

**PONDICHERRY ENGINEERING COLLEGE
PUDUCHERRY – 605 014**



**BACHELOR OF TECHNOLOGY
(B.Tech. Degree Programme)**

**Regulations
&
Syllabus – First Year
(I & II Semester)
Common for All Branches
Effective from the academic year 2013-2014**

of

**PONDICHERRY UNIVERSITY
PUDUCHERRY – 605 014**

REGULATIONS

1. Conditions for Admission:

- (a) Candidates for admission to the first semester of the 8 semester B.Tech Degree programme should be required to have passed :

The Higher Secondary Examination of the (10+2) curriculum (Academic Stream) prescribed by the Government of Tamil Nadu or any other examination equivalent there to with minimum of 45% marks (40% marks for OBC and SC/ST candidates) in aggregate of subjects – Mathematics, Physics and any one of the following optional subjects: Chemistry / Biotechnology/ Computer Science / Biology (Botany & Zoology) or an Examination of any University or Authority recognized by the Executive Council of the Pondicherry University as equivalent thereto.

- (b) For Lateral entry in to third semester of the eight semester B.Tech programme :

The minimum qualification for admission is a pass in three year diploma or four year sandwich diploma course in engineering / technology from an AICTE approved institution with at least 45% marks (40% marks for OBC and SC/ST candidates) in aggregate in the subjects covered from 3rd to final semester or a pass in B.Sc. degree from a recognized university as defined by UGC with at least 45% marks (40% marks for OBC and SC/ST candidates) and passed XII standard with mathematics as a subject.

Provided that in case of students belonging to B.Sc Stream shall clear the subjects of Engineering Graphics and Engineering Mechanics of the first year Engineering program along with the second year subjects.

Provided further that, the students belonging to B.Sc Stream shall be considered only after filling the supernumerary seats in this category with students belonging to the Diploma stream.

The list of diploma programs approved for admission for each of the degree programs is given in **Annexure A**.

2. Age Limit :

The candidate should not have completed 21 years of age as on 1st July of the academic year under consideration. For Lateral Entry admission to second year of degree programme, there is no age limit. For SC/ST candidates age limited is relaxable by 3 years.

3. Duration of Programme :

The Bachelor of Technology degree programme shall extend over a period of 8 consecutive semesters spread over 4 academic years – two semesters constituting one academic year. The duration of each semester shall normally be 15 weeks excluding examinations.

4. Eligibility for the award of Degree:

No candidate shall be eligible for the award of the degree of Bachelor of Technology, unless he/she has undergone the course for a period of 8 semesters (4 academic years) / 6 semesters (3 academic years for Lateral Entry candidates) in the faculty of Engineering and has passed the prescribed examinations in all the semesters.

5. Branches of Study:

Branch I	- Civil Engineering
Branch II	- Mechanical Engineering
Branch III	- Electronics & Communication Engineering
Branch IV	- Computer Science & Engineering
Branch V	- Electrical & Electronics Engineering
Branch VI	- Chemical Engineering
Branch VII	- Electronics & Instrumentation Engineering
Branch VIII	- Information Technology
Branch IX	- Instrumentation & Control Engineering
Branch X	- Biomedical Engineering

or any other branches of study as and when offered. The branch allocation shall be ordinarily done at the time of admission of the candidate to the first semester.

6. Subjects of Study:

The subjects of study shall include theory and practical courses as given in the curriculum and shall be in accordance with the prescribed syllabus. The subjects of study for the first two semesters shall be common for all branches of study.

7. Examinations:

The theory and practical examinations shall comprise continuous assessment throughout the semester in all subjects as well as university examinations conducted by Pondicherry University at the end of the semester (November / December or April / May).

(a) Theory courses for which there is a written paper of 75 marks in the university examination.

The Internal Assessment marks of 25 has to be distributed as 10 marks each for two class tests and 5 marks for class attendance in the particular subject. The distribution of marks for attendance is as follows.

5 marks for 95% and above

4 marks for 90% and above but below 95%

3 marks for 85% and above but below 90%

2 marks for 80% and above but below 85%

1 mark for 75% and above but below 80%

In total, three tests are to be conducted and the better two are to be considered for assessment.

(b) Practical courses for which there is a university practical examination of 50 marks:

The internal assessment marks of 50 has to be distributed as 20 marks for the periodic practical works and records submitted thereof, 15 marks for an internal practical examination, 5 marks for an internal viva voce, and 10 marks for class attendance in the particular subject. The distribution of marks is as given below.

10 marks for 95% and above

8 marks for 90% and above but below 95%

6 marks for 85% and above but below 90%

4 marks for 80% and above but below 85%

2 marks for 75% and above but below 80%

8. Requirement for appearing for University Examination:

A candidate shall be permitted to appear for university examinations at the end of any semester only if:

(i) He / She secures not less than 75% overall attendance arrived at by taking into account the total number of periods in all subjects put together offered by the institution for the semester under consideration.

(Candidates who secure overall attendance greater than 60% and less than 75% have to pay a condonation fee as prescribed by University along with a medical certificate obtained from a medical officer not below the rank of Asst. Director)

(ii) He / She earns a progress certificate from the Head of the institution for having satisfactorily completed the course of study in all the subjects pertaining to that semester.

(iii) His / Her conduct is found to be satisfactory as certified by the Head of the institution.

A candidate who has satisfied the requirement (i) to (iii) shall be deemed to have satisfied the course requirements for the semester.

9. Procedure for completing the course:

A candidate can join the course of study of any semester only at the time of its normal commencement and only if he/she has satisfied the course requirements for the previous semester and further has registered for the university examinations of the previous semester in all the subjects as well as all arrear subjects if any.

However, the entire course should be completed within 14 consecutive semesters (12 consecutive semesters for students admitted under lateral entry).

10. Passing Minimum :

(i) A candidate shall be declared to have passed the examination in a subject of study only if he/she secures not less than 50% of the total marks (Internal Assessment plus University examination marks) and not less than 40% of the marks in University examination.

(ii) A candidate who has been declared "Failed" in a particular subject may reappear for that subject during the subsequent semesters and secure a pass. However, there is a provision for revaluation of failed subjects provided he/she fulfills the following norms for revaluation.

- (a) Applications for revaluation should be filed within 4 weeks from the date of declaration of results or 15 days from the date of receipt of marks card whichever is earlier.
- (b) The candidate should have attended all the college examinations as well as university examinations.
- (c) If a candidate has failed in more than four papers in the current university examination, his/her representation for revaluation will not be considered.
- (d) The request for revaluation must be made in the format prescribed duly recommended by the Head of the Institution along with the revaluation fee prescribed by the University.

Further the University examination marks obtained in the latest attempt shall alone remain valid in total suppression of the University examination marks obtained by the candidate in earlier attempts.

11 Award of Letter Grades:

The assessment of a course will be done on absolute marks basis. However, for the purpose of reporting the performance of a candidate, letter grades, each carrying certain points, will be awarded as per the range of total marks (out of 100) obtained by the candidate, as detailed below:

Range of Total Marks	Letter Grade	Grade Points
90 to 100	S	10
80 to 89	A	9
70 to 79	B	8
60 to 69	C	7
55 to 59	D	6
50 to 54	E	5
0 to 49	F	0
Incomplete	FA	

'F' denotes failure in the course. 'FA' denotes absent / detained as per clause 8.

After results are declared, grade sheets will be issued to the students. The grade sheets will contain the following details:

- (a) The college in which the candidate has studied.
- (b) The list of courses enrolled during the semester and the grades scored.
- (c) The Grade Point Average (GPA) for the semester and The Cumulative Grade Point Average (CGPA) of all enrolled subjects from first semester onwards.
- (d) GPA is the ratio of sum of the products of the number of credits (C) of courses registered and the corresponding grades points (GP) scored in those courses, taken for all the courses and sum of the number of credits of all the courses

$$GPA = (\text{Sum of } (C \times GP) / \text{Sum of } C)$$

CGPA will be calculated in a similar manner, considering all the courses enrolled from first semester. FA grades are to be excluded for calculating GPA and CGPA.

The conversion of CGPA into percentage marks is as given below

$$\% \text{ Marks} = (CGPA - 0.5) \times 10$$

12 Award of Class and Rank:

- (i) A candidate who satisfies the course requirements for all semesters and who passes all the examinations prescribed for all the eight semesters (six semesters for lateral entry candidates) within a maximum period of 7 years (6 years for lateral entry candidates) reckoned from the commencement of the first semester to which the candidate was admitted shall be declared to have qualified for the award of degree.
- (ii) A candidate who qualifies for the award of the degree passing in all subjects pertaining to semesters 3 to 8 in his/her first appearance within 6 consecutive semesters (3 academic years) and in addition secures a CGPA of 8.50 and above for the semesters 3 to 8 shall be declared to have passed the examination in **FIRST CLASS** with **DISTINCTION**.

- (iii) A candidate who qualifies for the award of the degree by passing in all subjects relating to semesters 3 to 8 within a maximum period of eight semesters after his/her commencement of study in the third semester and in addition secures CGPA not less than 6.5 shall be declared to have passed the examination in **FIRST CLASS**.
- (iv) All other candidates who qualify for the award of degree shall be declared to have passed the examination in **SECOND CLASS**.
- (v) For the Award of University ranks and Gold Medal for each branch of study, the CGPA secured from 1st to 8th semester alone should be considered and it is mandatory that the candidate should have passed all the subjects from 1st to 8th semester in the first attempt. Rank certificates would be issued to the first ten candidates in each branch of study.

13. Provision for withdrawal :

A candidate may, for valid reasons, and on the recommendation of the Head of the Institution be granted permission by the University to withdraw from writing the entire semester examination as one Unit. The withdrawal application shall be valid only if it is made earlier than the commencement of the last theory examination pertaining to that semester. Withdrawal shall be permitted only once during the entire course. Other conditions being satisfactory, candidates who withdraw are also eligible to be awarded DISTINCTION whereas they are not eligible to be awarded a rank.

14. Discontinuation of Course:

If a candidate wishes to temporarily discontinue the course for valid reasons, he/she shall apply through the Head of the Institution in advance and obtain a written order from the University permitting discontinuance. A candidate after temporary discontinuance may rejoin the course only at the commencement of the semester at which he/she discontinued, provided he/she pays the prescribed fees to the University. The total period of completion of the course reckoned from the commencement of the first semester to which the candidate was admitted shall not in any case exceed 7 years, including of the period of discontinuance.

15. Revision of Regulations and Curriculum:

The University may from time to time revise, amend or change the regulations of curriculum and syllabus as and when found necessary.

ANNEXURE – A

B.Tech courses in which admission is sought	Diploma courses eligible for admission
Civil Engineering	Civil Engineering Civil and Rural Engineering Architectural Assistantship Architecture Agricultural Engineering
Mechanical Engineering	Mechanical Engineering Automobile Engineering Agricultural Engineering Mechanical and Rural Engineering Refrigeration and Air-conditioning Agricultural Engineering & Farm Equipment Technology Metallurgy Production Engineering Machine Design & Drafting Machine tool maintenance and Repairs Printing Technology / Engineering Textile Engineering / Technology Tool Engineering
Electrical and Electronics Engineering Electronics & Communication Engineering Electronic and Instrumentation Engineering Instrumentation and Control Engineering Bio Medical Engineering	Electrical Engineering Electrical and Electronics Engineering Electronics and Instrumentation Engineering Instrumentation Engineering / Technology Electronics and Communication Engineering Electronics Engineering Medical Electronics Instrumentation and Control Engineering Applied Electronics
Chemical Engineering	Chemical Engineering Chemical Technology Petrochemical Technology Petroleum Engineering Ceramic Technology Plastic Engineering Paper & Pulp Technology / Polymer Technology
Information Technology Computer Science & Engineering	Computer Science and Engineering Computer Technology Electrical and Electronics Engineering Electronics & Communication Engineering Electronics & Instrumentation Engineering Instrumentation Engineering / Technology Information Technology

PONDICHERRY UNIVERSITY

B.Tech - CURRICULUM & SYLLABUS

GROUP I (Civil, Mechanical, CSE, IT Branches)

I Semester

Sub. Code	Subjects	Periods			Credits	Marks		
		L	T	P		IA	UE	TM
	Theory							
T101	Mathematics – I	3	1	-	4	25	75	100
T102	Physics	4	-	-	4	25	75	100
T103	Chemistry	4	-	-	4	25	75	100
T104	Basic Electrical and Electronics Engineering	3	1	-	4	25	75	100
T105	Engineering Thermodynamics	3	1	-	4	25	75	100
T106	Computer Programming	3	1	-	4	25	75	100
	Practical							
P101	Computer Programming Lab	-	-	3	2	50	50	100
P102	Engineering Graphics	2	-	3	2	50	50	100
P103	Basic Electrical & Electronics Lab	-	-	3	2	50	50	100
	Total	22	4	9	30	300	600	900

II Semester

Sub. Code	Subjects	Periods			Credits	Marks		
		L	T	P		IA	UE	TM
	Theory							
T107	Mathematics – II	3	1	-	4	25	75	100
T108	Material Science	4	-	-	4	25	75	100
T109	Environmental Science	4	-	-	4	25	75	100
T110	Basic Civil and Mechanical Engineering	4	-	-	4	25	75	100
T111	Engineering Mechanics	3	1	-	4	25	75	100
T112	Communicative English	4	-	-	4	25	75	100
	Practical							
P104	Physics lab	-	-	3	2	50	50	100
P105	Chemistry lab	-	-	3	2	50	50	100
P106	Workshop Practice	-	-	3	2	50	50	100
P107	NSS / NCC *	-	-	-	-	-	-	-
	Total	22	2	9	30	300	600	900

* To be completed in I and II semesters, under Pass / Fail option only and not counted for CGPA calculation.

GROUP II (ECE, EEE, EIE, ChE, BME, ICE Branches)

I Semester

Sub. Code	Subjects	Periods			Credits	Marks		
		L	T	P		IA	UE	TM
	Theory							
T101	Mathematics – I	3	1	-	4	25	75	100
T102	Physics	4	-	-	4	25	75	100
T103	Chemistry	4	-	-	4	25	75	100
T110	Basic Civil and Mechanical Engineering	4	-	-	4	25	75	100
T111	Engineering Mechanics	3	1	-	4	25	75	100
T112	Communicative English	4	-	-	4	25	75	100
	Practical							
P104	Physics lab	-	-	3	2	50	50	100
P105	Chemistry lab	-	-	3	2	50	50	100
P106	Workshop Practice	-	-	3	2	50	50	100
	Total	22	2	9	30	300	600	900

II Semester

Sub. Code	Subjects	Periods			Credits	Marks		
		L	T	P		IA	UE	TM
	Theory							
T107	Mathematics – II	3	1	-	4	25	75	100
T108	Material Science	4	-	-	4	25	75	100
T109	Environmental Science	4	-	-	4	25	75	100
T104	Basic Electrical and Electronics Engineering	3	1	-	4	25	75	100
T105	Engineering Thermodynamics	3	1	-	4	25	75	100
T106	Computer Programming	3	1	-	4	25	75	100
	Practical							
P101	Computer Programming Lab	-	-	3	2	50	50	100
P102	Engineering Graphics	2	-	3	2	50	50	100
P103	Basic Electrical & Electronics Lab	-	-	3	2	50	50	100
P107	NSS / NCC *	-	-	-	-	-	-	-
	Total	22	4	9	30	300	600	900

* To be completed in I and II semesters, under Pass / Fail option only and not counted for CGPA calculation.

T101 MATHEMATICS – I

OBJECTIVES:

- *To introduce the idea of applying calculus concepts to problems in Engineering .*
- *To familiarize the student with functions of several variables.*
- *To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.*
- *To introduce effective mathematical tools for the solutions of differential equations that model physical processes*

UNIT I – CALCULUS

Curvature, radius of curvature, evolutes and involutes. Beta and Gamma functions and their properties.

UNIT II– FUNCTIONS OF SEVERAL VARIABLES

Partial derivatives, Total derivatives, Differentiation of implicit functions, Change of variables, Jacobians and their properties, Taylor's series for functions of two variables, Maxima and minima, Lagrange's method of undetermined multipliers.

UNIT III – MULTIPLE INTEGRALS AND APPLICATIONS

Multiple Integrals, change of order of integration and change of variables in double integrals (Cartesian to polar). Applications: Areas by double integration and volumes by triple integration (Cartesian and polar).

UNIT IV – DIFFERENTIAL EQUATIONS

Exact equations, First order linear equations, Bernoulli's equation, orthogonal trajectories, growth, decay and geometrical applications. Equations not of first degree: equations solvable for p , equations solvable for y , equations solvable for x and Clairaut's type.

UNIT V – DIFFERENTIAL EQUATIONS (Higher order)

Linear differential equations of higher order - with constant coefficients, the operator D , Euler's linear equation of higher order with variable coefficients, simultaneous linear differential equations, solution by variation of parameters method simple application to electric circuits.

Text Books

1. Venkataraman M.K, Engineering Mathematics-First year, National Publishing Company, Chennai, 2010(For Units I, III, IV & VI only)
2. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 41st Edition, 2011. (For Unit II only)

Reference Books

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
2. Kandasamy P. et al, Engineering Mathematics, Vol.1 & 2, S. Chand & Co., New Delhi.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, New Delhi, 8th Edition.
5. Bali N. and Goyal M., Advanced Engineering Mathematics, Lakshmi Publications Pvt. Ltd., New Delhi, 7th Edition, 2010.

T102 PHYSICS

OBJECTIVES:

- *To understand the concepts of physics and its significant contributions in the advancement of technology and invention of new products that dramatically transformed modern-day society.*
- *To expose the students to different areas of physics which have direct relevance and applications to different Engineering disciplines*
- *To understand the concepts and applications of Ultrasonics, optics and some optical devices, Lasers and Fiber optics, Nuclear energy sources and wave mechanics*

UNIT I – ACOUSTICS & NDT

ultrasonics - Ultrasonic Waves Productions (Piezoelectric & Magnetostriction method) – Detections (Acoustic Grating) *NDT applications* – *Ultrasonic Pulse Echo Method* - Liquid Penetrant Method

Acoustics - Factors affecting Acoustic of Buildings (Reverberation, Loudness, Focusing, Echo, Echelon Effect and Resonance) and their Remedies - Sabine's formula for Reverberation Time – Doppler effect and its applications to Radars.(elementary ideas)

UNIT II – OPTICS

Interference - Air Wedge – Michelson's Interferometer - Wavelength Determination – Interference Filter – Antireflection Coatings

Diffraction - Diffraction Grating – Dispersive power of grating - Resolving Power of Grating & Prism

Polarisation Basic concepts of Double Refraction - Huygens Theory of Double Refraction- Quarter and Half Wave Plates – Specific Rotary Power – Laurent Half Shade Polarimeter

UNIT III – LASERS & FIBER OPTICS

Lasers - Principles of Laser – Spontaneous and Stimulated Emissions - Einstein's Coefficients – Population Inversion and Laser Action – types of Optical resonators (qualitative ideas) – Types of Lasers - NdYAG, CO₂ laser, GaAs Laser-applications of lasers

Fiber Optics - Principle and Propagation of light in optical fiber – Numerical aperture and acceptance angle – Types of optical fibers (material, refractive index, mode)-applications to sensors and Fibre Optic Communication

UNIT IV – WAVE MECHANICS

Matter Waves – de Broglie Wavelength – Uncertainty Principle – Schrödinger Wave Equation – Time Dependent – Time Independent – Application to Particle in a One Dimensional potential Box – Quantum Mechanical Tunneling – Tunnel Diode.

UNIT V – NUCLEAR ENERGY SOURCE

General Properties of Nucleus (Size, Mass, Density, Charge) – Mass Defect – Binding Energy - Disintegration in fission –*Nuclear Reactor*: Materials Used in Nuclear Reactors. – PWR – BWR – FBTR. Nuclear fusion reactions for fusion reactors-D-D and D-T reactions, Basic principles of Nuclear Fusion reactors.

Text Books

- 1.V Rajendran, Engineering Physics, 2nd Edition, TMH, New Delhi 2011 (For Units I to IV only)
2. Arthur Beiser, Concepts of Modern Physics, 6th Edition, TMH, New Delhi reprinted 2008. (For Unit V only)

Reference Books

1. Ajoy Ghatak, Optics, 5th Edition TMH, New Delhi, 2012.
2. K. Thyagarajan and Ajoy Ghatak, Lasers Fundamentals and Applications, 2nd Edition, Springer 2010.
3. R. Murugesan, Modern Physics, S. Chand & Co, New Delhi 2006.
4. K.R.Nambiar, Lasers, New Age International, New Delhi, 2008.
5. Science of Engineering Materials, 2nd Edition, C.M. Srivastava and C. Srinivasan, New Age Int. (P) Ltd, New Delhi, 1997
6. Avadhanulu M N , Engineering Physics, Vol-I, S. Chand & Co, 2009.

T103 CHEMISTRY

OBJECTIVES

- *To know about the importance of Chemistry in Engineering domain*
- *To understand the chemistry background of industrial process*
- *To apply chemistry knowledge for engineering disciplines*

UNIT I – WATER

(9 Hours)

Hardness of water - units and calcium carbonate equivalent. Determination of hardness of water-EDTA method. Disadvantages of hardwater – boiler scale and sludge, caustic embrittlement, priming & foaming and boiler corrosion. Water softening methods – internal & external conditioning – Lime-Soda process, Zeolite process and Ion-exchange process. Desalination – reverse osmosis & electrodialysis.

UNIT II – POLYMERS

(9 Hours)

Classification, types of polymerization reactions – mechanism of radical, ionic and Ziegler-Natta polymerizations. Polymer properties – chemical resistance, crystallinity and effect of temperature, M_n and M_w . Thermoplastics and thermosets. Preparation, properties and uses of PVC, TEFLON, Nylons, Bakelite, Polyurethane, Rubbers – vulcanization, synthetic rubber, BuNa-S, BuNa-N, silicone and butyl rubber. Conducting polymers – classification and applications. Polymer composites – FRP – laminar composites. Moulding constituents of plastic, moulding techniques – compression, injection, transfer and extrusion moulding.

UNIT III - ELECTROCHEMICAL CELLS

(9 Hours)

Galvanic cells, single electrode potential, standard electrode potential, electromotive series. EMF of a cell and its measurement. Nernst equation. Electrolyte concentration cell. Reference electrodes – hydrogen, calomel, Ag/AgCl & glass electrodes. Batteries – primary and secondary cells, Leclanche cell, Lead acid storage cell, Ni-Cd battery & alkaline battery. Fuel cells – H_2 - O_2 fuel cell.

UNIT IV - CORROSION AND ITS CONTROL

(9 Hours)

Chemical & electrochemical corrosion – Galvanic, pitting, stress and concentration cell corrosion. Factors influencing corrosion – corrosion control methods – cathodic protection and corrosion inhibitors. Protective coating – types of protective coatings – metallic coating – tinning and galvanizing, cladding, electroplating and anodizing.

UNIT V -PHASE RULE

(9 Hours)

Definition and derivation of phase rule. Application to one component system – water and sulfur systems. Thermal analysis, condensed phase rule. Two component systems – Pb-Ag, Cu-Ni, and Mg-Zn systems.

Text book

1.P.C. Jain and Monika Jain, Engineering Chemistry, Dhanpat Rai and Sons, New Delhi 15th Ed, 2010.

Reference Books

- 1.S. S. Dara, A Textbook of Engineering Chemistry, 11th Ed, S.Chand & Co., Ltd. New Delhi, 2008.
- 2.B. K. Sharma, Engineering Chemistry, 3rd edition Krishna Prakashan Media (P) Ltd., Meerut, 2001.
- 3.P. Kannan and A. Ravi Krishnan “Engineering Chemistry” Hi-Tech Sri Krishna Publications, Chennai, 9th Ed, 2009
- 4.N. Krishnamurthy, P. Vallinayagam and D. Madhavan, Engineering Chemistry, 2ndEd. PHI Learning PVT., LTD, New Delhi, 2008.

T104 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

OBJECTIVES

- *To understand and gain basic knowledge about magnetic and electrical circuits, single phase and three phase power measurement and the operating principles of stationary and rotating machines*
- *To understand the basic operation, functions and applications of PN junction diode, transistor, logic gates and flip flops.*
- *To gain knowledge on various communication systems and network models and the use of ISDN*

PART A - ELECTRICAL

UNIT – I - DC CIRCUITS

Definition of Voltage, Current, Power & Energy, circuit parameters, Ohm's law, Kirchoff's law & its applications – Simple Problems - Division of current in Series & parallel circuits - star/delta conversion - Node and mesh methods of analysis of DC circuits.

UNIT – II - AC CIRCUITS

Concepts of AC circuits – rms value, average value, form and peak factors – Simple RLC series circuits – Concept of real and reactive power – Power factor - Introduction to three phase system - Power measurement by two wattmeter method.

UNIT – III – ELECTRICAL MACHINES AND POWER PLANTS

Law of Electromagnetic induction, Fleming's Right & Left hand rule - Principle of DC rotating machine, Single phase transformer and single phase induction motor (Qualitative approach only) - Simple layout of thermal and hydro generation (block diagram approach only). Fundamentals of fuses and circuit breakers

PART B – ELECTRONICS

UNIT – IV ELECTRONIC CIRCUITS

V-I Characteristics of diode - Half-wave rectifier and Full-wave rectifier – with and without capacitor filter - Transistor - Construction & working - Input and output characteristics of CB and CE configuration - Transistor as an Amplifier - Principle and working of Hartley oscillator and RC phase shift oscillator - Construction and working of JFET & MOSFET.

UNIT – V DIGITAL ELECTRONICS

Boolean algebra – Reduction of Boolean expressions - De-Morgan's theorem - Logic gates -Implementation of Boolean expressions - Flip flops - RS, JK, T and D. Combinational logic - Half adder, Full adder and Subtractors. Sequential logic - Ripple counters and shift registers.

UNIT – VI COMMUNICATION AND COMPUTER SYSTEMS

Model of communication system - Analog and digital - Wired and wireless channel. Block diagram of various communication systems - Microwave, satellite, optical fiber and cellular mobile system. Network model - PAN, LAN, MAN and WAN - Circuit and packet switching - Overview of ISDN.

Text Books

1. Kothari D P and Nagrath I J , Basic Electrical Engineering , Tata McGraw Hill,2009. (For Units I to III)
2. Rajendra Prasad , “ Fundamentals of Electronic Engineering” , Cengage learning, New Delhi, First Edition, 2011 (For Unit IV)
3. Morris Mano, “Digital design” , PHI Learning, Fourth Edition, 2008 (For Unit V)
4. Wayne Tomasi, “Electronic Communication Systems- Fundamentals Theory Advanced” , Sixth Edition, Pearson Education, 2004. (For Unit VI)

Reference Books

1. R.Muthusubramaniam, S.Salivahanan and K.A. Mureleedharan, Basic Electrical Electronics and Computer Engineering, Tata McGraw Hill, 2004..
2. J.B.Gupta, A Course in Electrical Power, Katson Publishing House, New Delhi, 1993.
3. David. A. Bell, “Electronic Devices and Circuits”, PHI Learning Private Ltd, India, Fourth Edition, 2008

4. Donald P Leach, Albert Paul Malvino and Goutam Saha, "Digital Principles and Applications," 6th edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2008.
5. S.K. Sahdev, Fundamentals of Electrical Engineering and Electronics, Dhanpat Rai & Co, 2013.
6. Jacob Millman and Christos C. Halkias, "Electronic Devices and Circuits" Tata McGraw Hill, 2008
7. R.L. Boylestad and L. Nashelsky, "Electronic Devices and Circuit Theory", PHI Learning Private Limited, Ninth Edition, 2008.
8. M.S.Sukhija and T.K.Nagsarkar, " Basic Electrical and Electronics Engineering", Oxford University Press, 2012.

T105 THERMODYNAMICS

OBJECTIVES

- *To understand the basics of the thermodynamic principles*
- *To establish the relationship of these principles to thermal system behaviors*
- *To develop methodologies for predicting the system behavior*
- *To establish the importance of laws of thermodynamics applied to energy systems*
- *To explain the role of refrigeration and heat pump as energy systems*
- *To develop an intuitive understanding of underlying physical mechanism and a mastery of solving practical problems in real world*

UNIT I - BASIC CONCEPTS AND DEFINITIONS

Energy conversion and efficiencies - System, property and state - Thermal equilibrium - Temperature - Zeroth law of Thermodynamics – Pure substance - P, V and T diagrams – Thermodynamic diagrams.

UNIT II - FIRST LAW OF THERMODYNAMICS

The concept of work and adiabatic process - First law of thermodynamics - Conservation of Energy principle for closed and open systems - Calculation of work for different processes of expansion of gases

UNIT III - SECOND LAW OF THERMODYNAMICS

Equilibrium and the second law - Heat engines - Kelvin-Planck statement of second law of thermodynamics - Reversible and irreversible processes - Carnot principle - Clausius inequality- Entropy

UNIT IV - GAS POWER CYCLES

Air standard cycles: The air standard Carnot cycle - Air standard Otto cycle, diesel cycle, dual cycle and Brayton cycles and their efficiencies

UNIT V - REFRIGERATION CYCLES AND SYSTEMS

Reverse Carnot cycle - COP - Vapor compression refrigeration cycle and systems (only theory) - Gas refrigeration cycle - Absorption refrigeration system – Liquefaction – Solidification (only theory).

Text Books

1. Nag, P. K., "Engineering Thermodynamics", 4th edition, Tata Mc Graw Hill Publishing Co. Ltd., New Delhi, 2008.

Reference Books

1. Arora, C.P., "Thermodynamics" , Tata Mc Graw Hill Publishing Co. Ltd., New Delhi,2010.
2. Burghardt, M.D., "Engineering Thermodynamics with Applications", 4th edition, Harper & Row, N.Y.,2009.
3. Huang, F.F., "Engineering Thermodynamics" 2nd edition , Macmillan Publishing Co. Ltd., N.Y.,2011.
4. Cengel, Y.A. and Boles, M.A., "Thermodynamics - An Engineering Approach", 5th edition, Mc-Graw Hill, 2008.
5. Wark, K., "Thermodynamics", 4th edition ,Mc Graw Hill, N.Y.,2009.

T106 COMPUTER PROGRAMMING

OBJECTIVES

- *To introduce the basics of computers and information technology.*
- *To educate problem solving techniques.*
- *To impart programming skills in C language.*
- *To practice structured programming to solve real life problems.*

UNIT – I

History of Computers – Block diagram of a Computer – Components of a Computer system – Classification of computers - Hardware – Software – Categories of Software – Operating System – Applications of Computers – Network structure – Internet and its services – Intranet – Study of word processor – Preparation of worksheets.

UNIT – II

Problem solving techniques – Program – Program development cycle – Algorithm design – Flowchart - Pseudo code.

Introduction to C – History of C – Importance of C - C tokens – data types – Operators and expressions – I/O functions.

UNIT – III

Decision making statements – branching and looping – arrays – multidimensional arrays – Functions – Recursion – Passing array to functions.

Storage classes – Strings – String library functions.

UNIT – IV

Structures – Arrays and Structures – nested structures – passing structures to functions – user defined data types – Union.

Pointers – pointers and arrays – pointers and functions - pointers and strings - pointers and Structures.

UNIT – V

Files – operations on a file – Random access to files – command line arguments.

Introduction to preprocessor – Macro substitution directives – File inclusion directives – conditional compilation directives – Miscellaneous directives.

Text Books

1. Balagurusamy. E, "Programming in ANSI C", Tata McGraw Hill, Sixth edition, 2012.

Reference Book

1. Vikas Verma, "A Workbook on C ",Cengage Learning, Second Edition,2012
2. Ashok N Kamthane, "Computer Programming", Pearson education, Second Impression, 2008.

P101 COMPUTER PROGRAMMING LAB

OBJECTIVES

- *To study and understand the use of OS commands*
- *To gain a hands on experience of compilation and execution of 'C' programs*

LIST OF EXERCISES:

1. Study of OS Commands
2. Write a C program to find the Area of the triangle.
3. Write a C program to find the total and average percentage obtained by a student for 6 subjects.
4. Write a C program to read a three digit number and produce output like
1 hundreds
7 tens
2 units
for an input of 172.
5. Write a C program to check whether a given character is vowel or not using Switch – Case statement.
6. Write a C program to print the numbers from 1 to 10 along with their squares.
7. Write a C program to find the sum of 'n' numbers using for, do – while statements.
8. Write a C program to find the factorial of a given number using Functions.
9. Write a C program to swap two numbers using call by value and call by reference.
10. Write a C program to find the smallest and largest element in an array.
11. Write a C program to perform matrix multiplication.
12. Write a C program to demonstrate the usage of Local and Global variables.
13. Write a C program to perform various string handling functions: strlen, strcpy, strcat, strcmp.
14. Write a C program to remove all characters in a string except alphabets.
15. Write a C program to find the sum of an integer array using pointers.

16. Write a C program to find the Maximum element in an integer array using pointers.
17. Write a C program to create student details using Structures.
18. Write a C program to display the contents of the file on the monitor screen.
19. Create a File by getting the input from the keyboard and retrieve the contents of the file using file operation commands.
20. Write a C program to pass the parameter using command line arguments.

P102 ENGINEERING GRAPHICS

OBJECTIVES

- *To convey the basics of engineering drawing*
- *To explain the importance of an engineering drawing*
- *To teach different methods of making the drawing*
- *To establish the importance of projects and developments made in drawing that are used in real systems*
- *To explain the role of computer aided design _Auto Cad*
- *To develop an intuitive understanding of underlying significance of using these drawings*

UNIT

Introduction to Standards for Engineering Drawing practice, Lettering, Line work and Dimensioning

UNIT I

Conic sections, Involutives, Spirals, Helix. Projection of Points, Lines and Planes

UNIT II

Projection of Solids and Sections of Solids.

UNIT III

Development of surfaces - Intersection of surfaces (cylinder-cylinder, cylinder-cone)

UNIT IV

Isometric projections and Orthographic projections

UNIT V

Computer Aided Drafting: Introduction to Computer Aided Drafting hardware -
Overview of application software - 2D drafting commands (Auto CAD) for simple shapes
- Dimensioning.

Text Books

1. K.R. Gopalakrishna and Sudhir Gopalakrishna, Engineering Graphics, Inzinc Publishers, 2007.

Reference Books

1. N.D. Bhatt, Engineering Drawing, 49th edition, Chorotar Publishing House, 2006.
2. K. Venugopal, Engineering Drawing and Graphics + Auto CAD, 4th edition, New Age International Publication Ltd., 2004 .
3. David I cook and Robert N Mc Dougal, Engineering Graphics and Design With computer applications, Holt – Sounders Int. Edn. 1985.
4. James D Bethune and et. al., Modern Drafting, Prentice Hall Int., 1989.
5. K.V. Natarajan, A Text Book of Engineering Drawing, Dhanalakshmi Publishers, 2006.
6. BIS, Engineering Drawing practice for Schools & College, 1992.

P103 BASIC ELECTRICAL AND ELECTRONICS LAB

OBJECTIVES

- *To get an exposure on the basic electrical tools, applications and precautions*
- *To gain training on different types of wiring used in domestic and industrial applications.*
- *To detect and find faults in electrical lamp and ceiling fan*
- *To get an exposure on the measurements of voltage and phase using CRO, basic operation and applications of devices such as PN junction diode and transistor*
- *To gain a practical knowledge on the functions and application of basic logic gates and flip flops*

ELECTRICAL LAB

LIST OF EXPERIMENTS

1. Electrical Safety, Precautions, study of tools and accessories.
2. Practices of different joints.
3. Wiring and testing of series and parallel lamp circuits.
4. Staircase wiring.
5. Doctor's room wiring.
6. Bed room wiring.
7. Godown wiring.
8. Wiring and testing a ceiling fan and fluorescent lamp circuit.
9. Study of different types of fuses, circuits breakers and A.C and D.C meters.

ELECTRONICS LAB

LIST OF EXPERIMENTS

1. Study of CRO

- (a) Measurement of AC and DC voltages
- (b) Frequency and phase measurements (using Lissajou's figures)

2. Verification of Kirchoff's Voltage and Current Laws

Determine the voltage and current in given circuits using Kirchoff's laws theoretically and verify the laws experimentally.

3. Characteristics and applications of PN junction diode.

Forward and Reverse characteristics of PN junction diode.

Application of Diode as Half wave Rectifier – Measurement of ripple factor with and without capacitor filter

4. Frequency Response of RC Coupled Amplifiers

Determination of frequency response of given RC coupled amplifier - Calculation of bandwidth.

5. Study of Logic Gates

- (a) Verification of Demorgan's theorems
- (b) Verification of truth tables of OR, AND, NOT, NAND, NOR, EX-OR, EX-NOR gates and Flipflops - JK, RS, T and D
- (c) Implementation of digital functions using logic gates and Universal gates.

T107 MATHEMATICS – II

OBJECTIVES

- *To develop the use of matrix algebra techniques for practical applications.*
- *To introduce the concepts of Curl, Divergence and integration of vectors in vector calculus which is needed for many application problems.*
- *To introduce Laplace transform which is a useful technique in solving many application problems and to solve differential and integral equations.*
- *To acquaint the students with Fourier transform techniques used in wide variety of situations in which the functions used are not periodic.*

UNIT I – MATRICES

Eigenvalues and Eigen vectors of a real matrix, Characteristic equation, Properties of Eigenvalues and Eigenvectors. Cayley-Hamilton Theorem, Diagonalization of matrices. Reduction of a quadratic form to canonical form by orthogonal transformation. Nature of quadratic forms.

UNIT II – VECTOR CALCULUS

Gradient, divergence and curl, their properties and relations. Gauss divergence theorem and Stoke's theorem (without proof). Simple application problems.

UNIT III – LAPLACE TRANSFORM

Definition, Transforms of elementary functions, properties. Transform of derivatives and integrals. Multiplication by t and division by t . Transform of unit step function, transform of periodic functions. Initial and final value theorems.

UNIT IV – APPLICATIONS OF LAPLACE TRANSFORM

Methods for determining inverse Laplace Transforms, convolution theorem, Application to differential equations and integral equations. Evaluation of integrals by Laplace transforms.

UNIT V – FOURIER TRANSFORM

Fourier Integral theorem (statement only), Fourier transform and its inverse, properties. Fourier sine and cosine transforms, their properties, convolution and Parseval's identity.

Text books

1. Venkataraman M.K., Engineering Mathematics, National Publishing Company, Chennai, 2012
2. Kandasamy P. et al, Engineering Mathematics, Vol.2 & 3, S. Chand & Co., New Delhi.

Reference Books

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
2. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 41st Edition, 2011.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, New Delhi.
5. Bali N. and Goyal M., Advanced Engineering Mathematics, Lakshmi Publications Pvt. Ltd., New Delhi, 7th Edition, 2010.

T108 MATERIAL SCIENCE

OBJECTIVES:

- *To understand the importance of Material Science as a subject that revolutionized modern day technologies*
- *To understand the significance of material science in the development of new materials and devices for all branches of Engineering*
- *To impart knowledge to the Engineering students about some of the important areas of Materials Science so as to enable them perceive the significant contributions of the subject in Engineering and Technology*

UNIT I - CRYSTAL STRUCTURE AND LATTICE DEFECTS

Crystal structure - Bravais Lattices , Crystal Systems - Coordination Number, Atomic Radius, Packing Factor for FCC & HCP structures – Miller Indices- Powder X Ray Diffraction Method

Lattice defects – Qualitative ideas of point, line, surface and volume defects

UNIT II – DIELECTRIC PROPERTIES

Dielectric Polarization and Mechanism –Temperature dependence of polarization, Internal or local Field - Clausius-Mossotti relation. Basic ideas of Dielectric loss - frequency dependence of dielectric constant – Measurement of Dielectric constant and loss using Scherring bridge – Elementary ideas of Piezoelectrics, Ferroelectrics and Pyroelectric materials and Applications

UNIT III – MAGNETIC PROPERTIES

Origin of atomic magnetic moment – Bohr magneton-Elementary Ideas of classification of magnetic materials (Dia, Para, Ferro, antiferro & Ferri). – Quantum theory of Para & Ferro Magnetism – Domain Theory of Hysteresis – Heisenberg Theory of Exchange Interaction (without derivation) – Qualitative ideas of Anti ferromagnetic Ordering – Structure and Properties of Ferrites – Properties of Soft & Hard Magnetic Materials – Applications. Magnetic data storage – Magnetic tapes, Hard disks, Magneto optical recording

UNIT IV – SEMICONDUCTORS AND SUPERCONDUCTORS

Semiconductors -Derivation of Carrier concentration in intrinsic Semiconductors –Basic ideas of Electrical conductivity in intrinsic and extrinsic semiconductors (without derivations) -temperature dependence of carrier concentration and electrical conductivity in semiconductors (qualitative ideas), Hall effect in Semiconductors -- Application of Hall Effect, Basic Ideas of Compound Semiconductors (II-VI & III-V)

Superconductivity - Basic concepts – transition temperature – Meissner effect – Type I and II superconductors – High Temperature Superconductors – 123 superconductor – Applications of superconductors.

UNIT V – ADVANCED MATERIALS

Liquid Crystals – Types – Application as Display Devices

Metallic Glasses – preparation by melt spinning. Twin roller system, properties and applications

Shape Memory alloys (SMA), Shape memory effect, Properties and applications of SMA

Nanomaterials- Nano materials (one, Two & three Dimensional) –Methods of synthesis (PVD, CVD, Laser Ablation, Solgel, Ball-milling Techniques), Properties and applications of nanomaterials. carbon nanotubes– synthesis, Properties and applications.

Text books

1. V Rajendran, Engineering Physics, 2nd Edition, TMH, New Delhi 2011.

Reference Books

1. Ali Omar M, Elementary Solid State Physics, Addison Wesley Publishing Co., 2009.
2. William D Callister Jr., Material Science and Engineering, 6th Edition, John Wiley and sons, 2009.
3. Charles Kittel, Introduction to Solid State Physics, 7th Edition, John Wiley & sons, Singapore, 2007.
4. V Raghavan , Materials Science and Engineering- A First Course, 5th Edition, Prentice Hall of India, 2008.
5. B.S. Murty, P. Shankar, Baldev Raj, B.B. Rath, and James Murday, Text book of Nanoscience and Nanotechnology, Universities Press, Hyderabad 2012
6. M.N. Avadhanulu, Engineering Physics- Volume-II, S.Chand &Co, New Delhi, 2009
7. Pillai S.O, Solid State Physics, 6th Edition – New Age International, 2005.

T109 ENVIRONMENTAL SCIENCE

OBJECTIVES

- *To know about the environment*
- *To understand about environmental pollution*
- *To apply the knowledge in understanding various environmental issues and problems*

UNIT I – ENVIRONMENT AND ENERGY RESOURCES

Environmental segments – atmosphere, hydrosphere, lithosphere and biosphere. Atmospheric layers. Pollution definition and classification. Pollutants classification. Forest resources – use and over exploitation, deforestation, forest management. Water resources – use and conflicts over water, dams – benefits and problems. Mineral resources – mineral wealth of India, environmental effects of extracting and using mineral resources. Food resources – world food problems, environmental impact of modern Agriculture – fertilizer and pesticides. Energy resources – growing needs, renewable and non-renewable energy resources and use of alternate energy sources. From unsustainable to sustainable development.

UNIT II - ECOSYSTEM AND BIODIVERSITY

Concept of an ecosystem - structure and function of an ecosystem. Producers, consumers, and decomposers. Energy flow in the ecosystem. Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of forest, grassland, desert and aquatic (fresh water, estuarine and marine) ecosystems. Biodiversity – definition, genetic species and ecosystem diversity. Value of biodiversity - consumptive use, productive use, social, ethical, aesthetic and option values. Hot spots of biodiversity. Threats to biodiversity, habitat loss, poaching of wildlife, human wildlife conflicts. Endangered and endemic species. Conservation of biodiversity – in-situ and ex-situ conservation of biodiversity.

UNIT III - AIR POLLUTION

Definition and classification. Chemical and photochemical reaction in different layers of atmosphere. Causes, sources, effects and control measures of air pollutants - oxides of Nitrogen, oxides of Carbon, oxides of Sulfur, hydrocarbons, chloro-fluoro carbons and particulates. Mechanism and effects of air pollution phenomenon – Global Warming, Ozone Depletion, Acid Rain, Sulfurous Smog and Photochemical Smog.

UNIT IV- WATER AND LAND POLLUTION

Water pollution – causes and effects of organic water pollutants – pesticides, insecticides, detergents and surfactants. Causes and effects of inorganic water pollutants – heavy metal pollution due to Hg, Pb, Cr & Cu. Water pollution control and monitoring – DO, COD, BOD & TOC. Land Pollution – Solid waste management – causes, effect and control measures of urban and industrial wastes. Thermal and radioactive pollution.

UNIT V -POLLUTION CONTROL AND MONITORING

Basic concepts and instrumentation of IR, UV-VIS, atomic absorption spectrometry, Gas Chromatography and Conductometry. Analysis of air pollutants – NO_x, CO_x, SO_x, H₂S, Hydrocarbons and particulates.

Text Books:

1. K. Raghavan Nambiar, "Text Book of Environmental Studies" 2ndEd, Scitech Publications (India) Pvt Ltd, India, 2010 (For Units I & II)
2. A. K. De, "Environmental chemistry" 7th Ed; New age international (P) Ltd, New Delhi, 2010. (For Units III, IV & IV)

Reference Books:

1. B.K. Sharma, "Environmental chemistry" 11th Ed, KRISHNA Prakashan Media (P) Ltd, Meerut, 2007.
2. S.S.Dara, and D.D. Mishra "A text book of environmental chemistry and pollution control, 5th Ed, S.Chandand Company Ltd, New Delhi, 2012.
3. Richard T. Wright, Environmental Science: Toward a Sustainable Future, 10th edition, Prentice Hall, 2008
4. G. S. Sodhi, Fundamental concepts of environmental chemistry, I Ed, Alpha Science International Ltd, India, 2000.

T110 BASIC CIVIL AND MECHANICAL ENGINEERING

OBJECTIVES

- *To be able to differentiate the types of buildings according to national building code.*
- *To understand building components and their functions as well as different types of roads, bridges and dams*
- *To explain the concepts of thermal systems used in power plants and narrate the methods of harnessing renewable energies*
- *To explain the role of basic manufacturing processes*
- *To develop an intuitive understanding of underlying working principles of mechanical machines and systems.*

PART-A CIVIL ENGINEERING

UNIT I - BUILDINGS, BUILDING MATERIALS

Buildings-Definition-Classification according to NBC-plinth area, Floor area, carpet area, floor space index-construction materials-stone, brick, cement, cement-mortar, concrete, steel- their properties and uses.

UNIT II - BUILDINGS AND THEIR COMPONENTS

Buildings: Various Components and their functions. Soils and their classification. Foundation: function and types. Masonry- function and types. Floors: definition and types of floors. Roofs: definition and types.

UNIT III - BASIC INFRASTRUCTURE

Surveying: classification, general principles, types, Uses, instruments used. Roads-types: components, types and their advantage and disadvantages. Bridges: components and types of bridges. Dams: Purpose, types of dams. Water supply-sources and quality requirements, need and principles of rainwater harvesting.

PART - B MECHANICAL ENGINEERING

UNIT - IV INTERNAL AND EXTERNAL COMBUSTION SYSTEMS

IC engines – Classification – Working principles - Diesel and petrol engines: two stroke and four stroke engines – Merits and demerits.

Steam generators (Boilers) – Classification – Constructional features (of only low pressure boilers) – Boiler mountings and accessories – Merits and demerits - Applications.

UNIT - V POWER GENERATION SYSTEMS

Conventional and Non-Conventional: Hydraulic – Thermal – Nuclear power plants – Schemes and layouts (Description Only)
Solar – wind – Geothermal - Wave – Tidal and Ocean Thermal Energy Conversion systems – Basic power plant schemes and layouts (Description only).

UNIT - VI MANUFACTURING PROCESSES

Machines – Lathe – Drilling – Bending – Grinding – Shearing (Description only)
Machining Processes – Turning – Planning – Facing – Blanking – Drilling – Punching – Shearing – Bending – Drawing – Filing – Sawing – Grinding.
Moulding and Metal Joining - Pattern making – Green and dry sand moulding – Arc and Gas welding – Brazing – Soldering (process description only).

Text Books

1. Natarajan, K V, Basic Civil Engineering, 11th Edition, Dhanalakshmi Publications Chennai, 2011. (For Units I to III)
2. Venugopal , K and Prabhu Raja, Basic Mechanical Engineering, Anuradha Publisher , 2012(For Units IV to VI)

Reference Books

1. Purushothama Raj.P., Basic civil engineering, 3rd Edn., Dhanam Publications, Chennai, 2001
2. Rajput, R K, Engineering Materials, S Chand & Co. Ltd., New Delhi, 2012.
3. Punmia, B.C., et. al., Surveying , Vol-I, Laxmi Publishers, New Delhi, 2012.
4. Punmia, B.C., et.al Building Construction, Laxmi Publishers, New Delhi ,2012.
5. El.Wakil, M.M., Power Plant Technology, Mc Graw Hill Book Co.,1985.
6. Hajra Choudhry, et. al., Workshop Technology Vol I and II, Media Promoters Publishers Pvt. Ltd., Bombay, 2004.
7. Lindberg, R.A.Process and Materials of Manufacture, PHI, 1999.
8. H.N.Gupta, R.C.Gupta and Arun Mittal, Manufacturing Processes, New Age Publications, 2001
9. Nagpal, Power Plant Engineering, Khanna Publishers, Delhi, 1998.

T111 ENGINEERING MECHANICS

OBJECTIVES

- *To understand the vector and scalar representation of forces and moments, static equilibrium of particles and rigid bodies in two dimensions*
- *To comprehend the effect of friction on equilibrium*
- *To understand the laws of motion, the kinematics of motion and the interrelationship and to learn to write the dynamic equilibrium equation*
- *To emphasis the concepts through solved examples*

UNIT I - FUNDAMENTAL OF MECHANICS

Basic Concepts Force System and Equilibrium, Definition of Force, Moment and Couple, Principle of Transmissibility, Varignon's theorem, Resultant of force system – Concurrent and non concurrent coplanar forces, Condition of static equilibrium for coplanar force system, stability of equilibrium, , applications in solving the problems on static equilibrium of bodies.

UNIT II – PRACTICAL APPLICATION OF FORCE SYSTEM

Structural member: definition, Degree of freedom, concept of free body diagrams, types of supports and reactions, types of loads, Analysis of Trusses-method of joints, method of sections.

Friction: Introduction, Static dry friction, simple contact friction problems, ladders, wedges.

UNIT III - PROPERTIES OF SURFACES

Properties of sections – area, centroids of lines, areas and volumes, moment of inertia first moment of inertia, second moment of inertia and product moment of inertia, polar moment of inertia, radius of gyration, mass moment of inertia.

UNIT IV - KINEMATICS AND KINETICS OF PARTICLES

Equations of motion - Rectilinear motion, curvilinear motion, Relative motion, D'Alembert's principle, work- Energy equation – Conservative forces and principle of conservation of energy, Impulse – momentum, Impact – Direct central impact and oblique central impact.

UNIT V - KINEMATICS AND KINETICS OF RIGID BODIES

Plane motion, Absolute motion, Relative motion, translating axes and rotating axes, work and energy, impulse and momentum

Text Books

1. Rajesekaran, S and Sankara Subramanian., G., Engineering Mechanics, Vikas Publishing House Private Ltd., 2012.

Reference Books

1. Palanichamy, M.S. Nagan, S., Engineering Mechanics – Statics & Dynamics, Tata McGraw-Hill,2011.
2. Beer, F.P and Johnson Jr. E.R, Vector Mechanics for Engineers, Vol. 1 Statics and Vol.2 Dynamics, McGraw – Hill International Edition, 1997.
3. Bhavikatti,S.S and K.G.Rajashekarappa, Engineering Mechanics, New Age International (P) Ltd, New Delhi,2010

T112 COMMUNICATIVE ENGLISH

OBJECTIVES

- *To improve the LSWR skills of I B.Tech students*
- *To instill confidence and enable the students to communicate with ease*
- *To equip the students with the necessary skills and develop their language prowess*

UNIT I – BASIC COMMUNICATION THEORY

Importance of Communication – stages of communication, modes of communication – barriers to communication – strategies for effective communication – Listening: Importance, types, barriers – Developing effective listening skills.

UNIT II – COMPREHENSION AND ANALYSIS

Comprehension of technical and non-technical material – Skimming, scanning, inferring- Note making and extension of vocabulary, predicting and responding to context- Intensive Reading and Reviewing

UNIT III – WRITING

Effective sentences, cohesive writing, clarity and conciseness in writing – Introduction to Technical Writing – Better paragraphs, Definitions, Practice in Summary Writing – Four modes of writing – Use of dictionaries, indices, library references – making bibliographical entries with regard to sources from books, journals, internet etc.

UNIT IV – BUSINESS WRITING / CORRESPONDENCE

Report writing – Memoranda – Notice – Instruction – Letters – Resumes – Job applications

UNIT V – ORAL COMMUNICATION

Basics of phonetics – Presentation skills – Group Discussions – Dialogue writing – Short Extempore – Debates-Role Plays-Conversation Practice

Text Book

1. Robert J.Dixon. ,Complete Course in English, Prentice-Hall of India Pvt. Ltd., New Delhi,2006.

Reference Books

1. Ashraf M.Rizvi., Effective Technical Communication. Tata-McGraw, 2005.
2. Boove, Courtland R et al., Business Communication Today. Delhi. Pearson Education,2002.
3. Meenakshi Raman and Sangeeta Sharma., Technical Communication Principles And Practice,OUP, 2007.
4. Robert J.Dixon., Everyday Dialogues in English, Prentice-Hall of India Pvt. Ltd., New Delhi,2007.
5. Sethi,J and Kamalesh Sadanand., A Practical Course in English Pronunciation, Prentice-Hall of India Pvt. Ltd, New Delhi,2007.

P104 PHYSICS LABORATORY

OBJECTIVES

- *To provide a practical understanding of some of the concepts learnt in the theory course on Physics.*

LIST OF EXPERIMENTS (ANY 10 EXPERIMENTS)

1. Thermal conductivity – Lee’s DISC
2. Thermal conductivity - Radial flow
3. Spectrometer – Prism or Hollow prism
4. Spectrometer – Transmission grating
5. Spectrometer - Ordinary & Extraordinary rays
6. Newton’s rings
7. Air – wedge
8. Half shade polarimeter – Determination of specific rotatory power
9. Jolly’s experiment – determination of α
10. Magnetism: $i - h$ curve
11. Field along the axis of coil carrying current
12. Vibration magnetometer – calculation of magnetic moment & pole strength
13. Laser experiment: wavelength determination using transmission grating, reflection grating (vernier calipers) & particle size determination
14. Determination of optical absorption coefficient of materials using laser
15. Determination of numerical aperture of an optical fiber
16. Electrical conductivity of semiconductor – two probe / four probe method
17. Hall effect in semiconductor

P105 CHEMISTRY LABORATORY

OBJECTIVES

- *To gain a practical knowledge of Engineering Chemistry in relevance to Industrial applications*

LIST OF EXPERIMENTS (ANY 10 EXPERIMENTS)

1. Determination of dissolved oxygen in water.
2. Determination of total hardness of water by EDTA method.
3. Determination of carbonate and bicarbonate in water.
4. Estimation of chloride content in water.
5. Estimation of magnesium by EDTA.

6. Estimation of acetic acid in vinegar.
7. Estimation of ferrous by permanganometry.
8. Estimation of ferrous and ferric iron in a solution mixture by dichrometry.
9. Estimation of available chlorine in bleaching powder.
10. Estimation of copper in copper sulphate solution.
11. Estimation of calcium by permanganometry.
12. Estimation of iron by colorimetry.

DEMONSTRATION EXPERIMENTS (ANY TWO OF THE FOLLOWING)

1. Determination of COD of water sample.
2. Determination of lead by conductometry.
3. Percentage composition of sugar solution by viscometry.

P106 WORKSHOP PRACTICE

OBJECTIVES

- *To convey the basics of mechanical tools used in engineering*
- *To establish hands on experience on the working tools*
- *To develop basic joints and fittings using the hand tools*
- *To establish the importance of joints and fitting in engineering applications*
- *To explain the role of basic workshop in engineering*
- *To develop an intuitive understanding of underlying physical mechanism used in mechanical machines.*

Sl. No.	Trade	List of Exercises
1.	Fitting	Study of tools and Machineries. Exercises on symmetric joints and joints with acute angle.
2.	Welding	Study of arc and gas welding equipment and tools – Edge preparation – Exercises on lap joint and V Butt joints – Demonstration of gas welding
3	Sheet metal work	Study of tools and Machineries – exercises on simple products like Office tray and waste collection tray.
4.	Carpentry	Study of tools and Machineries – Exercises on Lap joints and Mortise joints

LIST OF EXERCISES

I Fitting

1. Study of tools and Machineries
2. Symmetric fitting
3. Acute angle fitting

II Welding

1. Study of arc and gas welding equipment and tools
2. Simple lap welding (Arc)
3. Single V butt welding (Arc)

III Sheet metal work

1. Study of tools and machineries
2. Frustum
3. Waste collection tray

IV Carpentry

1. Study of tools and machineries
2. Half lap joint
3. Corner mortise joint.

P107 NCC / NSS

NCC/NSS training is compulsory for all the Undergraduate students

1. The above activities will include Practical/field activities/Extension lectures.
2. The above activities shall be carried out outside class hours.
3. In the above activities, the student participation shall be for a minimum period of 45 hours.
4. The above activities will be monitored by the respective faculty incharge and the First Year Coordinator.
5. Pass /Fail will be determined on the basis of participation, attendance, performance and behavior. If a candidate Fails, he/she has to repeat the course in the subsequent years
6. Pass in this course is mandatory for the award of degree.

