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 दुरध्वनी (ईपीएबीएक्स) २६०९००० (अभ्यास मंडळे विभाग- २६०९०९४)  
 फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३. e-mail: bos@unishivaji.ac.in

SU/BOS/Sci. & Tech/7400

Date: 21/07/2018

To,

The Principal/ Director,  
 All affiliated Engineering Colleges/ Institute,  
 Shivaji University, Kolhapur.

**Subject :** Regarding Guidelines, structure, of CBCS B. Tech. Program and syllabus of First Year B. Tech. Program under Faculty of Science and Technology.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the University Authorities have accepted and granted approval to Guidelines, structure of CBCS B. Tech. Program and syllabus of First Year B. Tech. Program to following branches under Faculty of Science and Technology:

**B. Tech. Programme (Branch)**

1.	Civil Engineering & Technology
2.	Mechanical Engineering & Technology
3.	Production Engineering & Technology
4.	Automobile Engineering & Technology
5.	Electrical Engineering & Technology
6.	Chemical Engineering & Technology
7.	Electronics Engineering & Technology
8.	Electronics and Telecommunication Engineering & Technology
9.	Biotechnology Engineering & Technology
10.	Information Technology Engineering & Technology
11.	Environmental Engineering & Technology
12.	Computer Science Engineering & Technology

The revised syllabi shall be implemented from the academic year 2018-19 (i.e. from July 2018) onwards. A soft copy containing CBCS Guidelines, structure, and syllabus of First Year B. Tech. is enclosed herewith. The syllabus is also made available on university website [www.unishivaji.ac.in](http://www.unishivaji.ac.in).

Further, it is hereby informed that the question papers on the pre-revised syllabi shall be set for the examination to be held in October/November 2018 and April/May 2019. These chances are available for repeater students, if any.

You are therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,

  
 Dy. Registrar

**Encl:-** as above.

**Copy to-**

- |   |  |
|---|--|
| 1) I/c Dean, Faculty of Science & Technology              | } For information                      |
| 2) Director, Examination and Evaluation                   |  |
| 3) The Chairman, respective BOS / Co-ordinating Committee |  |
| 4) O.E. 4 Section   | } For information & necessary action . |
| 5) Appointment Section                                    |  |
| 6) Eligibility Section                                    |  |
| 7) Meeting Section  |  |

# SHIVAJI UNIVERSITY, KOLHAPUR



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**Accredited by NAAC 'A' Grade  
CHOICE BASED CREDIT SYSTEM**

**Syllabus for**

**First Year B. Tech. Program**

**(To be implemented from June, 2018 onwards)**

**Course common to all branches except Architecture and Textile Engineering & Technology**

**Objective :** To learn basic concepts in optics, modern Physics and their applications in different fields of Engineering.

**SECTION – I**

**Unit 1. Diffraction and Polarization**

(7)

**Diffraction :**

Introduction, diffraction grating - construction, theory, resolving power of plain transmission grating.

**Polarization :**

Introduction, double refraction, Huygens' theory (positive and negative crystals), quarter and half wave plate, analytical treatment of elliptically and circularly polarized light, optical activity, Laurent's half shade polarimeter.

**Unit 2. Laser and Fibre Optics :**

(7)

Absorption, spontaneous emission, stimulated emission, pumping energy, population inversion, characteristics of laser, Ruby laser, applications of laser (industrial & medical), Holography (construction, reconstruction, and applications)

Principle, structure of optical fibre, propagation of light, acceptance angle and acceptance cone (no derivation), numerical aperture (no derivation), types of optical fibre, applications (medical, military, entertainment, communication, optical fibre sensors), advantages of optical fibres.

**Unit 3. Nuclear Energy:**

(7)

Introduction, energy released by 1 Kg of  $U^{235}$ , explosive chain reaction and critical size, nuclear reactor and their classification, essential features of nuclear reactor.

Nuclear fusion (p-p chain, c-n cycle), controlled thermonuclear reactions, conditions for fusion reaction, fusion reactor.

## SECTION – II

### Unit 4. Crystallography: (7)

Introduction, properties of unit cell (number of atoms per unit cell, coordination number, atomic radius, packing fraction), relation between density and lattice constant, Atomic packing – HCP and CCP structures, NaCl, Diamond crystal structure, symmetry elements in cube, Miller indices - procedure, features and sketches for different planes, X-ray diffraction, Bragg's law, Bragg's x-ray spectrometer.

### Unit 5. Quantum Physics: (7)

Wave-particle duality, Heisenberg's uncertainty principle, Schrodinger time independent equation, wave function and its significance, Electron microscope(Construction, working and image formation), Compton effect(Qualitative description).

### Unit 6. Nano- Physics: (7)

Concept, production techniques(Top down and bottom up), Ball milling technique for synthesis of nano particles, tools (STM and AFM), properties and applications of nano-materials, CNTs structure and two types), properties and applications of CNTs.

### List of Experiments ;

01. Biprism experiment
02. Cylindrical obstacle.
03. Calculation of divergence of LASER beam.
04. Determination of wavelength of LASER using diffraction grating.
05. Diffraction grating using Mercury Vapor lamp
06. Polarimeter.
07. Verification of inverse square law of intensity of light.
08. Resolving power of plain transmission grating.
09. Resolving power of Telescope
10. Measurement of band gap energy.
11. Study of crystal structure.
12. Study of symmetry elements of cube.
13. Determination of 'd' (interplaner distance) using XRD pattern.
14. Study of Planes with the help of models related Miller Indices.
15. Determination of e/m of an electron

Out of the above, a minimum of 8 experiments are to be performed.

### References :

1. R. K. Gaur & Gupta S. L, Engineering Physics -Dhanapat Rai Publication.
2. M. N. Avadhanulu & P. G. Kshirsagar - A Text Book of Engineering Physics -S. Chand Publication.
3. B. L. Theraja -Modern Physics - S. Chand & Company Ltd., Delhi.
4. Subramanyam & Brij Lal, A Text Book of Optics –S. Chand & Company (P.) Ltd.
5. B. K. Pandey and S. Chaturvedi- Engineering Physics, Cengage Learning-2012
6. S. O. Pillai, Solid State Physics : Structure & Electron Related Properties, Eastern Ltd., New Age International Ltd.

7. Charles Kittel, Introduction to Solid State Physics - Wiley India Pvt. Ltd.(8<sup>th</sup> Edition).
8. V. Rajendran – Engineering Physics- Mc. Graw Hills
9. Alan Giambattista and others- Fundamentals of physics, Tata Mc. Graw Hills
10. Vijay Kumari - Engineering Physics, Vikas Publications
11. Resnick Halliday, Physics Volume-I, Krane -John Wiley & Sons Pub.
12. Resnick Halliday, Physics Volume-II, Krane -John Wiley & Sons Pub.
13. Hitendra K. Malik, A. K. Singh – Engineering Physics - Tata Mc. Graw Hills Education Private Ltd.
14. A. Beiser – Concepts of Modern Physics - Tata Mc. Graw Hills
15. L. J. Schiff – Quantum Mechanics - Tata Mc. Graw Hills

## First year Engineering & Technology – Semester -I

### Engineering Mathematics-I

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Engineering Mathematics-I	03	01	---	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

#### Objectives:

1. To teach Mathematical methodologies and models.
2. To develop mathematical skills and enhance logical thinking power of students.
3. To provide students with skills in integral calculus, differential equations & numerical techniques which would enable them to devise engineering solutions for given situations they may encounter in their profession.
4. To produce graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in the solution of problems, principally in the area of engineering.

### SECTION I

#### Unit 1: Matrices and solution of linear system equations

(5)

1. Rank of matrix: definition, normal form and Echelon form
2. Consistency of linear system equations
3. System of linear homogeneous equations
4. System of linear Non-homogeneous equations

#### Unit 2: Eigen Values and Eigen vectors

(8)

1. Linear dependence and independence of vectors
2. Eigen Values
3. Properties of Eigen Values
4. Eigen vectors
5. Properties of Eigen vectors
6. Cayley-Hamilton's theorem (Without proof)
7. Inverse and higher powers of matrix by using Cayley-Hamilton's theorem

#### Unit 3: Complex Numbers

(8)

1. De Moivre's Theorem (Without proof)
2. Roots of complex numbers by using De Moivre's Theorem
3. Expansion of  $\sin n\theta$  and  $\cos n\theta$  in powers of  $\sin\theta$  and /or  $\cos\theta$ .
4. Circular functions of a complex variable - definitions
5. Hyperbolic Functions, Relation between Circular & Hyperbolic functions
6. Inverse Hyperbolic Functions
7. Separation into real and imaginary parts

## SECTION II

### Unit 4: Expansion of Functions and Indeterminate forms:

(7)

1. Maclaurin's theorem
2. Standard expansions
3. Taylor's theorem
4. Expansion of function in power series by using
  - i) Standard series method,
  - ii) Differentiation and integration method,
  - iii) Substitution method
5. Indeterminate forms and L' Hospital's rule

### Unit 5: Partial Differentiation:

(8)

1. Partial derivatives: Introduction
2. Total derivatives
3. Differentiation of implicit function
4. Euler's theorem on homogeneous function of two variables
5. Change of variables
6. Jacobian, Properties of Jacobian, Jacobian of Implicit function,
7. Errors and Approximation
8. Maxima and Minima of functions of two variables

### Unit 6: Numerical Solution of linear simultaneous equations:

(6)

1. Gauss elimination method
2. Gauss-Jordan method
3. Jacobi's iteration method
4. Gauss-Seidel iteration method
5. Determination of Eigen values by iteration

### General Instructions:

1. Batch wise tutorials are to be conducted. The number of students per batch should be as per the university pattern for practical batches.
2. Minimum number of assignments should be 8 covering all topics.

### Recommended Books:

1. A text book of Applied Mathematics, Vol.I by P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.

### Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
2. Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi.
3. A text book of Engineering Mathematics Volume I by Peter V. O'Neil and Santosh K. Sengar, Cengage Learning.
4. Mathematical methods of Science and Engineering by Kanti B. Datta, Cengage Learning.
5. Numerical methods by Dr. B. S. Grewal, Khanna Publishers, Delhi.
6. A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd., New Delhi.

**First year Engineering & Technology – Semester -I and II**  
**Basic Electrical Engineering**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Basic Electrical Engineering	03	--	02	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**SECTION I**

**Unit 1: D C Circuits and magnetic circuits:**

(8)

A) Analysis of D.C. circuits: Kirchhoff's laws, mesh and node analysis, Energy conversions between electrical, mechanical, thermal quantities.

B) Magnetic circuits with electromagnets: concept of mmf, reluctance, magnetic flux density, Magnetic field strength, BH curve, magnetic leakage, fringing, series magnetic circuits.

**Unit 2: Single phase AC Circuits:**

(8)

Generation of sinusoidal voltage, concept of R.M.S. & Average value, form factor, R-L,R-C, R-L-C series and parallel circuits, powers, power factor., power factor improvement by capacitor method.

**Unit 3: Earthing and lamps:**

(6)

Necessity of Earthing, Earthing methods, lightning arrestor, Fuse (rewireble and HRC). MCB, Mercury vapour lamp, Fluorescent tube, CFL, LED lamp, single line diagram of electrical systems.

**SECTION II**

**Unit 4: Three phase A.C. Circuits**

(6)

Introduction to 3 phase supply, balanced 3 phase load, relation between line and phase quantities For star connected circuit and delta connected circuit, advantages of 3 phase system.

**Unit 5: Single phase Transformer:**

(7)

Construction, operating principle, Types, emf equation, Ratios of voltage and current, operation on no load and with load, power losses, efficiency, All day efficiency, voltage regulation, applications, autotransformer.

**Unit 6: Single phase A.C. motor**

(7)

Single phase induction motor (capacitor run type, capacitor start and run type, shaded pole type) and universal motor, Construction, working, Torque-speed characteristics, applications of induction motor and universal.



## **List of Experiments**

**Minimum 8 experiments should be performed from the following list.**

1. Electric Shocks and precautions against shocks; Basic methods of Earthing.
2. Verification of Kirchhoff's Voltage Law and Kirchhoff's Current Law
3. B-H curve of magnetic material
4. Series and Parallel resonance- Tuning, Resonant frequency, Bandwidth and Q factor determination for RLC network
5. Power Factor improvement
6. Measurement of active and reactive power in balanced 3-phase circuit using Two-watt meter method.
- 7 Polarity and Ratio Test for single Phase Transformer; Pre-determination of efficiency and regulation by Open Circuit and Short circuit tests on single phase transformer.
8. Introduction to domestic wiring, service mains, meter board and distribution board; Wiring of two way and three way switching of lamp; Use of Fuse and Miniature Circuit breaker.
- 9 Study of different luminaries including Incandescent lamp, vapor lamps, fluorescent tube, CFL, LED lamps.

### **Reference books:**

- 1.P.V.Prasad and S.Shivan Raju – Electrical Engineering concepts and Applications – Cengage learning.
- 2.B.L.Theraja – Electrical Technology vol.2. – S.Chand.
- 3.Nagrath I.J. and D.P.kothari – Basic Electrical Engineering(2001) – Tata McGraw Hill.
- 4.Bharati Dwivedi and Anurasg Tripathi – Fundamentals of Electrical Engineering – Willey Precise Textbook.

**First year Bachelor of Engineering & Technology – Semester -I and II**  
**Basic Civil Engineering**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Basic Civil Engineering	03	--	02	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Objectives:** The student will be able

1. To understand relevance of Civil Engineering.
2. To understand significance of building system.
3. To understand the use of different survey instruments for the field operations.

**SECTION I**

**Unit 1: Relevance of Civil Engineering and Building Planning (7)**

Introduction, branches of civil engineering, application of civil engineering in other allied fields. Principles of planning, introduction to Bye-Laws regarding building line, height of building, open space requirements, F.S.I., setbacks, ventilation, sanitation as per municipal corporation area requirement.

**Unit 2: Components of Building (7)**

**A) Sub-structure:** Types of soil and rocks as foundation strata, concept of bearing capacity, types of foundations i.e. shallow and deep and their suitability. Shallow foundation such as wall foundation, isolated foundation, deep foundation such as pile foundation.

**B) Super-structure:** Elements of super-structures and their functions

**Unit 3: Building Materials and Design (7)**

Use and properties of the following materials--Concrete – ingredients and grades, plain and reinforced cement concrete and ready mix concrete, bricks, steel, aluminum, plastic, timber, roofing materials etc. Introduction to types of loads, load bearing and framed structures.

**SECTION II**

**Unit 4: Linear and Angular Measurements (7)**

Principles of surveying, Classification of surveys, Chain Surveying, Introduction to metric chain and tapes, error in chaining, nominal scale and R.F., ranging, chaining and offsetting, index plan, location sketch and recording of field book, Chain and compass survey, Meridian, bearing and its types, system of bearing, Types of compass: prismatic and surveyor's compass. Calculation of included angles, correction for local attraction.

**Unit 5: Leveling (7)**

Terms used in leveling, use of Dumpy level and Auto Level, temporary adjustments. Methods of reduction of levels, types of leveling, Contours, characteristics of contours, use of contour maps. Introduction and use of EDM's with special reference to Total Station. Measurement of area by planimeter – mechanical and digital.

**Unit 6: Introduction to Transportation, Environmental and Irrigation Engineering (7)**  
Components of rigid and flexible pavement, components of railway track (Broad Gauge) Components of water supply scheme (flow diagram), Hydrological Cycle, Types of Dams (Earthen and Gravity Dam)

**Term work:**

**List of Experiments:** Minimum 8 experiments should be performed from the following list- Practical exercises given be carried out and drawing sheets be plotted wherever necessary.

1. Introduction to Measurement of Distances.
2. Plotting the outlines of building by chaining, ranging and offsetting.
3. Plotting of closed traverse by prismatic compass.
4. Reduction of levels by rise and fall method.
5. Reduction of levels by collimation plane method.
6. Measurement of area by mechanical/digital planimeter
7. Study of total station for various measurements.
8. Site visit to study various construction processes and principles of planning.
9. Drawing sheet showing various building elements.

**Reference Books:**

1. Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications.
2. Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
3. Surveying by N. Basak, Tata Mc-Graw Hill Publication.
4. Basic Civil Engineering by G. K. Hiraskar, Dhanpat Rai Publication.
5. Surveying Vol.I, Vol.II, Vol.III by B.C. Punmia, Laxmi Publication.
6. Irrigation Engineering by B. C. Punmia, Dhanpat Rai Publications.

**First year Bachelor of Engineering & Technology – Semester -I and II  
Engineering Graphics**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Engineering Graphics	03	--	02	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Objectives:**

1. Students should be able to visualize the objects.
2. They should be able to understand and read drawing.
3. They should be able to present the same.

**SECTION I**

**Unit1: Fundamentals of Engineering Graphics& Engineering Curves (6)**

**A) Fundamentals of Engineering Graphics:** Introduction to Drawing instruments and their uses. Layout of drawing sheets, different types of lines used in drawing practice, Dimensioning system as per BIS (Theoretical treatment only)

**B) Engineering curves:** Construction of regular polygons (up to hexagon). Construction of Ellipse, Parabola, Hyperbola, Involute, Archimedian spiral and Cycloid only.

**Unit 2: Projections of lines & Planes (10)**

**A) Projections of lines:** Introduction to First angle and third angle methods of projection. Projections of points on regular reference planes. Projections of horizontal, frontal and Profile lines on regular and auxiliary reference planes. Projection of oblique lines it's True length and angle with reference planes by rotation and auxiliary plane method. Concept of grade and bearing of line, Point View of a line, Projections of intersecting lines, Parallel lines, perpendicular lines and skew line.

**B) Projections of planes:** Projections on regular and on auxiliary reference planes. 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. Projections of plane figures inclined to both the planes. (Circle and regular polygon)

**Unit 3: Projections of solids (5)**

Projections of Prisms, Pyramids, Cylinder and Cones inclined to both reference planes (Excluding frustum and sphere)

**SECTION II**

**Unit 4: Orthographic Projections (7)**

**Orthographic views:** lines used, Selection of views, spacing of views, dimensioning and sections. Drawing required views from given pictorial views (Conversion of pictorial view into orthographic view) including sectional orthographic view.

**Unit 5: Isometric projections****(7)**

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

**Unit 6: Development of plane and curved surfaces****(7)**

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

**Note:** The above syllabus is to be covered according to the first angle method of projection.

**Self-Study:** Geometrical constructions and free hand sketches, Missing Views

**Term work:**

The following six sheets are to be drawn based on the above topics. All these sheets should be drawn on half imperial (A3 size) drawing sheets only.

1. Engineering curves	01
2. Projections of lines and planes	01
3. Projections of solids	01
4. Orthographic projections	01
5. Isometric projections	01
6. Sections of solids and development of surfaces	01

**Reference Books:**

1. Engineering Drawing by N. D. Bhatt, Charotar Publication House, Bombay
2. Fundamentals of Engineering by W. J. Luzadder, Drawing, Prentice Hall of India.
3. Engineering Design and Visualization by Jon M. Duff, William A. Ross, CENGAGE Learning
4. Machine Drawing by N. D. Bhatt, Charotar Publication House, Bombay.
5. Graphic Science by French and Vierck, Mc-Graw Hill International.
6. Engineering Drawing and Graphics by K. Venugopal, New Age Publication
7. A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.
8. Machine Drawing by K. L. Narayana, New Age Publication
9. Engineering Drawing by N. B. Shaha and B. C. Rana, Pearson Education.
10. Engineering Drawing and Graphics Using AutoCAD by T. Jeyapoovan, Vikas Publication.
11. Engineering Drawing by Prof. Amar Pathak, WILEY India Publication.

**First year Bachelor of Engineering & Technology – Semester -I**

**Professional Communication-I**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Professional Communication-I	01	--	02	02	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Unit 1: Understanding Communication**

(2)

1. Introduction, nature and importance
2. Process of communication
3. Basic types of communication- Verbal and Non- verbal
4. Barriers and filters of communication

**Unit 2: Grammar and Vocabulary**

(3)

1. Forms of Tenses
2. LSRW skills
3. Types of Sentences
4. Pairs of confused words

**Unit 3: Phonetics**

(3)

1. Understanding Phonetics
2. List of phonetic alphabets
3. Transcription, Stress and Intonation

**Unit 4: Developing Oral Skills**

(2)

1. Importance and techniques to improve oral communication:
2. Techniques of formal speech, meetings, Elocution, Extempore etc.

**Unit 5: Professional Correspondence**

(4)

1. Importance, language and style, formats (British & American)
2. Letter Writing – Simple application letter (seeking permission regarding absence etc.), Inquiry and its reply, placing an order, complaint and its adjustment and email etc.

**Term Work:** Minimum 8 should be performed from the following list.

1. Elocution
2. Vocabulary building
3. Phonetic Alphabets (Listen & repeat)
4. Pronunciation
5. Fluency Tips
6. Extempore
7. Teamwork- story making

8. Effective reading (newspaper articles)
9. Active listening (memorizing)
10. Grammar activities
11. Letter writing Activities
12. Situational conversation

**Instructions:**

1. Minimum 8 assignments should be covered.
2. Use of language laboratory is mandatory for both the semesters.

**Reference Books:**

1. Handbook for Technical Writing by David A. McMurrey, Joanne Buckley, Cengage.
2. A Course in English by J.D. O'Connor.
3. Better English Pronunciation by J.D. O'Connor.
4. Communication Skills Handbook: How to succeed in written and oral communication by Jane Summers, Brette Smith, Wiley India Pvt.Ltd.
5. Personal Development for Life and Work by Masters, Wallace, Cengage.
6. Soft Skills for Managers by Dr. T. Kalyana Chakravarthi, Dr. T. Latha Chakravarthi, Biztantra.
7. Soft Skills for every one by Jeff Butterfield, Cengage.
8. Behavioural Science by Dr. Abha Singh, Wiley India Pvt.Ltd.
9. An Introduction to Professional English and Soft Skills by Bikram K. Das, Kalyani Samantray, Cambridge University Press New Delhi.
10. Speaking Accurately, K.C. Nambiar, Cambridge University Press New Delhi.
11. Speaking Effectively by Jeremy Comfort, Pamela Rogerson, Cambridge University Press New Delhi.
12. Cambridge English for Job Hunting by Colm Downes, Cambridge University Press New Delhi.
13. Body Language by Allen Pease.
14. The Ace of Soft Skills by Gopalswami Ramesh, Mahadevan Ramesh, Pearson Publication, Delhi.
15. Decision Making Skills by Khanka S.S.
16. Business Ethics and Communication by C.S. Tejpal Sheth.
17. Write Right by Syed Abdur Raheem.

**First year Bachelor of Engineering & Technology – Semester -I and II**  
**Workshop Practice-I**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Workshop Practice-I	01	--	02	02	ISE	---	---	50	40%
					MSE	---	---	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Unit 1: Safety**

(3)

Concept of accidents, causes of accidents, safety precautions while working in shop, safety equipments and their use.

**Unit 2: Measuring Instruments**

(3)

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

**Unit 3: Smithy**

(4)

Introduction to smithy operations like- bending, forming, upsetting, drawing. Smithy tools hammer, hot & cold chisel flatters, tongs, anvil etc.

**Unit 4: Fitting**

(4)

Study of various tools like- files, drills, taps, dies. Fitting operations.

**Term work:**

The term work consists of assignment on safety, measuring instruments, Smithy and fitting. Every student should perform,

**1. Smithy**

One job in smithy involving upsetting, Drawing, bending such as- Hook, peg, square headed bolt etc.

**2. Fitting**

One job Male/Female fitting with operations- Marking, cutting, drilling, tapping filing etc.

**Reference Books:**

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



**First year Bachelor of Engineering & Technology – Semester -I and II**  
**Engineering Chemistry**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Engineering Chemistry	03	--	02	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Objectives:**

1. To integrate pure Chemistry principles and fundamentals with engineering applications.
2. To understand the Chemistry behind the development of engineering materials.
3. To develop an analytical ability of students.

**SECTION I**

**Unit 1: Water**

(7)

Introduction, impurities in natural water, water quality parameters total solids, acidity, alkalinity, chlorides, and dissolved oxygen (definition, causes, significance), hardness of water types of hardness, units of hardness, ill effects of hard water in steam generation in boilers (scale & sludge formation), numerical on hardness, treatment of hard water (ion exchange and reverse osmosis).

**Unit 2: Instrumental methods of chemical analysis**

(7)

Introduction, advantages and disadvantages of instrumental methods-----

**A)pH-metry:** Introduction, pH measurement using glass electrode, applications of pH-metry.

**B)Spectrometry:** Introduction, Laws of spectrometry (Lamberts and Beer-Lambert's law),Single beam spectrophotometer (schematic, working and applications).

**C)Chromatography:** Introduction, types, gas-liquid chromatography (GLC), basic principle,instrumentation and applications.

**Unit 3: Advanced materials**

(7)

**A)Polymers:** Introduction, plastics, thermosoftening and thermosetting plastics, industriallyimportant plastics like phenol formaldehyde, urea formaldehyde and epoxy resins, conducting polymers (doping, conjugation, conductivity), examples and applications.

**B)Nanomaterials:** Introduction, synthesis and applications.

**C)Composite materials:** Introduction, Composition, properties and uses of fiber reinforced plastics (FRP) and glass reinforced plastic (GRP).

**SECTION II**

**Unit 4: Fuels**

(7)

Introduction, classification, calorific value, definition, units (calorie, kcal, joules, kilojoules), characteristics of good fuels, comparison between solid, liquid and gaseous fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter. Numerical on Bomb and Boy's calorimeter. Fuel cells: Introduction, classification based on temp., H<sub>2</sub>-O<sub>2</sub> fuel cell.

**Unit.5: Corrosion:**

(7)

Introduction, causes, classification, atmospheric corrosion (oxidation corrosion), electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors affecting rate of corrosion. Prevention of corrosion by proper design and material selection, hot dipping (galvanizing and tinning), cathodic protection, electroplating.

## Unit 6: Metallic materials & Green Chemistry

(7)

**A)Metallic materials:** Introduction, alloy definition and classification, purposes of making alloys. Ferrous alloys: Plain carbon steels (mild, medium and high), stainless steels. Nonferrous alloys: Copper alloy (Brass), Nickel alloy (Nichrome), Aluminum alloy (Duralumin and Alnico).

**B)Green Chemistry:** Definition, Twelve principles of Green Chemistry research. Industrial applications.

### Term work:

### List of Experiments:

Minimum 8 experiments should be performed from the following list out of which two experiments should be demonstrative on instrumental methods.

1. Determination of acidity of water.
2. Determination of alkalinity of water.
3. Determination of chloride content of water by Mohr's method.
4. Determination of total hardness of water by EDTA method.
5. Determination of moisture, volatile and ash content in a given coal sample by proximate analysis.
6. Preparation of urea-formaldehyde resin.
7. Preparation of phenol-formaldehyde resin.
8. Determination of percentage of copper in brass.
9. Estimation of zinc in brass solution.
10. Determination of rate of corrosion of aluminium in acidic and basic medium.
11. Demonstration of pH meter.
12. Demonstration of photo-colorimeter / spectrophotometer.
13. Demonstration of paper chromatography.

### Reference books:

- 1.Engineering Chemistry by Jain and Jain, DhanpatRai Publishing Company Ltd., New Delhi.
- 2.A Textbook of Engineering Chemistry by S. S. Dara and S. S. Umare, S. Chand & Company Ltd., New Delhi.
- 3.A Textbook of Engineering Chemistry by C. P. Murthy, C. V. Agarwal and A. Naidu, BS Publications, Hyderabad.
- 4.Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi.
- 5.Engineering Chemistry by Dr. A. K. Pahari and Dr. B. S. Chauhan, Laxmi Publications (P) Ltd, New Delhi.
- 6.A text Book of Engineering Chemistry by ShashiChawla, DhanpatRai& Co. (Pvt.) Ltd, Delhi.
- 7.Engineering Chemistry by Wiley India.
- 8.Engineering Chemistry by RenuBapna and Renu Gupta, MacMillan Publishers (India) Ltd, Delhi.

**First year Bachelor of Engineering & Technology – Semester -I and II  
Fundamentals of Electronics and Computer**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Fundamentals of Electronics and Computer	03	--	02	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Objectives:**

1. To understand testing and measurement of Electronic Components.
2. To understand construction, biasing, V-I characteristics and application of Diode and BJT.
3. To gain knowledge of operational amplifiers.
4. To understand basics of sequential & combinational logics
5. To understands Basics of Transducers.
6. To study basics of Computer hardware & software.
7. To expose students to Program building blocks.
8. To understand the basics of networks & Internet.
9. To provide hands on exposure to use of different application software.

**SECTION I**

**Unit 1: Semiconductor Devices and Applications**

(7)

Diodes-Semiconducting diode, Half wave, full wave, Bridge wave rectifiers, regulated power supply, Zener diode: characteristics, zener shunt regulator. BJT: characteristics, configuration CB, CE, CC. , load line, operating point, leakage currents, saturation and cut off mode of operations, CE as an amplifier. Specifications of all devices

**Unit 2: Digital Electronics**

(7)

Logic gates – Basic gates, Universal Gates. Boolean Algebra, Logic Families, sequential logic, half adder, full adder, multiplexer, de-multiplexer, Combinational logic, Flip flops (JK Flip flop).

**Unit 3: Applications**

(7)

**A) Transducers:** for Displacement, level, Temperature, Pressure, Speed measurement, Range Specifications, Limitations.

**B) Appliances:** Block diagram, Specifications, Operation and use of the Appliances: Digital Thermometer, Digital watch, weighing Machine, Washing machine, Microwave oven and Mobile Handset.

**SECTION II**

**Unit 4: Computer Basics and Hardware**

(7)

**A) Computer Basics:**

- a) Generations & classification of computers
- b) Computer System components – CPU, Input Unit, Output unit, storage unit
- c) Applications of Computers

**B) Computer Architecture:** Details of components of a digital computer system – CPU, communication among various units, Instruction format, cycle, inside a computer system.

**Unit 5: Data representation and Computer Software**

(7)

**A) Data representation in computer:** Types of number system – Binary, octal, Hexadecimal & their conversions, coding schemes – ASCII, Unicode.

**B) Computer Software:**

- a) Operating System: Types of operating system, Functions, Unix/Linux, Windows 7 - structures & features, Unix/Linux commands: Listing, changing, copying, moving files & directories (ls, cd, cat, mkdir, rmdir, other commands), any editor in Linux.
- b) System Software: Assembler, Interpreter, compiler.
- c) Application Software's: Word processor, spreadsheets, presentation, application, DBMS, etc.

**Unit 6: Computer Programming and Networks**

(7)

**A) Computer Programming & Languages:** Program Development Cycle, Algorithm, flowchart, Programming Control Structures – sequence, selection, repetition, Programming Languages: Introduction to low level & high level programming languages.

**B) Introduction to computer networks:** Definition of computer network, need, Standards: OSI, TCP/IP, types of Networks: LAN, WAN, MAN, Topologies, Internet www, emerging computing environment.

**Term work: FUNDAMENTAL OF ELECTRONICS**

**List of Experiments:** Minimum 4 experiments should be performed from the following list.

1. Testing of Electronic components- resistors, capacitors, inductor, diode, transistor, LED and switches using multi-meter & C.R.O.
2. V-I Characteristics of PN junction diode and zener diode.
3. Study of Half and Full wave rectifiers and their comparison.
4. Study of Frequency response of CE amplifier
5. Study of truth tables of logic Gates: OR, AND, NOT, NAND, NOR, EXOR.
6. Measurement of Distance using LVDT/strain Gauge.
7. Measurement of Temperature using any transducer.
8. Study of Mobile Handset.

**Self-Learning Activities:** Different types of Communication systems & Communication Media.

**Term work: FUNDAMENTAL OF COMPUTER**

**List of Experiments:** Minimum 4 experiments should be performed from the following list.

1. Study of computer system – Internal Components & peripherals.
2. Use of Unix/Linux commands & create a file using any editor in Linux.
3. Create a document using any word processor (In Linux (open office) /Windows (Microsoft office)).
4. Use any spreadsheet application to manipulate numbers, formulae and graphs (In Linux/Windows).
5. Use any power point presentation application and create a professional power point presentation using text, image, animation etc. (In Linux/Windows).
6. An assignment based on use of Internet and Web for searching and downloading Technical information.
7. Study of Tablet and Android Operating System Features and applications

**Text Books:**

1. A Text Book of Applied Electronics by R S Sedha, S. Chand
2. Basic Electronics Engineering by Vijay Baru, Rajendra Kaduskar, S T Gaikwad (Wiley/ DREAMTECH)

3. Digital Principals & Applications by Albert Malvino, Donald Leach, TMGH Publication.
4. Principle of Electronics by V.K. Mehata, S. Chand
5. Electronic Instrumentation by H. S. Kalasi, Tata McGraw Hills Publication

**Reference Books:**

- 1) Electronics Devices and Circuit Theory by Robert L. Boylestad and Louis Nashelsky (Pearson Education Publication)
- 2) Fundamental of Digital Circuits by A. Anand Kumar (PHI- Publication)
- 3) Fundamental of Electronics Engineering by R.Prasad ( CENGAGE- Learning)
- 4) Introduction to Information Technology, ITL Education Solutions LTD. Pearson Education
- 5) Fundamentals of Computers by V. Rajaram, PHI Publications.
- 6) UNIX concepts and applications by Sunitabha Das, TMGH.
- 7) Computer Fundamentals

**First year Bachelor of Engineering & Technology – Semester -I and II**  
**Applied Mechanics**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Applied Mechanics	03	--	02	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Objectives:**

1. To understand the various force systems and its effect on static bodies and moving bodies.
2. To understand the concept of equilibrium.
3. To understand geometric properties of plain laminae.
4. To understand dynamics of rigid bodies.

**SECTION I**

**Unit 1: Fundamentals of Statics**

(7)

Basic Concepts and Fundamental Laws, Force, Moment and Couple, System of Forces, Resultant, Resolution and Composition of Forces, Varignon's Theorem, Law of Moments.

**Unit 2: Equilibrium**

(7)

Lamis' Theorem, Free Body Diagram, Equilibrium of Forces, Equilibrium conditions, Surface friction for bodies on horizontal and inclined planes.

Beams: Types of Loads, Types of supports, Analysis of Simple beams, Virtual work method for support reactions.

**Unit 3: Centroid and Moment of Inertia**

(7)

Centroid and Center of Gravity, Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.

**SECTION II**

**Unit 4: Kinetics of Linear**

(8)

Introduction to Kinematics of Linear motion (no numerical on kinematics), Kinetics of linear motion, Newton's Laws, D'Alembert's Principle, Work- Energy Principle, Impulse Momentum Principal

**Unit 5: Kinetics of Circular Motion**

(8)

Introduction to Kinematics of Circular motion (no numerical on kinematics), Rotation with constant and variable angular acceleration, centripetal and centrifugal force, condition of skidding and overturning.

## **Unit 6: Impact and Collision**

(5)

Impact, Types of Impact, Law of conservation of Momentum, Coefficient of Restitution, Numerical on Direct central Impact.

### **Term work:**

List of Experiments:

A) Experiments: Any four experiments from

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

B) Graphics Statics:

1. To find support reactions - 3 problems

(All above problems will be solved on A3 size drawing sheet)

C) Home Assignments based on each unit (minimum 6 assignments)

### **Reference Books:**

1. Engineering Mechanics by S. S. Bhavikattis, New Age International Pvt. Ltd.
2. Engineering Mechanics by R. K. Bansal and Sanjay Bansal.
3. Vector Mechanics for Engineers Vol.I and II by F. P. Beer and E. R. Johnston, Tata Mc-Graw Hill Publication.
4. Engineering Mechanics by Manoj K Harbola, Cengage Learning
5. Engineering Mechanics by K. I. Kumar, Tata Mc-Graw Hill Publication
6. Engineering Mechanics by S. B. Junnerkar.
7. Engineering Mechanics by Irving H. Shames, Prentice Hall of India, New Delhi.
8. Applied Mechanics by S. N. Saluja, Satya Prakashan, New Delhi.
9. Engineering Mechanics by Statics and Dynamics by Ferdinand Singer, Harper and Row Publications
10. Engineering Mechanics by R. S. Khurmi, S. Chand Publications
11. Fundamentals of Engineering Mechanics by S. Rajasekaran, G. Sankarasubramanian, Vikas Publishing House

**First year Bachelor of Engineering & Technology – Semester -I and II**  
**Basic Mechanical Engineering**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Basic Mechanical Engineering	03	--	02	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Objectives:** The course will help the student to

1. Acquire basic knowledge of mechanical engineering
2. Impart knowledge of basic concepts of thermodynamics applied to industrial application
3. Understand principle of energy conversion system and power plants
4. Understand and identify power transmission devices with their functions
5. Learn and understand manufacturing process
6. Describe the scope of mechanical engineering in multidisciplinary industries

**SECTION – I**

**Unit 1: Thermodynamics**

(7)

Thermodynamic State, Process, Cycle, Thermodynamic System, Heat, work, Internal Energy, First Law of Thermodynamics, Application of First Law to steady Flow and Non-Flow processes, Limitations of First Law (Numerical Treatment) Statements of Second Law of Thermodynamics.

**Unit 2: Introduction to I C Engine**

(7)

Carnot Engine, Construction and Working of C.I. and S.I., Two stroke, Four Stroke Cycles, Air standard cycles- Carnot Cycle, Joule Cycle, Otto Cycle, Air Standard efficiency (Descriptive Treatment only)

**Unit 3: Introduction to Refrigeration and Air Conditioning**

(7)

Carnot refrigerator, Refrigerant types and properties, Vapour compression and vapour absorption system, solar refrigeration, Window Air Conditioning, Psychometric properties of moistair, Applications of refrigeration and air conditioning (Descriptive Treatment only).

**SECTION-II**

**Unit 4:Energy Sources and power plants**

(7)

Renewable and nonrenewable, Solar-flat plate collector, concentric collector–Parabolic and cylindrical, Photovoltaic cell, Wind, Geothermal, Tidal, Hydropower plant, Steam Power plant, Bio-gas, Bio-Diesel (Descriptive Treatment only).

**Unit 5: Mechanical Power Transmission and Energy conversion devices**

(7)

Type of Belt and belt drives, chain drive, Types of gears and gear Trains, Types of Coupling, Types of Bearings (Numerical Treatment on belt drive), Types, Construction, working and applications of Pumps, compressor and Hydraulic Turbines.



## **Unit 6: Manufacturing Processes**

(7)

Introduction to manufacturing processes - Casting Process, Steps involved in casting processes, and their applications, Metal removing processes and their applications, Metal Joining Processes – welding, soldering and brazing and their applications.

### **Term Work:**

**List of experiments:** Minimum 8 experiments should be performed from the following list--

1. Demonstration of I.C. engine
2. Demonstration of Two stroke and four stroke engine
3. Demonstration of vapour compression refrigeration system and window air conditioner.
4. Demonstration of solar water heating system.
5. Industrial visit to steam power plant or Hydroelectric power plant
6. Demonstration of Diesel power plant
7. Demonstration of types of Gears and gear trains.
8. Demonstration of pumps and compressor.
9. Demonstration of hydraulic turbine
10. Demonstration of metal joining processes.
11. Demonstration of metal removal processes

### **Reference Books:**

1. Solar Energy by Dr.S.P. Sukathame, Tata Mc-Graw Hill Publication
2. Non-Conventional Sources of Energy by G.D. Rai, Khanna Publication
3. Engineering Thermodynamics by R.Joel, The English Language Book Society.
4. Engineering Thermodynamics by Achultan, Prentice Hall of India.
5. Thermal Engineering by R.K. Rajput, Laxmi Publication, Delhi.
6. Elements of Heat Engine Vol.I,II,III by Patel and Karamchandani, Acharya Book Depot.
7. Power Plant Engineering by Arora and Domkunwar, Dhanpat Rai and Sons.
8. Manufacturing Technology Volume I and II by P. N. Rao, Tata Mc-Graw Hill Publication
9. Elements of Workshop Technology, Vol.I and II by Hajara Choudhari, Media Promoters
10. Basic Mechanical Engineering by Basant Agrawal & C. M. Agrwal, Wiley India Pvt. Ltd.
11. Energy Technology by S. Rao and Dr.B.B. Parulekar, Khanna Publication.

**First year Bachelor of Engineering & Technology – Semester -II**  
**Engineering Mathematics-II**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Engineering Mathematics-II	03	01	--	04	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	70	40%	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Objectives:**

1. To teach Mathematical methodologies and models.
2. To develop mathematical skills and enhance logical thinking power of students.
3. To provide students with skills in integral calculus, differential equations & numerical techniques which would enable them to devise engineering solutions for given situations they may encounter in their profession.
4. To produce graduates with mathematical knowledge, computational skills and the ability to deploy these skills effectively in the solution of problems, principally in the area of engineering.

**SECTION-I**

**Unit 1: Ordinary Differential Equations of First Order and First Degree**

(7)

1. Linear differential equations
2. Reducible to Linear differential equations
3. Exact differential equations
4. Reducible to Exact differential equations

**Unit 2: Applications of Ordinary Differential Equations of First Order and First Degree**

(6)

1. Applications to Orthogonal trajectories (Cartesian and Polar equations)
2. Applications to Simple Electrical Circuits
3. Newton's law of cooling
4. Rate of decay and growth

**Unit 3: Numerical Solution of Ordinary Differential Equations of First Order and First Degree**

(8)

1. Taylor's series method
2. Euler's method
3. Modified Euler's method
4. Runge-Kutta fourth order formula
5. Simultaneous first order differential equations by Runge-Kutta method

**SECTION-II**

**Unit 4: Special Functions**

(6)

1. Gamma function and its properties
2. Beta function and its properties
3. Differentiation under integral sign
4. Error function and its properties

**Unit 5: Curve Tracing****(6)**

1. Tracing of curves in Cartesian form
  - a) Semi cubical parabola, b) Cissoid of Diocles, c) Strophoid, d) Astroid, e) Witch of Agnesi, f) Common Catenary, g) Folium of Descartes,
2. Tracing of curves in polar form
  - a) Cardioid, b) Pascal's Limacon, c) Lemniscate of Bernoulli, d) Parabola, e) Hyperbola, f) Rose curves
3. Rectification of plane curves (Cartesian and Polar form)

**Unit 6: Multiple Integration and its applications:****(9)**

1. Double Integrals and evaluation
2. Change of order of integration
3. Double Integrals in Polar Coordinates
4. Change into Polar
5. Area enclosed by plane curves
6. Mass of a plane lamina
7. Center of Gravity of Plane Lamina
8. Moment of inertia of plane lamina

**General Instructions:**

1. Batch wise tutorials are to be conducted. The number of students per batch should be as per the University pattern for practical batches.
2. Minimum number of assignments should be 8 covering all topics.

**Recommended Books:**

1. A text book of Applied Mathematics, Vol.-I by P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
2. A text book of Applied Mathematics, Vol.-II by P. N. Wartikar & J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
3. Dr. B. S. Grewal - Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.

**Reference Books:**

1. Higher Engineering Mathematics by B.V.Ramana, Tata McGraw-Hill Publications, New Delhi
2. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
3. Advanced Engineering Mathematics by H. K. Dass.
4. Mathematical methods of Science and Engineering by Kanti B. Datta, Cengage Learning.
5. A textbook of Engineering Mathematics Volume I by Peter V. O'Neil and Santosh K. Sengar, Cengage Learning.
6. A textbook of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd., New Delhi.

**First year Bachelor of Engineering & Technology – Semester -I and II**  
**Workshop Practice-II**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Workshop Practice-II	01	--	02	02	ISE	---	---	50	40%
					MSE	---	---	---	---
					ESE	----	----	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Unit 1: Welding**

(4)

Types of welding – gas welding, arc welding, resistance welding, Welding equipment's, welding of various metals, electrode classification and coding, welding joints.

**Unit 2: Carpentry**

(4)

Introduction, Classifications of wood, common varieties of Indian timber, carpentry tools like- Marking tools, cutting tools, planes, striking tools, holding tools. Carpentry operations- marking, sawing, chiseling, grooving etc. carpentry joints.

**Unit 3: Sheet metal work**

(4)

Specifications of metal sheets, working tools, sheet metal operations like-cutting, bending, folding, punching, revetting and joining by brazing and soldering.

**Unit 4: Air pollution:**

(2)

Air pollution due to automobiles, causes, PUC testing.

**Term work:**

The term work consists of assignment on Welding, Carpentry, Sheet metal work, Air pollution.

Every student should perform---

**1. Welding:**

One job on Arc welding- Lap / Butt Joint etc. (For individual student)

OR

Table, Shoe stand, Bag stand etc. (For 4-6 students)

**2. Carpentry :**

One composite job involving dovetail joint, T joint, cross halving joint, pen stand etc.(For individual student)

OR

Table, Teapot, Stool etc. (For 4-6 students)

**3. Sheet metal Work:**

One job on commercial items such as Dust bin, funnel, tray etc.

**Reference Books:**

1. A Course in Workshop Technology, Vol – I by B. S. Raghuvanshi, Dhanapat Rai and Sons.
2. Elements of Workshop Technology, Vol – I by Hajara Chaudhari, Media Promoters.
3. Workshop Technology, Vol – I by Gupta and Kaushik, New Heights.
4. Workshop Technology, Vol – I by Chapman, The English Language Book Society.
5. Workshop technology, Vol.-I by H.S. Bawa, TMH Publications, New Delhi.
6. I.C. Engines by Mathur & Sharma, Dhanpat Rai Publications, New Delhi.

**First year Bachelor of Engineering & Technology – Semester -II**  
**Professional Communication-II**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Professional Communication-II	01	--	02	02	ISE	---	---	25	40%
					MSE	30	40%	---	---
					ESE	----	----	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Unit 1: Developing Writing Skills**

(3)

1. Importance of advanced technical writing
2. Report Writing:
  - a) Importance and Techniques of Report Writing
  - b) Methods of data collection and its utilization
  - c) Types of Report Writing- Survey, Inspection and Investigation

**Unit 2: Behavioral Skills**

(4)

1. Understanding Self
2. Attitude Building/ Developing Positive attitude
3. Decision Making Skills
4. Leadership Skills
5. Emotional Intelligence
6. Problem Solving Skills (case study)
7. Stress Management and Time Management
8. Team Work

**Unit 3: Presentation Skills**

(3)

1. Importance & techniques
2. Presenting yourself professionally
3. Public speaking

**Unit 4: Career skills**

(4)

1. Corporate Manners and Etiquettes
2. Planning and Managing Career
3. Job Application and Resume
4. Interview :Techniques & skills
5. Group Discussion
6. Debate

**Term Work:** Any 8 out of the following should be conducted

1. Group Discussion (lab session/class room activity)
2. Mock Interview
3. Report Writing (lab session/class room activity)
4. Paragraph writing on current technical writing
5. Presentation on current affairs

6. Developing Professional Telephonic skills
7. Exercise of Application writing and Resume writing
8. Practice of Case Study
9. Team building activities
10. Report writing ( 3 types)
11. Introduction and use of modern communication techniques
12. Computer aided presentation of a project report (PPT)

**Instructions:**

1. Minimum 8 assignments should be covered.
2. Use of language lab is mandatory for both the semesters.

**Reference Books:**

1. Handbook for Technical Writing by David A. McMurrey, Joanne Buckley, Cengage.
2. A Course in English by J.D. O'Connor.
3. Better English Pronunciation by J.D. O'Connor.
4. Communication Skills Handbook: How to succeed in written and oral communication by Jane Summers, Brette Smith, Wiley India Pvt.Ltd.
5. Personal Development for Life and Work by Masters, Wallace, Cengage.
6. Soft Skills for Managers by Dr. T. Kalyana Chakravarthi, Dr. T. Latha Chakravarthi, Biztantra.
7. Soft Skills for every one by Jeff Butterfield, Cengage.
8. Behavioural Science by Dr. Abha Singh, Wiley India Pvt.Ltd.
9. An Introduction to Professional English and Soft Skills by Bikram K. Das, Kalyani Samantray, Cambridge University Press New Delhi.
10. Speaking Accurately, K.C. Nambiar, Cambridge University Press New Delhi.
11. Speaking Effectively by Jeremy Comfort, Pamela Rogerson, Cambridge University Press New Delhi.
12. Cambridge English for Job Hunting by Colm Downes, Cambridge University Press New Delhi.
13. Body Language by Allen Pease.
14. The Ace of Soft Skills by Gopalswami Ramesh, Mahadevan Ramesh, Pearson Publication, Delhi.
15. Decision Making Skills by Khanka S.S.
16. Business Ethics and Communication by C.S. Tejpal Sheth.
17. Write Right by Syed Abdur Raheem.

**First year Bachelor of Engineering & Technology – Semester –I/II**  
**Yoga**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Yoga	01	-	--	01	ISE	---	---	--	--
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**UNIT-I**

- (i) Origin of Yoga & its brief development.
- ii) Meaning of Yoga & its importance
- iii) Yoga as a Science of Art (Yoga Philosophy)
- iv) Meaning of meditation and its types and principles.

**UNIT-II**

- i) Classification of Yoga/Types of Yoga
- ii) Hatha Yoga , Raja Yoga, Laya Yoga, Bhakti Yoga, Gyan Yoga, Karma Yoga.
- iii) Asthang Yoga.

**UNIT -III**

- i) Principles of Yogic Practices.
- ii) Meaning of Asana, its types and principles.
- iii) Meaning of Pranayama, its types and principles.
- iv) Meaning of Kriya its types and principles.

**First year Bachelor of Engineering & Technology – Semester –I/II**  
**Right to Information**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Right to Information	01	-	--	01	ISE	---	---	--	--
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

Unit-I Introduction to RTI Act The evolution of the Right to Information in India.

- The important terms and concepts used in the Act.
- The salient features of the Act Public Authorities and their Obligations under the Act
- What is a Public Authority?
- Who are the Public Authorities covered under the Act?
- Which Public Authorities are exempted from the ambit of the Act?
- Obligations of Public Authorities.

Unit-II Role of Public Information Officers: PIOs and APIOs - Accepting an Information Request, Processing and Disposing

- The requirement for designation of Information Officers - PIOs / APIOs - in public authorities
- The specific Duties & Responsibilities of Information Officers.
- The liabilities of a PIO for non-compliance with the provisions of the Act.
- How to accept information requests and assist citizens in making information requests?
- What is the process for disposal of requests?
- The time limits for disposal of information requests.
- The fees and costs to be charged for providing information.
- The grounds on which requests can be rejected and the procedure for such rejection.

Unit-III Exemptions from Disclosure of Information, Partial Disclosure and "Third Party" Information

- Specific provisions of the Act which exempt certain kinds of information - the classification of such exempted information.
- Application of public interest test with respect to exempted information.
- Grounds that allow for partial disclosure of information.
- The concept of 'Third Party' and the issues and considerations revolving around its involvement.



**First year Bachelor of Engineering & Technology – Semester –I/II**  
**Tourism**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
Tourism	01	-	--	01	ISE	---	---	--	--
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Objective:** This will be an introductory module giving the basis of tourism studies. This will give an overview of tourism industry and various organisations.

**Course Contents:**

**Unit – I Introduction:** What is Tourism? Definitions and Concepts, tourist destination, services and industry, definition and historical development, Past to 2<sup>nd</sup> world war, recent and current 1945–2002, Future from 2002 onwards. General Tourism Trends. Types of Tourists, Visitor, Traveller, and Excursionist–Definition and differentiation. Tourism, recreation and leisure, their inter–relationships.

**Unit – II Tourism Products & Attraction:** Nature, Characteristics and Components of Tourism Industry. Why it is different from other types of consumer product? Elements and characteristics of tourism products. Tourism product production system, Tourism Product Life Cycle, typology of tourism products.

**Unit –III Types and Forms of Tourism:** Inter–regional and intra–regional tourism, inbound and outbound tourism, domestic, international tourism. Forms of Tourism: religious, historical, social, adventure, health, business, conferences, conventions, incentives, sports and adventure, senior tourism, special interest tourism like culture or nature oriented, ethnic or ‘roots’ tourism and VFR.

**Unit – IV Tourist Transportation: Air transportation:** The airline industry present policies, practices. Functioning of Indian carriers. Air Corporation Act, Air charters.

**Surface Transport:** Rent-a-car Scheme and Coach-Bus Tour, Fare Calculation. Transport & Insurance documents, All-India Permits

**Rail Transport:** Major Railway Systems of World, (Euro Rail and Amtrak) General information about Indian Railways, Types of rail tours in India:, Place-on-Wheels and Royal Orient, Deccan Odessa, Toy Trains. Inrail Pass.

**Water Transport:** Historical past, cruise ships, ferries, hovercrafts, river and canal boats, Fly-cruise.

**Unit – V A study of International Tourism Organisations:** Origin, location and functions of WTO, IATA, PATA, ASTA, UFTAA, and ICAO.

**Suggested Readings:**

- Mill and Morrison, (1992), The Tourism System: An Introductory Text , Prentice Hall.
- Cooper, Fletcher et al, (1993), Tourism Principles and Practices, Pitman.
- Burkart and Medlik, (1981), Tourism: Past, Present and Future ,Heinemann, ELBS.
- Mill, R.C., (1990), Tourism: The International Business, Pretience Hall, New Jersey.
- Bhatia, A.K., - International Tourism
- Seth, P.N., (1999) Successful Tourism Management (Vol 1 &2)

**First year Bachelor of Engineering & Technology – Semester –I/II  
E Banking and Financial services**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
<b>E Banking and Financial services</b>	01	-	--	01	ISE	---	---	--	--
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Course Description:**

Banking and Financial Services is an interactive seminar that brings students, faculty, and industry leaders together to study and discuss critical issues facing today’s financial services industry. The course will address the full range of financial services including investment and commercial banking, insurance, pension plans, risk management, mutual funds,

e-commerce, and personal and business planning. Leadership, customer service, and marketing issues will be discussed. Finally, the course will provide a comprehensive overview of the structure of the financial system, interest rate and business cycle determinates, and international financial markets.

**First year Bachelor of Engineering & Technology – Semester –I/II**  
**Food Technology**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
<b>Food Technology</b>	01	-	--	01	ISE	---	---	--	--
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

Food technology is a branch of food science that equips a student with technical knowledge of food processing. As a student of Food Technology, one learns the art of preservation, processing and packaging food along with the techniques of transforming raw materials into safe, nutritious, wholesome ready-to-consume food. It also involves addition of flavours, reduction of toxins and so on. With rise in demand for packaged and processed food, there is an equal rise in demand of manpower with good sense of packaging and preservation, which makes a product more marketable.

A Food Technology graduate can expect to work as Quality Assurance Managers, Production Managers, Product development Technologists in leading packaging and food industries like Hindustan Lever, Amul and similar companies.

**First year Bachelor of Engineering & Technology – Semester –I/II**  
**Vermi Composting**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
<b>Vermi Composting</b>	01	-	--	01	ISE	---	---	--	--
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

**Vermicompost Technology (Methods and Products)**

Small Scale Earthworm farming for home gardens - Earthworm compost for home gardens

Conventional commercial composting - Earthworm Composting larger scale

Earthworm Farming (Vermi culture),

Extraction (harvest), vermin composting harvest and processing.

Nutritional Composition of Vermicompost for plants, comparison with other fertilizers

Vermiwash collection, composition & use

Enemies of Earthworms, Sickness and worm's enemies.

Frequent problems. How to prevent and fix them.

Complementary activities of auto evaluation.

**First year Bachelor of Engineering & Technology – Semester –I/II**  
**General Technical Proficiency**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
<b>General Technical Proficiency</b>	01	-	--	01	ISE	---	---	--	--
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

Working principle of Mini exchange and its features and facilities.

Self Management

- Self Evaluation
- Self Discipline
- Self Criticism
- Recognition of one's own limits and deficiencies

•Independency etc.

•Thoughtful & Responsible

•Self Awareness

Self Management

•Identifying one's strengths and weaknesses

•Planning & Goal setting

•Managing self – emotions, ego, pride.

Team Management Technique Practice by game play & other learning methodology for achieving targets and getting of right first time. Time Management concept

•Attendance , Discipline & Punctuality

•Act in time on commitment

•Quality/ Productive Time

**First year Bachelor of Engineering & Technology – Semester –I/II**  
**Management Information System**

Course	Teaching Scheme					Evaluation Scheme			
	L	T	P	Credit	Scheme	Theory (Marks)		Practical(Marks)	
						Max.	Min. for passing	Max.	Min. for passing
<b>Management Information System</b>	01	-	--	01	ISE	---	---	--	--
					MSE	30	40%	---	---
					ESE	---	---	---	---

ISE: In Semester Evaluation

MSE: Mid Semester Evaluation

ESE: End Semester Evaluation

*Unit 1-Managing Information Systems in Organisations:* Introduction, Managing in the Internet Era, Managing Information Systems in Organisation-the IT interaction model, Challenges for the manager-what information to build?-how much to spend on information systems?-what level of capabilities should be created with information systems?-how centralized should the services be?-what security levels are required?-what is technology road map for the organization?

*Unit 2- Data and Information:* Introduction, data and information- measuring data, information as a resource, information in organisational functions, types of information technology, types of information systems- transaction processing systems-management information systems

*Unit 3-Decision making and communication:* Introduction, Decision making with MIS-Tactical decisions-operational decisions-strategic decisions, communication in organisations- types of communication- examples of communications in organisations- decision making with communication technology