

UNIVERSITY OF KERALA

B.TECH DEGREE COURSE
(2008 SCHEME)

REGULATIONS, SCHEME AND SYLLABUS

FOR

**ELECTRONICS AND COMMUNICATION
ENGINEERING**

UNIVERSITY OF KERALA
B.Tech Degree Course – 2008 Scheme
REGULATIONS

1. Conditions for Admission

Candidates for admission to the B.Tech degree course shall be required to have passed the Higher Secondary Examination, Kerala or 12th Standard V.H.S.E., C.B.S.E., I.S.C. or any examination accepted by the university as equivalent thereto obtaining not less than 50% in Mathematics and 50% in Mathematics, Physics and Chemistry/ Bio- technology/ Computer Science/ Biology put together, or a diploma in Engineering awarded by the Board of Technical Education, Kerala or an examination recognized as equivalent thereto after undergoing an institutional course of at least three years securing a minimum of 50 % marks in the final diploma examination subject to the usual concessions allowed for backward classes and other communities as specified from time to time.

2. Duration of the course

- i) The course for the B.Tech Degree shall extend over a period of four academic years comprising of eight semesters. The first and second semester shall be combined and each semester from third semester onwards shall cover the groups of subjects as given in the curriculum and scheme of examination
- ii) Each semester shall ordinarily comprise of not less than 400 working periods each of 60 minutes duration
- iii) A candidate who could not complete the programme and pass all examinations within Ten (10) years since his first admission to the B.Tech programme will not be allowed to continue and he has to quit the Programme. However he can be readmitted to the first year of the programme if he/she satisfies the eligibility norms applicable to the regular candidates prevailing at the time of readmission.

3. Eligibility for the Degree

Candidates for admission to the degree of bachelor of technology shall be required to have undergone the prescribed course of study in an institution maintained by or affiliated to the University of Kerala for a period of not less than four academic years and to have passed all the examinations specified in the scheme of study

4. Subjects of Study

The subjects of study shall be in accordance with the scheme and syllabi prescribed

5. Evaluation

Candidates in each semester will be evaluated both by continuous assessment and end semester University examination. The individual maximum marks allotted for continuous assessment and University examination for each subject is as prescribed by the scheme of study.

5.1 Continuous Assessment (C.A)

The marks awarded for the continuous assessment will be on the basis of the day-to-day work, periodic tests (minimum two in a semester) and assignments (minimum of three – one each from each module). The faculty member concerned will do the continuous assessment for each semester. The C.A. marks for the individual subjects shall be computed by giving weight age to the following parameters.

Subject	Attendance	Tests	Assignments/ Class Work
Theory Subjects	20%	50%	30%
Drawing	20%	40%	40%
Practical	20%	40%	40%
Project Work	Work Assessed by Guide – 50% Assessed by a three member committee out of which one member is the guide – 50%		

The C.A. marks for the attendance (20%) for each theory, practical and drawing shall be awarded in full only if the candidate has secured 90% attendance or above in the subject. Proportionate reduction shall be made in the case of subjects in which he/she gets below 90% of the attendance for a subject. The CA marks obtained by the student for all subjects in a semester is to be published at least 5 days before the commencement of the University examinations. Anomalies if any may be scrutinized by the department committee and the final CA marks are forwarded to the university within the stipulated time.

5.2. End Semester University Examinations

- i) There will be University examinations at the end of the first academic year and at the end of every semester from third semester onwards in subjects as prescribed under the respective scheme of examinations. Semester classes shall be completed at least 10 working days before the commencement of the University examination.
- ii) The examination will be held twice in an year – April/May session (for even semester) and October/November session (for odd semester). The combined 1st and 2nd semester is reckoned as equivalent to an even semester for the purpose of conduct of examination and the University examination will be held during April/May. However VII and VIII Semester examination will be conducted in both the sessions. This schedule will not be changed
- iii) A student will be permitted to appear for the university examination only if he/she satisfies the following requirements
 - a. He/she must secure not less than 75% attendance in the total number of working periods during the first year and in each semester thereafter and shall be physically present for a minimum of 60% of the total working periods. In addition, he/she also shall be physically present in at least 50% of total working periods for each subject
 - b. He must earn a progress certificate from the head of the institution of having satisfactorily completed the course of study in the semester as prescribed by these regulations
 - c. It shall be open to the Vice-Chancellor to grant condonation of shortage of attendance on the recommendation of the head of the institution in accordance with the following norms
 - d. The attendance shall not be less than 60% of the total working periods
 - e. He/she shall be physically present for a minimum of 50% of the total working periods
 - f. The shortage shall not be condoned more than twice during the entire course
 - g. The condonation shall be granted subject to the rules and procedures prescribed by the university from time to time.
 - h. The condonation for combined 1st and 2nd semesters will be reckoned as a single condonation for attendance purposes.
- iv) A student who is not permitted to appear for the University examinations for a particular semester due to the shortage of attendance and not permitted by the authorities for condonation of shortage of attendance shall repeat the semester when it is offered again. This provision is allowed only once for a semester.

- v) The university will conduct examinations for all subjects (Theory, Drawing & Practical)
- vi) The scheme of valuation will be decided by the chief examiner for theory / drawing subjects
- vii) For practical examinations, the examiners together will decide the marks to be awarded. The student shall produce the certified record of the work done in the laboratory during the examination. The evaluation of the candidate should be as per the guidelines given in the syllabus for the practical subject.

6. Letter Grades

For each subject in a semester, based on the total marks obtained by the student in the University examination and Continuous assessment put together a letter grade (S, A+, A, B+, B, C+, C, D, E and F) will be awarded. ***All letter grades except 'F' will be awarded if the marks for the University examination is 40 % or above and the total mark (C.A marks + University Exam mark) is 50 % or above.*** No absolute mark will be indicated in the grade card. Letter grade corresponding to total marks (C.A marks+ University Exam mark) and the corresponding grade point in a ten-point scale is described below.

% of Total marks (C.A marks + University Exam mark)	Letter Grade	Grade Point (G.P)	Remarks
90 % and above	S	10	Excellent
85 % and above but less than 90%	A+	9	
80 % and above but less than 85%	A	8.5	
75 % and above but less than 80%	B+	8	
70 % and above but less than 75%	B	7.5	
65 % and above but less than 70%	C+	7	
60 % and above but less than 65%	C	6.5	
55 % and above but less than 60%	D	6	
50 % and above but less than 55%	E	5.5	
Below 50% (C.A + U.E) or below 40 % for U.E only	F	0	Failed

7. Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)

Grade point average is the semester wise average points obtained by each student in a 10-point scale. GPA for a particular semester is calculated as per the calculation shown below.

$$GPA = \frac{\sum Credit \times GP \text{ obtained for the subject}}{\sum credit \text{ for subject}}$$

Cumulative Grade point Average (CGPA) is the average grade points obtained by the students till the end of any particular semester. CGPA is calculated in a 10-point scale as shown below.

$$CGPA = \frac{\sum Credits \text{ for semester} \times GPA \text{ obtained for the semester}}{\sum credits \text{ for the semester}}$$

GPA and CGPA shall be rounded to two decimal points. The Grade card issued to the students shall contain subject number and subject name, credits for the subject, letter grades obtained, GPA for the semester and CGPA up to that particular semester. In addition to the grade cards for each semester all successful candidate shall also be issued a consolidated statement grades. On specific request from a candidate and after remitting the prescribed fees the University shall issue detailed mark to the individual candidate.

8. Minimum for a pass

- a) A candidate shall be declared to have passed a semester examination in full in the first appearance if he/she secures not less than 5.5 GPA with a minimum of 'E' grade for the all individual subject in that semester.
- b) A candidate shall be declared to have passed in an individual subject of a semester examination if he/she secures grade 'E' or above.
- c) A candidate who does not secure a full pass in a semester examination as per clause (a) above will have to pass in all the subjects of the semester examination as per clause (b) above before he is declared to have passed in that semester examination in full.

9. Improvement of Grades

- i) A candidate shall be allowed to re-appear for a maximum of two subjects of a semester examination in order to improve the marks and hence the grades already obtained subject to the following conditions
 - a) The candidate shall be permitted to improve the examination only along with next available chance.
 - b) The candidate shall not be allowed to appear for an improvement examination for the subjects of the VII & VIII semesters
 - c) The grades obtained by the candidate for each subject in the improvement chance he has appeared for or the already existing grades – whichever is better will be reckoned as the grades secured.
 - d) First & Second semester will be counted as a single chance and they can improve a maximum of three subjects
- ii) A candidate shall be allowed to repeat the course work in one or more semesters in order to better the C.A. marks already obtained, subject to the following conditions
 - a) He/she shall repeat the course work in a particular semester only once and that too at the earliest opportunity offered to him/her.
 - b) He/she shall not combine this course work with his/her regular course work
 - c) He/she shall not be allowed to repeat the course work of any semester if he has already passed that semester examination in full
 - d) The C.A marks obtained by the repetition of the course work will be considered for all purposes

iii) A candidate shall be allowed to withdraw from the whole examination of a semester in accordance with the rules for cancellation of examination of the University of Kerala.

10. Classification of Successful candidates

- i) A candidate who qualifies for the degree passing all the subjects of the eight semesters within five academic years (ten consecutive semesters after the commencement of his/her course of study) and secures not less than 8 CGPA up to and including eighth semester (overall CGPA) shall be declared to have passed the B.Tech degree examination in **FIRST CLASS WITH DISTINCTION**
- ii) A candidate who qualifies for the degree passing all the subjects of the eight semesters within five academic years (ten consecutive semesters after the commencement of his/her course of study)

and secures less than 8 CGPA but not less than 6.5 CGPA up to and including eighth semester shall be declared to have passed the B.Tech degree examination in FIRST CLASS.

iii) All other successful candidates shall be declared to have passed the B.Tech Degree examination in SECOND CLASS

iv) Successful candidates who complete the examination in four academic years (Eight consecutive semesters after the commencement of the course of study shall be ranked branch-wise on the basis of the CGPA in all eight semesters put together. In the case of a tie in the CGPA the total marks of the students who have got same CGPA shall be considered for finalizing the rank. Students who pass the examination in supplementary examination are also covered under this clause

11. Educational Tour

- a) The students may undertake one educational tour preferably after fourth semester of the course and submit a tour report
- b) The tour may be conducted during the vacation / holidays taking not more than 5 working days, combined with the vacation / holidays if required. Total number of Tour days shall not exceed 15 days.
- c) The tour period shall be considered as part of the working periods of a semester

12. Revision of Regulations

The university may from time to time revise, amend or change the regulations, curriculum, scheme of examinations and syllabi. These changes unless specified otherwise, will have effect from the beginning of the academic year / semester following the notification of the University

SCHEME FOR B.TECH DEGREE FROM 2008
ELECTRONICS AND COMMUNICATION

BRANCH: ELECTRONICS & COMMUNICATION SEMESTER I & II								
Course No.	Name of Subject	Weekly load hrs			Max. Sessional Marks	Exam Duration Hrs	Exam Max. Marks	Credits
		L	T	D/P				
08.101	Engineering Mathematics I	2	1	-	50	3	100	6
08.102	Engineering Physics	2	1	-	50	3	100	6
08.103	Engineering Chemistry	2	1	-	50	3	100	6
08.104	Engineering Graphics	1	-	2	50	3	100	6
08.105	Engineering Mechanics	2	1	-	50	3	100	6
08.106	Basic Civil Engineering	2	1	-	50	3	100	6
08.107	Basic Mechanical Engineering	2	1	-	50	3	100	6
08.108	Basic Electrical & Electronics Engineering	2	1	-	50	3	100	6
08.109	Basic Communication & Information Engineering	2	1	-	50	3	100	6
08.110	Engineering Workshops	-	-	2	50	3	100	4
	TOTAL	17	8	4	500		1000	58
TOTAL MARKS 1500 TOTAL CREDITS 58								

Note: 08.109 Subject shall be handled by the faculty of Electronics & Communication Dept.in the Colleges.

BRANCH: ELECTRONICS & COMMUNICATION SEMESTER III								
Course No.	Name of Subject	Weekly load hrs			Max. Sessional Marks	Exam Duration Hrs	Exam Max. Marks	Credits
		L	T	D/P				
08.301	Engineering Mathematics II(CMPUNERFHBTA)	3	1	-	50	3	100	4
08.302	Solid State Devices (TA)	3	1	-	50	3	100	4
08.303	Network Analysis (TA)	3	1	-	50	3	100	4
08.304	Programming in C++ & Data Structures (TA)	2	-	2	50	3	100	4
08.305	Electronics Circuits I (T)	3	1	-	50	3	100	4
08.306	Digital Electronics (T)	2	1	-	50	3	100	3
08.307	Electronics Devices Lab (TA)	-	-	3	50	3	100	3
08.308	Digital Integrated Circuits Lab (T)	-	-	3	50	3	100	3
	TOTAL	16	5	8	400		800	29
TOTAL MARKS 1200 TOTAL CREDITS 29								

Note: 08.304 shall be handled by faculty of Electronics & Communication Dept.

BRANCH: ELECTRONICS & COMMUNICATION SEMESTER IV								
Course No.	Name of Subject	Weekly load hrs			Max. Sessional Marks	Exam Duration Hrs	Exam Max. Marks	Credits
		L	T	D/P				
08.401	Engineering Mathematics III - Probability & Random Processes (TA)	3	1	-	50	3	100	4
08.402	Humanities (CTARFHD)	3	-	-	50	3	100	3
08.403	Signals & Systems (TA)	3	1	-	50	3	100	4
08.404	Electronics Circuits II (T)	2	1	-	50	3	100	3
08.405	Analog Integrated Circuits (T)	3	1	-	50	3	100	4
08.406	Analog Communication (T)	2	1	-	50	3	100	3
08.407	Electronics Circuits Lab (T)	-	-	4	50	3	100	4
08.408	Analog Integrated Circuits Lab (T)	-	-	4	50	3	100	4
	TOTAL	16	5	8	400		800	29
TOTAL MARKS 1200 TOTAL CREDITS 29								

Note:08.401 shall be handled by faculty of Mathematics Dept.

ALL ELECTIVES FROM SEMESTER V TO VIII EXCEPT 08.556 SHALL BE HANDLED BY FACULTY OF ELECTRONICS & COMMUNICATION DEPT.

BRANCH: ELECTRONICS & COMMUNICATION SEMESTER V								
Course No.	Name of Subject	Weekly load hrs			Max. Sessional Marks	Exam Duration Hrs	Exam Max. Marks	Credits
		L	T	D/P				
08.501	Engineering Mathematics IV - Complex Analysis & Linear Algebra(TA)	3	1	-	50	3	100	4
08.502	Digital Signal Processing (TA)	3	1	-	50	3	100	4
08.503	Computer Organisation & Architecture (TA)	2	1	-	50	3	100	3
08.504	Electrical Drives & Control (T)	2	1	-	50	3	100	3
08.505	Applied Electromagnetic Theory (T)	3	1	-	50	3	100	4
	Elective I (TA) or (T)	2	1	-	50	3	100	3
08.507	Communication Engineering Lab (T)	-	-	4	50	3	100	4
08.508	Digital Signal Processing Lab (T)	-	-	4	50	3	100	4
	TOTAL	15	6	8	400		800	29
TOTAL MARKS 1200		TOTAL CREDITS 29						

Elective I	
08.506	Logic Synthesis & Verification (TA)
08.516	Fuzzy Systems & Applications (TA)
08.526	System Software (TA)
08.536	Artificial Neural Networks (TA)
08.546	Digital Systems Design with VHDL (TA)
08.556	Professional Communication (TA)
08.566	Electromagnetic Compatibility (T)

Note:08.501 shall be handled by faculty of Mathematics Dept.

BRANCH: ELECTRONICS & COMMUNICATION SEMESTER VI								
Course No.	Name of Subject	Weekly load hrs			Max. Sessional Marks	Exam Duration Hrs	Exam Max. Marks	Credits
		L	T	D/P				
08.601	Microcontroller Based System Design (TA)	3	1	-	50	3	100	4
08.602	VLSI Design (TA)	3	1	-	50	3	100	4
08.603	Control Systems (T)	2	1	-	50	3	100	3
08.604	Digital Communication (T)	3	1	-	50	3	100	4
08.605	Antenna & Wave Propagation (T)	2	1	-	50	3	100	3
	Elective II (TA) or (T)	2	1	-	50	3	100	3
08.607	Microcontroller Lab(TA)	-	-	4	50	3	100	4
08.608	Electronic Product Design & Mini Project (TA)	1	-	3	50	3	100	4
	TOTAL	16	6	7	400		800	29
TOTAL MARKS 1200 TOTAL CREDITS 29								

Elective II	
08.606	Speech Processing (TA)
08.616	Adaptive Signal Processing. (TA)
08.626	Digital Image Processing (TA)
08.636	Wavelets & Applications (TA)
08.646	Digital Signal Processors (TA)
08.656	Optimization Techniques (TA)
08.666	Electronic Instrumentation(T)

BRANCH: ELECTRONICS & COMMUNICATION SEMESTER VII								
Course No.	Name of Subject	Weekly load hrs			Max. Sessional Marks	Exam Duration Hrs	Exam Max. Marks	Credits
		L	T	D/P				
08.701	Industrial Management (TA)	2	1	-	50	3	100	3
08.702	Optical Communication (T)	3	1	-	50	3	100	4
08.703	Microwave Engineering (T)	3	1	-	50	3	100	4
08.704	Information Theory & Coding (T)	3	1	-	50	3	100	4
	Elective III (TA) or (T)	2	1	-	50	3	100	3
	Elective IV (TA) or (T)	2	1	-	50	3	100	3
08.707	Industrial Electronics Lab (T)	-	-	3	50	3	100	3
08.708	Communication Systems Lab (T)	-	-	3	50	3	100	3
08.709	Seminar (TA)	-	-	1	50	-	-	1
08.710	Project Design (TA)	-	1	-	50	-	-	1
	TOTAL	15	7	7	500		800	29
TOTAL MARKS 1300 TOTAL CREDITS 29								

Elective III	
08.705	Real Time Operating Systems (TA)
08.715	Cryptography (TA)
08.725	Pattern Recognition (TA)
08.735	Optoelectronic Devices (TA)
08.745	Computer Vision (TA)
08.755	CDMA Systems (T)

Elective IV	
08.706	Mixed Signal Circuits Design (TA)
08.716	Embedded Systems (TA)
08.726	Intellectual Property Rights (TA)
08.736	MEMS (TA)
08.746	Low Power VLSI Design (TA)
08.756	Antenna Design (T)

BRANCH: ELECTRONICS & COMMUNICATION SEMESTER VIII								
Course No.	Name of Subject	Weekly load hrs			Max. Sessional Marks	Exam Duration Hrs	Exam Max. Marks	Credits
		L	T	D/P				
08.801	Nanoelectronics (TA)	2	1	-	50	3	100	3
08.802	Radar & Television Engineering (T)	3	1	-	50	3	100	4
08.803	Computer Communication (T)	2	1	-	50	3	100	3
08.804	Satellite & Mobile Communication (T)	3	1	-	50	3	100	4
	Elective V (T)	2	1	-	50	3	100	3
	Elective VI (T)	2	1	-	50	3	100	3
08.807	Microwave & Optical Communication Lab (T)	-	-	4	50	3	100	4
08.808	Project (TA)	-	-	5	150	-	-	3
08.809	Viva – Voce (TA)	-	-	-	-	3	100	2
	TOTAL	14	6	9	500		800	29
TOTAL MARKS 1300 TOTAL CREDITS 29								

Elective V	
08.805	Aviation Electronics (T)
08.815	Integrated Optics & Photonic Systems (T)
08.825	Microwave Devices & Circuits(T)
08.835	Discrete Control & Navigation Systems (T)
08.845	Artificial Intelligence and Robotics (T)

Elective VI	
08.806	Modelling & Simulation of Communication Systems (T)
08.816	Biomedical Engineering (T)
08.826	Information Security (T)
08.836	Digital Instrumentation (T)
08.846	Current Topics (T)

Syllabus I & II Semester
(Common To All Branches)

08-101 ENGINEERING MATHEMATICS- 1

L-T-P : 2-1-0

Credits: 6

MODULE- 1

Applications of differentiation:– Definition of Hyperbolic functions and their derivatives- Successive differentiation- Leibnitz’ Theorem(without proof)- Curvature- Radius of curvature- centre of curvature- Evolute (Cartesian ,polar and parametric forms)

Partial differentiation and applications:– Partial derivatives- Euler’s theorem on homogeneous functions- Total derivatives- Jacobians- Errors and approximations- Taylor’s series (one and two variables) - Maxima and minima of functions of two variables - Lagrange’s method- Leibnitz rule on differentiation under integral sign.

Vector differentiation and applications :- Scalar and vector functions- differentiation of vector functions-Velocity and acceleration- Scalar and vector fields- Operator ∇ - Gradient- Physical interpretation of gradient- Directional derivative- Divergence- Curl- Identities involving ∇ (no proof) - Irrotational and solenoidal fields – Scalar potential.

MODULE-II

Laplace transforms:– Transforms of elementary functions - shifting property- Inverse transforms- Transforms of derivatives and integrals- Transform functions multiplied by t and divided by t - Convolution theorem(without proof)-Transforms of unit step function, unit impulse function and periodic functions-second shifting theorem- Solution of ordinary differential equations with constant coefficients using Laplace transforms.

Differential Equations and Applications:– Linear differential equations with constant coefficients- Method of variation of parameters - Cauchy and Legendre equations –Simultaneous linear equations with constant coefficients- Application to orthogonal trajectories (cartisian form only).

MODULE-III

Matrices:–Rank of a matrix- Elementary transformations- Equivalent matrices- Inverse of a matrix by gauss-Jordan method- Echelon form and normal form- Linear dependence and independence of vectors- Consistency- Solution of a system linear equations-Non homogeneous and homogeneous equations- Eigen values and eigen vectors – Properties of eigen values and eigen vectors- Cayley Hamilton theorem(no proof)- Diagonalisation- Quadratic forms- Reduction to canonical forms-Nature of quadratic forms-Definiteness,rank,signature and index.

REFERENCES

1. Kreyszig; *Advanced Engineering Mathematics*, 8th edition, Wiley Eastern.
2. Peter O’ Neil ; *Advanced Engineering Mathematics*, Thomson
3. B.S.Grewal ; *Higher Engineering Mathematics*, Khanna Publishers
4. B.V.Ramana; *Higher Engineering Mathematics*, Tata Mc Graw Hill, 2006
5. Michel D Greenberg; *Advanced Engineering Mathematics*, Pearson International
6. Sureshan J, Nazarudeen and Royson; *Engineering Mathematics I*, Zenith Publications

08.102 ENGINEERING PHYSICS

L-T-P: 2-1- 0

Credits: 6

MODULE-I

Oscillations and Waves

Basic ideas of harmonic oscillations – Differential equation of a SHM and its solution. Theory of damped harmonic oscillations. Quality factor. Theory of forced harmonic oscillations and resonance. Types of waves. One dimensional waves – Differential Equation. Harmonic waves. Three dimensional waves - Differential Equation and solution. Plane waves and spherical waves. Energy in wave motion. Velocity of transverse waves along a stretched string.

Electromagnetic Theory

Del operator – grad, div, curl and their physical significance. Concept of displacement current. Deduction of Maxwell's equations. Prediction of electromagnetic waves. Transverse nature of electromagnetic waves. \mathbf{E} and \mathbf{H} are at right angles. Poynting's theorem (qualitative only)

Physics of Solids

Space lattice. Unit cell and lattice parameters. Crystal systems. Co-ordination number and packing factor with reference to simple cubic, body centered cubic and face centered cubic crystals. Directions and planes. Miller indices. Interplanar spacing in terms of Miller indices. Super conductivity - Meissner effect. Type-I and Type-II superconductors. BCS theory (qualitative). High temperature superconductors. Applications of superconductors. Introduction to new materials (qualitative) - Metallic glasses, Nano materials, Shape memory alloys, Bio materials.

MODULE- II

Interference of Light

Concept of temporal and spatial coherence. Interference in thin films and wedge shaped films. Newton's rings. Michelson's interferometer. Determination of wave length and thickness. Interference filters. Antireflection coating.

Diffraction of Light

Fresnel and Fraunhofer diffraction. Fraunhofer diffraction at a single slit. Fraunhofer diffraction at a circular aperture (qualitative). Rayleigh's criterion for resolution. Resolving power of telescope and microscope. Plane transmission grating. Resolving power of grating. Grating equation. X-ray diffraction. Bragg's law.

Polarization of Light

Types of polarized light. Double refraction. Nicol Prism. Retardation plates. Theory of plane, circular and elliptically polarized light. Production and analysis of circularly and elliptically polarized light. Polaroids. Induced birefringence. Photo elasticity – isoclinic and isochromatic fringes – photo elastic bench

Special Theory of Relativity

Michelson-Morley experiment. Einstein's postulates. Lorentz transformation equations (no derivation). Simultaneity. Length contraction. Time dilation. Velocity addition. Relativistic mass. Mass energy relation. Mass less particle.

MODULE – III

Quantum Mechanics

Dual nature of matter. Wave function. Uncertainty principle. Energy and momentum operators. Eigen values and functions. Expectation values. Time Dependent and Time Independent Schrodinger equations. Particle in one dimensional box. Tunnelling (qualitative).

Statistical Mechanics

Macrostates and Microstates. Phase space. Basic postulates of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics. Distribution equations in the three cases (no derivation). Bosons and Fermions. Density of states. Derivation of Planck's formula. Free electrons in a metal as a Fermi gas. Fermi energy.

Laser

Einstein's coefficients. Population inversion and stimulated emission. Optical resonant cavity. Ruby Laser, Helium-Neon Laser, Carbon dioxide Laser (qualitative). Semiconductor Laser (qualitative). Holography. Fiber Optics - Numerical Aperture and acceptance angle. Types of optical fibers. Applications.

REFERENCE:

1. Sears & Zemansky ; University Physics. XI Edn.,; Pearson
2. Frank & Leno; Introduction to Optics. III Edn., , Pearson
3. J.C. Upadhyaya; Mechanics., Ram Prasad & Sons
4. David J Griffiths; Introduction to Electrodynamics, III Edn, , Pearson
5. M Ali Omar; Elementary Solid State Physics., Pearson
6. S O Pillai; Solid State Physics., New Age International Publishers
7. John R Taylor, Chris D Zafiratos & Michael A Dubson; Modern Physics for Scientists and Engineers. II Edn, Prentice Hall of India
8. Eugene Hecht; Optics. IV Edn, Pearson
9. Robert Resnick ; Introduction to Special Relativity., John Willey and Sons
10. Richard L Libboff; Introduction to Quantum Mechanics. IV Edn, Pearson
11. Donald A Mcquarrie; Statistical Mechanics., Vivo Books
12. Mark Ratner& Daniel Ratner; Nanotechnology.
13. T.A. Hassan et al; A Text Book of Engineering Physics., Aswathy Publishers, Trivandrum
14. B. Premlet; Advanced Engineering Physics , Phasor Books, Kollam.

LIST OF DEMONSTRATION EXPERIMENTS

1. Newton's Rings – Determination of wave length.
2. Air Wedge – Diameter of a thin wire
3. Spectrometer – Plane transmission grating – wavelength of light.
4. Spectrometer – Refractive indices of calcite for the ordinary and extraordinary rays.
5. Laser – Diffraction at a narrow slit.
6. Laser – Diffraction at a straight wire or circular aperture.
7. Michelson's interferometer – Wavelength of light.
8. Michelson's interferometer – Thickness of thin transparent film.
9. Polarization by reflection – Brewster's law.
10. Computer stimulation – superposition of waves.
11. Computer stimulation – study of **E** & **H**. (Gauss' law & Ampere's law)

Pattern of Question Paper

University examination is for a maximum of **100 marks**, in **3 hour** duration. The syllabus is spread in 3 modules. The question paper will consist of two parts (A and B).

Part A contains short answer questions for **40 marks**. This part contains 10 questions without any choice, **each of 4 marks** (uniformly taken from all modules).

Part B contains long answer questions for **60 marks**. From each module, this part contains 3 questions out of which 2 are to be answered, **each of 10 marks**. Long answer questions from all the 3 modules will form 60 marks.

08.103 ENGINEERING CHEMISTRY

L-T-P: 2-1-0

Credits: 6

MODULE-1

Electrochemistry - Electrodes- Electrode potential- Origin of electrode potential- Helmholtz double layer- Nernst equation and application- Reference electrodes- Standard hydrogen electrode- Saturated calomel electrode- Quinhydrone electrode-Determination of P^H using these electrodes- Concentration cells- Fuel cells- Secondary cells- Lead acid cell- Nickel cadmium cell- Lithium-ion cell. - Conductometric and Potentiometric titrations (acid base, oxidation reduction and precipitation titrations). (12hrs)

Corrosion and its control- Theories of corrosion (chemical corrosion and electrochemical corrosion)- Galvanic series- Types of corrosion (Concentration cell corrosion, Stress corrosion, Galvanic corrosion) - Factors affecting corrosion (nature of metal and nature of environment) and different methods of corrosion control (corrosion inhibitors, cathodic protection). (5hrs)

Protective coatings- Metallic coatings- Chemical conversion coatings- paint (4hrs)

Nano materials- Introduction-Classification-preparation (laser ablation technique and sputtering technique)- Chemical method (reduction)-Properties and Applications of nano materials-Nano tubes-Nano wires. (4hrs)

MODULE-2

Water treatment- Types of hardness- Degree of hardness- Related problems- Estimation of hardness- by EDTA method- Sludge and scales in boilers- Priming and foaming- Boiler corrosion- Water softening methods, Lime-soda process, Ion exchange methods-Internal treatments (colloidal, carbonate, phosphate and calgon conditioning)- Domestic water treatment- Methods of disinfection of water-Desalination process (Reverse osmosis, electro dialysis- Distillation). (12hrs)

Environmental damages and prevention- Air pollution- CFCs and ozone depletion- Alternative refrigerants-Green house effect-Water pollution- BOD and COD- Waste water treatment- Aerobic - Anaerobic and USAB processes. (3hrs)

Thermal methods of analysis-Basic principles involved in Thermo gravimetry, Differential thermal analysis and applications. (2hrs)

Spectroscopy- Molecular energy levels-Types of molecular spectra- Electronic spectra (Classification of electronic transitions- Beer Lamberts law, Vibrational spectra (mechanism of interaction and application), Rotational spectra (Determination of bond length and application). NMR spectra (Basic principle, chemical shift, spin-spin splitting) (6hrs)

Chromatography- General principles- High performance liquid chromatography- Gas chromatography. (2hrs)

MODULE-3

Polymers- Classifications- Mechanism of polymerisation (Addition, free radical, cationic, anionic and coordination polymerisation)- Thermoplastics and thermosetting plastics-Compounding of plastics- Moulding techniques of plastics (Compression, Injection, Transfer and Extrusion moulding)- Preparation, properties and uses of PVC, PVA, PMMA, Nylon, PET, Bakelite, Urea formaldehyde resin- Silicon polymers- Biodegradable plastics. Elastomers- structure of natural rubber- vulcanisation- synthetic rubbers (Buna-S, Butyl rubber and Neoprene) (12hrs)

Organo electronic compounds -Super conducting and conducting organic materials like Polyaniline, polyacetylene and [polypyrrol and its applications. (2hrs)

Fuels- Calorific value- HCV and LCV-Experimental determination of calorific value-Theoretical calculation of calorific value by Dulong's formula - Bio fuels -Bio hydrogen and Bio-diesel (5hrs)

Lubricants- Introduction-Mechanism of lubrication- solid and liquid lubricant- Properties of lubricants-Viscosity index- flash and fire point- cloud and pour point- aniline value. (4hrs)

Cement- Manufacture of Portland cement- Theory of setting and hardening of cement (2hrs)

LAB-EXPERIMENTS (DEMONSTRATION ONLY)

1. Estimation of total hardness in water using EDTA.
2. Estimation of chloride ions in domestic water.
3. Estimation of dissolved oxygen.
4. Estimation of COD in sewage water.
5. Estimation of available chlorine in bleaching powder.
6. Estimation of copper in brass.
7. Estimation of iron in a sample of hematite.
8. Determination of flash and fire point of a lubricating oil by Pensky Marten's apparatus.
9. Potentiometric titrations.
10. Preparation of buffers and standardisation of pH meter.
11. Determination of molarity of HCl solution pH -metrically.
12. Determinations of pH using glass electrode and quinhydrone electrode.

REFERENCES

1. H.A. Willard, L.L. Merritt and J.A. Dean ; *Instrumental methods of analysis*
2. A.K. De ; *Environmental Chemistry*
3. K.J.Klaunig; *Nanoscale materials in chemistry*
4. B.R. Gowariker ; *Polymer science*
5. B.W.Gonser ; *Modern materials*
6. V.Raghavan; *Material Science and engineering. A first course*
7. L.H. Van Vlack ; *Elements of Material science and Engineering*
8. J.W.Goodby ; *Chemistry of liquid crystals*
9. S.Glasstone ; *A text book of physical chemistry*
10. P.C. Jain; *Engineering Chemistry*
11. Juhaina Ahad ; *Engineering Chemistry*
12. Shashi Chawla ; *A text book of Engineering Chemistry*
13. R. Gopalan, D.Venkappayya & S. Nagarajan ; *Engineering Chemistry*
14. J.C. Kuriakose and J. Rajaram ; *Chemistry of Engineering and Technology volume I & II*
15. R.N Goyal and Harmendra Goyal; *Engineering Chemistry, Ane Students Edition, Thiruvananthapur*

08.104 ENGINEERING GRAPHICS

L- T-D: 1-0-2

CREDITS: 6

INTRODUCTION: Introduction to technical drawing and its language. Lines, lettering, dimensioning, scaling of figures, symbols and drawing instruments. (1 sheet practice)

MODULE 1

PLAIN CURVES: Conic sections by eccentricity method. Construction of ellipse: (i) Arc of circles method (ii) Rectangle method (ii) Concentric circles method. Construction of parabola (i) Rectangle method (ii) Tangent method. Construction of hyperbola (i) Arc of circles method (ii) given ordinate, abscissa and the transverse axis (iii) given the asymptotes and a point on the curve. Construction of Tangent and Normal at any point on these curves

MISCELLANEOUS CURVES: Construction of Cycloid, Epicycloid and Hypocycloid, Involute of a circle. Archimedian spiral, Logarithmic spiral and Helix. Construction of Tangent and Normal at any point on these curves

PROJECTION OF POINTS AND LINES: Types of projections, Principles of Orthographic projection. Projections of points and lines. Determination of true length, inclination with planes of projection and traces of lines.

MODULE II

PROJECTION OF SOLIDS: Projection of simple solids such as prisms, pyramids, cone, cylinder, tetrahedron, octahedron, sphere and their auxiliary projections.

SECTIONS OF SOLIDS: Types of cutting planes, section of simple solids cut by parallel, perpendicular and inclined cutting planes. Their projections and true shape of cut sections.

DEVELOPMENT OF SURFACES: Development of surfaces of (i) simple solids like prisms, pyramids, cylinder and cone (ii) Cut regular solids.

MODULE III

ISOMETRIC PROJECTION: Isometric scale, Isometric view and projections of simple solids like prisms, pyramids, cylinder, cone sphere, frustum of solids and also their combinations.

INTERSECTION OF SURFACES: Intersection of surfaces of two solids as given below.

(i) Cylinder and cylinder

(ii) Prism and prism.

(iii) Cone and Cylinder

(Only cases where the axes are perpendicular to each other and intersecting with or without offset.)

PERSPECTIVE PROJECTION: Principles of perspective projection, definition of perspective terminology. Perspective projection of simple solids like prisms and pyramids in simple positions.

CAD: Introduction to CAD systems, Benefits of CAD, Various Soft wares for CAD, Demonstration of any one CAD software.

General Note:

(i) First angle projection to be followed

(ii) Question paper shall contain 3 questions from each module, except from CAD. Students are required to answer any two questions from each module.

(iii) Distribution of marks

Module -I 2 x 16 = 32

Module -II 2 x 17 = 34

Module III 2 x 17 = 34

100

REFERENCES

1. Luzadder and Duff ; *Fundamentals of Engineering Drawing*
2. N. D. Bhatt ; *Engineering Drawing*
3. K. Venugopal ; *Engineering Drawing and Graphics*
4. P.S. Gill; *Engineering Graphics*
5. P.I. Varghese; *Engineering Graphics*
6. K.R. Gopalakrishnan; *Engineering Drawing*
7. Thamaraselvi; *Engineering Drawing*
8. K.C. John; *Engineering Graphics*
9. K.N. Anil Kumar; *Engineering Graphics*

08.105 ENGINEERING MECHANICS

L-T-P: 2 - 1 - 0

Credits: 6

MODULE I (20 HRS)

Idealizations of Mechanics- Elements of vector algebra

Statics of rigid bodies-Classification of force systems- principle of transmissibility of a force-composition and resolution- Resultant and Equilibrant of coplanar concurrent force systems-various analytical methods- Lami's theorem, method of resolution- Conditions of equilibrium-

Moment of a force, couple, properties of couple- Varignon's theorem- Resultant and equilibrant of coplanar non-concurrent force systems- Conditions of equilibrium. Equilibrium of rigid bodies-free body diagrams.(simple problems)

Types of supports - types of beams - types of loading- Support reactions of simply supported and overhanging beams under different types of loading.

Forces in space, equations of equilibrium, Vector approach.

Friction-Laws of friction-angle of friction- cone of friction- ladder friction- wedge friction.

MODULE II (20 HRS)

Properties of surfaces- centroid of composite areas- Theorems of Pappus-Guldinus- Moment of inertia of areas, Parallel and perpendicular axes theorems- Radius of Gyration- moment of inertia of composite areas.

Dynamics: Kinematics-Combined motion of translation and rotation-instantaneous centre, motion of link, motion of connecting rod and piston, wheel rolling without slipping.

Relative velocity - basic concepts-analysis of different types of problems

Kinetics- Newton's laws of translatory motion- D'Alembert's principle- Motion of lift- Motion of connected bodies.

MODULE III (20 HRS)

Work, Power and Energy - Work-Energy principle-Impulse, Momentum.

Collision of elastic bodies-Law of conservation of momentum-Direct and oblique impact between elastic bodies and impact with fixed plane.

Curvilinear motion- D'Alembert's principle in curvilinear motion- Mass moment of inertia of rings, solid discs and solid spheres (no derivations required)Angular momentum-Angular impulse.

Kinetics of rigid bodies under combined translatory and rotational motion – work – energy principle for rigid bodies.

Centrifugal and centripetal forces – motion of vehicles on curved paths in horizontal and vertical planes – super elevation – stability of vehicles moving in curved paths (qualitative ideas only).

Simple harmonic motion – vibration of mechanical systems - basic elements of a vibrating system – spring mass model – undamped free vibrations – angular free vibration – simple pendulum.

REFERENCES:

1. Beer & Johnston, "Vector Mechanics for Engineers – Statics and Dynamics", Tata Mc-Graw Hill Publishing Company Limited, New Delhi, 2005.
2. Irving. H. Shames, "Engineering Mechanics", Prentice Hall Book Company, 1966.
3. Timoshenko S. & Young D. H., "Engineering Mechanics", Mc-Graw Hill –International Edition
4. Popov, "Mechanics of Solids", Pearson Education,2007
5. Kumar K.L., "Engineering Mechanics", Tata Mc-Graw Hill Publishing Company Limited, New Delhi, 1998.
6. Rajasekaran S. & Sankarasubramanian G., "Engineering Mechanics", Vikas Publishing House Private Limited, New Delhi, 2003.
7. Tayal A K, "Engineering Mechanics- Statics and Dynamics" , Umesh Publications, Delhi,2004

8. Benjamin J., "Engineering Mechanics", Pentex Book Publishers and Distributors, Kollam, 2008

Note

Question For University Examination:- Part A – 8 compulsory questions covering entire syllabus, 5 marks each. ($5 \times 8 = 40$) Part B – Three questions of 10 marks from each module, out of which two should be answered ($10 \times 2 \times 3 = 60$).

08.106 BASIC CIVIL ENGINEERING

L-T-P: 2- 1 - 0

Credits: 6

MODULE I

Surveying: Object and Principles of Surveying.

Linear Measurements: Direct measurements - Tape & chain only - Ranging out survey lines-Taking measurements of sloping ground - Errors - Tape correction (problems).

Levelling: Levelling instruments - Level (Dumpy Level, Tilting Level) Levelling Staff. Measurements in levelling - Temporary adjustments of a level, holding the staff, reading the staff - Principles of leveling - recording measurements in the field book - reduction of level - height of collimation method only (simple examples).

Contour maps (Brief description only). Computation of areas - Mid ordinate rule, average ordinate rule, Trapezoidal rule, Simpson's rule (examples)- Introduction to Distomat, Total Station & GPS (Brief description only)

MODULE II

Building construction: Selection of site for buildings - types of buildings - Components of buildings.

Foundation: Different types - Spread footing, Isolated footing, Combined footing, Mat foundation, Pile foundation (description only).

Safe Bearing Capacity of Soil: Importance of determination of the Safe Bearing Capacity of Soil (brief description only).

Super structure: Masonry - stone masonry, brick masonry –Types- desirable qualities of stone and brick.

Partition: Materials used for making partition - plywood, particle boards & glass.

Doors, windows & ventilators : Types - materials used for the construction of doors and windows - wood, steel & Aluminium.

Plastering: Mortar – properties - Preparation of Cement mortar

Painting: Preparation of surfaces for painting - plastered, wood and steel surfaces- Types of paint - enamel, emulsion & distemper. Flooring: Types - mosaic tiles, ceramic tiles, marble, granite and synthetic materials. Roofing: Selection of type of roof -flat roof, sloping roof -Concrete roof, tiled roof. Selection of roof covering materials. GI Sheet , AC Sheet, PVC Sheet

MODULE III

Concrete: Ingredients- cement, aggregate, and water. Qualities of ingredients (brief description only).

Tests on Cement - consistency, initial and final setting times. Compressive strength -IS Specifications.

Aggregates – desirable qualities of fine and coarse aggregates

Plain Cement Concrete (PCC): preparation-proportioning-mixing of concrete.

Steel-common types used in construction- Mild Steel, HYSD Steel and their properties.

Reinforced Cement Concrete (RCC)-advantages of RCC over Plain Cement Concrete.

Elementary ideas on pre-cast and pre-stressed concrete constructions.

Building services – vertical transportation – stairs – types, escalators and elevators, ramps (brief description only). Plumbing services- brief description of water supply and sewage disposal arrangements for residential buildings.

REFERENCE:

1. Adler R., Vertical Transportation for Buildings, American Elsevier Publishing Company, New York.1970
2. B.C Punmia, "Surveying & Leveling" Vol. – I, Laxmi publications(P) Ltd,N.Delhi, 2004
3. Rangwala., Building Materials,Charotar publishing house, 2001
4. Rangwala, "Building Construction" , Charotar Publishing House., 2004
5. S.K. Roy, "Fundamentals of Surveying" Prentice-Hall of India, New Delhi.2004

6. Rangwala., "Water Supply and Sanitary Engineering", Charotar Publishing House. 1990
7. Moorthy, "Building Construction", Modern Publishing House distributor., 1957
8. Jha and Sinha, "Construction and Technology"
9. Narayanan and Lalu Mangal , "Introduction to Civil Engineering" Phasor Books, Kollam.
10. Santha Minu, "Basic Civil Engineering" Karunya Publications, Trivandrum

Note: The question paper will consist of two parts. Part I and part II..

Part I is Compulsory covering the entire syllabus, for 40 marks. It contains 8 questions of 5 marks each.

Part II is to cover 3 modules. There will be two questions (20 marks each) from each module out of which one from each module is to be answered. (20 X 3 = 60)

08.107 BASIC MECHANICAL ENGINEERING

L-T-P/D: 2-1-0

Credits: 6

MODULE I

Thermodynamics : Basic concepts and definitions of Zeroth law, First law, Second law of thermodynamics- concept of reversibility and entropy. p-v and T-s diagrams

Air cycles: Carnot, Otto and Diesel cycles-Air standard efficiency (simple problems)

IC Engines: Working and comparison of two stroke and four stroke petrol and diesel engines - general description of various systems using block diagrams – air system, fuel system, ignition system and governing system. A brief description of CRDI, MPFI, GDI and Hybrid Vehicles

Steam boilers: Classification – Cochran boiler, Babcock and Wilcox boiler, Benson boiler- fluidized bed combustion,

MODULE II

Principles and fields of application of - compressors - reciprocating and centrifugal, blower, pumps- reciprocating, centrifugal and jet pumps, steam and hydraulic turbines- impulse and reaction, gas turbine cycles- open and closed

Elementary ideas of hydro electric, thermal and nuclear power plants

Refrigeration & Air Conditioning: Refrigerants, CFC free refrigerants. Vapor compression refrigeration system, Comfort and Industrial air conditioning-typical window air conditioning unit (general description only).

MODULE III

Mechanical Power transmission systems: Belt, rope and gear drives-types, comparison and fields of application-velocity ratio-slip (simple problems) friction disc, single plate clutch, gear trains (no derivations).

Manufacturing processes: Elementary ideas of casting, forging, rolling, welding, soldering and brazing

Machining processes- turning, taper turning, thread cutting, shaping, drilling, grinding, milling (simple sketches and short notes).

Non conventional machining - Electro discharge machining (EDM) and Electro chemical machining (ECM)

Principle, application and advantages of C N C machine

REFERENCES

1. Spalding and Cole, "Engineering Thermodynamics"
2. Gill, Smith and Zuirys, "Fundamentals of IC Engines"
3. Amstead, Ostwald and Begeman, "Manufacturing processes"
4. Crouse, "Automobile Engineering"
5. Roy and Choudhary, "Elements of Mechanical Engineering"
6. Hajra Choudhary, "Workshop Technology"
7. R K Bensal, "Fluid mechanics and machines"
8. J Benjamin, "Basic Mechanical Engineering"

Note: Lectures are to be supplemented by demonstration in laboratories.

Note: The question paper will consist of two parts. Part I is to be compulsory for 40 marks. This may contain 10 questions of 4 marks each. Part II is to cover 3 modules. There can be 3 questions from each module (10 marks each) out of which 2 are to be answered.

08.108 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L-T-P:2-1-0 **Credits 6**

MODULE – I

Elementary concepts - Kirchhoff's laws - Magnetic Circuits - MMF, field strength, flux density, reluctance – problems in series magnetic circuits. Review of electromagnetic induction - Faraday's laws, Lenz's law - statically induced and dynamically induced emf - self and mutual induction - inductance.

Alternating current fundamentals - generation of alternating currents – waveforms - frequency - period - average and rms values - form factor. Phasor representation of alternating quantities - rectangular polar and exponential forms.

Analysis of simple ac circuits – concept of impedance and admittance - phasor representation - j notation - power and power factor in ac circuits - active and reactive components. Solution of RL, RC and RLC series circuits.

Three phase systems - generation of three phase voltage - star and delta connection - relation between phase and line values of voltage and current - phasor representation - three wire and four wire systems.

Measurement of power in three phase circuits (two wattmeter method). Measurement of energy – working of 1-phase energy meter.

MODULE – II

Transformers - Principle of operation - EMF equation - constructional details of single phase and three phase transformers

Methods of bulk generation of electric power. Block schematic of layout of generating stations - hydroelectric, thermal and nuclear power plants. Renewable energy sources - solar, wind, tidal, wave and geothermal energy.

Bulk transmission of electric power - typical electrical power transmission scheme - need for high transmission voltage - substations - substation equipments. Primary and secondary transmission and distribution systems

Different methods of wiring for LT installations. Schematic layout of LT switchboards. Earthing of installations - necessity of earthing - plate and pipe earthing. Protective fuses, MCBs, ELCBs and switches.

Working of incandescent lamps, -fluorescent lamps, energy efficient lamps

MODULE – III

Diodes - PN junction diodes, V-I characteristics, dynamic & static resistance, principle of working and V-I characteristics of Zener diode, principle of Photo diode, Solar cell, & LED.

Rectifiers & power supplies - block diagram description of a dc power supply, circuit diagram & working of half-wave & full wave rectifier, final equations of V_{rms} , V_{dc} , ripple factor and peak inverse voltage in each case, principle of working of series inductor and shunt capacitor filters.

Working of simple zener voltage regulator.

Power devices – V – I characteristics and applications of SCR and Triac Working principle of UPS and SMPS

Transducers – Resistance strain gauge, thermistor, LVDT

REFERENCES

1. V.N. Mittle, "Basic Electrical Engineering", Tata McGraw Hill, 1990.
2. DP Kothari, LJ Nagrath, "Theory and Problems of Basic Electrical Engineering", Prentice Hall of India, 2000.
3. B.L. Thereja, "A Text Book of Electrical Technology", Volume I, S Chand & Co, New Delhi, 1992.
4. Francis M Fernandez, "A Basic Course in Electrical Engineering", Rajath Publishers, Ernakulam.

5. TP Imthias Ahmed, B. Premlet, "Introduction to Electrical Engineering", Phasor Books, Kollam
6. Gopakumar, "Introduction To Electronics and Communications", .Phasor Books, Kollam
7. Millman and Halkias, "Integrated Electronics: Analog and digital circuits and systems", McGraw-Hill Book Co
8. Edward Hughes, "Electrical and Electronic Technology", Pearson Education, 2002.
9. ML Soni, PU Guptha, US Bhatnagar and A Chakrabarthy, "A Text Book on Power System Engineering", Dhanpath Rai & Sons, New Delhi 1997
10. N.N.Bhargava, "Basic Electronics and Linear Circuits", Tata McGraw Hill
11. Rangan C.S., Sarma G.R., and Mani V.S.V., "Instrumentation Devices and Systems", Tata McGraw Hill, 1992.
12. Muhammad H. Rashid, "Power Electronic Circuits, Devices and Applications", Pearson education, Asia 2003.

Note : The question paper will consist of two parts. Part – A is to be compulsory for 40 marks (10 questions of 4 marks each). Part-B is to cover 3 modules for 60 marks. (50% choice- One out of two or two out of four from each module).

08.109 BASIC COMMUNICATION AND INFORMATION ENGINEERING

L-T-P: 2-1-0

Credits: 6

MODULE 1(Qualitative Treatment)

(a) Bipolar junction transistors: NPN & PNP transistors, structure, typical doping, working of NPN transistor, concepts of common base, common emitter & common collector configurations, current gain of each, input & output characteristics of common emitter configuration, comparison of three configurations with reference to voltage & current gain, input & output resistances and applications. (6 hrs)

(b) Field effect Transistors: basic principles of JFET, MESFET and MOSFET, comparison with BJT. (3 hrs)

(c) Amplifiers & Oscillators: circuit diagram & working of common emitter amplifier, function of each component in the circuit, need of proper biasing, frequency response, voltage gain and 3dB bandwidth, concepts of class A, B, AB and Class C power amplifiers, circuit diagram & working of push pull amplifiers, concepts of feedback, working principles of oscillators, circuit diagram & working of RC phase shift oscillator (7 hrs)

(d) Integrated circuits: advantages of ICs, analog and digital ICs, functional block diagram of operational amplifier, ideal operational amplifier, use as inverting amplifier, non inverting amplifier, summing amplifier, integrator and comparator. (4 hrs)

(e) Digital ICs: logic gates, realization of logic functions, principle of combinational and sequential logic circuits, flip flop (JK), logic families: TTL and CMOS Logic (No internal diagram) (4 hrs)

(f) IC fabrication: purification of silicon, crystal growth, wafer preparation. unit process: oxidation, diffusion, ion implantation, epitaxy, deposition, photolithography. (4 hrs)

MODULE 2 (Qualitative Treatment)

(a) Measurements: principle and block diagram of analog and digital multimeter, working principle of CRT, block diagram of CRO, measurements using CRO, principle of digital storage oscilloscope, principle and block diagram of function generator. (5hrs)

(b) Radio communication: principle of AM & FM, wave forms, bandwidths, block diagrams of AM & FM transmitters, principle of AM & FM demodulation, comparison of AM & FM, principle & block diagram of super heterodyne receiver. (4 hrs)

(c) Color television: TV Standards interlaced scanning, block diagram of PAL TV transmitter & receiver, basic principles of cable TV, CCTV system, basic principles of HDTV, basic principles of LCD & Plasma displays. (5 hrs)

(d) Radar and navigation: principle of radar and radar equation, block schematics of pulsed radar, factors affecting range, applications of radar in measurements and navigation. (4 hrs)

(e) Satellite communication: microwave frequency bands, concept of geo-stationary satellite, frequency bands used, satellite transponder, block diagram of earth station transmitter & receiver, advantages of satellite communication, principle of Global Positioning System(GPS). (3 hrs)

(f) Optical communication: block diagram of the optical communication system, principle of light transmission through fiber, concepts of Single Mode and Multi Mode optical fiber, working principle of source (semiconductor Laser) & detector (PIN, APD), advantages of optical communication. (5 hrs)

MODULE 3 (Qualitative Treatment)

(a) Computer Architecture: functional units: basic concept of ALU- data path and control, memory hierarchy, caches, main memory, virtual memory, operating systems, microprocessors - functional block diagram of 8085 (9 hrs)

(b) Data communication: overview, analog and digital data transmission, transmission media, digitization of wave forms, PCM, digital modulation techniques- ASK, PSK, FSK, basic concepts of error detection, parity checking. (6hrs)

(c) Mobile communication: basic principles of cellular communications, concepts of cells, frequency reuse, principle and block diagram of GSM, principle of CDMA, WLL & GPRS technologies.(4hrs)

(d) Internet Technology: concepts of networking: client - server computing, IP addresses, domain names, network interface unit - modem, switching technologies- circuit switching and packet switching, LAN,MAN,WAN &World wide web, network topologies, communication protocols- TCP/IP, Introduction to web languages-HTML,XML, internetworking concepts, network devices- basic principles of router, bridge, switch, network security- Firewall. (7 hrs)

REFERENCES

1. Santiram Kal, *Basic Electronics – Devices, Circuits and IT fundamentals*, PHI
2. Louis.E.Frenzel, *Principles of Electronic Communication Systems*, TMH
3. William Stallings, *Wireless Communications and Networks*, Pearson Education.
4. M.Moris Mano, *Computer Architecture*, PHI
5. Neil H E Weste,Kamran Eshraghian, *Principles of CMOS VLSI design – A system perspective*, Pearson Education [Module 1(f)]
6. David A. Bell, *Electronic Instrumentation and Measurements*, PHI .[Module 2(a)]
7. N N Bhargava,D C Kulshreshtha,S C Gupta, *Basic Electronics & Linear Circuits*, TMH
8. ITL Education Solution Ltd., *Introduction to Information Technology*, Pearson Education, 5th edition, 2008
9. R.R. Gulati, *Monochrome and Colour Television*, New Age International [Module 2 (c)]
10. K Gopakumar, *Introduction to Electronics & Communication*, 3rd edition, 2008,Phasor Publisher's,Kollam

This subject shall be handled by faculty of Dept.of Electronics and Communication.

Question Paper

The question paper shall consist of two parts. Part I is to cover the entire syllabus, and carries 40 marks. This shall contain 10 compulsory questions of 4 marks each. Part II is to cover 3 modules, and carries 60 marks. There shall be 3 questions from each module (10 marks each) out of which 2 are to be answered.

08.110 ENGINEERING WORKSHOPS

L-T-P: 0-0-2

CREDITS: 4

A. Carpentry:

Study of tools and joints. Practice in planning, chiseling, marking and sawing. Joints – Cross joint, T joint, Dove tail joint.

B. Fitting:

Study of tools, Practice in filing, cutting, drilling and tapping. Male and female joints, Stepped joints.

C: Sheet Metal Work:

Study of tools. Selection of different gauge GI sheets for jobs. Practice on riveted joints. Preparing tube joints, frustums, trays and containers.

D. Plumbing:

Study of tools. Details of plumbing work in domestic and industrial applications. Study of pipe joints, cutting, threading and laying of pipes with different fittings using PVC pipes. Use of special tools in plumbing work.

E: Foundry:

Study of tools. Preparation of sand, moulding practice and demonstration of casting.

F. Welding:

Study of welding machines. Straight line practices, Making of Butt joint, T joint and Lap joint.

G: Smithy:

Study of tools. Demonstration on forging of square prism, hexagonal bolt, T bolt and Eye bolt.

H: Machine Tools:

Study and demonstration on working of machine tools. Lathe and Drilling machine.

NOTE: For the university examination the student shall be examined in sections A, B, C, D and E only.