



SHIVAJI UNIVERSITY, KOLHAPUR

FIRST YEAR B.TECH

Scheme of Teaching and Examination
Semester – I (Engineering Chemistry Group)

Sr. No.	Subject	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
		L	T	P	Credits	Theory			Practical		
						Scheme	Max. marks	Min. Passing \$	Scheme	Max. marks	Min. Passing
1.	Engineering Chemistry	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
2.	Engineering Mathematics – I	3	1	-	04	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
3.	Engineering Mechanics	3	1	-	04	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
4.*	Engineering Graphics	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
5.	Electronic Components and Devices	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
6.	Lab. – I Engineering Chemistry	-	-	2	01	-----	-----	-----	IPE	50	20
7.	Lab. – II Professional Communication	2	-	-	02	-----	-----	-----	IPE	50	20
8.	Lab. – III Electronic Components and Devices	-	-	2	01	-----	-----	-----	IPE	50	20
9.	Lab. – IV Engineering Mechanics	-	-	2	01	-----	-----	-----	IPE	50	20
10.	Lab. – V Engineering Graphics	-	-	2	01	-----	-----	-----	IPE	100	40
Total		17	2	8	23		500			300	

Total Credits: 23

Total Contact Hours/Week: 27 hrs

Note:

\$: Minimum 40% marks required in CIE to become eligible for SEE.

Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

CIE – Continuous Internal Evaluation

SEE – Semester End Examination

IPE – Internal Practical Evaluation

* Semester End Examination duration will be 4 hrs.



SHIVAJI UNIVERSITY, KOLHAPUR

FIRST YEAR B.TECH

Scheme of Teaching and Examination
Semester – I (Engineering Physics Group)

Sr. No.	Subject	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
		L	T	P	Credits	Theory			Practical		
						Scheme	Max. marks	Min. Passing \$	Scheme	Max. marks	Min. Passing
1.	Engineering Physics	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
2.	Engineering Mathematics – I	3	1	-	04	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
3.	Engineering Mechanics	3	1	-	04	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
4.*	Engineering Graphics	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
5.	Electronic Components and Devices	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
6.	Lab. – I Engineering Physics	-	-	2	01	-----	-----	-----	IPE	50	20
7.	Lab. – II Professional Communication	2	-	-	02	-----	-----	-----	IPE	50	20
8.	Lab. – III Electronic Components and Devices	-	-	2	01	-----	-----	-----	IPE	50	20
9.	Lab. – IV Engineering Mechanics	-	-	2	01	-----	-----	-----	IPE	50	20
10.	Lab. – V Engineering Graphics	-	-	2	01	-----	-----	-----	IPE	100	40
Total		17	2	08	23		500			300	

Total Credits: 23

Total Contact Hours/Week: 27 hrs

Note:

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Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

CIE – Continuous Internal Evaluation

SEE – Semester End Examination

IPE – Internal Practical Evaluation

* Semester End Examination duration will be 4 hrs.



SHIVAJI UNIVERSITY, KOLHAPUR

FIRST YEAR B.TECH

Scheme of Teaching and Examination
Semester – II (Engineering Chemistry Group)

Sr. No.	Subject	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
		L	T	P	Credits	Theory			Practical		
						Scheme	Max. marks	Min. Passing \$	Scheme	Max. marks	Min. Passing
1.	Engineering Physics	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
2.	Engineering Mathematics – II	3	1	-	04	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
3.	Fundamentals of Mechanical Engineering	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
4.	Fundamentals of Civil Engineering	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
5.	Fundamentals of Electrical Engineering	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
6.	Lab. – I Engineering Physics	-	-	2	01	-----	-----	-----	IPE	50	20
7.	Lab. – II Workshop Practice	-	-	2	01	-----	-----	-----	IPE	50	20
9.	Lab. – III Fundamentals of Mechanical Engineering	-	-	2	01	-----	-----	-----	IPE	50	20
9.	Lab. – IV Fundamentals of Civil Engineering	-	-	2	01	-----	-----	-----	IPE	50	20
10.	Lab. V Fundamentals of Electrical Engineering	-	-	2	01	-----	-----	-----	IPE	50	20
11.	Lab. – VI Computer Programming	1	-	2	02				IPE	50	20
	Total	16	1	12	23		500			300	

Total Credits: 23

Total Contact Hours/Week: 29 hrs

Note:

\$: Minimum 40% marks required in CIE to become eligible for SEE.

Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

CIE – Continuous Internal Evaluation

SEE – Semester End Examination

IPE – Internal Practical Evaluation



SHIVAJI UNIVERSITY, KOLHAPUR

FIRST YEAR B.TECH

Scheme of Teaching and Examination
Semester – II (Engineering Physics Group)

Sr. No.	Subject	Teaching Scheme (Hours / Week)				Examination Scheme (Marks)					
		L	T	P	Credits	Theory			Practical		
						Scheme	Max. marks	Min. Passing \$	Scheme	Max. marks	Min. Passing
1.	Engineering Chemistry	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
2.	Engineering Mathematics – II	3	1	-	04	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
3.	Fundamentals of Mechanical Engineering	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
4.	Fundamentals of Civil Engineering	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
5.	Fundamentals of Electrical Engineering	3	-	-	03	CIE	50	40	-----	-----	-----
						SEE	50		-----	-----	-----
6.	Lab. – I Engineering Chemistry	-	-	2	01	-----	-----	-----	IPE	50	20
7.	Lab. – II Workshop Practice	-	-	2	01	-----	-----	-----	IPE	50	20
8.	Lab. – III Fundamentals of Civil Engineering	-	-	2	01	-----	-----	-----	IPE	50	20
9.	Lab. – IV Fundamentals of Mechanical Engineering	-	-	2	01	-----	-----	-----	IPE	50	20
10.	Lab. – V Fundamentals of Electrical Engineering	-	-	2	01	-----	-----	-----	IPE	50	20
11.	Lab. – VI Computer Programming	1	-	2	02	-----	-----	-----	IPE	50	20
Total		16	1	12	23		500			300	

Total Credits: 23

Total Contact Hours/Week: 29 hrs

Note:

\$: Minimum 40% marks required in CIE to become eligible for SEE.

Tutorials and practical shall be conducted in batches with batch strength not exceeding 20 students.

CIE – Continuous Internal Evaluation

SEE – Semester End Examination

IPE – Internal Practical Evaluation

Detailed Examination Scheme

1. Out of total 100 theory marks, 50 marks are allotted for Continuous Internal Evaluation (CIE). In CIE minimum 20 marks are required to become eligible for Semester End Examination. (SEE).
2. CIE (50 marks) includes :
 - Internal Test – 1, of 25 marks in 5th week on 1st & 2nd unit
 - Internal Test - 2, of 25 marks in 10th week on 3rd & 4th unit
3. For the Semester End Examination (SEE), 100 marks (3 hrs.) paper will be set and finally it will be converted to 50 marks, in which student must secure minimum 40 % i.e. 20 marks as an university examination passing head.
4. Final theory marks (out of 100) will be the addition of CIE (out of 50 marks) and SEE (out of 50 marks).
5. Internal Practical Evaluation (IPE) will be assessed on the basis of Internal Oral/ Practical/Tutorials/seminar in which student must secure minimum 40% i.e. 20 marks.
6. *Semester End Examination duration will be 4 hrs.

Academic Autonomy:

1. Flexibility in deciding Structure and Contents of Curriculum with reasonable frequency for changes in the same.
2. Continuous Assessment of Students performance with newly adopted - Credit System based on Award of Grade.
3. Credits are quite simply a means of attaching relative values to courses different components. They are a currency of learning, and in general regarded as a measure of the time typically required to achieve a given curricular outcome.
4. All subjects (year-wise) under each course/discipline are unitized.

Credit system:

Education at the Institute is organized around the semester-based credit system of study. The prominent features of the credit system are a process of continuous evaluation of a student's performance/progress and flexibility to allow a student to progress at an optimum pace suited to his/her ability or convenience, subject to fulfilling minimum requirements for continuation.

A student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grades obtained by the student, grade point

average is calculated. A minimum grade point average is required to be maintained for satisfactory progress and continuation in the programme. Also a minimum number of earned credits and a minimum grade point average should be acquired in order to qualify for the degree. All programmes are defined by the total credit requirement and a pattern of credit distribution over courses of different categories.

Course credits assignment:

Each course, except a few special courses, has a certain number of credits assigned to it depending upon its lecture, tutorial and laboratory contact hours in a week. This weightage is also indicative of the academic expectation that includes in-class contact and self-study outside of class hours.

Lectures and Tutorials: One lecture or tutorial hour per week per semester is assigned one credit.

Practical/Laboratory: One laboratory hour per week per semester is assigned half credit.

Example: Course Engineering Graphics: 4 credits (3-0-2)

The credits indicated for this course are computed as follows:

3 hours/week lectures = 3 credits

0 hours/week tutorial = 0 credit

2 hours/week practical = $2 \times 0.5 = 1$ credit

Also, (3-0-2) 4 credit course = (3 h Lectures + 0 h Tutorial + 2 h Practical) per week
= 5 contact hours per week

For each lecture or tutorial credit, the self study component is 1 hour/week and 2 hours/week. In the above example, the student is expected to devote $3 + 1 = 4$ hours per week on self study for this course, in addition to class contact of 5 hours per week.

Earning credits:

At the end of every course, a letter grade is awarded in each course for which a student had registered. On obtaining a pass grade, the student accumulates the course credits as earned credits. A student's performance is measured by the number of credits that he/she has earned and by the weighted grade point average.

The credit system enables continuous evaluation of a student's performance, and allows the students to progress at an optimum pace suited to individual ability and convenience, subject to fulfilling minimum requirement for continuation.

Features of Credit System at Shivaji University, Kolhapur:

1. Every subject is allotted credits based on its academic importance/weight age.
2. All subjects may not have same credits.
3. 23 Credits / Semester.
4. Absolute Grading System with 6 Passing Grades viz. O, A, B, C, D, E and F for failure.
5. Getting F grades in 4 heads in the one academic year he/she considered as failed.
6. Continuous Evaluation: Internal Test 1 [25 marks], & Internal Test 2 [25 marks].
7. Standardization of courses; each course is of 6 units. T1 for unit 1 & 2, T2 for unit 3 & 4, SEE for all units.
8. Internal Test 1 & Internal Test 2 handled by internal; SEE mostly by external.
9. Under no circumstances will a request for re-test be entertained after internal test.
10. Re-examination after SEE; No examination for odd sem. courses in even sem. or vice-versa.

Attendance rule:

All students must attend every lecture, tutorial and practical class.

However, to account for late registration, sickness or other such contingencies, the attendance requirement will be a minimum of 75 % of the classes actually held.

A student with less than 75 % attendance in a course during the semester, in lectures, tutorials and practicals taken together (as applicable), will be awarded an 'XX' grade in that course irrespective of his/her performance in the tests.

The course coordinator will award 'XX' grade to the student who is deficient in attendance taking into account the consolidated attendance record for the whole semester.

For the purpose of attendance calculation, every scheduled practical class will count as one unit irrespective of the number of contact hours.

Attendance record will be maintained based upon roll calls (or any equivalent operation) in every scheduled lecture, tutorial and practical class. The course coordinator will maintain and consolidate attendance record for the course (lectures, tutorials and practicals together, as applicable).

Evaluation system:

1. Semester Grade Point Average (SGPA) =

$$\frac{\sum (\text{course credits in passed courses} \times \text{earned grade points})}{\sum (\text{Course credits in registered courses})}$$

2. Cumulative Grade Point Average (CGPA) =

$$\frac{\sum (\text{course credits in passed courses} \times \text{earned grade points}) \text{ of all Semesters}}{\sum (\text{Course credits in registered courses}) \text{ of all Semesters}}$$

3. At the end of B. Tech Program, student will be placed in any one of the divisions as detailed below:

Ist Division with distinction: CGPA \geq 7.5 and aboveIst Division : CGPA \geq 6.0 and $<$ 7.5IInd Division : CGPA \geq 5.0 and $<$ 6.0

An example of these calculations is given below:

Typical academic performance calculations - I semester

Course no.	Course credits	Grade awarded	Earned credits	Grade points	Points secured
Col 1	Col 2	Col 3	Col 4	Col 5	Col 6 (col4 *col5)
MALXXX	5	D	5	6	30
CSLXXX	4	E	4	5	20
PHLXXX	4	O	4	10	40
PHPXXX	2	B	2	8	16
MELXXX	4	F	0	0	00
TTNXXX	2	A	2	9	18
Total	21		17	38	124

1. Semester Grade Point Average (SGPA) =

$$\frac{(124)}{(21)} = 5.90$$

2. Cumulative Grade Point Average (CGPA) =

Cumulative points earned in all passed courses = 124 (past semesters) + 124 (this sem.) = 248

Cumulative earned credits = 23 (past semesters) + 21 (this sem.) = 44

$$\frac{\sum (124 + 124)}{\sum (23 + 21)} = 5.63$$

System of Evaluation

Grade	Grade Points	Range	Description of Performance
O	10	91-100	OUTSTANDING
A	09	81-90	EXCELLENT
B	08	71-80	GOOD
C	07	61-70	FAIR
D	06	51-60	AVERAGE
E	05	40-50	POOR
F	00	BELOW 40	FAIL (Eligible for Re-Exam)
XX	--	--	INSUFFICIENT ATTENDENCE
AB	--	--	ABSENT
\$	--	--	PASSED IN FIRST ATTEMPT
** 2 nd *** 3 rd **** 4 th	--	--	ONE GRADE PUNISHMENT FOR 2 ND , 3 RD , 4 TH , ...ATTEMPT,

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

ENGINEERING CHEMISTRY**Teaching Scheme: L: 3 hrs/week****Credits: 3**

Evaluation Scheme:	CIE (25 + 25)	SEE 50	Minimum Passing Marks 40
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UNIT 1 Water**7 hrs**

Introduction, water quality parameters (definitions, causes and estimation) like total solids, acidity, alkalinity, chlorides, dissolved oxygen and hardness. Hardness: Types of waters, causes of hardness, calculation of hardness, ill effects of hard water in various industries and boilers, treatments of hard water for domestic purposes by sedimentation, coagulation and sterilization (chlorination). Treatment of water for industrial purpose by cold and hot lime soda method, ion exchange process. (Numerical problems on calculation of temporary and permanent hardness).

UNIT 2 Lubricants**4 hrs**

Introduction, classification, types of lubricants (solid, semisolid and liquid).
Lubrication: mechanism of lubrication (fluid film, boundary and extreme pressure lubrication),
characteristics of lubricants: viscosity, viscosity index, cloud and pour point, flash and fire point. Selection of lubricants (transformer oils, hydraulic systems, refrigeration oils, delicate equipments)

UNIT 3 Fuels**4 hrs**

Introduction, classification, calorific value and its units, theoretical calculation of calorific value of fuels by Bomb and Boy's calorimeters (numerical problems on Dulong's Formula, Bomb and Boy's calorimeters).

UNIT 4 Engineering Materials**11 hrs**

Introduction, alloys, purposes of making alloys, classification of alloys, composition, properties and applications of plain carbon steel (mild, medium and high carbon steels).

Copper alloys: Duralumin and alnico. **Nickel alloys:** Nichrome (Composition, properties and applications)

Ceramics: Introduction, classification, properties of ceramics (polymorphism, ceramic bonding and insulation etc.), applications of ceramics.

Refractories: Introduction, classification, properties (refractoriness, porosity, thermal spalling, thermal & electrical conductivity strength)

Polymers :Introduction, polymers and polymerization (addition, condensation and copolymerization). **Plastics:** Introduction, definition, types (thermo softening and thermosetting). **Rubber:** Definition, types (natural and synthetic rubber). Isolation of natural rubber, properties (drawbacks of natural rubber). Vulcanization of natural rubber. Synthetic rubber. Preparation, properties and uses of plastics like polythene, polyvinyl chloride, phenol formaldehyde, urea formaldehyde.

Preparation, properties and uses of synthetic rubbers like Polyurethane, silicon rubber and conducting polymers.

UNIT 5 Corrosion and its prevention

07 hrs

Introduction, corrosion and its causes, classification, atmospheric corrosion, corrosion due to oxygen and other gases. Electrochemical corrosion, emf and galvanic series, mechanism of electrochemical corrosion (hydrogen evolution and oxygen absorption). Factors influencing corrosion. Prevention of corrosion: prevention of corrosion by proper design and material selection, cathodic and anodic protection, metallic coating like hot dipping (galvanizing and tinning), metal cladding, spraying and electroplating.

UNIT 6 Instrumental Methods of Chemical Analysis

6 hrs

Introduction, advantages and disadvantages of instrumental and non-instrumental methods.
pH metry: Equation and working of pH meter, glass electrode, principle, construction and working. Advantages and disadvantages, applications of pH meter.
Potentiometry: Introduction, measurement of emf by potentiometer, applications of acid base titrations.
Spectrometry: Laws of spectrometry, schematic diagram of single beam spectrometer.
Partition chromatography: Paper, thin layer and column chromatography, gas liquid chromatography (TLC).

REFERENCE BOOKS :-

1. Chatwal, Anand, - "Instrumental methods of chemical analysis", Himalaya publishing house.
2. Dr. A. K. Phari and B. S. Chavan, -"Engineering Chemistry", Laxmi Publishing, New Delhi.
Jain & Jain, -"Engineering Chemistry", Dhanpatrai & Co.
3. M. M. Uppal , - "A text book of Engineering Chemistry", Khanna Publishers, New Delhi.
4. Shashi Chawla, - "A text book of Engineering Chemistry", Dhanpatrai & Co.
5. S. S. Dara, - "A textbook of Engineering Chemistry", S. Chand & Co., Delhi.
6. S. K. Singh, -"Fundamental of Engineering Chemistry", New Age International Publishers.

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

ENGINEERING PHYSICS

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 Ultrasonic

4 hrs

Introduction, production of ultrasonic waves- magnetostriction method, Piezo-electric generator, detection of ultrasonic waves, properties of ultrasonic waves, use of ultrasonics for non-destructive testing, Industrial applications of ultrasonics.

UNIT 2 Optics

7 hrs

Interference – Superposition of waves, coherence, Young’s double slit experiment, interference in thin films by reflection, Diffraction – Fresnel and Fraunhofer diffractions, Fraunhofer diffraction at a single slit, Diffraction grating, Determination of wavelength.
Polarization – types of polarization, Brewster’s law, Polaroid, Nicol prism.

UNIT 3 Lasers

8 hrs

Introduction, characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein’s coefficients, population inversion, Ruby laser, Helium-Neon laser, Applications of lasers in Industrial, scientific and medical fields. Holography – Basic principles, construction and reconstruction of image on hologram, applications of holography.

Fibre optics

Principle of optical fibre, cross sectional view of optical fibre, acceptance angle, acceptance cone (no derivation), numerical aperture, step index fibre, transmission of light in step index fibre, graded index fibre, transmission of light in graded index fibre, attenuation in optical fibre, applications (medical, military, communication)

UNIT 4 Crystallography

7 hrs

Lattice, basis and crystal structure, unit cell, Seven crystal systems (Bravais space lattices), number of atoms per unit cell, coordination number, packing fraction for cubic & HCP space groups, Lattice planes- Miller indices, relation between interplanar distance and Miller indices. X-ray diffraction, Bragg’s law, crystallography by powder method.

UNIT 5 Superconductivity

6 hrs

Discovery, General properties, Meissner effect, Type I and Type II superconductors, BCS theory (qualitative), High T_c superconductors. Applications of superconductivity.

UNIT 6 Nuclear and Solar energy

7 hrs

Nuclear fission – Discovery of fission, binding energy curve, chain reaction (fission of U²³⁵), critical size, critical mass, essentials of nuclear reactor. **Nuclear fusion** – Thermonuclear reaction, p-p chain, C-N cycle, controlled fusion. **Solar energy** – solar spectrum, Ways of harnessing solar energy – solar photovoltaic and photo thermal.

REFERENCE BOOKS :-

1. A. Ghatak, "Optics", S. Chand and Company Ltd
2. Brijlal and Subramanian, "Optics", 5006, 23rd Edition
3. B. L. Theraja, "Modern Physics", S. Chand & Company Ltd., Delhi.
4. Charles Kittel, "Introduction to Solid State Physics," Wiley India Pvt
5. L. Tarasov, "Laser Physics and Applications," Mir Publishers.
6. M. N. Avadhanulu and P. G. Kshirsagar "Engineering Physics", S. Chand Publication.
7. P.K. Palanisamy, "Solid State Physics", Scitech Publications (India) Pvt. Ltd.
8. R. K. Gaur and Gupta S. L, "Engineering Physics", Dhanapat Rai and Sons Publication.
9. Resnick Halliday, "Physics Volume-I", Krane -John Wiley & Sons Pub.
10. Resnick Halliday, "Physics Volume-II", Krane -John Wiley & Sons Pub. Ltd.
11. S. O. Pillai, "Solid State Physics: Structure & Electron Related Properties", Eastern Ltd., New Age International Ltd.
12. V. Rajendran, "Engineering Physics", Tata Mc-Graw Hill Company Ltd, New Delhi

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

ENGINEERING MATHEMATICS - I

Teaching Scheme: L: 3 hrs/week
: T: 1 hrs/week

Credits: 4

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

Unit 1 Complex Numbers With Applications **7 hrs**

Necessity of complex numbers and their usefulness in various engineering branches, definition of complex number, representation of a complex number in Cartesian & Polar co-ordinate systems, Argand's diagram, De'Moivre's Theorem and its applications, trigonometry of complex numbers, circular and inverse circular functions, hyperbolic and inverse hyperbolic functions, logarithm of complex numbers.

Unit 2 Differential Calculus-I **6 hrs**

Recapitulation of differential calculus and its importance in engineering, successive differentiation, Leibnitz's Theorem, Rolle's Mean Value Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem.

Unit 3 Differential Calculus-II **7 hrs**

Maclaurin's series expansion of standard functions, Taylor's series expansion and its usefulness in engineering problems, indeterminate forms.

Unit 4 Matrices-I **6 hrs**

Importance of matrices in engineering, Rank of a matrix, Normal form of a matrix, Consistency of the system of linear equations, homogeneous and non homogeneous equations, Gauss elimination method, Gauss-Jordan method, linear dependence of vectors.

Unit 5 Matrices-II **7 hrs**

Eigen values and eigen vectors, Cayley-Hamilton Theorem, iterative method for finding the largest and smallest eigen values, Jacobi and Gauss-Seidal iterative methods, quadratic forms, applications to engineering problems.

Unit 6 Partial Differentiation And Its Applications **6 hrs**

Partial derivatives and their usefulness in engineering problems, Euler's Theorem on homogeneous functions, implicit function, total derivative, change of independent variables. Approximation to errors and small changes, Jacobians, maxima and minima of two variables, To Maxima and Minima of functions of two variables and Tangent plane and normal line to the surfaces.

Reference Books

1. B. S. Grewal, “Higher Engineering Mathematics”, Khanna Publications, New Delhi.
2. C.R.Wylie, “Advanced Engineering Mathematics”, McGraw Hill Publication, New Delhi.
3. Erwin Kreyszig, “Advanced Engineering Mathematics (7th Edition)”, Wiley Eastern Ltd., Bombay.
4. P. N. Wartikar and J. N. Wartikar, “A Text Book of Engineering Mathematics (Volume-I)”, Pune Vidyarthi Griha Prakashan, Pune.
5. Shanti Narayan, “Differential Calculus” S. Chand and company, New Delhi.
6. S. S. Sastry, “Engineering Mathematics (Volume-I)”, Prentice Hall Publication, New Delhi.

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

ENGINEERING MECHANICS

Teaching Scheme: L: 3 hrs/week
: T: 1 hrs/week

Credits: 4

Evaluation Scheme:	CIE (25 + 25)	SEE 50	Minimum Passing Marks 40
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UNIT 1 Laws of Forces and Moments Centroid and Second moment of area 8 hrs

SI Units, Basic Units, Derived units, Particle, Body, Elastic Body, Rigid Body, Scalar quantities, Vector Quantities, Force, Resolution of a force, Law of Transmissibility of force, Moment of a force, couple, moment of a couple, Resultant, Parallelogram of forces, triangle law of forces, polygon of forces, Varignon's theorem, Composition of forces, co-planner concurrent and non concurrent forces, analytical method

Centre of gravity, Centroid, Centroid of composite area, Second moment of area, Moment of inertia of sections, Parallel axes theorem, Perpendicular axes theorem, M.I. of unsymmetrical sections, Radius of gyration, polar moment of inertia.

UNIT 2 Equilibrium of Co-planer Forces 6 hrs

Analytical and graphical conditions of equilibrium, different types of supports, free body diagram, Lami's theorem, Problems on compound frames with hinged joints, Pulleys, Theory of friction, Laws of Friction and Applications of friction. Equilibrium of beam, point load, uniformly varying load and couple, Support reactions of statically determine beams, compound beams.

UNIT 3 Analysis of Trusses 5 hrs

Pin-jointed statically determinate plane trusses, Assumptions, Static degree of indeterminacy, Analysis of statically determinate trusses by method of joints, method of sections.

UNIT 4 Kinematics 9 hrs

Introduction to various types of motions, Kinematics of particles, rectilinear motion, Equations of linear motion with constant and variable acceleration, motion under gravity, Curvilinear motion, Angular motion, Relation between angular motion and linear motion, Equation of angular motion, Tangential and radial acceleration, Centrifugal and Centripetal forces, Motion along a curved path, Super elevation of road and railway curves, motion of a projectile.

UNIT 5 Kinetics 4 hrs

Newton's Laws of motion for linear and angular motion, Torque, Mass moment of inertia, D'Alembert's principle, Problems on linear motion and centroidal rotation.

UNIT 6 Work, Power, Energy

7 hrs

Work done by a force, spring, potential energy, kinetic energy of linear motion and rotation, work energy equation, Principle of conservation of energy, impulse momentum principle. Collision of elastic bodies; direct central impact, oblique impact, coefficient of restitution, loss of kinetic energy.

REFERENCE BOOKS :-

1. Arthur Boresi & Richard Schmit, “Engineering Mechanics (Statics & Dynamics)”,Brookes/Cole Publications
2. Bhavikatti. S. S and Rajashekarappa. K. G., “Engineering Mechanics”, New Age International Publications, 5006, 2nd Edition.
3. F.P. Beer and E. R. Johnston, “Vector Mechanics for Engineers Vol. I and II”, McGraw Hill Company Publication, 5006, 7th Edition.
4. Khurmi. R. S., “Textbook of Applied Mechanics”, Tata McGraw Hill Publishing Company, 5006, 1st Edition.
5. K. I. Kumar, “Engineering Mechanics”, Tata Mc-Graw Hill Publication.
6. McLean and Nelson “Engineering Mechanics”, Schaum’s outline series, (McGraw Hill Book Company, New Delhi, Publication.)
7. Ramamrutham. S, “Textbook of Applied Mechanics”, Dhanpat Rai Publications, 1987, 4th Edition.
8. Singer.F. L, “Engineering Mechanics Statics &Dynamics”,(Harper and Row Publishers, New York)
9. Shames. I. H, “Engineering Mechanics”, Statics & Dynamics, Prentice Hall Publication, 5007, 4th Edition.
10. Timoshenko. S. & Young. D. H, “Engineering Mechanics”, McGraw Hill Book Company Publication, 5006, 4th Edition.
11. Thadani. B. N, “Engineering Mechanics”, Weinall Book Corporation, 1987, 1st Edition.

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

ENGINEERING GRAPHICS

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:

CIE
(25 + 25)

SEE
50

Minimum Passing Marks
40

UNIT 1 Drafting Technology and Plane Curve

6hrs

Layout of drawing sheets, sizes of drawing sheets, different types of lines used in drawing practice, Dimensioning – linear, angular, aligned system, unidirectional system, parallel dimensioning, chain dimensioning. Regular Polygons up to hexagon.

Plane Curve: Ellipse, Parabola and Hyperbola, Cycloid, Involute, Archimedian spiral.

UNIT 2 Projections of points and lines

7 hrs

Introduction to First angle and third angle methods of projection. Projections of points on regular and auxiliary reference planes (Including coordinate system of points). Projections of lines (horizontal, frontal, oblique and Profile lines) on regular and auxiliary reference planes. True length of a line, Point View of a line, angles made by the line with reference planes. Projections of intersecting lines, Parallel lines, perpendicular lines, and skew lines. Distance between point and line, grade and bearing of a line.

UNIT 3 Projections of planes

6 hrs

Projections on regular and on auxiliary reference planes. (Including coordinate system). Types of planes (horizontal, frontal, oblique and Profile planes), Edge view and True shape of a Plane. Angles made by the plane with Principle reference planes. Strike and Dip of the plane.

UNIT 4 Projections and Section of solids

7 hrs

Prisms, Pyramids, Cylinders and Cones, in simple positions only.

UNIT 5 Orthographic views

6 hrs

Lines used, selection of views, spacing of views. ISI conventions used in drawing, dimensioning and sections. Drawing required views from given pictorial views (conversion of pictorial views in to orthographic views).

UNIT 6 Isometric projections Development of plane and curved surfaces

7 hrs

Isometric scale, Isometric projections and Isometric views / drawings. Circles in isometric view. Isometric views of simple solids and objects.

Development of plane and curved surfaces :Prisms, Pyramids, Cylinders and Cones along with cutting planes.

NOTE: All the above syllabus is to be covered according to the first angle method of projection.

REFERENCE BOOKS:-

1. French and Vierck, “Graphic Science”, Mc-Graw Hill International.
2. K. L. Narayana, “Machine Drawing”, New Age Publication
3. K. Venugopal, “Engineering Drawing and Graphics”, New Age Publication
4. N. B. Shaha and B. C. Rana, “Engineering Drawing”, Pearson Education.
5. N. D. Bhatt, “Engineering Drawing”, Charotor Publication House, Bombay
6. N. D. Bhatt, “Machine Drawing”, Charotor Publication House, Bombay
7. R. K. Dhawan, “A text book of Engineering Drawing”, S. Chand and Co.
8. Rowes, “Descriptive Geometry”.
9. Sevsen and Street, “Engineering Drawing”.
10. W. J. Luzadder, “Fundamentals of Engineering Drawing”, Prentice Hall of India.

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

ELECTRONIC COMPONENTS AND DEVICES**Teaching Scheme: L: 3 hrs/week****Credits: 3**

Evaluation Scheme:	CIE (25 + 25)	SEE 50	Minimum Passing Marks 40
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UNIT 1 Circuit Elements**5 hrs**

Resistors: - Definition, symbol and colour code method. [Construction, specifications and Application], Types of resistors: - Linear Resistors (Fixed): -Carbon composition, carbon ceramic, carbon film, wire wound. Linear resistors (Variable): -Wire wound, Potentiometer, Preset. Non-Linear resistors: - Thermistors, photo resistors and varistors. Specifications and Applications.

UNIT 2 Capacitors**5 hrs**

Definition, symbol and colour code method. Capacitance, capacitive reactance X_C , Energy stored in a capacitor, charging and discharging of a capacitor, leakage current in capacitor, stray capacitance. Types of capacitors: - Fixed electrostatic capacitors: -ceramic, mica, plastic and paper, Fixed electrolytic capacitors: - Aluminium and Tantalum polycarbonate Polyethylene. Construction of capacitors, Variable capacitors: -Air dielectric capacitor and Trimmers. Specifications, Applications.

UNIT 3 Inductors, other components with specifications and materials**8 hrs**

Definition, symbol, Inductance, Inductive reactance (X_L), Energy stored in an inductor, Q Factor. Types of Inductors: - Air core, Iron core and ferrite core inductors.

Use of Inductors:- Filter chokes AFC & RFC and Variable inductor.

Relays:- Principle, construction and working of electromagnetic relay and Reed relay applications.

Fuses:- Slow blow and Fast blow.

Materials:- Dielectrics, ferroelectrics, Magnetic, Piezoelectric, Pyroelectric Materials, properties, characteristics and applications

UNIT 4 Semiconductor diodes and its applications**14 hrs**

The energy band theory of crystal (Mathematical treatment is not expected), Energy band Structure of insulators, semiconductor and metals. Types of semiconductors, conduction mechanism in semiconductors.

Definition of PN junction, formation of depletion layer and internal potential barrier. Biased junction: - Forward and Reverse biased V-I characteristics of p-n junction diode, Junction resistance (i.e. diode resistance), Diode applications, power and current rating of diode, effect of temperature on PN junction diode, Diode capacitances, Specifications of diode. Point contact diode.

Rectifiers:- Half wave, full wave, bridge with L, C, L section and filter.

Zener diode:- Breakdown mechanism, Zener versus Avalanche Break down, V-I characteristics, Zener specifications, applications and effect of temperature on Zener diode, photo diode, varactor diode, point contact diode, LED applications and specifications of these diodes

UNIT 5 Bipolar Junction Transistor

5 hrs

BJT:- The Bipolar Junction Transistor structure PNP and NPN Constructions, Working of NPN transistor, **Transistor configurations:** - CB, CE and CC configuration, V-I characteristics of CB and CE and definitions of α and β . Relation between α and β , Leakage current in CB and CE (i.e. I_{CB0} and I_{CE0}), Transistor as switch.

UNIT 6 Other semiconductor devices

5 hrs

FET:- Structure and operation of n-channel FET. The volt-ampere characteristics of FET. FET parameters & Applications. Comparison with BJT.

Thyristors: - Structure, operation, V-I characteristics and Applications. (SCR, Triac, Diac and UJT).

REFERENCE BOOKS :-

1. Allen Mottershead, (PHI) “Electronic Devices and Circuits”,
2. Bernard Grob “Basic Electronics”
3. Floyd, “Electronic Devices”
4. J.Millman & C.C. Halkias, (TMH) “Electronic Devices and Circuits”,
5. Madhuri Joshi, “Electronics materials and components”,.
6. Malvino, “Semiconductor Approximation”,
7. N.N.Bharagava, D.C.Kulshreshtha and S.C.Gupta (TMH), “Basic Electronics and Linear circuits”,
8. R.S.Sedha, “A text book of Applied Electronics”, (S.Chand & Company)
9. R.Boylested & Louis Nashlsky, “Electronic Devices and Circuit Theory”
10. V.K. Mehta “Principles of Electronics”, (New Edn.)

Shivaji University, Kolhapur

First Year B. Tech (Semester I and II)

Laboratory I

ENGINEERING CHEMISTRY LAB

Teaching Scheme: P: 2hrs/week

Credits: 1

Evaluation Scheme: IPE : 50

Minimum Passing Marks : 20

EXPERIMENTS (Any 8):

1. Determination of total hardness of a water sample using disodium salt.
2. Determination of chloride content of water sample.
3. Determination of acidity of a water sample.
4. Determination of alkalinity of a water sample.
5. Preparation of phenol formaldehyde resin.
6. Preparation of urea formaldehyde resin.
7. Estimation of rate of corrosion of aluminum in acidic and alkaline medium.
8. Estimation of copper in the given brass solution.
9. Estimation of zinc in the given brass solution.
10. Determination of viscosity of a lubricant by Ostwald's viscometer.
11. Proximate analysis of coal in the given sample.
12. Estimation of calcium in lime stone solution.
13. Estimation of calcium and magnesium in Dolomite solution.

ASSIGNMENTS:

At least 4 assignments based on theory syllabus.

Shivaji University, Kolhapur

First Year B. Tech (Semester I and II)

Laboratory I

ENGINEERING PHYSICS LAB

Teaching Scheme: P: 2hrs/week

Credits: 1

Evaluation Scheme: IPE : 50

Minimum Passing Marks : 20

EXPERIMENTS (Any 8):

1. Diffraction grating - measurement of wavelength.
2. Diffraction grating - measurement of wavelength of Laser.
3. Fresnel Bi-prism – determination of band width.
4. Study of divergence of laser beam
5. Polarimeter – determination of specific rotation of sugar solution.
6. Crystallography - analysis of cubic crystal.
7. Calculation of lattice constant from the given powder XRD pattern.
8. Determination of band gap of semiconductor material .
9. Study of I-V characteristics of a solar cell
10. Photodiode – inverse square law.
11. Ultrasonic Interferometer -Measurement of velocity of sounds in solids and liquids

ASSIGNMENTS:

At least 6 assignments based on theory syllabus.

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

Laboratory II

PROFESSIONAL COMMUNICATION

Teaching Scheme: L: 1hrs/week

Credits: 2

: P: 2hrs/week

Evaluation Scheme: IPE: 50

Minimum Passing Marks: 20

UNIT 1 Communication **2 hrs**

Nature and Importance of Communication, Process and barriers to Communication, Forms of Communication

UNIT2 Techniques of Communication **3 hrs**

- a. Verbal Communication - Techniques of Formal Speech, Meetings, Interviews, Group Discussion, Debate, Elocution, Extempore etc.
- b. Non-verbal Communication – Body Language.

UNIT 3 Précis writing **1 hr**

Importance and Techniques of précis writing.

UNIT 4 Techniques of Professional Correspondence **2 hrs**

Importance of professional correspondence, Techniques of professional correspondence.

UNIT 5 Types of professional correspondence **2 hrs**

Application Letter, Enquiries and replies, order, complaint and their reply, invitation letters and its reply.

UNIT 6 Report writing **3 hrs**

Importance and Techniques of report writing, Investigation Reports (Losses, Strikes, Declines) Survey Reports (Examining feasibility of proposals),

TERM WORK:-

1. Formal speech on following topics;
 - a. About myself
 - b. The problems I face while communicating
 - c. Topics on current affairs
2. Group Discussion on current topics.
3. Vocabulary exercise – Synonyms, Antonyms, Phrases and Idioms.
4. Language Lab. Sessions on phonetics and grammar.
5. Precise writing exercises – Exercises of summarizing English Articles & News.
6. Games on team building, communication and public speaking.
7. A letter each on different types of professional correspondence should be practiced.
8. Report writing – At least one report on each types should be practiced.
9. Presentation techniques.

REFERENCES BOOKS:-

1. Aspi Doctor, “Principles and Practice of Business Communication”, Rhoda Doctor, Sheth Publications, Mumbai
2. J. D. O’Connor, “Better English pronunciation”.
3. Pravil S. R. Bhatia, “Professional Communication Skills”, S. Chand and Co., New Delhi.
4. R. K. Chaddha, “Communication Techniques and skills”, Dhanpat Rai Publication, New Delhi.
5. Sunita Mishra, C. Muralikrishna, “Communication Skills for Engineers”, Pearson Education.
6. Wren and Martin, “High-school English Grammar and Composition”, S. Chand and Co., New Delhi.

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

Laboratory III

ENGINEERING MECHANICS

Teaching Scheme: P: 2hrs/week

Credits: 1

Evaluation Scheme: IPE : 50

Minimum Passing Marks : 20

I. EXPERIMENTS (Any 5) :-

1. Law of polygon of forces
2. Jib crane
3. Bell crank lever
4. Support Reactions of Beam
5. Fletcher's Trolley
6. Centrifugal force

II. GRAPHICAL SOLUTIONS:

1. To find resultant (Coplanar Force Systems) - 2 problems
2. To find resultant (Non- Coplanar Force Systems) - 2 problems
3. To find support reactions - 2 problems
4. To find forces in the members of truss – 2 problems

III. ASSIGNMENTS:

At least 6 assignments based on theory syllabus.

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

Laboratory IV

ELECTRONIC COMPONENTS AND DEVICES

Teaching Scheme: P: 2hrs/week

Credits: 1

Evaluation Scheme: IPE : 50

Minimum Passing Marks : 20

I. EXPERIMENTS:-

1. Characteristics of Si, Ge and point contact diodes
2. Performance characteristics of half wave rectifier with and without filter
3. Performance characteristics of full wave rectifier with and without filter
4. Characteristics of Zener diode
5. Temperature coefficient of Zener and Avalanche diodes
6. Input and output characteristics of C.B and C.E transistor configurations
7. Characteristics of FET
8. I-V characteristics of SCR

II. ASSIGNMENTS:-

At least 4 assignments based on theory syllabus.

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

Laboratory V

ENGINEERING GRAPHICS

Teaching Scheme: P: 2hrs/week

Credits: 1

Evaluation Scheme: IPE : 50

Minimum Passing Marks : 20

TERM WORK:-

The following eight sheets to be drawn based on the above topics. All these sheets should be drawn on half imperial (A2 size) drawing sheets only.

Sr. No.	Title of Sheets	No. Of Sheets
1.	Plane curves	01
2.	Projections of lines	01
3.	Projections of planes	01
4.	Orthographic projections	01
5.	Isometric projections	01
6.	Projections of solids	01
7.	Sections of solids	01
8.	Development of Plane and curved surfaces of solids	01

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

ENGINEERING PHYSICS

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:	CIE	SEE	Minimum Passing Marks
	(25 + 25)	50	40

UNIT 1 Ultrasonic 4 hrs

Introduction, production of ultrasonic waves- magnetostriction method, Piezo-electric generator, detection of ultrasonic waves, properties of ultrasonic waves, use of ultrasonics for non-destructive testing, Industrial applications of ultrasonics.

UNIT 2 Optics 7 hrs

Interference – Superposition of waves, coherence, Young’s double slit experiment, interference in thin films by reflection, Diffraction – Fresnel and Fraunhofer diffractions, Fraunhofer diffraction at a single slit, Diffraction grating, Determination of wavelength.
Polarization – types of polarization, Brewster’s law, Polaroid, Nicol prism.

UNIT 3 Lasers 8 hrs

Introduction, characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein’s coefficients, population inversion, Ruby laser, Helium-Neon laser, Applications of lasers in Industrial, scientific and medical fields. Holography – Basic principles, construction and reconstruction of image on hologram, applications of holography.

Fibre optics

Principle of optical fibre, cross sectional view of optical fibre, acceptance angle, acceptance cone (no derivation), numerical aperture, step index fibre, transmission of light in step index fibre, graded index fibre, transmission of light in graded index fibre, attenuation in optical fibre, applications (medical, military, communication)

UNIT 4 Crystallography 7 hrs

Lattice, basis and crystal structure, unit cell, Seven crystal systems (Bravais space lattices), number of atoms per unit cell, coordination number, packing fraction for cubic & HCP space groups, Lattice planes- Miller indices, relation between interplanar distance and Miller indices. X-ray diffraction, Bragg’s law, crystallography by powder method.

UNIT 5 Superconductivity

6 hrs

Discovery, General properties, Meissner effect, Type I and Type II superconductors, BCS theory (qualitative), High T_c superconductors. Applications of superconductivity.

UNIT 6 Nuclear and Solar energy

7 hrs

Nuclear fission – Discovery of fission, binding energy curve, chain reaction (fission of U²³⁵), critical size, critical mass, essentials of nuclear reactor. **Nuclear fusion** – Thermonuclear reaction, p-p chain, C-N cycle, controlled fusion. **Solar energy** – solar spectrum, Ways of harnessing solar energy – solar photovoltaic and photo thermal.

REFERENCE BOOKS :-

1. A. Ghatak, “Optics”, S. Chand and Company Ltd
2. Brijlal and Subramanian, “Optics”, 5006, 23rd Edition
3. B. L. Theraja, “Modern Physics”, S. Chand & Company Ltd., Delhi.
4. Charles Kittel, “Introduction to Solid State Physics,” Wiley India Pvt
5. L. Tarasov, “Laser Physics and Applications,” Mir Publishers.
6. M. N. Avadhanulu and P. G. Kshirsagar “Engineering Physics”, S. Chand Publication.
7. P.K. Palanisamy, “Solid State Physics”, Scitech Publications (India) Pvt. Ltd.
8. R. K. Gaur and Gupta S. L, “Engineering Physics”, Dhanapat Rai and Sons Publication.
9. Resnick Halliday, “Physics Volume-I”, Krane -John Wiley & Sons Pub.
10. Resnick Halliday, “Physics Volume-II”, Krane -John Wiley & Sons Pub. Ltd.
11. S. O. Pillai, “Solid State Physics: Structure & Electron Related Properties”, Eastern Ltd., New Age International Ltd.
12. V. Rajendran, “Engineering Physics”, Tata Mc-Graw Hill Company Ltd, New Delhi

Shivaji University, Kolhapur

First Year B. Tech (Semester I)

ENGINEERING CHEMISTRY

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:	CIE (25 + 25)	SEE 50	Minimum Passing Marks 40
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UNIT 1 Water**7 hrs**

Introduction, water quality parameters (definitions, causes and estimation) like total solids, acidity, alkalinity, chlorides, dissolved oxygen and hardness. Hardness: Types of waters, causes of hardness, calculation of hardness, ill effects of hard water in various industries and boilers, treatments of hard water for domestic purposes by sedimentation, coagulation and sterilization (chlorination). Treatment of water for industrial purpose by cold and hot lime soda method, ion exchange process. (Numerical problems on calculation of temporary and permanent hardness).

UNIT 2 Lubricants**4 hrs**

Introduction, classification, types of lubricants (solid, semisolid and liquid).
Lubrication: mechanism of lubrication (fluid film, boundary and extreme pressure lubrication),
characteristics of lubricants: viscosity, viscosity index, cloud and pour point, flash and fire point. Selection of lubricants (transformer oils, hydraulic systems, refrigeration oils, delicate equipments)

UNIT 3 Fuels**4 hrs**

Introduction, classification, calorific value and its units, theoretical calculation of calorific value of fuels by Bomb and Boy's calorimeters (numerical problems on Dulong's Formula, Bomb and Boy's calorimeters).

UNIT 4 Engineering Materials**11 hrs**

Introduction, alloys, purposes of making alloys, classification of alloys, composition, properties and applications of plain carbon steel (mild, medium and high carbon steels).

Copper alloys: Duralumin and alnico. **Nickel alloys:** Nichrome (Composition, properties and applications)

Ceramics: Introduction, classification, properties of ceramics (polymorphism, ceramic bonding and insulation etc.), applications of ceramics.

Refractories: Introduction, classification, properties (refractoriness, porosity, thermal spalling, thermal & electrical conductivity strength)

Polymers :Introduction, polymers and polymerization (addition, condensation and copolymerization). **Plastics:** Introduction, definition, types (thermo softening and thermosetting). **Rubber:** Definition, types (natural and synthetic rubber). Isolation of natural rubber, properties (drawbacks of natural rubber). Vulcanization of natural rubber. Synthetic rubber. Preparation, properties and uses of plastics like polythene, polyvinyl chloride, phenol formaldehyde, urea formaldehyde.

Preparation, properties and uses of synthetic rubbers like Polyurethane, silicon rubber and conducting polymers.

UNIT 5 Corrosion and its prevention

7 hrs

Introduction, corrosion and its causes, classification, atmospheric corrosion, corrosion due to oxygen and other gases. Electrochemical corrosion, emf and galvanic series, mechanism of electrochemical corrosion (hydrogen evolution and oxygen absorption). Factors influencing corrosion. Prevention of corrosion: prevention of corrosion by proper design and material selection, cathodic and anodic protection, metallic coating like hot dipping (galvanizing and tinning), metal cladding, spraying and electroplating.

UNIT 6 Instrumental Methods of Chemical Analysis

6 hrs

Introduction, advantages and disadvantages of instrumental and non-instrumental methods.
pH metry: Equation and working of pH meter, glass electrode, principle, construction and working. Advantages and disadvantages, applications of pH meter.
Potentiometry: Introduction, measurement of emf by potentiometer, applications of acid base titrations.
Spectrometry: Laws of spectrometry, schematic diagram of single beam spectrometer.
Partition chromatography: Paper, thin layer and column chromatography, gas liquid chromatography (TLC).

REFERENCE BOOKS :-

1. Chatwal, Anand, - “Instrumental methods of chemical analysis”, Himalaya publishing house.
2. Dr. A. K. Phari and B. S. Chavan, -“Engineering Chemistry”, Laxmi Publishing, New Delhi.
Jain & Jain, -“Engineering Chemistry”, Dhanpatrai & Co.
3. M. M. Uppal , - “A text book of Engineering Chemistry”, Khanna Publishers, New Delhi.
4. Shashi Chawla, - “A text book of Engineering Chemistry”, Dhanpatrai & Co.
5. S. S. Dara, - “A textbook of Engineering Chemistry”, S. Chand & Co., Delhi.
6. S. K. Singh, -“Fundamental of Engineering Chemistry”, New Age International Publishers.

Shivaji University, Kolhapur

First Year B. Tech (Semester II)

ENGINEERING MATHEMATICS - II

Teaching Scheme: L: 3 hrs/week

T: 1 hrs/week

Credits: 4

Evaluation Scheme:	CIE (25 + 25)	SEE 50	Minimum Passing Marks 40
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Unit 1 Curve Tracing and Rectification **7hrs**
Tracing of curves (Cartesian and Polar), Rectification of plane curves (Cartesian and Polar form)

Unit 2 Integral Calculus **7hrs**
Reduction formulae, Beta and Gamma functions, differentiation under the sign of integration, error function.

Unit 3 Multiple Integrals & Applications **9hrs**
Introduction of Double Integrals, Evaluation of Double Integrals, Change of order of Integration, Change of variables using Jacobians, Change to Polar, Evaluation of Triple Integral with given limits. Applications Of Multiple Integrals: Area of surfaces, volume of solids, mean and Root Mean Square values.

Unit 4 Numerical Differentiation **5 hrs**
Stirling's Central difference interpolation formula, Newton's Divided difference formula Numerical Solution of Ordinary Differential Equations of first order and first degree Taylor's series method , Euler's method , Modified Euler's method, Runge-Kutta fourth order formula

Unit 5 Fourier Series **6hrs**
Dirichlet's conditions, full range Fourier series, half range Fourier series, harmonic analysis.

Unit 6 Differential Equations of first order and first degree & Applications **5hrs**
Exact differential equations, Equations reducible to exact equations, Linear equations, Equations reducible to Linear form.
Applications to Orthogonal trajectories (Cartesian and Polar equations), Simple Electrical Circuits

Reference Books

1. Dr. B. S. Grewal , "Higher Engineering Mathematics," - Khanna Publishers, Delhi.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", - New Age International (P) Ltd.Publishers.
3. M. K. Jain, S. R. K. Iyengar, R. K. Jain, "Numerical Methods for Scientific and Engineering Computation", – New Age International (P) Ltd.
4. P. N. Wartikar & J. N. Wartikar , "A Text Book of Applied Mathematics Vol.-I and II," - Pune Vidyarthi Griha Prakashan, Pune.

Shivaji University, Kolhapur

First Year B. Tech (Semester II)

FUNDAMENTALS OF MECHANICAL ENGINEERING

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:	CIE (25 + 25)	SEE 50	Minimum Passing Marks 40
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UNIT 1 Fundamentals of Thermodynamics 6 hrs

Thermodynamics systems, control volume, thermodynamics substances, path, process and cycle, reversible and irreversible processes, irreversibility, point and path functions, energy forms, work, types of work such as shaft work, displacement (PdV) work, flow work, electrical work, paddle wheel work, spring work, gravitational work, acceleration work, stretching work. (Numerical treatment). The Zeroth law of thermodynamics, Thermodynamics Laws – The first law of thermodynamics, statement, Perpetual motion machine (PMM-I), steady flow energy equation and its applications to nozzle, turbine, compressor, fan, pump, throttling valves, heat exchangers, boilers, refrigerators. (Numerical treatment).

UNIT 2 Gas Laws, Gas Processes, Gas Power Cycle 6 hrs

Boyle's law, Charle's law, Combined gas law, Air standard cycles: The air standard Carnot cycle - Air standard Otto cycle, diesel cycle, dual cycle and Bryton cycles and their efficiencies. (Numerical treatment on gas processes and Carnot, Otto cycles only).

UNIT 3 Internal Combustion Engines and Refrigeration 6 hrs

Classification, two and four stroke engines, construction and working of petrol and diesel engines. Refrigeration Cycles and Systems: Reverse Carnot cycle - COP - Vapor compression refrigeration cycle and systems – Gas refrigeration cycle - Absorption refrigeration system - Liquefaction and solidification of gases.

UNIT 4 Heats and Mass Transfer 6 hrs

Statement and explanation of Fourier's law of heat conduction, Newton's law of cooling, Stefan Boltzmann's law. Conducting and insulating materials and their properties. Introduction, Modes of mass transfer, Analogy between heat and mass transfer.

UNIT 5 Power Transmission Devices, Pumps, Compressor and Hydraulic Turbines 6 hrs

Types of Belts and belt drives, Chain drive, Types of gears, Types of Couplings, friction clutch (cone and single plate), brakes (types and applications only) Applications of these devices.

Pumps, Compressor and Hydraulic Turbines: Types, Construction, working and applications

UNIT 6 Energy Sources 6 hrs

Energy crisis, non-conventional energy sources such as solar, wind, tidal, ocean wave, ocean thermal, geothermal energy, energy saving

REFERENCE BOOKS :-

1. Dr. S. P. Sukathame, Solar Energy, Tata Mc-Graw Hill Publication
2. Eastop and McConkey, “Applied Thermodynamics” Publisher: Pearson
3. E. Rathakrishnan, “Thermodynamics publisher”. PHI
4. G. D. Rai, Non Conventional Sources of Energy, Khanna Publication
5. M.Achuthan, “Engineering Thermodynamics” Publisher: PHI
6. M. K. Rodge, “Basic Thermodynamics”, SadhuSudha Prakashan, Nanded.
7. P. B. Nagraj and D. Venkatesh, “Basic Thermodynamics”, New Age International Publishers.
8. P. K. Nag, “Engineering Thermodynamics”, Tata McGraw Hill Pub. Company Limited, New Delhi
9. Russel and Adebisi, “Engineering Thermodynamics” publisher, Oxford
10. R. K. Rajput, “Heat transfer”, S Chand Publication, Delhi.
11. R. K. Rajput, “Thermal Engineering”, Laxmi Publications Pvt. Limited, New Delhi
12. T. S. Rajan, “Basic Mechanical Engineering”, New Age International Publishers.
13. Van Wylen and Sonntag, “Engineering Thermodynamics” John Wiley
14. Yunus A. Cengel and Michael A. Boles, “Thermodynamics an Engineering approach”,
Tata McGraw Hill Publishing Company Limited, New Delhi.

Shivaji University, Kolhapur

First Year B. Tech (Semester II)

FUNDAMENTALS OF CIVIL ENGINEERING

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:	CIE (25 + 25)	SEE 50	Minimum Passing Marks 40
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UNIT 1 General Scope **2 hrs**

General scope of Civil Engineering, various sub branches in civil engineering and their scope.

UNIT 2 Building Constructions

a) Building Materials: **2 hrs**

Uses and Engineering properties of following materials from selection point view: stones, bricks, cement, sand, timber, steel, roofing and flooring materials. Mortar: types, suitability, Concrete: grades and their suitability, idea about plain, reinforced and prestressed concrete. Requirements of good concrete.

b) Components of Building, Foundation, Superstructure: **2 hrs**

General idea about substructure and superstructure, building components & their functions.

c) Foundations **3 hrs**

Function, soil types as founding strata (Cohesive cohesion-less soils) concept of bearing capacity, Ultimate, safe and presumptive bearing capacity, introduction to various types of shallow and deep foundations and their suitability.

d) Design Loads and their Transfer Mechanism **3 hrs**

Types of loads, principles of load transfer, load bearing, concept of strength, stability and factor of safety. Of building, load bearing & framed structures.

e) Building Planning **3 hrs**

Principles of planning, introduction to bye laws regarding building line, space requirements, FSI, height of building as per IS 1856.

f) Masonries **1 hr**

General constructional precautions in Stone masonry, brick masonry, hollow block masonry.

UNIT 3 Surveying

a) General 2 hrs

Definition, classification and basic principles of surveys, selection of stations, location sketches, site plan, surveying methods - Triangulations and Traversing, Drawing preparation, use of scales, RF and symbols.

b) Measurement of Horizontal Distances 2 hrs

Use of tapes, ranging and reciprocal ranging, tape corrections, tape traversing, main, tie, check stations, offsetting, use of Open Cross Staff, French Cross Staff and line ranger, recording in field book.

c) Measurement of Horizontal Angles 5 hrs

Definition of Bearing, types, use of prismatic compass, calculations for included angles, correction for local attraction, numerical problems.

d) Levelling 5 hrs

Definition, Terms used, Construction, temporary adjustments and use of Dumpy level and levelling staff, reduction of levels by Collimation Plane and Rise-Fall method, concepts of fly, check and profile levelling, numerical problems.

e) Remote Sensing 1 hr

Basic concepts of remote sensing and its application in Civil Engineering.

UNIT 4 Transportation Engineering

a) General: 1 hr

Various modes of transportation of man and material, their merits and demerits.

b) Roads 3 hrs

Types of roads (NH, SH, MDR, ODR VR) and their general requirements. General cross section of road, Various elements of road structure and their functions.

UNIT 5 Water Management 2 hrs

Sources of water, introduction to Dams, storage reservoirs, irrigation methods.

UNIT 6 Computer Applications in Civil Engineering 1 hr

Introduction to various available software packages in Civil Engineering field and their general Capabilities.

REFERENCE BOOKS:-

1. Arora, “Building Material”, S. Publication
2. B.C. Punmia, “Surveying”, Vol.- I, Vol.-II, Vol.-III, Laxmi Publication
3. Gidde, Phadke, Kadam, “Basic Civil Engineering”, 5007, 2nd Edition.
4. G. K. Hiraskar, “Basic Civil Engineering”, Dhanpat Rai Publica
5. L.G. Gole, “Introduction to Civil Engineering”, Mahu Publisher House, 5005, 4th Edition.
6. P.D. Deshpande, “Basic Civil Engineering”, Nirali Prakashan, 1988, 1st Edition.
7. P. R. Patankar, “Elements of Civil Engineering”, New Vrinda Publishing House
8. M. S. Palani Gamy, “Basic Civil Engineering”, Tata Mc-Graw Hill Publication
9. N. Basak, “Surveying”, Tata Mc-Graw Hill Publication.

Shivaji University, Kolhapur

First Year B. Tech (Semester II)

FUNDAMENTALS OF ELECTRICAL ENGINEERING

Teaching Scheme: L: 3 hrs/week

Credits: 3

Evaluation Scheme:	CIE (25 + 25)	SEE 50	Minimum Passing Marks 40
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UNIT 1 D.C. Circuits

7 hrs

Definition of EMF, current, resistance, power, energy. Factors affecting resistance, resistance temperature coefficient of resistance. (Numerical treatment) Series, parallel circuits, division of current in two parallel branches. Kirchhoff's Laws – KCL, KVL. (Numerical based on two variables) Numerical Based on energy conversion between electrical, mechanical and thermal quantities.

UNIT 2 A.C. Fundamentals & circuits

8 hrs

Faraday's law of electromagnetic induction. Lenz's law, dynamically induced EMF, Fleming's right hand rule, statically induced EMF - self and mutually induced EMF, Concept of self and mutual inductance. Generation of single phase alternating EMF. Cycle, frequency, time period, amplitude, average value, RMS value, form factor, peak factor, phase, phase difference, phasor representation. A.C. Circuits - Analysis of purely resistive, inductive and capacitive circuits. R-L, R-C, R-L-C circuits, impedance triangle, power factor and its significance. Different powers in A.C. circuits. (Numerical expected)

UNIT 3 Magnetic Circuits

6 hrs

Concept of magnetic circuit, MMF, reluctance, magnetic flux, flux density, magnetic field strength, Comparison between electrical and magnetic circuits, B - H curve, magnetic leakage and fringing. Simple examples on series magnetic circuit. (Numerical expected)

UNIT 4 Transformer

7 hrs

Working principle and elementary theory of an ideal transformer, Constructional features of single phase transformer, EMF equation, turns ratio, vector diagram, equivalent circuit, impedance transformation, transformer losses, flux leakage, efficiency, open circuit and short circuit load tests. (Numerical expected)

UNIT 5 Basic principles of electrical machines

7hrs

Concepts of motoring and generating action, DC machines- Main constructional features, principles of operation, types of generators, EMF equation, characteristics, applications, armature reaction and commutation, types of motors, torque, speed, and power, characteristics, applications, starting losses, and efficiency, speed control, testing, load test of dc machines.

UNIT 6 Domestic Wiring and Lamps

4 hrs

Simple staircase and godown wiring. Necessity of earthing. Construction and working of fluorescent lamp, sodium vapour lamp, mercury vapour lamp, CFL and metal halide lamp. Types of insulated wires , selection of cables.

REFERENCE BOOKS:-

1. Ashfaq Hussein, “Fundamentals of Electrical Engineering”, Dhanapat Rai Publication.
2. B. L. Theraja, “A Text Book of Electrical Technology (Vol.-I and II)”
3. Edward Hughes, “Electrical Technology”, ELBS Longman.
4. F.S.Bimbira, “Electrical Machines”, Khanna publications.
5. Nagarath & Kothari, “Electrical Machines” (TMH)
6. H. Cotton, “Advanced Electrical Technology”, Wheeler publications.
7. V. K. Mehta “Fundamentals of Electrical Technology”, S. Chand Publications

Shivaji University, Kolhapur

First Year B. Tech (Semester I and II)
Laboratory I

ENGINEERING PHYSICS LAB

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: IPE: 50

Minimum Passing Marks: 20

EXPERIMENTS (Any 8):

1. Diffraction grating
2. Fresnel Bi-prism – determination of band width.
3. Measurement of wavelength of Laser.
4. Study of divergence of laser beam
5. Polari meter – determination of specific rotation of sugar solution.
6. Crystallography - analysis of cubic crystal.
7. Calculation of lattice constant from the given powder XRD pattern.
8. Determination of band gap of semiconductor material.
9. Study of I-V characteristics of a solar cell
10. Photodiode – inverse square law.
11. Ultrasonic Interferometer -Measurement of velocity of sounds in solids and liquids

ASSIGNMENTS:

At least 6 assignments based on theory syllabus.

Shivaji University, Kolhapur

First Year B. Tech (Semester I and II)
Laboratory I

ENGINEERING CHEMISTRY LAB

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: IPE: 50

Minimum Passing Marks: 20

EXPERIMENTS (Any 8):

1. Determination of total hardness of a water sample using disodium salt.
2. Determination of chloride content of water sample.
3. Determination of acidity of a water sample.
4. Determination of alkalinity of a water sample.
5. Preparation of phenol formaldehyde resin.
6. Preparation of urea formaldehyde resin.
7. Estimation of rate of corrosion of aluminium in acidic and alkaline medium.
8. Estimation of copper in the given brass solution.
9. Estimation of zinc in the given brass solution.
10. Determination of viscosity of a lubricant by Ostwald's viscometer.
11. Proximate analysis of coal in the given sample.
12. Estimation of calcium in lime stone solution.
13. Estimation of calcium and magnesium in Dolomite solution.

ASSIGNMENTS:

At least 4 assignments based on theory syllabus.

Shivaji University, Kolhapur

**First Year B. Tech (Semester I and II)
Laboratory II**

WORKSHOP PRACTICE

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: IPE : 50

Minimum Passing Marks : 20

UNIT 1 Safety 1 hr

Common hazards while working with engineering equipment and related safety measures.

UNIT 2 Materials 2 hrs

Brief introduction of materials used in Industries, steels and alloys, cast iron, non-ferrous metals, timber, plastics and polymers, glass etc. and; their applications.

UNIT 3 Measuring Instruments 2 hrs

Brief introduction to instruments like – Steel rule, Vernier Caliper, Micrometer, Dial indicator, their least counts, common errors and care while using them, Use of marking gauge, ‘V’ block and surface plate.

UNIT 4 Carpentry and Fitting 1 hr

Brief study of various hand tools like chisel, saw, planer and fitting tools like files, saw, drills, taps and dies.

UNIT 5 Welding 2 hrs

Classification and brief introduction to welding processes - Arc, Gas and Resistance.

UNIT 6 Sheet Metal Working 2 hrs

Specifications of metal sheets, Surface coatings; Operations like cutting, bending, folding, punching, riveting ; Joining by brazing and soldering.

UNIT 7 Smithy 2 hrs

Introduction to smithy operations like upsetting, drawing, bending, Forming ; Tools- hammer, hot and cold chisels, swages, drifts, flatters, tongs, Anvils.

UNIT 8 Brief introductions to machine tools and processes- 1 hr

Metal removing, metal shaping, plastic molding.

TERM WORK :-

One Job Each In:

1. Sheet metal working involving marking, cutting, bending, joining operations such as a tray in, funnel etc.
2. Fitting involving marking, filing, hacksaw cutting, drilling and tapping such as a male-female type pare.
3. Smithy involving upsetting, drawing, bending, forming such as a square / hexagonal headed bolt, hook etc.
4. Welding involving But / Tee / Lap joints and demonstration of welding processes – Arc, Gas, Spot, etc.

REFERENCES BOOKS :-

1. B. S. Raghuvanshi, “A Course in Workshop Technology, Vol – I”, Dhanapat Rai and Sons.
2. Chapman, “Workshop Technology, Vol – I”, The English Language Book Society.
3. Gupta and Kaushik, “Workshop Technology, Vol – I”, New Heights.
4. H.S.Bawa, “Workshop technology, Vol.-I”, TMH Publications, New Delhi.
5. Hajara Choudhari, “Elements of Workshop Technology, Vol – I”, Media Promoters.

Shivaji University, Kolhapur
First Year B. Tech (Semester II)
Laboratory III

FUNDAMENTALS OF CIVIL ENGINEERING

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: IPE: 50

Minimum Passing Marks : 20

EXPERIMENTS (Any 6):

1. Plotting the outlines of building by chaining, ranging and offsetting.
2. Plotting of closed traverse by prismatic compass.
3. Plotting of closed traverse by surveyor's compass
4. Reduction of levels by rise and fall method.
5. Reduction of levels by collimation plane method.
6. Measurement of area by mechanical planimeter.
7. Measurement of area by digital planimeter.
8. Use of total station for various measurements.

DRAWING SHEETS:-

1. Preparation of Half Imperial Drawing Sheet showing types of lines, symbols of doors-windows, building materials, North line etc. according to IS 962.
2. Layout and setting out of small residential building showing plan, elevation and section of a building.

ASSIGNMENTS:-

At least 4 assignments based on theory syllabus.

INDUSTRIAL VISIT:-

Site visit to study various construction materials and processes.
Report to be submitted on visited construction site.

Shivaji University, Kolhapur

First Year B. Tech (Semester II)
Laboratory IV

FUNDAMENTALS OF MECHANICAL ENGINEERING

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: IPE: 50

Minimum Passing Marks: 20

EXPERIMENTS:-

1. Demonstration of Two stroke and four stroke engine,
2. Demonstration of pumps and compressor
3. Study of domestic refrigerator & window air-conditioner.
4. Wind mill, Solar water heaters,
5. Pumps, compressor, Turbines,
6. Study of power transmitting elements: Coupling, Gears

INDUSTRIAL VISIT (Any 2):

1. Industrial visit to Hydroelectric power plant
2. Industrial visit to steam power plant
3. Industrial visit to Diesel power plant

Shivaji University, Kolhapur

First Year B. Tech (Semester II)

Laboratory V

FUNDAMENTALS OF ELECTRICAL ENGINEERING

Teaching Scheme: P: 2hrs/week

Credit: 1

Evaluation Scheme: IPE: 50

Minimum Passing Marks: 20

EXPERIMENTS (Any 8):-

1. Study of RLC series circuit.
2. Efficiency and voltage regulation of a single phase transformer by direct loading with variac.
3. Efficiency of a single phase transformer by open circuit / short circuit test.
4. To plot B-H curve.
5. To plot characteristics of D. C. shunt motor.
6. Working of a simple staircase and godown wiring.
7. Load test on single phase induction motor.
8. Working of electric lamps.
9. Verification of Kirchoff's voltage law.
10. Verification of Kirchoff's current law.
11. Study of Ohm's law.
12. Working of table fans, ceiling fan, electric iron, geyser.
13. Determination of resistance and inductance of a choke coil by voltmeter ammeter method.

ASSIGNMENTS:-

At least 4 assignments based on theory syllabus.

Shivaji University, Kolhapur

First Year B. Tech (Semester II)

Laboratory VI

COMPUTER PROGRAMMING

Teaching Scheme: L: 1 hr/week

P: 2 hrs/week

Credits: 2

Evaluation Scheme: IPE : 50

Minimum Passing Marks : 20

UNIT 1 Programming Methodology

3 hrs

Step involving in problem solving., Problem definition, Algorithm, Characteristics, Notation of Algorithm, Flowcharts- Definition, Symbol, features, Running and debugging the program.

UNIT 2 Introduction to ‘C’

4 hrs

History, Character set and keywords, Structure of ‘C’ programming, constant and its type, Variable and its type (Data types), Operators- Arithmetic, logical, relational, bitwise, increment, decrement, conditional

UNIT 3 Control Statements

4 hrs

Conditional control statements- if, if else, nested if, switch, Looping – for statements, nested for, while, do-while statements, Unconditional control statements- break, continue, goto

UNIT 4 Functions

3 hrs

Definition, declaration, prototype of function, Local and global variable, User defined function, Storage classes, Preprocessor

UNIT 5 Arrays

3 hrs

Array definition and declaration, Single and multidimensional array, String functions

UNIT 6 Pointers

4 hrs

Definition and declaration, Operation on pointer, Pointer initialization, Pointer and function, Pointer and array, Pointer of pointer, Call by value and Call by reference, Dynamic memory allocation

UNIT 7 Structures and Union

3 hrs

Definition and declaration, Array of structures, Passing structure to function, Pointer to structure, Nested structure, self referential structure, Sizeof and typedef

UNIT 8 File Handling

3 hrs

Standard input- getchar(), getch(), getche(), Standard output- putchar(), putch(), putche(), Formatted input- scanf(), sscanf(), fscanf(), fread(), Formatted output- printf(), sprintf(), fprintf(),

fwrite(), Functions- fseek(), ftell(), fflush(), fclose(), File opening mode- open, modify, write, append, Text and binary mode.

REFERENCE BOOKS:-

1. E Balguruswamy, “Programming with ANSI C”, (TMH).
2. Gottfried, “Programming in C”, Shattern Series.
3. Herbert Schildt, “Complete ‘C’ Reference”
4. Kernighan and Richie, “The C Programming Language” (PHI)/Pearson Education
5. Y.C. Kanekar, “Let us C”

EXPERIMENTS:-

Eight experiments/Assignment based on the following topics may be carried out during Practical session and submitted as termwork.

1. Creation editing, compilation, extension, deluging demonstration with some small program.
2. Constants, variables and data types declaration use of storage classes.
3. Use of operators and expressions
4. Control statements: if, if-else nested if.
5. Control statement: for statement, while statement, do while statement, Use of break, continue, goto statements.
6. Use of arrays
7. Use of functions: Prototyping, - Concept of local/J lobal variables
8. Use of structures and unions: declarations
9. Use of pointers: Sinaple pointers, Operations on pointers, Pointer to arrays, Pointer to Functions
10. Dynamic memory allocation
11. I/o functions and files handling

Equivalence of F.Y B. Tech Semester I & II

The above detailed syllabus is a revised version of the F. Y. B. Tech course being conducted by the Shivaji University at the Technology Department of the University. This syllabus is to be implemented from June 2011.

The Equivalence for the subjects of F.Y.B. Tech Semester I and II pre-revised course under the faculty of Engineering and Technology is as follows.

F.Y.B Tech Semester I

Sr. No	F. Y. B. Tech Semester I Pre-revised syllabus	F. Y. B. Tech Semester I & II Revised syllabus	Remark
1	Engineering Chemistry	Engineering Chemistry	No change in the subject content.
2	Engineering Mathematics I	Engineering Mathematics I	Change in the subject content.
3	Applied Mechanics	Engineering Mechanics	Change in the subject content.
4	Engineering Graphics	Engineering Graphics	No change in the subject content.
5	Basic Electrical Technology	Fundamentals of Electrical Engineering	Change in the subject content. Shifted to 2 nd Semester.
6	Not Specified	Lab. – I Engineering Chemistry	No change in the subject content.
7	Not Specified	Lab. – II Professional Communication	No change in the subject content.
8	Not Specified	Lab. – III Electronic Components and Devices	No change in the subject content.
9	Not Specified	Lab. – IV Engineering Mechanics	Change in the subject content.
10	Not Specified	Lab. – V Engineering Graphics	No change in the subject content.

F.Y.B Tech Semester II

Sr. No	F. Y. B. Tech Semester II Pre-revised syllabus	F. Y. B. Tech Semester I & II Revised syllabus	Remark
1	Engineering Physics	Engineering Physics	Change in the subject content.
2	Engineering Mathematics II	Engineering Mathematics II	Change in the subject content.
3	Basic Engineering	Fundamentals of Mechanical Engineering	Change in the subject content.
4	Basic Engineering	Fundamentals of Civil Engineering	Change in the subject content.
5	Electronic Components and Devices	Electronic Components and Devices	Change in the subject content. Shifted to 1 st Semester.
6	Not Specified	Lab. – I Engineering Physics	No change in the subject content.
7	Not Specified	Lab. – II Workshop Practice	No change in the subject content.
8	Not Specified	Lab. – III Fundamentals of Civil Engineering	Change in the subject content.
9	Not Specified	Lab. – IV Fundamentals of Mechanical Engineering	Change in the subject content.
10	Not Specified	Lab. V Fundamentals of Electrical Engineering	No change in the subject content.
11	Not Specified	Lab. – VI Computer Programming	No change in the subject content.