical engineering materials and incorporation of optics in engineering field.
- Identify different types of crystal structures in materials and x-ray diffraction through crystals.
- Know about importance of ultrasonic's in engineering field.
- Analysis of basic concepts of quantum mechanics and electron theory and consequences.
- Explain about basic mechanism of different types of advanced materials used in engineering field.
- Get brief idea about synthesis, properties and applications of nano materials.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES::RAJAMPET
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B.Tech. I Year I Semester

(5GC14) ENGINEERING MATHEMATICS – I
(Common to all branches)

Course Objectives:

The course aims to provide the student with the ability

- To understand the Differential equations of first, second and higher orders with their applications.
- To understand the concept of partial differentiation and its applications.
- To understand the concept of curve tracing in various forms

Unit I

Linear and Bernoulli equations. Applications to Newton's law of cooling, law of natural growth and decay, Chemical reaction and solutions, orthogonal trajectories.

Unit II

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, sin*ax*/cos*ax*, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters. Applications to oscillatory electrical circuits.

Unit III

Rolle's Theorem – Lagrange's Mean Value Theorem (without proof). Simple examples of Taylor's and Maclaurin's Series.

Infinite series – Comparison test, Integral test, Ratio test, Cauchy's root test– Alternating series: Leibnitz rule (Without proof).

Unit IV

Functions of several variables – Partial differentiation- Chain rule-Jacobian – Maxima and Minima of functions of two variables, Lagrangian method of Multipliers with three variables only.

Unit V

Curve tracing – Tracing of Cartesian, polar and parametric curves.

Text Book:

Higher Engineering Mathematics, B.S.Grewal, Khanna publishers-43rd Edition (2014)

Reference Books:

1. Higher Engineering Mathematics, by Kreyszig.
2. A Text Book of Engineering Mathematics, B.V. Ramana, Tata McGraw Hill.
3. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others, S.Chand & Company.

Course Outcomes:

Upon completion of the course, students should be able to

- Understand the various types of ordinary differential equations
- Have the knowledge on functions of several variables.
- Understand the concepts of curve tracing

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B.Tech. I Year I Semester

(5G111) PROBLEM SOLVING TECHNIQUES AND INTRODUCTION TO C PROGRAMMING
(Common to ALL branches)

Course Objectives:

- Introduction to computer peripherals, Software development.
- Describe when and how to use the stand C statement and to Write, Compile and Debug basic C programs using an IDE
- Write and debug programs using an IDE and the principles of designing
- structured programs when and how to use the appropriate statements available in the C language
- Write basic C programs using , Selection statements, Repetitive statements, Functions, Pointers, Arrays and Strings
- Implementation of C applications for data structures, sorting and searching.

Unit I:

Introduction to Computer Problem Solving: Introduction to Computer Systems, Computer Environments, Computer Languages, Introduction to Problem Solving Aspect, Top- down Design, Implementation of Algorithms, Flow Charts, SDLC.

Unit II:

Introduction to C Language: Structure of a C Language program, Creating and Running C programs, Keywords, Identifiers, Data Types, Typedef, enumerated Types variables, constants, input/output. Operators and Expressions, precedence and associatively, Type Conversions, Bitwise Operators. Example programs for each topic.

Unit III

C Program Statements, Selection and Decision making Statements-two way selection –if…else statements, multi way selection-switch statements. Loop Control Statements-concept of a loop, Loops in C-while loop, do…while loop, for loop, Other Related Statements -break, continue, Goto, example programs for each topic.

Unit IV

ARRAYS: Declaring and Referencing Arrays, Array Subscripts, Using for Loops for Sequential Access, Multidimensional Arrays.

Strings: String Basics, String Library Functions, Array of Strings, example programs for each topic.

Unit V

Functions: Library Functions in C, User defined Functions,-declaration, definition, calling of function , types of User defined functions, Parameter passing methods-pass by value, pass by reference, Scope, Storage Classes - Auto, Register, Static, Extern, Scope rules, Type Qualifiers, Recursion - Recursive Functions, Preprocessor Commands. Using Array Elements as Function Arguments. Example programs for each topic.

Text Books:

1. C Programming and Data Structures.B.AForouzan, R. F.Gilberg, Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
3. C and Data Structures, E.Balaguruswamy, Tata McGraw Hill.
4. How to Solve it By Computer, R.G.Dromey, PHI.

Reference Books:

1. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, and S. Chand.
2. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication.

Course Outcomes:

After completion of the course student will be able to

- Understand the importance of the software development process and System development tools.
- Understand general principles of C programming language and able to write simple program in C. Able to develop programs based on arrays and functions.

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B.Tech. I Year I Semester

(5G311) ELECTRONIC DEVICES AND CIRCUITS - I

(**Common to EEE and ECE**)

Course Objectives:

The Course aims to provide the students with the ability

- To learn the basic fundamentals of circuit components, circuit laws and network theorems.
- To understand the concepts of semiconductor diode and its applications.
- To understand the basic concepts of Bipolar Junction transistor.

Unit-I

CIRCUIT ELEMENTS: - Sources: Voltage and Current Sources, Resistors-Types- resistance colour coding-potentiometer-types, Capacitors-types-uses of capacitors, Inductors-types.

Unit-II

NETWORK THEOREMS (D.C. Excitation only):- Ohm's law, Kirchhoff laws-network reduction techniques-series, parallel, series parallel circuits-source transformations. Thevenin's Theorem- Norton's Theorem- Superposition Theorem-maximum power transfer theorem.

Unit-III

SEMICONDUCTOR DIODE: Energy Band Diagram, V-I Characteristics of PN Junction Diode (Ideal, Simplified and Piece-wise), Temperature Dependency, Transition and Diffusion Capacitances, Breakdown Mechanisms in semiconductor diodes, Zener diode characteristics.

Unit-IV

DIODE APPLICATIONS:

Rectifier Circuits: Half Wave and Full Wave Rectifiers – General Filter Considerations – Capacitor Filter – RC Filter, Choke Filter, LC Filter, π Filter – Zener diode acts as a regulator.

Unit-V

INTRODUCTION OF BJTs: Transistor construction - Transistor operation, CB, CE and CC configurations and Characteristics

Text Books:

1. "Electronic Devices and Circuits" David A Bell, Fifth Edition, 2008, Oxford University Press.
2. "Circuits & Network Analysis & Synthesis", Sudhakar A & Shyammohan S Palli, 4th Edition, Tata McGraw Hill, 2010.
3. Engineering basics: Electrical, Electronics and computer Engineering" , T.Thyagarajan, New Age International, 2007

Reference Books:

1. "Electronic Devices and Circuits" J. Millman and Halkias, 1991 edition, 2008, TMH.
2. "Electronic Devices and Circuit Theory" Robert L.Boylestad and Louis Nashelsky, 9th edition, PHI.
3. "Electronic Principles" Albert Malvino, David J Bates, MGH, SIE 2007.
4. "Micro Electronic Circuits" Sedra and Smith, Oxford University Press.

Course Outcomes:

Upon completion of the course students will

- Have the knowledge to analyze the basic circuit elements.
- Have the knowledge of semiconductor diode and its applications.
- Understand the basic concepts of Bipolar Junction Transistor.

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B.Tech. I Year I Semester

(5G513) ENGINEERING DRAWING- I
(Common to EEE, ECE, CSE and IT)

Course Objectives:

- To enable the students with various concepts like Dimensioning, Conventions and standards related to working drawing in order to become professionally efficient.
- To introduce fundamental concepts of curves used in engineering, projection of points, lines.
- To impart and inculcate proper understanding of the theory of projections.
- To improve the visualization skills.

Unit I

INTRODUCTION:

Lettering –Geometrical constructions - Construction of polygons by General method – Inscribing a triangle, square. Pentagon, hexagon in a circle.

Unit II

CONICS:

Ellipse, Parabola and Hyperbola (General method only).

Special Methods: Ellipse - Concentric Circles method, Oblong method & Arcs of Circles method - Drawing tangent& normal to the conics.

Unit III

CYCLOIDAL CURVES:

Cycloid, Epi cycloid, Hypo cycloid (simple problems) - Drawing tangent & normal to the cycloidal curves.

Unit IV

PROJECTIONS OF POINTS & LINES:

Projections of points - Projections of lines inclined to one reference plane.

Unit V

PROJECTIONS OF LINESINCLINED TO BOTH REFERENCE PLANES:

Projections of lines inclined to both reference planes.

Text Book:

Engineering drawing by N.D.Bhatt.

References Books:

1. Engineering graphics by K.L. Narayana & P. Kannayya.
2. Engineering drawing and graphics by Venugopal/ New age
3. Engineering drawing by Johle / TMI

Course Outcomes:

- Students will be able to know and understand the conventions and the methods of Engineering Drawing.
- Able to understand the application of industry standards and techniques applied in Engineering Drawing.
- Dimension and annotate two-dimensional engineering drawings.
- Students will be able to improve their visualization skills.

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B.Tech. I Year I Semester

(5GC16) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB - I
(Common to all branches)

Course Objectives:

- To train students to use language effectively in everyday conversations
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable the students learn better pronunciation through emphasis on individual speech sounds

The following course content is prescribed for the **English Language Laboratory** sessions:

1. **Introduction to the Sounds of English- Vowels, Diphthongs & Consonants**
2. **Situational Dialogues and Role-play**
3. **Telephone Skills**
4. **Describing Objects / Situation / People**

Manual cum Record, prepared by the Faculty Members of English of the college will be used by Students.

Minimum Requirement:

The English Language Lab shall have two parts:

- **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V. an LCD projector, a digital stereo –audio & video system and camcorder etc.

Suggested Software:

Sky Pronunciation Suite

Connected Speech from Clarity

Clarity Pronunciation Power – Part I

Mastering English in Vocabulary, Grammar, Spellings, Composition

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy,

Cambridge. Language in Use, Foundation Books Pvt. Ltd with CD

Learning to Speak English - 4 CDs

Cambridge Advanced Learners' English Dictionary with CD.

Murphy's English Grammar, Cambridge with CD

Course Outcomes

- The student will be able to express himself fluently in social and professional contexts
- The student will learn how to neutralize his accent

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B.Tech. I Year I Semester

(5GC18) ENGINEERING PHYSICS LAB
(Common to EEE and ECE)

COURSE OBJECTIVES:

- The student will able to handle and understanding of different apparatus to perform experiments.
- The student will learn practical measurement of different physical quantities.
- The student will able to characterize the materials and their properties.
- The student allows to learn practical experience of theory conceptual values.

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

1. Determination of wavelengths of various colors of mercury spectrum using diffraction grating in normal incidence method
2. Determination of dispersive power of the prism
3. Determination of thickness of thin object by wedge method
4. Determination of radius of curvature of lens by Newton's Rings
5. Laser : Diffraction due to single slit
6. Laser : Diffraction due to double slit
7. Laser: Determination of wavelength using diffraction grating
8. Determination of Numerical aperture of an optical fiber
9. Meldi's experiment: Determination of the frequency of tuning fork
10. Determination of particle size by using laser.
11. Energy gap of a material using p-n junction diode
12. Hall effect : Determination of mobility of charge carriers in semiconductor
13. B-H curve
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
15. Determination of rigidity modulus –Torsional pendulum

Manual cum Record:

Prepared by Engineering Physics Faculty Members of Annamacharya Institute of Technology and Sciences.

Reference Books:

1. Engineering Physics Practicals – Dr. B. Srinivasa Rao V.K.V. Krishna K.S Rudramamba
2. Engineering Practical Physics – S.L Kakani & Shubra Kakani

Equipment required:

Spectrometers
Microscopes
Meldi's apparatus
Stewart-Gee's apparatus
Torsional pendulum
Light sources
Optical fiber cables

COURSE OUTCOMES:

- The student would be confident in handling apparatus to perform experiments.
- The student would have developed practical skill.
- The student would have knowledge in practical values and applications

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B.Tech. I Year-I semester

(5G113)PROBLEM SOLVING THROUGH C LAB
(Common to ECE, EEE, ME and CE branches)

Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

• Intel based desktop PC with ANSI C/ TURBO C Compiler and Supporting Editors

Exercise l

Minimum of 4 programs on Data types, Variables, Constants and Input and Output.

Exercise 2

Minimum of 4 programs on Operator, Expressions and Type Conversions.

Exercise 3

Minimum of 4 programs on Conditional Statements [two way and multipath].

Exercise 4

Minimum of 4 programs on Loop Control Statements [for, while and do-While]

Exercise 5

Minimum of 4 programs on Unconditioned JUMP Statements- break, continue, Goto.

Exercise 6

Minimum of 4 programs on Declaring Arrays, Referencing Arrays, Array Subscripts. Using for loop for sequential Access.

Exercise 7

Minimum of 4 programs on Multidimensional Arrays.

Exercise 8

Minimum of 4 programs on String Basics, String Library Functions and Array of Strings.

Exercise 9

Minimum of 4 programs on simple user defined functions, Parameter passing methods- pass by value, pass by reference.

Exercise 10

Minimum of 4 programs on Storage classes- Auto, Register, Static and Extern

Exercise 11

Minimum of 4 programs on Recursive Functions, Preprocessor commands.

Exercise 12

Minimum of 4 programs on using Array Elements as Function Arguments.

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B.Tech. I Year I Semester

(5G312)ELECTRONIC DEVICES AND CIRCUITS LAB -I
(Common to EEE & ECE)

Course Objectives:

The Course aims to provide the students with the ability

- To determine the characteristics of semiconductor diode.
- To perform various rectifier circuits in practical approach.
- To perform input and output characteristics of BJT for various configurations.

Perform the following Experiments

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs, Diodes, BJTs.
2. Study and operation of
   - Multi-meters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO
3. Verification of Kirchhoff's Voltage and Current Law
4. Forward and Reverse Bias Characteristics of PN junction Diode.
5. V-I Characteristics of Zener Diode
6. Half Wave Rectifier with and without filter.
7. Full Wave (Center trapped) Rectifier with and without filter.
8. Full Wave (Bridge) Rectifier with and without filter.
9. Zener Diode as a Voltage Regulator
10. Input and Output Characteristics of Transistor CB Characteristics.
11. Input and Output Characteristics of Transistor CE Characteristics.
12. Input and Output Characteristics of Transistor CC Characteristics.

Course Outcomes:

Upon completion of the course students will be

- Able to determine the parameters like cut-in voltage , resistances and breakdown voltage of semiconductor diode
- Able to design DC power supply circuits using rectifiers and filters
- Able to choose the desired configuration for specified applications.

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B.Tech I Year- I semester

(5G114) I.T. WORKSHOP
(Common to ECE and EEE)

I.T. WORKSHOP

Objective:

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
- To learn about Networking of computers and use Internet facility for Browsing and Searching.

Preparing your Computer

Task 1

Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2

Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3

Install Operating system: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4

Operating system features: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5

Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6

Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, Skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, and search process using different natural languages, and creating e-mail account.

Task 7

Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8

Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 9

Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10

Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyper linking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Optional Tasks:

Task 11

Laboratory Equipment: Students may submit a report on specifications of various equipment that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make modifications to the list to suit the department concerned.

- Desktop computer
- Server computer
- Switch (computer science related)
- Microprocessor kit
- Micro controller kit
- Lathe machine
- Generators
- Construction material
- Air conditioner
- UPS and Inverter
- RO system
- Electrical Rectifier
- CRO
- Function Generator
- Microwave benches

Task 12

Software: Students may submit a report on specifications of various software that may be used by them for the laboratories in their curriculum starting from I B.Tech to IV. B.Tech. The software may be proprietary software or Free and Open source software. It can vary from department to department. Students can refer to their syllabus books, consult staff members of the concerned department or refer websites. The following is a sample list. Instructors may make

modifications to the list to suit the department concerned.

- Desktop operating system
- Server operating system
- Antivirus software
- MATLAB
- CAD/CAM software
- AUTOCAD

Reference Books:

1. Introduction to Computers, Peter Norton, Mc Graw Hill
2. MOS study guide for word, Excel, PowerPoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH

Outcome:

- Disassemble and Assemble a Personal Computer and prepare the computer ready to use.
- Prepare the Documents using Word processors
- Prepare Slide presentations using the presentation tool
- Interconnect two or more computers for information sharing
- Access the Internet and Browse it to obtain the required information
- Install single or dual operating systems on computer

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B.Tech. I Year II Semester

(5GC21) TECHNICAL ENGLISH
(Common to all branches)

Course Objectives:

- To improve the language proficiency of the students in English with an emphasis on LSRW skills
- To equip the students with comprehension skills to study academic subjects with greater felicity
- To develop English communication skills of the students in formal and informal situations

TEXTBOOK PRESCRIBED: *Sure Outcomes* published by Orient Black Swan (with CD)

- The book prescribed serves as students' handbook. The reader comprises essays which are particularly relevant to engineering students.
- The teacher should focus on developing LSRW skills of students while using the prescribed text and exercises. The classes should be interactive. The students should be encouraged to participate in the classroom proceedings and also to write short paragraphs and essays. The main aim is to encourage two-way communication in place of one-sided lecture.

Unit I

Sure Outcomes: Technology with a Human Face

Grammar: Kinds of Verbs and their Use; Writing: Official Letters; Vocabulary: Synonyms and Antonyms, Prefixes and Suffixes, Idioms and Phrases

Unit II

Sure Outcomes: Climatic Change and Human Strategy

Grammar: Tenses; Writing: Letters of Application; Vocabulary: One-word Substitutes

Unit III

Sure Outcomes: Emerging Technologies: Solar Energy in Spain

Grammar: Types of Sentences: Simple, Compound and Complex; Declarative, Interrogative, Imperative and Exclamatory; Writing: E-mails; Vocabulary: Commonly Confused Words

Unit IV

Sure Outcomes: Water: The Elixir of Life

Grammar: Subject-Verb Agreement; Writing: Official Reports, Technical Reports; Vocabulary: English Spelling, Commonly misspelt words

Unit V

Sure Outcomes: The Secret of Work

Grammar: Active and Passive Voice; Writing: Note-making; Vocabulary: Connotations

References Books:

1. Essential Grammar in Use, (with CD), Raymond Murphy, 3/e, Cambridge University Press, 2009
2. Basic Communication Skills for Technology, Andrea J Rutherford, Pearson Education, Asia.
3. English for Technical Communication, Aysha Viswamohan, Tata Mc-Graw Hill
4. English Grammar and Composition, David Grene, Mc Millan India Ltd.
5. Murphy’s English Grammar, Raymond Murphy, CAMBRIDGE
6. Everyday Dialogues in English by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
7. Communication Skills for Technical Students, Farhathullah, T.M., Orient Blackswan, 2008
8. Developing Communication Skills, 2/e. by Krishna Mohan &MeeraBanerji , Macmillan, 2009
9. English for Technical Communication, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
10. Longman Dictionary of Contemporary English with DVD, Pearson Longman

Course Outcomes:

- The student will demonstrate the ability to guess the contextual meaning of the words and grasp the overall message of the text to draw inferences
- The student will understand the components of different forms of writing
- The student will exhibit effective writing skills through his understanding of English Grammar

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I year B.Tech-II semester

(5GC22) ENGINEERING CHEMISTRY
(Common to EEE and ECE)

Course Objectives:

- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry in the field of engineering.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications.
- The lucid explanation of the topics will help students understand the fundamental concepts and apply them to design engineering materials and solve problems related to them. An attempt has been made to logically correlate the topic with its application.
- The extension of fundamentals of electrochemistry to energy storage devices such as commercial batteries and fuel cells is one such example.
- After the completion of the course, the student would understand about the concepts of chemistry in respect of Electrochemical cells, fuel cells, mechanism of corrosion and factors to influence, polymers with their applications, analytical methods, engineering materials and water chemistry.

Unit I

Water Treatment Impurities in water, Hardness of water and its Units, Disadvantages of hard water, Estimation of hardness by EDTA method, Numerical problems on hardness, Estimation of dissolved oxygen, Alkalinity and chlorides in water, Water treatment for domestic purpose Disinfection- Definition, Kinds of disinfectants (Bleaching powder, Ozone, chloramine, UV light and Chlorine), Break point chlorination.

Industrial Use of water: For steam generation, Boiler troubles: Scale & Sludge, Priming and Foaming, Caustic Embrittlement and Boiler Corrosion.

Treatment of Boiler Feed water: Internal Treatment: Colloidal, Phosphate, Carbonate, Calgon and sodium aluminate conditioning. External Treatment: Permutit/ Zeolite process, Ion-Exchange process, Desalination of brackish water by Reverse Osmosis.

Unit II

Electrochemistry Electrochemical cells: Basic concepts, classification of electrochemical cells, numerical calculations, Batteries: classification of batteries: Primary (Leclanche battery, mercury battery) and Secondary /rechargeable batteries (Lead acid, Ni-Cd, Lithium Ion Batteries) Fuels cells: (Hydrogen-Oxygen and Methanol-Oxygen)

Electrochemical sensors: Potentiometric Sensors and voltammetric sensors. Examples: analysis of Glucose and urea.

Corrosion: Definition & Types (dry & wet Corrosions), Electrochemical Theory of corrosion, concentration cell corrosion, galvanic corrosion, factors affecting the corrosion, Prevention: Anodic and Cathodic protection, Electroplating (Nickel, copper and chromium) & Electrolessplating

Unit III

Polymers introduction to polymers, Polymerization process- types (without mechanism), Plastics: Thermosetting and Thermoplastics, Preparation, properties and Engineering applications of PVC, Bakelite, nylons.

Natural Rubber: Processing, vulcanization and compounding of rubber. Elastomers: Preparation, properties and engineering applications of Buna-S, Buna-N and polyurethane rubbers.

Conducting polymers: Mechanism, synthesis and applications of polyacetylene, polyaniline. Biodegradable polymers Carbohydrates, proteins

Inorganic Polymers: Basic Introduction Silicones, polyphosphazines.

Unit IV

Fuel Technology Classification of Fuels – Characteristics of Fuels- Calorific Value – Units, its determination using bomb calorimeter, Numerical Problems. Solid Fuels-Coke: Manufacture of Metallurgical Coke by Otto Hoffmann's by product oven processes.

Liquid Fuels: Petroleum: Refining of Petroleum, Gasoline: Knocking, Octane Number, Synthetic Petrol: Bergius Processes, Fischer Tropsch's synthesis. Diesel and Cetane number. Power Alcohol: Manufacture, Advantages and Disadvantages of Power Alcohol

Gaseous Fuels: Origin, Production and uses of Natural gas, Producer gas, Water gas, Coal gas and Biogas. Flue Gas analysis by Orsat's apparatus, Solving of problems on Combustion.

Unit V

Chemistry of Engineering Materials Cement: Composition & manufacture of Portland cement, Setting and Hardening (Hydration and Hydrolysis), Refractories: Classification with suitable examples, properties and applications

Lubricants: Definition and properties of lubricants, theory of lubrication, and applications of lubricants.

Rocket Propellants: Classification, Characteristics of a good propellant

Text Books

1. Engineering Chemistry by K.N.Jayaveera, G.V.Subba Reddy and C. Ramachandraiah, McGraw Hill Higher Education, New Delhi, Fourth Edition, 2012.
2. A Text Book of Engineering Chemistry, Jain and Jain, Dhanapat Rai Publishing Company, New Delhi, 15th Edition, 2010.

Reference Books

1. A Text book of Engineering Chemistry by S.S Dhara, S.S.Umare, S. Chand Publications, New Delhi, 12th Edition, 2010.
2. Engineering Chemistry by K.B.ChandraSekhar, UN.Das and Sujatha Mishra, SCITECH, Publications India Pvt. Limited, Chennai, 2nd Edition, 2012.
3. Concepts of Engineering Chemistry- Ashima Srivastava and N.N. Janhavi, Acme Learning Pvt Ltd, First Edition, 2013.
4. Text Book of Engineering Chemistry – C. Parameswara Murthy, C.V.Agarwal and Andra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.
5. Text Book of Engineering Chemistry, Shashichawla, Dhanapat Rai Publications, New Delhi, 4th Edition, 2011.
6. Engineering Chemistry, K. Sesha Maheswaramma and Mrudula Chugh, Pearson Education, First Edition, 2013.

Course outcomes:

The student is expected to:

- The student will able to understand the function of fuel cells, batteries and extends the knowledge to the processes of corrosion and its prevention.
- Understand industrially based polymers, various engineering materials.
- Differentiate between hard and soft water.
- Understand the disadvantages of using hard water domestically and industrially.
- Select and apply suitable water treatment methods domestically and industrially.
- Understand the manufacture of synthetic petrol.
- Differentiate between thermoplastics and thermosetting plastics.
- Understand the manufacture, setting and hardening of cement.

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B.Tech. I Year II Semester

(5GC24) ENGINEERING MATHEMATICS – II

(Common to all branches)

COURSE OBJECTIVES:

The course aims to provide the student with the ability

- To apply this knowledge to evaluate the multiple integrals in real life situations.
- To apply the knowledge of Laplace transforms and vector calculus for engineering problems.

Unit I

Multiple integral: –Double integral – Evaluation - Change of Variables - Change of order of integration- Area and volumes using double integral. Triple integral - Evaluation.

Unit II

Laplace transform of standard functions – Inverse transform – First shifting Theorem, Transforms of derivatives and integrals – Second shifting theorem– Laplace transform of Periodic functions – Inverse Laplace transform – Convolution theorem.

Unit III

Application of Laplace transforms to ordinary differential equations of first and second order.

Unit IV

Vector Calculus: Scalar and vector point functions, Gradient and its geometrical interpretation, Divergence–physical interpretation of divergence, Curl -physical interpretation of curl, Del applied twice to point functions, Line integral - Area, Surface and volume integrals.

Unit V

Vector integral theorems: Green's theorem – Stoke's theorem and Gauss's Divergence Theorem (without proofs) and their applications.

Text Book:

Higher Engineering Mathematics, B.S.Grewal, Khanna publishers-43rdEdition (2014)

References Books:

1. Higher Engineering Mathematics, by Kreyszig.
2. A Text Book of Engineering Mathematics, B.V. Ramana, Tata McGraw Hill.
3. A Text Book of Engineering Mathematics, Vol – 1, T.K.V. Iyengar, B. Krishna Gandhi and others, S. Chand & Company.

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B.Tech. I Year-II Semester

(5G121) C PROGRAMMING AND DATA STRUCTURES
(Common to ALL branches)

Course Objectives:

- Structured programs when and how to use the appropriate statements available in the C language
- Write basic C programs using , Selection statements, Repetitive statements, Functions, Pointers, Arrays and Strings
- Implementation of C applications for data structures, sorting and searching.

Unit I

Pointers - Introduction, Features of Pointers, Pointer Declaration and Definition, Void Pointers, pointers for inter function communication, Pointers to Pointers, Pointer Applications: arrays and pointers, pointer arithmetic, Dynamic Memory Allocation, Pointers to Functions, pointer to void and command line arguments.

Unit II

Structures – Definition, initialization, accessing structures, nested structures, array of structures, structures and functions. Pointers and Structures. Unions. Sample programs

Files: Introduction to Streams and Files, Standard library input / output functions, formatted input / output functions, character input/output functions; Text verses binary Streams, Standard library functions for files. File examples.

Searching and Sorting - Exchange (Bubble) Sort, Selection Sort, Quick Sort, Insertion Sort, Merge Sort, Searching- Linear and Binary Search Methods.

Unit III

Data Structures: Overview of Data Structure. **Stack:** Representation of a Stack, Operation on a Stack, Implementation of a Stack using Arrays and Pointers, Representation of Arithmetic Expressions, Infix, Prefix, and Postfix Notations, Evaluation of Postfix Expression, Recursion.

Queues: Representation of Queue, Insertion, Deletion, Searching Operations, Circular Queues.

Unit IV

Linked List: Singly Linked List, Linked List with and without header, Insertion, Deletion and Searching Operations.

Doubly Linked List: Insertion, Deletion and Searching Operations.

Circular Linked List: Insertion, Deletion and Searching Operations.

Unit V

Trees: Introduction to Trees, Binary Trees, creation of binary tree, Operations on Binary Tree. Introduction to Binary Search Tree, Operations on Binary Search Trees.

Graphs: Defining graph, basic terminology, graph representation.

Text Books

1. C Programming and Data Structures.B.AForouzan,R. F.Gilberg, Cengage learning, Indian edition.
2. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.
3. Data Structures and Algorithms: Concepts, Techniques and Applications
   G.A.V. Pai [UNIT-V]

Reference Books

1. C and Data Structures, A snapshot oriented treatise with live engineering examples, Dr. N.B.Venkateswarlu, Dr. E.V.Prasad, S. Chand.
2. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication.

Course Outcomes:

- Understand the purpose of pointers for parameter passing, referencing and dereferencing and understands the concepts of structures, unions and File management.
- Understand what and how to design data structure programs using C programming language.
- Understand how to solve applications like searching and sorting using C Programming language.

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B.Tech. I Year II Semester

(5G321)ELECTRONIC DEVICES AND CIRCUITS - II
(Common to EEE & ECE)

Course Objectives:

The Course aims to provide the students with the ability

- To understand the concepts of biasing and stabilization in BJT.
- To understand the concepts of FET, MOSFET and their biasing techniques.
- To analyze the parameters like band width, gain and impedances for single and multistage amplifier circuits.
- To understand the working principles of special purpose electronic devices.

Unit-I

BIASING & STABILITY Overview of BJT Configurations, Transistor Amplifying Action – Load Line Analysis of AC & DC – Operating Point. Types of Biasing: Fixed Bias – Emitter Bias – Emitter Feedback Bias - Collector to Base bias – Voltage Divider Bias. Bias Stability: Need for Stabilization – Stabilization Factors (s,S',S'') – Stability Factors for Voltage Divider Bias - Thermal Stability and Thermal Runaway – Heat Sinks**.**

Unit-II

FIELD EFFECT TRANSISTORS & ITS BIASING: - Construction of JFETs – Transfer Characteristics – FET Biasing: Fixed Bias Configuration – Self Bias Configuration – Voltage Divider Biasing – Construction and Characteristics of MOSFETs – Depletion type MOSFETs – Enhancement type MOSFETs – Biasing in MOSFETs.

Unit-III

SINGLE STAGE AMPLIFIERS: Single Stage Transistor Amplifier-How Transistor Amplifies-Graphical Demonstration of Transistor Amplifier- Practical Circuit of Transistor Amplifier-Phase Reversal- D.C. and A.C. Equivalent Circuits- Load line Analysis- A.C. emitter resistance-Formula for A.C. emitter resistance-Voltage gain in terms of A.C. emitter Resistance-Voltage gain-Classification of Amplifiers-Amplifier equivalent circuit-Equivalent circuit with signal source-Input impedance of and amplifier.

Unit-IV

MULTI STAGE AMPLIFIERS: Multistage transistor Amplifier-Important terms-R.C. Coupled Transistor amplifier-Direct coupled amplifier-Comparison of different types of coupling.

Unit-V

SPECIAL PURPOSE ELECTRONIC DEVICES: Varactor Diode, Tunnel Diode, LED, PIN Diode, Schottky Diode, SCR, UJT, Photodiode, Phototransistor.

Text Books:

1. "Electronic Devices and Circuits" David A Bell, Fifth Edition, 2008, Oxford University Press.
2. "Electronic Devices and Circuits" J. Millman and Halkias, 1991 edition, 2008, TMH.

Reference Books:

1. "Electronic Devices and Circuit Theory" Robert L.Boylestad and Louis Nashelsky, 9th edition, PHI.
2. "Principles of Electronics", V.K.Mehta, S.Chand Publications 2004
3. "Integrated Electronics, Analog and Digital Circuits and Systems" J. Millman and Halkias, TMH.
4. "Micro Electronic Circuits" Sedra and Smith, Oxford University Press.

Course Outcomes:

Upon completion of the course students can

- Able to determine operating conditions of BJT in amplifier circuits.
- Able to design the amplifier circuits under given requirements.
- Able to design FET amplifiers with different biasing.
- Able to have the knowledge and usage of special purpose electronic devices in various applications.

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B.Tech. I Year II Semester

(5G523) ENGINEERING DRAWING- II
(Common to EEE, ECE, CSE and IT)

Course Objectives:

- To impart and inculcate proper understanding of the theory of projections of planes, solids and simple machine components.
- To improve the visualization skills of the student.
- To prepare the student for future engineering positions.

Unit I

PROJECTIONS OF PLANES: Projection of planes inclined to one reference plane - and inclined to both the reference planes.

Unit II

PROJECTIONS OF SOLIDS: Cylinder, Cone, Prism and Pyramid - Axis Inclined to one reference plane.

Unit III

PROJECTIONS OF SOLIDS: Cylinder, Cone, Prism and Pyramid - Axis inclined to both the reference planes.

Unit IV

ISOMETRIC PROJECTIONS: Projections of Lines, Planes and Simple Solids – Prism, Pyramid, Cylinder and Cone in simple positions only.

Unit V

CONVERSION OF VIEWS: Conversions of Orthographic views into Isometric views and Conversion of Isometric views to Orthographic views.

Text Book:

Engineering drawing by N.D. Bhatt

Reference Books:

1. Engineering graphics by K.L. Narayana & P. Kannayya
2. Engineering drawing and graphics by Venugopal/ New age
3. Engineering drawing by Johle / TMI

Course Outcomes:

- Comprehend general projection theory, with an emphasis on the use of orthographic projection to represent three-dimensional objects in two-dimensional views.
- Can employ 3D pictorial sketching to aid in the visualization process and to efficiently communicate ideas graphically.
- Analyze a drawing and bring out any inconsistencies to put forth inferences graphically.

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B.Tech. I Year II Semester

(5GC26) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB - II

(Common to all branches)

Course Objectives:

- To enable a learner sharpen his public speaking skills
- To expose the students to a varied blend of self-instructional, learner-friendly modes of language learning
- To enable the student learn better pronunciation through emphasis on word accent, intonation, and rhythm

SYLLABUS: The following course content is prescribed for the **English Language Laboratory** sessions:

1. **Introduction to Stress and Intonation**
2. **'Just A Minute' (JAM)**
3. **Oral Presentations**
4. **Information Transfer**

Manual cum Record, prepared by the Faculty Members of English of the college will be used by Students.

Minimum Requirements:

The English Language Lab shall have two parts:

- **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V. an LCD projector, a digital stereo –audio & video system and camcorder etc.

Suggested Software:

- Sky Pronunciation Suite
- Connected Speech from Clarity
- Clarity Pronunciation Power – Part I
- Language in Use, Foundation Books Pvt Ltd with CD
- Learning to Speak English - 4 CDs
- Cambridge Advanced Learners' English Dictionary with CD.
- Murphy's English Grammar, Cambridge with CD

Course Outcomes

- The student will enhance his skills to make a presentation confidently
- The student will learn how to neutralize his accent
- The student will be able to decipher information from graphics and describe it professionally

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B.Tech. I Year II Semester

(5GC27) ENGINEERING CHEMISTRY LAB
(Common to ECE and EEE)

Course Objectives:

- The student will learn practical understanding of the redox reaction.
- The student will learn the preparation and properties of synthetic polymers and other material that would provide sufficient impetus to engineer these to suit diverse applications.
- The student will also learn the hygiene aspects of water would be in a position to design methods to produce potable water using modern technology.

LIST OF EXPERIMENTS

Any 10 of the following experiments has to be performed

VOLUMETRIC ANALYSIS

Redox titrations

1. Estimation of iron (II) using Diphenylamine indicator (Dichrometry – Internal indicator method)
2. Estimation of Chloride ion using potassium Chromite indicator (Mohr's method)

Water analysis

3. Determination of total hardness of water by EDTA method
4. Estimation of Dissolved Oxygen by Winkler's method
5. Determination of acidity of Water
6. Determination of Alkalinity of Water.

Complexometry

7. Determination of Copper by EDTA method

Iodometry

8. Determination of Copper by Iodometry

INSTRUMENTATION

Colorimetry

9. Estimation of Iron in Cement by Colorimetry.

Conductometry

10. Conductometric titration of strong acid Vs strong base (Neutralization titration)

Fuel analysis

11. Determination of Calorific Value of fuel by using Bomb Calorimeter

Lubricants

12. Determination of Viscosity of oils using Redwood Viscometer I
13. Determination of Viscosity of oils using Redwood Viscometer II

PREPARATION OF POLYMERS

14. Preparation of Bakelite
15. Preparation of Thiokol rubber

Manual cum Record: Prepared by the Faculty Members of Engineering Chemistry of the college will be used by Students.

Equipment Required:

- ✓ Analytical weighing balance
- ✓ Digital Conductometer
- ✓ Photo-colorimeter
- ✓ Bomb calorimeter
- ✓ Redwood viscometers
- ✓ Deionizer plant
- ✓ Digital electronic balance

Glassware Required:

Pipettes, burettes, conical flasks, standard flasks, beakers, reagent bottles, spatulas, wash bottles, BOD Bottles, measuring cylinders, glass rods, Bunsen burners, funnels, thermometers etc.

Chemicals Required:

EDTA, Hypo, Mohr Salt Solution, HCl, Sulphuric Acid, Copper Solution, Iron Solution, Potassium Dichromate Solution, Potassium Iodide Solution, Buffer Solution, diphenyl amine, EBT indicator, NaOH solution, Benzoic acid Urea, distilled water etc.

References:

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et al, Pearson Education, Sixth Edition, 2012.
2. Chemistry Practical – Lab Manual by K.B.ChandraSekhar, G.V. Subba Reddy and K.N.Jayaveera, SM Publications, Hyderabad, 3rd Edition, 2012.

Course Outcomes:

- The student would be confident in understanding of redox systems
- The student would have acquired the practical skill to handle the analytical methods with confidence.
- The student would feel comfortable to think of design materials with the requisite properties
- The student would be in a position to technically address the water related problems.

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B.Tech. I Year II semester

(5G123)PROGRAMMING IN C AND DATA STRUCTURES LAB
(Common to ECE, EEE, ME and CE)

Course Objectives:

- To make the student learn a programming language.
- To teach the student to write programs in C to solve the problems.
- To introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

• Intel based desktop PC with ANSI C/ TURBO C Compiler and Supporting Editors

Exercise 1

Minimum of 4 Programs on pointer basics [declaration, A, Pointers, pointers for inter function communication.

Exercise 2.

Minimum of 4 Programs on Pointers applications.

Exercise 3

Minimum of 4 programs on structures and unions

Exercise 4

Minimum of 4 programs on basic File operations.

Exercise 5

Minimum of 4 programs on searching and sorting techniques .

Exercise 6

Implementation of Stack and perform all Stack operations using

i) Arrays ii) Pointers

Exercise 7

Implementation of Queue and perform all Queue operations using

i) Arrays ii) Pointers

Exercise 8

Implement Circular Queue (its operations) using

i) Arrays ii) Pointers

Exercise 9

Implementation of Single Linked List and its operations using

i) Arrays ii) Pointers

Exercise 10

Implementation of Double Linked List and its operations using

i) Arrays ii) Pointers

Exercise 11

Implementation of Circular Linked List and its operations using

i) Arrays ii) Pointers

Exercise 12

C program that uses Stack operations to perform the following:

i) Write Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Exercise 13

Implement Binary Tree using Double Linked List and its operations.

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B.Tech. I Year II Semester

(5G322)ELECTRONIC DEVICES AND CIRCUITS LAB -II
(Common to ECE & EEE)

Course Objectives:

The Course aims to provide the student with the ability

- To determine characteristics of JFET, MOSFET, SCR and UJT.
- To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

Perform the following Experiments

1. Identification, Specifications and Testing of Active Devices, Low power JFETs, MOSFETs, Photodiode, Phototransistor, LEDs, SCR and UJT.
2. JFET Characteristics.
3. MOSFET Characteristics
4. Frequency response of CE Amplifier.
5. Frequency response of CB Amplifier.
6. Frequency response of CC Amplifier.
7. Frequency response of Common Source FET Amplifier.
8. V-I Characteristics of LED.
9. SCR Characteristics.
10. UJT Characteristics.
11. Photodiode and Phototransistor Characteristics
12. Soldering Practice

Course Outcomes:

Upon completion of the course students can

- Able to gain the knowledge and practical usage of JFET, MOSFET and some special electronic devices.
- Able to design the amplifier circuits under given requirements.

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B.Tech. I Year II Semester

(5G524) ENGINEERING WORKSHOP
(Common to ECE and EEE)

Course Objectives:

The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially, know the labour involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. TRADES FOR EXERCISES:

a. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 50 x 50 mm soft wood stock

b. Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock.

c. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 gauge G.I. sheet.

d. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.

e. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.

f. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint

2. TRADES FOR DEMONSTRATION:

a. Plumbing

b. Machine Shop

c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

Reference Books:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009.
2. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
3. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas.
4. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

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B.Tech. II Year I-Semester

(5GC32) MATHEMATICAL METHODS - III

Course Objectives:

- To understand several important concepts in linear algebra, including systems of linear equations and their solutions; matrices and their properties; determinants and their properties; and Eigen values and Eigen vectors.
- To improve your ability to think logically, analytically and abstractly.
- The objective of curve fitting is to find the parameters of a mathematical model that describes a set of (usually noisy) data in a way that minimizes the difference between the model and the data.
- Introduce students to how to solve linear partial differential with different methods.
- Know how to derive a Fourier series of a given periodic function by evaluating Fourier coefficients. Understand the nature of the Fourier series that represent even and odd functions and how derivation of a Fourier series can be simplified in this way. Be able to expand an odd or even function as a half-range cosine or sine Fourier series.
- To equip students with adequate knowledge of mathematics that will enable them in formulating problems and solving problems analytically.

Unit I

Matrix algebra -Rank-Echelon form, normal form -solutions of linear system of homogenous and non-homogenous equations -Gauss Elimination Method

Eigen Values-Eigen Vectors-Properties. Cayley Hamilton theorem.

Unit II

Solution of algebraic and Transcendental Equations-Bisection Method-Method of false Position-Newton-Raphson method

Numerical solutions of ordinary differential Equations-Taylor's Series-Euler's methods–Runge-Kutta fourth order Method-Milne's predictor-corrector method. (Without proofs)

Unit III

Interpolation - Introduction – Forward Differences – Backward Differences – Newton's forward and backward difference interpolation formulae – Lagrange's Interpolation formula.

Numerical Differentiation - Numerical Integration – Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule.

Unit IV

Curve fitting: Fitting a straight line-second degree parabola-Exponential curve –power curve by the method of least squares.

Partial differential equations: Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions-solutions of linear equation–Charpit's method-Method of separation of variables.

Unit V

Fourier series: Determination of Fourier coefficients-Fourier series of even and odd functions-Fourier series in an arbitrary interval-half range Fourier sine and cosine expansions.

Fourier transforms: Fourier sine Transforms-Cosine Transforms-Properties-Inverse Transforms-Finite Fourier Transforms.

Text Book:

Higher Engineering Mathematics, B. S. Grewal, 42nd edition, Khanna Publishers, New Delhi.

Reference Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, 8th edition, New Age International (Pvt) Limited.
2. A text book of Engineering Mathematics, B. V. Ramana, Tata McGraw Hill.
3. Mathematical Methods, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.

Course Outcomes:

Upon completing this course students should be able to:

- Analyze real world scenarios to recognize when matrices, or linear systems are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the result.
- Understand linear algebra concepts that are encountered in the real world, and be able to communicate the underlying mathematics involved to help another person gain insight into the situation.
- Apply numerical method to obtain approximate solutions to mathematical problems.
- Have the knowledge of interpolation, numerical integrations, and numerical differentiation; know how to approximate definite integrals and derivatives.
- Be competent in solving linear PDEs using classical solution methods.
- Compute the Fourier series representation of a periodic functions, in both exponential and sine-cosine forms. Be able to apply Fourier analysis to simple initial condition standing wave problems and determine the resulting time evolution.

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B. Tech II Year I Semester

(5GC34)ENVIRONMENTAL SCIENCE

Unit - I

Multidisciplinary nature of environmental studies - Scope & Importance of environmental studies - Need for public awareness - Global environmental crisis (over-exploitation of natural resources, decline of ecosystems, loss to biodiversity, environmental pollution, and population growth) – People in environment – Institutions in environment

Unit - II

Renewable & non-renewable natural resources. Forest resources: Use – deforestation, case studies - dams & their effects on forest & tribal people Water resources: Use - floods, drought- conflicts over water. Mineral resources: Use - environmental effects of extracting mineral resources, case studies. Food resources: Impacts of over grazing, traditional agriculture and modern agriculture, Energy resources: Renewable and non – renewable energy resources - use of alternate energy resources. Land resources: Land as a resource, land degradation, soil erosion. Role of an individual in the conservation of natural resources.

Unit - III

ECOSYSTEMS: Producers, consumers & decomposers - Food chains, food webs & ecological pyramids - Energy flow in the ecosystem- Cycling of nutrients (Bio geo chemical cycles-water, oxygen, carbon, nitrogen & energy cycles) – Types and characteristic features of the following ecosystems :(a)Forest ecosystems (b) Grass land ecosystems (c) Desert ecosystems (d) Aquatic ecosystems (lakes, rivers, oceans, estuaries)

BIODIVERSITY AND ITS CONSERVATION: Definition - Values of biodiversity: consumptive value, productive value, social value, ethical value, aesthetic value & option values - Hot spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wild life - Conservation of biodiversity: In –situ & Ex-situ conservation

Unit –IV

ENVIRONMENTAL POLLUTION: Definition, causes, effects & control measures of: Air pollution, Water pollution, Soil pollution, Noise pollution, Thermal pollution, Marine pollution, Nuclear hazards - Solid waste management: Causes, effects and control measures of urban wastes.

Unit – V

SOCIAL ISSUES AND THE ENVIRONMENT: Rain water harvesting - Environmental ethics: Issues & possible solutions - Global warming - Acid rain - Ozone layer depletion – Wasteland reclamation - Environment protection Act.-Air (Prevention & Control of Pollution) Act.-Water (Prevention & Control of Pollution) Act.-Wildlife Protection Act-Forest Conservation Act.

HUMAN POPULATION & ENVIRONMENT: Population explosion – Family Welfare Program -Environment & human health - Human Rights (in relation to environment) - Value Education (environmental values) - HIV/AIDS.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, University press.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.
3. Perspectives In Environmental Studies by Anubha Kaushik and C.P.kaushik, New Age International Publishers.

Reference Books:

1. Comprehensive Environmental Studies by J.P.Sharma, Laxmi Publications.
2. Environmental Studies by Anindita Basak – Pearson education.
3. Environmental Studies by Benny Joseph, Mc.GrawHill Publications.

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B. Tech. II Year I Semester

(5G235)ELECTRICAL CIRCUIT THEORY

COURSE OBJECTIVE:

This course introduces the basic concepts of circuit analysis which helps to analyze the circuits. The emphasis of this course is laid on the basic analysis of circuits which includes Basic concepts like 1-Φ ac circuits, three phase systems. Network theorems, Magnetic Circuits.

COURSE OUTCOMES:

- Analyze the Basic concepts of Electrical Circuits.
- Analyze the concepts of 1-Φ electric circuits.
- Analyze the phenomenon of Resonance and Magnetic Circuits.
- Analyze the three phase systems.
- Solve electric circuits for voltage, current and power using network theorems.

Unit-I

FUNDAMENTALS OF ELECTRICAL CIRCUITS: Concepts of Charge, Current, Voltage & Power, Active & Passive Elements, V-I Relationships for Passive Elements, Current & Voltage Division Rules, Network Reduction Techniques, Star &Delta transformations, Source Transformation, Nodal & Mesh Analysis, Super Node & Super Mesh Concepts - Problems.

Unit-II

FUNDAMENTALS OF AC CIRCUITS: Advantages of AC Supply, Types of Wave Forms, Importance of Sinusoidal Wave Forms, Cycle, Time Period, Frequency & Amplitude, Determination of Average & RMS Value, Form Factor & Peak Factor for different Alternating Wave Forms, Phase & Phase Difference, Power Factor, Sinusoidal response of R, L, C & Combination of RLC circuits, Concept of Reactance, Impedance, Susceptance, Admittance & Power Triangle.

Unit-III

RESONANCE & MAGNETIC CIRCUITS:

Resonance: Resonant frequency, Band Width & Q-Factor for Series & Parallel RLC Networks,

Magnetic Circuits: Basic concepts of Magnetic circuits, **S**elf & Mutual Inductance, Coefficient of Coupling, DOT Convention, Analysis of Magnetic Circuits, Series & Parallel Circuits and Comparison of Electrical & Magnetic circuits.

Unit-IV

THREE PHASE SYSTEMS: Advantages of 3-Φ System over 1-Φ System, Phase sequence, Star & Delta connections and Relationship between their Phase & Line quantities, Balanced System, Measurement of Power & P.F in 3-Φ Systems by using Two Wattmeter Method.

Unit-V

NETWORK THEOREMS : Superposition, Thevenin's, Norton's, Maximum Power Transfer, Millman's, Tellegen's, Reciprocity & Compensation Theorems for both DC & AC Excitations .

Text Books:

1. A. Sudhakar, Shyammohan S Palli. *Circuits and Networks*. (Analysis and Synthesis), 5th edition, Tata Mc Graw Hill Publishing company Ltd., 2015.
2. A. Chakrabarti. *Circuit Theory*. 6th edition, Dhanpat Rai & Co, New Delhi, 2014.

Reference Books:

1. M.E. Van Valkenberg. *Network Analysis*. 3rd edition, Pearson Publications, New Delhi 2006.

2. William H. Hayt & Jack E. Kennedy & Steven M. Durbin. *Engineering Circuit Analysis*. 8th edition, TATA Mc Graw Hill Company, 2013.
3. J.A.Edminister & M.D.Nahvy. *Theory and Problems of Electric Circuits*. 4th Edition Schaums Outline series, New Delhi TATA Mc Graw Hill Company, 2004.
4. G. K. Mittal, Ravi Mittal. *Network Analysis*. 14th Edition, Khanna Publishers, New Delhi, 1997.
5. C. K. Alexander and M. N. O. Sadiku. *Fundamentals of Electric Circuits*. 5th Edition, Tata Mc Graw hill Publishing Company Limited, New Delhi, 2012.

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B. Tech. II Year I Semester

(5G331)ELECTRONIC CIRCUITS

COURSE OBJECTIVES: The course aims to provide the student with the ability

- To analyze and design the transistor amplifiers, feedback and tuned amplifiers.
- To design of oscillators.

Unit I

SMALL SIGNAL ANALYSIS OF AMPLIFIERS:- Small Signal model of BJT – h-parameter model of BJT – Analysis of CB, CE and CC configurations using h-parameters – simplified hybrid model – miller's theorem – dual of miller's theorem – Small signal model of JFET and MOSFET – Common source and common Drain amplifiers, using FET, Analysis of Cascaded Transistor Amplifiers, RC Coupled amplifier, Frequency response of RC Coupled, Direct coupled and Transformer coupled amplifiers.

Unit II

BJT Frequency Response: General frequency considerations, Low and high frequency response of BJT amplifier , Effect of coupling and Bypass capacitors, Hybrid- π transistor model, CE short circuit current gain, Current gain with resistive load, Gain Bandwidth product, Emitter follower at High frequencies.

Unit III

Feedback Amplifiers: concept of Feedback, Classification of feedback amplifiers, Transfer Gain with feedback, General characteristics of negative feedback amplifiers. Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components (Topologies).

Unit IV

Oscillators: Condition for oscillations. Oscillator Types, Frequency and amplitude stability of oscillators, generalized analysis of LC oscillators-Hartley and Colpitts oscillators, RC-phase shift and Wien bridge oscillators, Crystal Oscillators-Quartz and Pierce.

Unit V

Large Signal and Small Signal Single Tuned Amplifiers:

Direct coupled and Transformer Coupled Class A power Amplifiers, Efficiency of Class A power amplifier, Push-pull and Complementary Symmetry Class B power Amplifiers, phase inverter, Transistor power dissipation. Introduction to tuned amplifiers, Q-Factor, Analysis of Small Signal Single Tuned Amplifiers–Capacitive coupled, Inductive coupled amplifiers.

Text Books:

1. J. Millman and C.C. Halkias- Integrated Electronics, Mc Graw-Hill, 1972.
2. Robert T. Paynter- Introductory Electronic Devices and Circuits, Pearson Education, 7th Edition.

Reference Books:

1. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuits Theory, Pearson/Prentice Hall, 9th Edition, 2006.
2 . Donald A. Neumann- Electronic Circuit Analysis and Design, Mc Graw Hill.

COURSE OUTCOMES: *Upon completion of the course, student can*

- analyze the single stage and multistage amplifiers using h-parameter model at low frequencies.
- understand the concept and analysis of BJT amplifier circuits at High frequencies using Hybrid- π model.
- design the feedback amplifiers and oscillators.
- design and analyze large signal and tuned amplifiers.

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B. Tech. II Year I Semester

(5G332) DIGITAL DESIGN

COURSE OBJECTIVES:

The course aims to provide the student with the ability

- To get the knowledge on Number Systems and codes.
- To gain the knowledge on Boolean algebra.
- To acquire the knowledge of various circuits in Digital design.

Unit I

NUMBERSYSTEMS, CODES & BOOLEAN ALGEBRA: Philosophy of number systems – r, (r-1)'s complement, representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes, hamming codes.

Boolean Algebra: Fundamental postulates of Boolean algebra, Basic theorems and properties, digital logic gates, properties of XOR gate, universal gates.

Unit II

SWITCHING FUNCTIONS AND THEIR MINIMIZATION: Switching Functions-Canonical and Standard forms, algebraic simplification using Boolean theorems, two level & Multilevel Realization of Boolean Functions using Universal Gates.

Minimization: K-Map methods, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime-Implicant chart, simplification rules.

Unit III

COMBINATIONAL LOGIC DESIGN & PROGRAMMABLE

LOGIC DEVICES: Design using conventional logic gates-Binary Adders, Subtractors, Ripple Adder, carry Look Ahead adder, Magnitude comparator, Encoder, Decoder, Multiplexer, De-Multiplexer, Code converters.

PLD's: ROM, PROM, PLA, PAL, and Realization of Switching functions using PLD's. Comparison between PLA, PAL, ROM.

Unit IV

SEQUENTIAL CIRCUITS : Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples),Basic flip-flops, Triggering and excitation tables, flip flop conversions, Steps in synchronous sequential circuit design, Design of modulo-N Synchronous counters – up/down counter, ring counter, Johnson counter, Design of modulo-N Asynchronous counter-Sequence detector, Serial binary adder.

Unit V

FSM MINIMIZATION AND ASM CHARTS: Finite state machine-capabilities and limitations, Mealy and Moore models and their conversions, minimization of completely specified and incompletely specified sequential machines, Partition techniques and Merger chart methods, concept of minimal cover table. Salient features of the ASM chart, Simple examples**.**

Text Books:

1. Morris Mano, *Digital Design*. Prentice Hall India, 3rd Ed.
2. ZVI Kohavi and Niraj K.Jha Switching& Finite Automata theory. Tata McGraw Hill, 3 rd Ed.

Reference Books:

1. Charles H. Roth, *Fundamentals of Logic Design*. Thomson Publications, 2004, 5th Ed.
2. Fletcher, *an Engineering Approach to Digital Design*. Prentice Hall India. Anand Kumar, *Switching Theory and Logic Design*. Prentice Hall India, 2008.

COURSE OUTCOMES: *Upon completion of the course, students can*

- Understand different number systems conversions & Binary codes
- simplify Boolean functions& realize them using digital logic gates.
- design various combinational & sequential circuits
- Understand the Minimization techniques of Finite State Machine & the elements of ASM chart.

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B. Tech. II Year I Semester

(5G333) SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

The course aims to provide the student with the ability

- To do analysis of signals & systems (continuous and discrete) using time domain & frequency domain methods.
- To acquire practical knowledge on various transform techniques in the analysis of signals and systems.
- To acquire the knowledge of different signal transmission.
- To study the various sampling methods and convolution in communication systems

Unit I

INTRODUCTION TO SIGNALS AND SYSTEMS : Continuous time Signal and Discrete time Signals, Elementary Continuous and Discrete time signals, Basic Operations on Signals, Classification of Signals, Concept of Systems, Representation of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Fourier spectrum, Gibbs Phenomenon, properties of Fourier series,

Unit II

FOURIER TRANSFORMS: Deriving Fourier transform from Fourier series, Fourier transform of standard signals, properties of Fourier transforms, Fourier transform of periodic signals, Introduction to Hilbert Transform.

Unit III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS : Introduction to LTI systems, Properties of LTI Systems, Transfer function of LTI System, Filter Characteristics of Linear systems, Distortion less Transmission through a system, signal and system bandwidth, Ideal filter characteristics, Causality and Paley-Wiener Criterion, Relationship between Bandwidth and Rise Time.

Unit IV

CONVOLUTION AND SAMPLING: Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function. Relation between convolution and correlation

Sampling theorem – Graphical and analytical proof for Band Limited Signals, effect of under sampling – Aliasing Sampling Techniques, data Reconstruction, Sampling of Band pass signals

Unit V

LAPLACE TRANSFORMS AND Z–TRANSFORMS: Laplace Transforms- Introduction, Region of Convergence, L.T's of some commonly used signals, Properties, Inverse Laplace Transforms.

Z-Transforms- Relation between DTFT and Z-Transform, Region of Convergence, Z-transforms of common sequences, Properties, Inverse Z-Transform.

Text Books:

1. B.P. Lathi- Signals, Systems & Communications – BS Publications, 2003.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab- Signals and Systems – PHI, 2nd Edn.

Reference Book:

Simon Haykin and Van Veen,Wiley- Signals & Systems – 2nd Edition.

COURSE OUTCOMES: Upon completion of the course, students can

- Understand signal representation methods and operation on signals.
- Have the knowledge to obtain Fourier series and Fourier Transforms
- Understand the convolution and correlation of signals.
- Learn various systems and their responses.
- Understand different transforms (Laplace & Z) and their responses with different types of signals.

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B. Tech. II Year I Semester

(5G335) ELECTRONIC CIRCUITS LAB

Course Objectives:

- Aims to make students be able to design electronic circuits.
- To understand the Analysis of transistor based amplifiers.
- The student will construct and analyze voltage regulator circuits.
- To understand the circuit configuration and the principle operation of Oscillators.

Design and Simulation* of following experiments and also verify in Hardware Laboratory (minimum 6 of the following):

1. Common Emitter amplifier
2. Common Source FET amplifier
3. Two Stage RC- Coupled Amplifier
4. Feedback amplifier (Current Series & Voltage Series).
5. RC Phase Shift Oscillator
6. Wien Bridge Oscillator
7. Hartley/ Colpitts Oscillator.
8. Class A/B Power Amplifier
9. Series Voltage Regulator
10. Shunt Voltage Regulator

*** Multisim OR PSPICE OR Equivalent Simulation Software.**

Course Outcomes: Upon completion of the course, students will

- Have the ability to analyze and design single and multistage amplifiers
- Determine the efficiencies of power amplifiers.
- Design different Oscillators.
- Be able to analyze all the circuits using simulation software and Hardware.

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B. Tech. II Year I Semester

(5G336) BASIC SIMULATION LAB

***Write Programs and Simulate using MATLAB/SCI LAB/Any Equivalent Software of the following Experiments.**

List of Experiments:

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit impulse, unit step, square, saw tooth, triangular, sinusoidal, ramp, sinc.
3. Observations on signals and sequences such as addition, multiplication, scaling, shifting, folding, computation of energy and average power.
4. Finding the even and odd parts of signal/ sequence and real and imaginary parts of signal.
5. Convolution between signals and sequences.
6. Autocorrelation and cross correlation between signals and sequences.
7. Verification of linearity and time invariance properties of a gi discrete system.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical reliability and stability properties.
9. Gibbs phenomenon.
10. Finding the Fourier transform Phase spectrum.
11. Waveform synthesis using Laplace Transform
12. Locating the zeros and poles and plotting the pole Z-plane for the given transfer function.
13. Sampling theorem verification.
14. Removal of noise by autocorrelation / cross correlation.
15. Verification of winer-khinchine relations.

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B. Tech. II Year II Semester

(5GC41)COMPLEX VARIABLES AND SPECIAL FUNCTIONS

Course Objectives:

The course aims to provide the students with the ability

- To understand the complex variables and their functions.
- To apply this knowledge to evaluate the complex integrals in real life situations.

Unit – I

Beta and Gamma Functions – their properties – Evaluation of improper integrals using Beta and Gamma functions.

Complex variables: Exponential, trigonometric, hyperbolic functions and their properties – General power z^c (c is complex), principal value.

Unit – II

Functions of a complex variable – Continuity – Differentiability – Analyticity – Properties – Cauchy – Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne – Thompson method.

Unit – III

Complex Integration: Line integral – Evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

Complex power series: Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series.

Unit – IV

Singular point – Isolated singular point – Pole of order m – Essential singularity.

Residue – Evaluation of residues – Residue theorem. Evaluation of integrals of the type $\int_{-\infty}^{\infty} f(x)dx$ *and* $\int_{0}^{2\pi} f(\cos\theta,\sin\theta)d\theta$.

Determination of zeros – Argument principle – Rouche's theorem.

Unit – V

Conformal mapping: Definition – Translation, rotation, and inversion –- Transformation by e^z, $\ln z$, z^2, z^n, $\sin z$, $\cos z$.

Bilinear transformation -Fixed points – Cross ratio – Determination of bilinear transformation mapping for three given points

Text Book:

Higher Engineering Mathematics, B. S. Grewal, Khanna Publication.

References:

1. A Text Book of Engineering Mathematics, B. V. Ramana, Tata McGraw Hill.
2. A Text Book of Engineering Mathematics, Vol – III, T.K. V Iyengar, B. Krishna Gandhi and Others S. Chand & Company.
3. Complex Variables – Chruchile and Brown.
4. Complex Variables – Schaum Series.

Course Outcomes:

Upon completion of the course, students will

- Understand the properties of Beta and Gamma functions.
- Have the knowledge on functions of a complex variable.
- Understand the concepts of exponential, trigonometric, hyperbolic functions and their properties.
- Have the knowledge of complex integration and apply it solve complex integrals of different type.
- Learn about conformal mapping.

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B. Tech. II Year II Semester

ELECTRICAL TECHNOLOGY

Course Objectives:

- To impart the knowledge about the Transient Response.
- To inculcate the understanding about the Filters & Attenuators.
- To understand the working of various Electrical Machines.

Unit-I

TWO PORT NETWORKS: Impedance, Admittance, Hybrid, Transmission (ABCD) Parameters, Conversion of one Parameter to another Parameter, Conditions for Reciprocity & Symmetry, Inter connection of Two Port Networks in Series, Parallel and Cascaded Configurations - Problems.

Image parameters.

Unit-II

TRANSIENT ANALYSIS: Transient Response of RL, RC & RLC Series Circuits for DC Excitations, Time Constant, Initial Conditions, Solution using Differential Equations & Laplace Transform Approach.

Unit-III

FILTERS & ATTENUATORS:

Filters: Classification of Filters, Classification of Pass Band & Stop Band, Characteristic Impedance in the Pass Band & Stop Bands, Constant-k Filters Low Pass Filter, High Pass Filter, Band Pass Filter and Band Elimination Filter, m-Derived T-Section Low Pass Filter and High Pass Filter.

*Attenuators (*symmetrical*)*: T-Type, Π-Type, Bridged T-Type & Lattice Attenuators.

Unit-IV

D.C MACHINES: *DC Generator*: Constructional Features - Principle of operation - EMF Equation, Types - Characteristics - Applications.

DC Motor: Principle of operation, Back EMF, Torque Equation, Characteristics of DC Motors - Losses & Efficiency – Three Point Starter - Testing - Brake Test & Swinburne's Test - Speed control of DC shunt Motor - Applications.

Unit-V

1-Φ TRANSFORMERS & SPECIAL MACHINES: Transformers*:* Principle of operation, Types, Constructional Features, Phasor diagram on No-load, Equivalent Circuit, Losses, Efficiency & Regulation, OC & SC Tests, Pre-Determination of Efficiency & Regulation.

Special Machines: Principle of operation of Capacitor start and Capacitor run Motors, Stepper Motor - Characteristics, Applications.

Text Books:

1. *Network Analysis* by A. Sudhakar & Shyam Mohan S.Pillai, Tata Mc Graw Hill, 3rd Edition, New Delhi, 2009.
2. *A Text book of Electrical Technology* by B.L.Theraja & A.K.Theraja, Vol-II, S.Chand & Company, New Delhi, 2010.

Reference Books:

1. *Introduction to Electrical Engineering* by M.S. Naidu & S. Kamakshaiah, Tata Mc Graw Hill, New Delhi, 2008.
2. *Basic Electrical Engineering* by T.K. Nagasarkar & M.S. Sukhija, Oxford University Press, New Delhi, 2005.

Course Outcomes:

- Able to determine the transient response of series RL, RC and RLC circuits with DC-Excitation.
- Able to determine all network parameters for a given Two-port network.
- Able to understand the basics of Filters, Attenuators and their Design.
- Able to identify the types of DC-Machines and their applications
- Able to calculate the efficiency of DC-Machines.
- Able to explain the principle operation of Transformer.
- Able to calculate the Efficiency and Regulation of transformer.
- Able to identify the types of special machines and their applications

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B. Tech. II Year II Semester

(5G341) RANDOM VARIABLES AND RANDOM PROCESSES

COURSE OBJECTIVES:

The course aims to provide the student with the ability

- To understand the basics of Probability and its Theorems
- To gain the knowledge on random variables and related operations
- To understand random processes those are useful in probability estimations

Unit I

PROBABILITY AND RANDOM VARIABLES: Probability introduced through sets and relative frequency, Joint and Conditional Probability, Total Probability, Bayes Theorem, Independent Events, Random Variable Concept, Distribution and Density functions, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, and Conditional Distribution & Conditional Density Functions.

Unit II

OPERATIONS ON ONE RANDOM VARIABLE: Expectation, Moments: moments about the origin, Central Moments, Variance and Skew, Chebyshev's Inequality, Functions that give moments.

Unit III

MULTIPLE RANDOM VARIABLES: Vector Random Variables, Joint Distribution Function and its Properties Joint Density and its properties, Conditional Distribution and Density, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, Expected Value of a Function of Random Variables, Joint Characteristic Functions, Jointly Gaussian Random Variables.

Unit IV

RANDOM PROCESSES – TEMPORAL CHARACTERISTICS: The Random Process Concept, Stationarity and independence: Distribution and Density Functions, Statistical Independence, First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, N-Order and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes. Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Discrete Time processes and sequences.

Unit V

RANDOM PROCESSES – SPECTRAL CHARACTERISTICS: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, the Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

Text Books:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Probability, Random Variables and Stochastic Processes – Athanasius Papoulis and S. Unnikrishna Pillai, PHI, 4th Edition, 2002.

Reference Books:

1. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
2. Probability Methods of Signal and System Analysis. George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.

COURSE OUTCOMES: *upon completion of the course, students will be able to*

- Understand the concept of Probability and types of random variables.
- Learn the possible operations on random variables with real time examples.
- Understand the concept of random processes
- analyze the random processes based on their characteristics

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B.Tech. II Year II-Semester

(5G342) PULSE AND DIGITAL CIRCUITS

COURSE OBJECTIVES:

The course aims to provide the student with the ability

- To study various wave shaping circuits and their applications.
- To study and acquire knowledge on different circuits that produce non-sinusoidal waveforms
- To study various voltage time base generators, Logic gates etc.

Unit I

LINEAR WAVE SHAPING High pass & low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and Exponential inputs. High pass RC network as differentiator, Low pass RC network as integrator, attenuators, ringing circuit.

Unit II

SWITCHING CHARACTERISTICS & NON-LINEAR WAVE SHAPING:

Switching Characteristics of Devices: Diode as a switch, Diode Switching Times, Transistor as a Switch, transistor-switching times

Non-Linear Wave Shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, clamping operation, clamping circuit taking source and diode resistance into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage.

Unit III

MULTIVIBRATORS

Design and analysis of Bi-stable, Monostable & Astable Multivibrators with BJT. Schmitt trigger circuit, Symmetrical & Un Symmetrical Triggering of Bi-stable Multivibrator, Monostable Multivibrators

Unit IV

TIME BASE GENERATORS: Voltage time base generators: General features of a time base signal, methods of generating time base waveform, Principle and working of Miller and Bootstrap time base generators.

Current time base generators: Simple current sweep circuit, linearity correction through driving waveform.

Unit V

SAMPLING GATES, LOGIC GATES AND LOGIC FAMILIES Sampling Gates: Basic operation and principle of Sampling gates, uni-directional diode sampling gate, Bi-Directional diode & Transistor sampling gates, four diode sampling gate and their applications.

Realization of AND,OR,NOT gates using diodes and transistors, Inhibit operation, classification of logic families, DTL, RTL, DCTL,TTL, and CMOS logic families, comparison of logic families.

Text Books:

1. J. Millman and H. Taub, "Pulse, Digital and Switching Waveforms", McGraw-Hill, second edition, 2007.
2. Anand Kumar, "Pulse and Digital Circuits", PHI, 2005.Second Edition.

References:

1. Fundamentals of pulse and digital circuits-Ronald j.Tocci, third edition, 2008.
2. Solid state pulse circuits-David A.Bell,4th Edition,2002 PHI.

COURSE OUTCOMES: Upon completion of the course, student can

- Design and analyze linear and non linear wave shaping circuits.
- Design and analyze different multivibrator circuits.
- identify and differentiate various time base generators
- Understand the operation and realization of different sampling gates and logic families.

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B. Tech. II Year II Semester

(5G343) ANALOG COMMUNICATION

COURSE OBJECTIVES*:*

The course aims to provide the student with the ability

- To enable the students to learn the fundamentals of modulation and different applications of modulation.
- To understand the concepts of Noise and Transmitters & Receivers in Communication

Unit I

AMPLITUDE MODULATION: Introduction to communication system, Need for modulation, Types of Modulation, Amplitude Modulation-single tone modulation, power relations in AM waves, Generation and Detection of AM Waves, Double side band suppressed carrier modulation, Generation and Detection of DSB-SC Modulated waves, SSB Modulation, Generation and Detection of AM-SSB Modulated waves, vestigial side band modulation, Generation and Detection of VSB waves.

Unit II

ANGLE MODULATION: Basic concepts, Frequency Modulation, Single tone frequency modulation, Narrow band FM, Wide band FM, Transmission bandwidth of FM Wave, Generation of FM Waves, and Detection of FM Waves: Comparison of FM & AM.

Unit III

NOISE: Noise in Analog communication System, Noise in DSB & SSB System Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, SNR Calculation, Pre-emphasis & de-emphasis.

Unit IV

TRANSMITTERS & RECEIVERS: Introduction, Classification of Transmitter, AM Transmitter, FM Transmitter, Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter, Receiver Types, Characteristics of Receiver, TRF receiver, Super-heterodyne receiver-RF section and Characteristics, Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver.

Unit V

PULSE ANALOG MODULATION: Multiplexing-TDM, FDM, Types of Pulse modulation, PAM-Single polarity PAM, double polarity PAM, PWM-Generation & demodulation of PWM, PPM-Generation and demodulation of PPM.

Text Books:

1. Simon Haykin, John Wiley - Principles of Communication Systems , 2nd Ed.,
2. George Kennedy and Bernard Davis - Electronics & Communication System , TMH 2004

Reference Books:

1. H Taub & D. Schilling, Gautam Sahe - Principles of Communication Systems, TMH, 2007 3rd Edition.
2. John G. Proakis, Masood Salehi - Fundamentals of Communication Systems PEA, 2006.

COURSE OUTCOMES: *upon completion of the course, students can*

- Learn the need of Modulation and Application in real time.
- Gain the knowledge of Different Modulation Techniques and their Generation & Detection methods
- gain the knowledge about the Effect of Noise in analog modulation techniques
- design radio Transmitters, Receivers & applications in real life

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B. Tech. II Year II Semester

(5G344) FIELD THEORY AND TRANSMISSION LINES

COURSE OBJECTIVES: The course aims to provide the student with the ability

- To understand the Concepts of Vectors and Co-ordinate Systems
- To learn the concepts of Electric and Magnetic Fields with their corresponding equations.
- To know the importance of Maxwell's equations in differential and integral forms.
- To acquire a knowledge of wave propagation with its different characteristics.
- To acquire a knowledge on transmission lines & their characteristics.

Unit I:

VECTOR ANALYSIS AND INTRODUCTION TO ELECTROSTATICS: Introduction to Vector Algebra, Coordinate systems and Transformation, Vector Calculus**.** Introduction to Electrostatic Fields, Coulomb's Law, Electric Field Intensity, Fields due to continuous Charge Distributions, Electric Flux Density, Gauss's Law and Applications, Electric Potential, Relations Between E and V-Maxwell's Equations, Energy Density.

Unit II:

ELECTROSTATIC FIELDS

Introduction to electrical fields in material space- Convection and Conduction Currents, Conductors, Polarization in Dielectrics, Dielectric Constant and strength, Linear, Isotropic and Homogeneous Dielectrics, Continuity Equation and Relaxation Time, Resistance and Capacitance.

Unit III:

MAGNETOSTATIC FIELDS AND MAXWELL'S EQUATIONS. : Introduction to magnetic fields, Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Equations for Static EM Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductors and Inductances, Magnetic Energy. Introduction to Maxwell's equations, Faraday's Law, Transformer and Motional EMFs, Displacement Current Density, Maxwell's Equations in Final Forms.

Unit IV:

EM WAVE PROPAGATION AND CHARACTERISTICS: Introduction, Waves in general, Wave propagation in Lossy Dielectrics, Plane waves in Lossless Dielectrics, Plane Waves in Free space, Plane waves in Good conductors. Poynting Vector and Poynting Theorem, Reflection of a Plane Wave at Normal and Oblique Incidences.

Unit V:

TRANSMISSION LINES : Types, Primary & Secondary Constants, Transmission Line Equations, Expressions for Characteristic Impedance &Propagation Constant, wavelength, Phase and Group Velocities, Infinite Line Concepts, Input Impedance Relations , Standing waves in SC & OC lines, Reflection Coefficient, Reflection loss, Line Distortion, Condition for Distortion less &lossless lines, Condition for minimum attenuation, Loaded line, loading coil, loading practice, Smith Chart – Properties and Applications, Single and Double Stub Matching.

Text Books:

1. Elements of Electromagnetics – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition,2000.
3. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech.India Publications), New Delhi.

Reference Books:

1. Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed. 2005.
2. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed., 1999. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.

COURSE OUTCOMES:

Upon completion of the course, students can

- Understand the vector analysis-vector algebra and vector calculus, co-ordinate systems, transformations.
- Understand the electrostatic fields in free space and in material space.
- Understand the Magneto static fields in free space & also in material space.
- Learned the usage of Maxwell's equations in differential and integral final forms in electromagnetic fields.
- able to analyze and apply EM wave propagation characteristics on different mediums.
- able to identify different transmission lines and their relations.

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B. Tech. II B.Tech. II Semester.

(5GC44)APTITUDE AND REASONING SKILLS

APTITUDE AND REASONING SKILLS

QUANTITATIVE APTITUDE:

1. Number Systems
2. Averages
3. Problems on ages
4. Allegations
5. Percentages
6. Profit and loss
7. Simple interest and Compound interest
8. Ratio and Proposition and variation
9. Time and Work
10. Time and Distance
11. Menstruation
12. Permutation and Combinations
13. Progressions
14. Inequalities
15. Logarithms
16. HCF and LCM
17. Decimal Fractions
18. Simplification
19. Square Roots and Cube Roots
20. Pipes and Cisterns
21. Area, Volume and Surface Areas
22. Calendar, Clocks
23. True Discount, Banker's Discounts
24. Data Interpretation, Tabulation, Bar Graphs, Pie charts, Line Graphs

REASONING:

1. Directions
2. Blood Relations
3. Problems on Cubes
4. Series and Sequences
5. Odd man out
6. Coding and Decoding
7. Data sufficiency
8. Logical deductions
9. Arrangements and Combinations
10. Groups and Teams
11. Puzzles to puzzle you. More puzzles, Brain Teasers, Puzzles and Teasers

Reference Books:

1. Arun Sharma, How to Prepare for Quantitative Aptitude, TMH Publishers, New Delhi, 2003.
2. R.S. Agarwal, Quantitative Aptitude, S. Chand Publishers, New Delhi, 2005.
3. Sharon Weiner-Green, Irn K.Wolf, Barron's GRE, Golgotha Publications, New Delhi, 2006.
4. R.S.Agarwal, Verbal and Non-Verbal Reasoning, S.Chand Publishers, New Delhi, 1998.
5. Shakuntala Devi, Puzzles to Puzzle you, Orient Paper Backs Publishers (OPB), New Delhi, 2005.
6. Shakuntala Devi, More Puzzles, OPB, New Delhi, 2006.
7. Ravi Narula, Brain Teasers, Jaico Publishing House, New Delhi, 2005.
8. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai, 2005.

Library:

1. Mittal.U Puzzles to puzzle you (Book-I & II).
2. Aptitude (Quantitative, Analytical, Logical), By Globarena.
3. Aptitude – Student work book, Part-I &II, By Globarena.
4. Material for Soft Skills, By Globarena

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B. Tech. II Year II Semester

(5G346)PULSE & DIGITAL CIRCUITS LAB

Course Objectives:

- To generate Different types of non-sinusoidal signals.
- To learn about Multivibrators
- To know about sampling gates and their uses.
- To obtain Basics of digital logic families.

Perform following experiments

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Astable Multivibrator.
6. Monostable Multivibrator.
7. Bi-stable Multivibrator.
8. Schmitt Trigger.
9. Bootstrap sweep circuit.
10. UJT Relaxation Oscillator
11. Sampling Gates.
12. Study of Logic Gates & Some applications.

Course Outcomes:

Upon completion of the course, students will

- Design wave shaping circuits
- Design circuits to generate various types of signals.
- Design various digital circuits based on the application and specifications.

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(AN AUTONOMOUS INSTITUTION)

B. Tech. II B.Tech. II Semester

(5G347)ANALOG COMMUNICATION LAB

Course Objectives:

- To provide a real time environment about different analog modulation and demodulation methods
- To analyse the available circuits behaviour in analog communication through hardware as well as software environment

Design and Simulation* of following experiments and also verify in Hardware Laboratory (minimum 6 of the following)

1. Amplitude Modulation& Demodulation
2. SSB Modulation and demolation
3. DSB-SC Modulation and Demodulation
4. Frequency Modulation & Demodulation
5. Characteristics of Mixer
6. Pre-Emphasis and De- Emphasis
7. Pulse Amplitude Modulation& Demodulation
8. Pulse Width Modulation& Demodulation
9. Pulse Position Modulation& Demodulation

*** Multisim OR Pspice OR Equivalent Simulation Software.**

Course Outcomes:

Upon the completion of the course the students will be able

- To design circuits of different analog modulation schemes
- To understand the working mechanism of modulation methods.
- To analyze practical behaviour of different elements available in analog communication system such as filters and mixers.
- To analyse the working of communication methods using both hardware and software.