

**COURSE STRUCTURE
AND
DETAILED SYLLABUS**

for

B.Tech – I - IV Year

in

MECHANICAL ENGINEERING

(ME)

(Applicable from the Academic Year 2010-2011)



SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY

(An Autonomous Institution approved by UGC and affiliated to JNTUH)

Yamnampet, Ghatkesar, R.R.District-501 301.

SREENIDHI INSTITUTE OF SCIENCE & TECHNOLOGY (AUTONOMOUS)**B.Tech in Mechanical Engineering**
COURSE STRUCTURE & SYLLABUS**I Year – I Semester**

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101EN01	English-I	3	---	---	3	30	70
2	101MA01	Engineering Mathematics-I	3	1	---	3	30	70
3	101PH01	Engineering Physics-I	3	1	---	3	30	70
4	101CH01	Engineering Chemistry	2	1	---	2	30	70
5	101IT01	Computer Programming	3	1	---	3	30	70
6	101ME01	Engineering Drawing-I	2	---	4	4	30	70
7	101EN71	English Language Lab-I	---	---	2	1	25	50
8	101PH71	Engineering Physics – I	---	---	3/2	1	25	50
9	101CH71	Engineering Chemistry Lab	---	---	3/2	1	25	50
10	101IT71	Computer Programming Lab	---	---	3	2	25	50
11	101ME71	Engineering Workshop - I	---	---	3/2	1	25	50
12	101IT72	IT workshop-I	---	---	3/2	1	25	50
Total			16	4	15	25	330	720

I Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101EN02	English-II	2	---	---	2	30	70
2	101MA03	Engineering Mathematics-II	3	1	---	3	30	70
3	101CS01	Data Structures and C++	3	1	---	3	30	70
4	101ME02	Engineering Drawing-II	1	---	2	2	30	70
5	101EE41	Basic Electrical Engineering	3	---	---	3	30	70
6	101ME03	Engineering Mechanics	4	1	---	4	30	70
7	101PH03	Applied Physics	3	1	---	3	30	70
8	101EN72	English Language Lab-II	---	---	2	1	25	50
9	101CS71	Data Structures and C++ Lab	---	---	3	2	25	50
10	101ME72	Engineering Workshop-II	---	---	3/2	1	25	50
11	101PH72	Engineering Physics Lab-II	---	---	3/2	1	25	50
Total			19	4	10	25	310	690

II Year – I Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101MA06	Mathematical Methods	3	1	---	3	30	70
2	101EC01	Electronics for Mechanical Engineering	3	1	---	3	30	70
3	101ME06	Thermodynamics	3	1	---	3	30	70
4	101ME07	Mechanics of Solids	3	1	---	3	30	70
5	101ME08	Material Science & Metallurgy	3	1	---	3	30	70
6	101ME09	Machine Drawing	1	---	6	4	30	70
7	101EN73	Functional and Communicative Written English	---	---	2	2	25	50
8	101EE91	Basic Electrical Engineering Lab	---	---	3/2	1	25	50
9	101EC84	Basic Electronics Engineering Lab	---	---	3/2	1	25	50
10	101ME73	Metallurgy Lab	---	---	3/2	1	25	50
11	101ME74	Mechanics of Solids Lab	---	---	3/2	1	25	50
Total			16	5	14	25	305	670

II Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101CH03	Environmental Studies	3	1	---	3	30	70
2	101MA09	Probability and Statistics for Mechanical Engineering	3	1	---	3	30	70
3	101ME10	Applied Thermodynamics-I	3	1	---	3	30	70
4	101ME11	Manufacturing processes	3	1	---	3	30	70
5	101ME12	Fluid Mechanics & Hydraulic Machinery	3	1	---	3	30	70
6	101ME13	Kinematics of Machinery	3	1	---	3	30	70
7	101EN74	Effective English Communication and Soft Skills	---	---	2	2	25	50
8	101ME75	Comprehensive Viva	---	---	---	1	---	50
9	101ME76	Manufacturing Processes Lab	---	---	3	2	25	50
10	101ME77	Fluid Mechanics & Hydraulic Machinery Lab	---	---	3	2	25	50
Total			18	6	8	25	255	620

III Year – I Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1		Open Elective-I (Foreign Language)	2	1	---	2	30	70
2	101ME14	Dynamic of Machinery	3	1	---	3	30	70
3	101ME15	Metal Cutting & Machine Tools	3	1	---	3	30	70
4	101ME16	Applied Thermodynamics-II	3	1	---	3	30	70
5	101ME17	Design of Machine Members-I	3	1	---	4	30	70
6	101ME18	Metrology & Instrumentation	3	1	---	3	30	70
7	101MA71	Logical Reasoning-I	---	---	2	2	25	50
8	101ME78	Group Project	---	---	3	1	25	50
9	101ME79	Applied Thermodynamics Lab	---	---	3	2	25	50
10	101ME80	Metrology & Machine Tools Lab	---	---	3	2	25	50
Total			17	6	11	25	280	620

Open Elective – I

101FL01	Spanish
101FL02	French
101FL03	German

III Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101MB01	Managerial Economics and Financial Analysis	3	1	---	3	30	70
2	101CS03	OOPS Through Java	3	1	---	3	30	70
3	101ME19	Design of Machine Members-II	4	0	---	4	30	70
4	101ME20	Heat Transfer	3	1	---	3	30	70
5	101ME21	CAD/CAM	3	1	---	3	30	70
7	101BT37	Human Values, Ethics & IPR	2	---	---	2	30	70
8	101MA72	Quantitative Aptitude	---	---	2	2	25	50
9	101ME81	Comprehensive Viva	---	---	---	1	0	50
10	101ME82	Heat Transfer Lab	---	---	3	2	25	50
11	101CS74	OOPS through Java Lab	---	---	3	2	25	50
Total			18	4	8	25	255	620

*** Industry Oriented Min Project will be conducted by all students in summer vacation of III/IV B.Tech, II semester for a period of One month. The report must be submitted in IV/IV B.Tech I-Semester and will have to be defended. Marks allotted are “75” and Two Credits are provided.

IV Year – I Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101ME22	Operation Research	3	1	---	3	30	70
2	101ME23	Principle of Finite Element Method	3	1	---	3	30	70
3	101ME24	Automobile Engineering	3	1	---	3	30	70
4		Professional Elective-I	3	1	---	3	30	70
5		Professional Elective-II	3	1	---	3	30	70
6		Open Elective-II	3	---	---	3	30	70
7	101MA73	Logical Reasoning-II	---	---	2	2	25	50
8	101ME83	Pre Project Seminar	---	---	---	2	50	---
9	101ME84	Industry Oriented mini Project	---	---	---	2	25	50
10	101ME85	CAD/CAM Lab	---	---	3	2	25	50
11	101ME86	Production Drawing Practice Lab	---	---	3/2	1	25	50
12	101ME87	Instrumentation Lab	---	---	3/2	1	25	50
Total			18	5	8	28	355	670

Professional Elective – I

101ME25	Refrigeration & Air Conditioning
101ME26	Nano Technology
101ME27	Non-conventional Source of energy

Professional Elective – II

101ME28	Robotics
101ME29	Mechatronics
101ME30	Automation in Manufacture

Open Elective - II

101MB03	Banking, Insurance and Risk Management
101MB06	Entrepreneurship and Innovation
101MB07	Production and Operation Management

IV Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101MB01	Management Science	4	---	---	4	30	70
2		Professional Elective - III	4	---	---	4	30	70
3	101ME88	Project	---	---	---	10	50	150
4	101ME89	Comprehensive Viva	---	---	---	2	---	50
5	101ME90	Technical Seminar	---	---	---	2	25	---
Total			8	---	---	22	135	340

Professional Elective – III

101ME31	Jet propulsion and Rocket Engines
101ME32	Computational Fluid Dynamics
101ME33	Composite Materials

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering
Code: 101EN01 ENGLISH – I (A Communicative Approach)
(Common to all branches)**

L	T	P/D	C
3	-	-	3

UNIT I: NOBLE THOUGHT:

- | | | |
|----------------------|---|---|
| 1. Reading | : | The Last Leaf – O. Henry |
| 2. Writing | : | Paragraph writing |
| 3. Listening | : | Listening for sounds |
| 4. Speaking | : | Greeting, taking leave and introducing |
| 5. Grammar | : | Naming words |
| 6. Vocabulary | : | Homonyms, homophones, homographs, synonyms and antonyms |

UNIT II: BIOGRAPHY:

- | | | |
|----------------------|---|------------------------------------|
| 1. Reading | : | Sri C.V. Raman- Shubashree Desikan |
| 2. Writing | : | Work-related correspondence |
| 3. Listening | : | Listening for words |
| 4. Speaking | : | Making requests |
| 5. Grammar | : | Naming words specific (Part I) |
| 6. Vocabulary | : | Word Formation |

UNIT III: HUMAN INTEREST:

- | | | |
|----------------------|---|---------------------------------------|
| 1. Reading | : | The Connoisseur- Nergis Dalal |
| 2. Writing | : | Summarizing |
| 3. Listening | : | Listening for word stress |
| 4. Speaking | : | Apologizing and inviting |
| 5. Grammar | : | Making naming words specific (part 2) |
| 6. Vocabulary | : | Collocations |

UNIT IV: DISASTER MANAGEMENT:

- | | | |
|----------------------|---|--|
| 1. Reading | : | The Cuddalore Experience-Anu George |
| 2. Writing | : | Basics of Essay Writing |
| 3. Listening | : | Listening for theme |
| 4. Speaking | : | Congratulating, offering sympathy, condolences and making complaints |
| 5. Grammar | : | Tenses |
| 6. Vocabulary | : | Phrasal verbs |

UNIT V: HUMOUR:

1. **Reading** : The Luncheon – Somerset Maugham
2. **Writing** : Note making
3. **Listening** : Listening for details and taking notes
4. **Speaking** : Interview skills
5. **Grammar** : Adverbials and modal verbs
6. **Vocabulary** : Idioms

UNIT VI: OUTLOOK:

1. **Reading** : Indian Crowds – Nirad C. Choudhary
2. **Writing** : Information transfer
3. **Listening** : Listening to announcements and directions
4. **Speaking** : Making presentations
5. **Grammar** : Conjunctions and prepositions
6. **Vocabulary** : Business vocabulary

TEXT BOOKS:

1. Enjoying Everyday English : A Rama Krishna Rao, Sangam Books, HYD.

REFERENCES:

- Business Vocabulary In Use -Bill Mascull, Cambridge University Press.
- How to build a better vocabulary –Nurnberg Maxwell & Morris Rosenblum: Grand Central Publishers
- Word power made easy – Norman Lewis, W.R.Goyal Publishers.
- How to read better and faster: Norman Lewis, W.R.Goyal Publishers, New Delhi

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering**

Code: 101MA01 ENGINEERING MATHEMATICS – I
(Common to all branches except Bio-Technology)

L	T	P/D	C
3	1	---	3

UNIT-I

Matrix Theory-I: Elementary row and column operations on a matrix, rank of a matrix, normal form, Inverse of a matrix using elementary operations, consistency and solutions of systems of linear equations using elementary operations.. Linear dependence and independence of vectors,

UNIT-II

Matrix Theory-II Characteristic roots and vectors of a matrix, properties of Eigen values and Eigen Vectors, Caley-Hamilton theorem and its applications, reduction to diagonal form, quadratic and canonical forms.

UNIT-III**Sequences and series & Mean value theorems**

Sequences and series- Convergence and divergence – Comparison test – integral test – Cauchy root test – Ratio test – Raabe's test – Log test – Absolute and conditional convergence. Rolle's Theorem, Mean value theorems (Without Proof) – Taylor's and Maclaurin's theorems with out remainders, expansions.

UNIT-IV**Functions of several variables & partial differentiation**

Functions of several variables, partial differentiation, total differentiation, Euler's theorem and generalization, Jacobians and its properties, Maxima and Minima of functions of several variables (two and three variables), Lagrange's method of multipliers ,

UNIT-V

Radius of curvature Cartesian, Parametric and polar forms .Radius of curvature at origin., center of curvature, evolutes, envelopes.

UNIT-VI

Curve Tracing & Multiple integrals : curve tracing- Cartesian ,parametric and polar forms. Length of curves, Double and triple integrals, change of variables in double integrals.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S. Grewal , Khanna Publications, New Delhi.
2. Engineering Mathematics, B.V.Ramana, Tata McGraw Hill Publishing Company Ltd.

REFERENCE BOOKS:

1. A text Book of KREYSZIG's Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications
2. A Text book of Engineering Mathematics, M.Venkata Krishna, Jaico Publishing House, 2010.
3. Jain, S.R.K, Advanced Engineering Mathematics, Narosa Publishing House, London, 2002.

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering**

Code: 101PH01

ENGINEERING PHYSICS – 1

(Common to all branches)

L	T	P/D	C
3	1	--	3

UNIT - I

Crystallography and Crystal Structures: Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond and hcp Structures, Structures of NaCl, ZnS, CsCl.

UNIT-II

X-ray Diffraction: Basic Principles, Bragg's Law, Laue Method, Powder Method, Applications of X-ray Diffraction.

Defects in Crystals: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects; Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector, Surface Defects and Volume Defects.

UNIT- III

Elements of Statistical Mechanics: Phase space, Ensemble, Difference between micro, canonical & grand canonical ensemble, Maxwell - Boltzman Statistics, Bose – Einstein Statistics, Fermi – Dirac Statistics with derivations.

UNIT-IV

Free electron theory of Metals: Classical free electron theory (Drunde and Lorentz), Electrical conductivity of a metals, Relaxation time, Collision time and mean free path, Success of classical free electron theory, Breakdown of free electron theory, Fermi – Dirac distribution function- variation with temperature, The quantum free electron theory.

UNIT-V

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation -Physical Significance of the Wave Function -Particle in One Dimensional Potential Box.

UNIT-VI

Band Theory of Solids: Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators.

TEXT BOOKS:

1. Introduction to Solid State Physics, by Charles Kittel
2. Engineering Physics P K Palanisamy

REFERENCE BOOKS:

1. Solid State Physics Neil by W. Ashcroft, N. David Mermin
2. Statistical Mechanics by Donald Allan McQuarrie
3. Statistical Mechanics by Sathya Prakash
4. Quantum Mechanics by John L Powel
5. Principles of quantum Mechanics by Ramamurti Shanker
6. Applied Physics by M Chandrashekar and P Appa Naidu
7. Modern Engineering Physics by K. Vijaya Kumar, S Chandralingam

Syllabus for B. Tech. I Year I semester
Mechanical Engineering
ENGINEERING CHEMISTRY
(Common to all Branches Except Bio-Tech)

Code: 101CH01

L	T	P/D	C
2	1	--	2

UNIT-I:

Water Technology: Hardness-temporary and permanent hardness. Units and inter conversions of Units. Estimation of Hardness; EDTA method Analysis of water – Alkalinity. Water Treatment: Internal treatment, External treatment – Lime – Soda Process, Zeolite Process, Ion-Exchange Process – Numerical Problems Lime – Soda Process.

UNIT II:

Electrochemistry: Conductance-types, Electrolytic conductance-specific, equivalent and molar conductance, ionic conductance, ionic mobilities, Kohlrausch's law and its applications. EMF: Galvanic Cells, types of Electrodes, Reference Electrode (SCE), Redox electrode (Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode) Nernst equation and its applications, Potentiometric titrations, Numerical problems.

Batteries: Primary and secondary cells, (Ni-Cd cell, Lithium ion cells, lead-Acid cell,). Applications of batteries, Fuel cells – Hydrogen – Oxygen fuel cell, Advantages of fuel cells.

UNIT III:

Corrosion and its Control: Definition of corrosion, oxidation corrosion, mechanism of oxidation corrosion, electrochemical corrosion, mechanism of electrochemical corrosion, formation of anodic and cathodic areas, galvanic corrosion, waterline corrosion, soil corrosion, Factors affecting rate of corrosion control. Cathodic protection: Sacrificial anodic protection method, impressed current protection method, Protective coatings-metallic coatings, electroplating, Organic surface coatings – paints constituents and functions.

UNIT-IV:

Phase Rule and Adsorption: Phase rule- Definition and terminology, Application of phase rule to Water system and Ag-Pb system.

Adsorption: Definition, types, Adsorption of gases on solids, Langmuir adsorption isotherm, BET adsorption equilibrium.

UNIT – V:

Polymer Technology: Polymers, terminology, Polymerization- Types of Polymerization – Addition and Condensation and Co-Polymerization. Plastics – Thermosetting and Thermoplastics – Preparation, Properties and applications of the following: PVC, Teflon, Bakelite, Nylon 6:6, Polyester and Dacron. Rubber-natural and artificial rubber, Vulcanization of natural rubber, Buna S, Buna N, Thiokol. Conducting Polymers: Poly acetylene, polyaniline and their applications.

UNIT-VI:

Fuels and Lubricants: Fuels: Classification- Characteristics of a good fuel, **Calorific value:** gross calorific value, net calorific value, determination of calorific values by bomb calorimeter.

Solid fuels: Coal, analysis of coal - proximate analysis and ultimate analysis

Liquid fuels: Petroleum –Refining, fractional distillation of crude oil, octane number, cetane number.

Gaseous fuels: Advantages of gaseous fuels, analysis of flue gases – Orsat's apparatus

Lubricants: Functions of Lubricants – Types of Lubrication and Mechanism – Thick Film or Hydrodynamic Lubrication. Thin Film or Boundary Lubrication. Extreme pressure lubrication, Classification and Properties of Lubricants.

TEXT BOOKS:

1. Engineering Chemistry: P.K. Jain and M.K. Jain, Dhanpathrai Publications – 14th Edition.
2. Text Book of Engineering Chemistry – Shashi Chawla, Dhantpat Rai publishing Company, New Delhi (2008).

REFERENCE BOOKS:

1. Essentials of Physical chemistry; Baul & Tuli; S. Chand Publications.
2. Text of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co, New Delhi (2006)
3. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.
4. Engineering Chemistry by R. P. Mani, K. N. Krishna B. Rama Devi Cengage Learning New Delhi (2010).
5. Engineering Chemistry by Shiva Shnakar Tata McGraw Hill (2010).

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering**

Code: 101IT01

**COMPUTER PROGRAMMING
(Common to all Branches)**

L	T	P/D	C
3	1	---	3

UNIT – I

Computer fundamentals – Computer architecture (block diagram), CPU, Memory, Types of memory, I/O devices.

Software Development Steps - Algorithms, pseudo code, flowcharts, Software Development Life Cycle.

UNIT – II

C fundamentals – History of C Language, Features of C, Structure of C, Character set, identifiers, constants, variables and keywords.

Simple data types – char, int, float, double. Data type modifiers and qualifiers. Memory allocation for these types.

Operators – Unary, binary and ternary, precedence and association rules among operators. *Decision control structures* – if..else, dangling else, switch statement.

Repetitive control structures - while, do..while, for, break and continue statements, Nested structures.

UNIT – III

Functions – Function definition, arguments, return value, prototype, arguments and parameters.

Parameter passing – Call by value and call by reference.

Recursive functions – Definition, examples, advantages and disadvantages.

Macros – Definition, examples, comparison with functions.

Arrays – Definition, initialization, strings as character arrays, two dimensional and multidimensional arrays. Passing arrays as arguments to functions.

UNIT – IV

Pointers – Definition, Pointer variable, Pointer to a pointer, Memory mapping, arithmetic operations on pointers, relationship between arrays and pointers, pointers as arguments and return type of a function, pointers to a function, array of pointers and pointers to arrays, dynamic memory allocation.

Strings – Input output functions, string handling functions.

Structures – Declaring a structure, array of structures, nested structures, unions, passing structures as arguments to a function and structure as a return type of a function.

UNIT – V

Files – Data Organization, file operations, file opening modes, creating, storing, retrieving, appending, editing, copying files, Examples illustrating counting characters, tabs, spaces, string (line) I/O in files, record I/O in files, text files and binary files, command line arguments, error handling functions in files random access files.

UNIT – VI

Applications – Case study of simple bank transactions and program development.

Preprocessor directives – Macro expansion, file inclusion, condition compilation, miscellaneous directives.

Graphics in C – Line drawing, Rectangle, ellipse, working with image, move to function, and graphic related library functions.

TEXT BOOKS:

1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education.

REFERENCES:

3. Let us C by Yashwanth P. Kanetkar 8th edition BPB publications.
4. Understanding pointers in C by Yashwanth P. Kanetkar.
5. Computer programming for teens by Mary Farrell.
6. Working with C by Yashwanth P. Kanetkar.
7. Graphics under C by Yashwanth P. Kanetkar.
8. The complete reference, 4th edition, Herbert Schmidt.
9. C Faqs by Steve Summit.

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering
ENGINEERING DRAWING - I**

Code: 101ME01

L	T	P/D	C
2	---	4	4

UNIT – I

Introduction to Engineering Drawing: Drawing Instrument and their use Types of lines, use of pencils, Lettering, Rules of dimensioning.

Construction of polygons: Inscription and superscription of polygons given the diameter

Scales: Scales used in Engineering Practice and Representative Fraction – construction of Plain, diagonal, Vernier Scales.

Curves used in Engineering Practice and their Constructions.

Conic Sections including the Rectangular Hyperbola-General method only.

Cycloid, Epicycloid and Hypocycloid

Involute

UNIT – II

Drawing of Projections or Views Orthographic Projection in First Angle Projection Only: Principles of Orthographic Projections – Conventions – First and Third Angle Projections, Projection of Points, Projection of Lines - inclined to both planes, True lengths, traces.

UNIT – III

Projections of Planes: Projections of regular Planes, Traces, Oblique planes. Introduction to Auxiliary planes

UNIT –IV

Projections of Solids: Projections of Regular Solids – Regular Polyhedra, solids of revolution, Axis inclined to both planes – Alteration of position and Auxiliary plane method.

UNIT –V

Sections of Solids: Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views

UNIT –VI

Development of Surfaces: Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing, Narayana and Kannaiah / Sciotech publishers.

REFERENCES:

1. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering**

Code: 101EN71

ENGLISH LANGUAGE LAB – I

L	T	P/D	C
---	---	2	1

Introduction:

The Language Lab focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

Objectives:

1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-bases competitive exams such GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

Syllabus:

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

1. Introduction to the Sounds of English – Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues/Role Play
4. Oral Presentations-Prepared and Extempore
5. 'Just A Minute' Sessions (JAM)
6. Describing Objects/Situations/People
7. Information Transfer
8. Debate

Minimum Lab Requirements:

The English Language Lab shall have two parts.

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

System Requirement (Hardware component):

Computer network with LAN with minimum 60 multimedia systems with the following specifications:

- 1) P-IV Processor
 - a) Speed – 2.8 GHZ
 - b) RAM -512 MB Minimum
 - c) Hard Disk – 80 GB
- 2) Headphones of High quality

Software:

- * Pro Power Pronunciation Software
- * Hi Class system Monitoring Software.
- * A.P.State Council of Higher Education Software (Foundation Course in communication skills)
- * Face to Face elementary and Pre –intermediate CDs.
- * Cambridge Advanced Learners’ English Dictionary with CD
- * Learn to speak English book + CD set. (Set of 4 CDs)
- * Mastering English (CD).
- * DOKI English CD

REFERENCES

1. English Conversation Practice by Grant Taylor, Tata Mc.Graw Hill
2. Speaking Effectively, Cambridge University Press
3. A text book of English Phonetics for Indian Students by T. Balasubramanian Mac Millan

Syllabus for B. Tech. I Year I semester
Mechanical Engineering
ENGINEERING PHYSICS–I

Code: 101PH71

L	T	P/D	C
---	---	3/2	1

1. Calculation of error - Error estimation.
2. Determination of wavelength of a given laser source of light by using diffraction Grating.
3. To find the frequency of a Tuning fork - Melde's Experiment.
4. To find the frequency of ac signal generator - A.C. Sonometer.
5. Electrical conductivity of a given material
6. To study the Characteristics of a Thermistor.
7. R.C. Network.
8. L.C.R. series and parallel resonance.
9. Energy gap of a semiconductor
10. Planck's constant

Note: Any Six of the above Ten Experiments are to be conducted

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering**

Code: 101CH71 ENGINEERING CHEMISTRY LAB

L	T	P/D	C
---	---	3/2	1

1. Estimation of MnO₂ in Pyrolusite.
2. Estimation of Hardness of water.
3. Estimation of Mn⁺² / Cu⁺² ions by colorimetry.
4. Estimation of acid by conductometric titrations.
5. Estimation of acid by potentiometric titrations.
6. Determination of viscosity.
7. a) Preparation of Aspirin
b) Preparation of Polymer (Thiokol rubber).
8. Determination of Flash and Fire point of a fuel using Abel's / Pensky – Martin's Apparatus.
9. Determination of Calorific value of a solid fuel by Bomb Colorimeter.
10. Grease penetration Test.

Note: Any Six of the above Ten Experiments are to be conducted

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering**

Code: 101IT71

COMPUTER PROGRAMMING LAB

L	T	P/D	C
---	---	3	2

1. Unit I (Cycle 1)

- 1.1. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart using RAPTOR tool and test it using the data: 0⁰C, 35⁰C, 55.35⁰C, and 100⁰C.
- 1.2. Write an algorithm to find the largest of three given numbers and draw a flowchart using RAPTOR tool and test it for data: (5, 7, 2), (3.5, 5.8, 9.2), (112, 19.6, 82.7).
- 1.3. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients and test it for data: (1, 3, 2), (2, 1, 6), (6, 5, 1).

2. Unit I (Cycle 2)

- 2.1. Write an algorithm and draw a flowchart for computing the sum of the digits of a given integer and test it for the data: 3259, 89725, 10092.
- 2.2. Write an algorithm and draw a flowchart to test whether a given integer is a prime number or not. Test for the data: 29, 35, 89.
- 2.3. Write an algorithm and flowchart for printing the first n Fibonacci numbers, give n. Test using the data: 10, 25, 50.

3. Unit II (Cycle 3)

- 3.1. Write an algorithm, flowchart, and C program for:
 - 3.1.1. Finding the area and circumference of a circle of given radius.
 - 3.1.2. Finding the volume of a sphere of given radius.
 - 3.1.3. Finding the lateral surface area of a right circular cone of given base radius and height.
 - 3.1.4. Finding selling price of an item, given its cost price and profit percent.
 - 3.1.5. Finding the interest on a given principal for a given period of time at a given rate of per year.
- 3.2. Write a C program to display all the sizes of data types in C.
- 3.3. Write a C program to display a given decimal integer into an equivalent octal number and hexadecimal number.

4. Unit II (Cycle 4)

- 4.1. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.
- 4.2. Write a C program for finding the largest of three given numbers.
- 4.3. A salesman gets a commission of 5% on the sales he makes if his sales is below Rs.5000/- and a commission of 8% on the sales that exceeds Rs.5000/- together with Rs.250/-. Write an algorithm or a flowchart and develop C program for computing the commission of the salesman, given his sales.

5. Unit II (Cycle 5)

- 5.1. Write a program that reads a letter given by the user and prints whether it is a vowel or not.
- 5.2. An institution gives grades to its students as follows:
 - a. Grade A if he gets 80 or more marks
 - b. Grade B if he gets between 60 and 79 (both inclusive)
 - c. Grade C if he gets between 50 and 59 (both inclusive)
 - d. Grade D if he gets between 40 and 49 (both inclusive)
 Grade F otherwise. Marks of student are always an integer ranging from 0 to 100. Use case structure to print the grade obtained by the candidate, given his marks.
- 5.3. Write three C programs to print a multiplication table for a given number using while, do..while, and for loops.

6. Unit II (Cycle 6)

- 6.1. Write a C program to compute the sum of:
 - 6.1.1. $1+x+x^2+x^3+\dots+x^n$, given x and n.
 - 6.1.2. $1! + 2! + 3! + \dots + n!$, given n.
 - 6.1.3. $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \dots$ to n terms where the n^{th} term becomes less than 0.0001.
- 6.2. Write a C program in the menu driven style to perform the operations +, -, *, /, % between two given integers.
- 6.3. Write a C program to find the largest and the least of some numbers given by the user.

7. Unit III (Cycle 7)

- 7.1. Write C functions for the following:
 - 7.1.1. A function that takes an integer n as argument and returns 1 if it is a prime number and 0 otherwise.
 - 7.1.2. A function that takes a real number x and a positive integer n as arguments and returns x^n .
 - 7.1.3. A function that takes a positive integer n as an argument and returns the n^{th} Fibonacci number.
- 7.2. Using recursion write C functions for the following:
 - 7.2.1. Factorial of a non-negative integer n.
 - 7.2.2. Number of combinations of n things taken r at a time.
 - 7.2.3. Greatest Common Divisor of two integers.
 - 7.2.4. Least Common Multiple of two integers.

8. Unit III (Cycle 8)

- 8.1. Write a menu driven style program to compute the above functions (cycle 7) on the choice of the function given by the user.
- 8.2. Write a C program to solve the problem of Towers of Hanoi.
- 8.3. Write a program to generate Pascal's triangle.
- 8.4. Write a program to count the number of letters, words, and lines in a given text.

9. Unit III (Cycle 9)

- 9.1. Write a program to store the numbers given by the user in an array, and then to find the mean, deviations of the given values from the mean, and variance.
- 9.2. Write a C program to initially store user given numbers in an array, display them and then to insert a given number at a given location and to delete a number at a given location.
- 9.3. Write a program to store user given numbers in an array and find the locations of minimum and maximum values in the array and swap them and display the resulting array.
- 9.4. Define macros for the following and use them to find sum of the squares of the minimum and maximum of two given numbers.
 - 9.4.1. Larger of two numbers.
 - 9.4.2. Smaller of two numbers.
 - 9.4.3. Sum of the squares of two numbers.

10. Unit IV (Cycle 10)

- 10.1. Write a function to swap two numbers.
- 10.2. Write a function to compute area and circumference of a circle, having area and circumference as pointer arguments and radius as an ordinary argument.
- 10.3. Write a C program to implement the operations of matrices – addition, subtraction, multiplication.
- 10.4. Write a program to find whether a given matrix is symmetric, lower triangular, upper triangular, diagonal, scalar, or unit matrix.

11. Unit IV (Cycle 11)

- 11.1. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
- 11.2. Define a structure point. Write a program to find the distance between two points.

12. Unit IV (Cycle 12)

- 12.1. Define a structure student having members roll no., name, class, section, marks. Create an array of 10 students give the data and find the average marks, section-wise.
- 12.2. Define functions – length of the string, copy, concatenate, convert into upper case letters, compare two strings for alphabetical order – over strings and implement them in a program.

13. Unit V (Cycle 13)

- 13.1. Write a program to:
 - 13.1.1. Create a file by the name given by the user or by command line argument and add the text given by the user to that file.
 - 13.1.2. Open the file created above and display the contents of the file.
 - 13.1.3. Copy a file into some other file, file names given by the user or by command line arguments.
 - 13.1.4. Append a user mentioned file to another file.
 - 13.1.5. Reverse the first n characters of a file.

14. Unit V (Cycle 14)

- 14.1. Store the marks of the students of a class into file and the display the results as per the rules of your institution.
- 14.2. In the above file search a student by roll no. and display the particulars.

15. Unit VI (Cycle 15)

- 15.1. Write a program to draw figure of your liking with appropriate colors.
- 15.2. Write a program to implement simple bank transactions – opening an account, closing an account, deposit money into an account, withdraw money from an account, maintaining the customer database, and daybook.

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering**

Code: 101ME71 ENGINEERING WORKSHOP – I

L	T	P/D	C
---	---	3/2	1

1. House Wiring

To connect the Tube Light as per circuit diagram
To connect the Calling Bell as per circuit diagram

2. Home Appliances

Study of circuits and systems used in various home appliances such as Fans, Mixers, Washing machines etc.,

3. Welding

To prepare a Lap Joint
To prepare a Butt Joint

4. Machine Shop (demonstration)

Operations performed on Lathe, Drilling, Milling and grinding machines

**Syllabus for B. Tech. I Year I semester
Mechanical Engineering
IT WORKSHOP - I**

Code: 101IT72

L	T	P/D	C
---	---	3/2	1

Week 1 : Introduction to computers, identify the peripherals of a computers, componenets in a CPU & its functions, draw the block diagram of the cpu along with the configuration of each peripherals.

Week 2 : disassemble & assemble the PC back to working condition [video, manual], Hardware troubleshooting.

Week 3 Introducton to operating system [Basics], Installation of Windows XP.

Week 4 : DOS (Internal & External) commands, work on that commands, comparisions of windows & open source OS.

Week 5 :Installation of Linux O.S [Advanced debian, ubuntu], Basic Linux Commands, work on that commands.

Week 6 : Software troubleshooting, Identify the system software problems & fix it to get the computer back to working conditions.

Cyber Hygeine : Installation of Antivirus software, Configure their personal firewall & windows update on their computer, customize the browsers to block POP UPS, block active x downloads to avoid viruses and worms.

Week 7 : Introduction to Internet & LAN

Browsing the Net : Connect the LAN and access the Internet, Know how to acces the websites and email.

Search Engines:

Introduction to search engines, types of search engines, uses of search engines, how to use search engine. Give few topics to students for which they need to search on GOOGLE.

Syllabus for B. Tech. I Year II semester
Mechanical Engineering
ENGLISH – II
(English Language Teaching Through Literature)

Code: 101EN02

L	T	P/D	C
2	-	-	2

UNIT – I :

1. Speech : Swami Vivekananda
2. Short Story : The Lottery Ticket: Anton Chekhov
3. Letter Writing

UNIT – II :

1. Speech : Polonious Speech –An extract from Shakespeare’s *Hamlet*
2. Short Story : Ha’ Penny – Alan Paton
3. Sentence Construction

UNIT – III :

1. Biography : Sam Pitroda
2. Short Story : Subha – Rabindranath Tagore
3. Letter : Abraham Lincoln’s Letter to His Son’s Teacher

UNIT – IV :

1. Biography : Mother Theresa
2. Short Story : The Only American From Our Village by Arun Joshi
3. Note-Making

UNIT – V :

1. Poem : The Gift of India – Sarojini Naidu
2. Short story : Diamond Rice - Ranga Rao S.S
3. Analogies

UNIT –VI :

1. Poem : La Belle Dame sans Merci – John Keats
2. Short Story : Luck – Mark Twain
3. Reading Comprehension

TEXT BOOKS:

1. Inspiring Speeches and Lives; B. Yadava Raju, Maruthi Publications, Guntur.
2. Vignettes of Life (A collection of short stories by T. Padma), McMillan India Ltd.

REFERENCES:

1. Barron's TOEFL; Barron, Galgotias Publication Pvt. Ltd.
2. A Modern Approach to Verbal And Non Verbal Reasoning – R S Aggarwal, S.Chand Publications.

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering**

**Code: 101MA03 ENGINEERING MATHEMATICS – II
(Common to all branches)**

L	T	P/D	C
3	1	---	3

UNIT-I

Ordinary Differential Equations Of First Order: Differential equations of first order and first degree – Exact, linear and Bernoulli equations. Applications to geometry, law of natural growth and decay and Newton’s law of cooling, electrical circuits, Orthogonal Trajectories.

UNIT-II

Ordinary Linear Differential Equations Of Higher Order: Linear differential equations of second and higher orders with constants coefficients – Method of variation of parameters – Systems of linear differential equations with constant coefficients – Applications: Bending of beams, electrical circuits, Simple harmonic motion.

UNIT-III

Laplace Transformations Laplace Transformations – Laplace transform, Shifting theorems, Multiplication by powers of t, Division by t, Laplace transform of Unit Step function, Impulse function, and periodic functions.

Inverse Laplace transforms Inverse Laplace transform, Shifting theorems, Partial fraction method, convolution theorem (without proof), solutions of ordinary differential equations with constant coefficients and systems of linear differential equations with constant coefficients using Laplace transformations.

UNIT-IV

Z- transforms : Z- transforms – Inverse Z- transforms – properties – Damping rule – Shifting rules – Initial and final value theorems – Convolution theorem – Solution of difference equation by Z- transforms

UNIT-V

Fourier series Fourier series – Even and Odd functions – Fourier series in an arbitrary interval – Half-range Fourier sine and cosine series

UNIT-VI

Vector Calculus- Scalar and vector fields , vector differentiation, level surfaces, directional derivative, gradient of a scalar field, divergence and curl of a vector field, Laplacian operator and related properties. Line and surface integrals, Green’s theorem in plane, Gauss-Divergence theorem, Stoke’s theorem and verification of problems(without proof).

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S. Grewal , Khanna Publications, New Delhi.
2. Engineering Mathematics, B.V.Ramana, Tata McGraw Hill Publishing Company Ltd.

REFERENCE BOOKS:

1. A text Book of KREYSZIG’s Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications
2. A Text book of Engineering Mathematics, M. Venkata Krishna, Jaico Publishing House, 2010.
3. Jain, S.R.K, Advanced Engineering Mathematics, Narosa Publishing House, London 2002.

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering**

Code: 101CS01

DATA STRUCTURES AND C++

L	T	P/D	C
3	1	-	3

UNIT – I

Introduction to data structures: Abstract data type(ADT), Stacks and Queues circular queues and their implementation with arrays. Stack applications: infix to post fix conversion, postfix expression evaluation. Applications of queues.

UNIT – II

Singly linked lists, doubly linked lists, circular list and their operations, representing stacks and queues with linked lists.

UNIT – III

Trees- Binary trees, terminology, representation, traversals, Minimal Spanning trees.

Graphs- terminology, representation, graph traversals (dfs & bfs).

UNIT - IV

Searching - Linear and binary search methods.

Sorting - Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.

UNIT – V

Introduction to c++ programming-object oriented programming concepts, Structured Vs OOP.

Classes and objects-class definition, Objects, class scope and accessing members, access functions and utility functions.

UNIT – VI

Constructors-default constructor, parameterized constructor, constructor initialization list, copy constructor. Destructors, Static class members this pointer, friend functions and classes, Dynamic memory management with operators new and delete.

Overloading-function overloading, Operator overloading, restrictions on operator overloading, overloading unary and binary operators, type conversion, templates, inheritance.

TEXT BOOKS:

- 1.Data Structure Through C by Yashavant Kanetkar.
- 2.The complete reference C++ By Herb Schildt.

REFERENCES:

1. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. *Data Structures and Algorithms*. Addison Wesley, 1983.
2. Data Structures using c Aaron M.Tenenbaum , Yedidyah Langsam,Moshe J Augenstein.
3. Introduction To Data Structures In C By Kamtane

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering**

Code: 101ME02

ENGINEERING DRAWING - II

L	T	P/D	C
1	---	2	2

UNIT – I

Intersection of Similar Solids: Line method, Cutting plane method, Intersection of prism Vs prism, Cylinders Vs Cylinder, Cone Vs Cone

UNIT – II

Intersection of Dis-Similar Solids: Cylinder Vs prism, Cylinder Vs cone, Cone Vs Prism

UNIT – III

Isometric Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

UNIT –IV

Transformation of Projections: Conversion of Orthographic Views to Isometric Views and Vice-Versa.

UNIT –V

Perspective Projection: Principle, Perspective elements, Perspective View of Points, Lines, Plane Figures and Simple Solids, Vanishing Point Method, Visual ray method.

UNIT –VI

Introduction to Computer Aided Drafting: Generation of points, lines, curves, polygons, simple solids, dimensioning.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing, Narayana and Kannaiah / Scietech publishers.

REFERENCES:

Engineering graphics with Auto CAD- R.B Choudary / Anuradha Publishes
Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering**

Code: 101EE41 BASIC ELECTRICAL ENGINEERING

L	T	P/D	C
3	1	---	3

UNIT – I

Introduction to Electrical Engineering : Ohm's Law, basic circuit components, Kirchhoff's Laws. Types of sources, source transformation, Voltage – current relationship for passive elements. Series parallel circuits, star delta and delta star transformation. Network theorems, superposition, Thevenin's Maximum power transfer theorems and simple problems. Faradays laws of electromagnetic induction, concept of self and mutual inductance.

UNIT – II

Alternating Circuits: Principle of ac voltage, waveforms and basic definitions, r.m.s. and average values of alternating currents and voltage, form factor and peak factor, phasor representation of alternating quantities.

Three phase circuits – phase sequence, star and delta connection, relation between line and phase voltages and currents in balanced system.

UNIT – III

DC Machines: Principle of operation of dc machines, types of D.C. generators, e.m.f equation of D.C. Generator. Characteristics of D.C shunt and series generators. Types of D.C. motors, losses, torque equation, efficiency calculation in D.C. machines. Characteristics of D.C shunt and series Motors. Speed control of DC motors, Ward Leonard system. Operation and control of DC servo motor.

UNIT – IV

Transformers: Principle, construction and operation of an Ideal Transformer and Practical Transformer, Losses, OC and SC Tests, Efficiency and Regulation, equivalent circuit. Auto transformer all day efficiency.

UNIT – V

A.C. Machines:

Three phase induction motor, principle of operation, slip and rotor frequency, torque. (Elementary treatment) single phase induction motors application slipped motor.

Principles of synchronous machines.

Special Machines: Operation and characteristics of stepper motors, ac servo motor, universal motor and their characteristics.

UNIT – VI

Basic Instruments: Introduction, classification of instruments, operating principles, essential features of measuring instruments, Moving coil permanent magnet (PMMC) instruments, Moving Iron Ammeters and voltmeters (elementary Treatment only).

TEXT BOOKS:

1. Basic Electrical Engineering – By T.K.Nagesarkar and M.S.Sukhja Oxford University Press.
2. Electrical Technology by Edward Huges.

REFERENCES:

1. Theory and problems of Basic electrical Engineering by D.P.Kotahari & L.J.Nagrath PHI.
2. Principles of Electrical Engineering by V.K.Mehta, S.Chand Publications.

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering
ENGINEERING MECHANICS**

Code: 101ME03

L	T	P/D	C
4	1	---	4

UNIT-I**Introduction to Engineering Mechanics** - Basic Concepts**System of Forces:** Coplanar Concurrent Forces - Components in Space - Resultant - Moment of Force and its Application - Couples and Resultant of Force Systems.**Equilibrium of Systems of Forces:** Free Body Diagrams, Equations of Equilibrium of Coplanar and Spatial System of forces.**UNIT-II****Friction:** Basic concepts, Types of Friction, cone of friction,**Applications of Friction:** Wedge friction, Screw friction and Belt friction**UNIT-III****Analysis of Pin-Jointed Plane Frames:** Determination of Forces in members of plane, pin jointed, perfect trusses by Method of joints and Method of sections.

Analysis of various types of cantilever and simply supported trusses-by method of joints, method of sections and Tension coefficient methods.

UNIT-IV**Centroid:** Centroids of simple figures (from basic principles) Centroids of Composite Figures.**Centre of Gravity:** CG of simple bodies (from basis principles), CG of composite bodies, theorems of Pappus.**UNIT-V****Area Moment of Inertia: Definition** - Polar Moment of Inertia, Transfer Theorem, MI of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.**Mass Moment of Inertia:** MI of Masses, Transfer Formula for MMI, MMI of composite bodies.**UNIT - VI****Dynamics:** Kinematics of General plane motion, Kinetics of General plane motion, Work - Energy Method applied to plane motion.**TEXT BOOK:**

- 1) Engineering Mechanics by Ferdinand. L.Singer
- 2) Engineering Mechanics by S.S.Bhavikatti J.G.Rajasekharappa.

REFERENCE BOOKS:

- 1) Engineering Mechanics by Timoshenko & Young.
- 2) Engineering Mechanics by Meriam and Kraize
- 3) Engineering Mechanics by K.L.Kumar / Tata McGraw Hill.
- 4) Engineering Mechanics by Tayal.

Syllabus for B. Tech. I Year II semester
Mechanical Engineering
APPLIED PHYSICS

Code: 101PH03

L	T	P/D	C
3	1	---	3

UNIT-I

Vibrations and Resonance: Undamped, Damped, Forced vibrations and Resonance.. Physical pendulum, Torsional pendulum and compound pendulum. Vibrating Strings and plates. Ultrasonics, production of ultrasonics by magnetostriction effect and piezoelectric effect, Application and uses of ultrasonics.

UNIT-II

Interference: Introduction, Superposition of waves, Young's double slit experiment, Interference in thin films by reflection – Newton rings.

Diffraction: Introduction, Plane diffraction grating, Theory of plane transmission grating, Resolving power of a grating.

Polarization: Polarized and un-polarized light, Wave plates, Theory of plane, circularly and elliptically polarized light.

UNIT-III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Electric Susceptibility, Polarizability, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities -Internal Fields in Solids, Clausius -Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.

UNIT - IV

Magnetic Properties: Electron spin, Relation between electron spin and magnetic moment, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, super conductivity – Meisner's effect, Type I & Type II superconductors, Magnetic levitation, Applications of super conductors.

UNIT - V

Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Carbon Dioxide Laser, Semiconductor Diode Laser, Applications of Lasers.

Fiber Optics: Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles – step & Graded index optical fiber, Attenuation in Optical Fibers, Application of Optical Fiber in communication system.

UNIT - VI

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods, Characterization (XRD&TEM), carbon nanotubes, Magnetic tunnel junction, Giant magneto resistance (GMR) devices.

TEXT BOOKS:

1. Gaur and Gupta, Engineering Physics, Dhanpat Rai Publications
2. P K Palanisamy, Engineering Physics, Sitech Publications

REFERENCE BOOKS:

1. Reed Hill, Principles of Metallurgy, Thomson Publishing
2. D Halliday, Robert Resnik, Kenneth S Krane, Physics, John Wiley Publications
3. Charles Kittel, Introduction to Solid State Physics, John Wiley & Sons
4. Neil W. Ashcroft , N. David Mermin, Solid State Physics, Thomson Publisher
5. M Ratner, D Ratner, Nanotechnology: A Gentle Introduction To The Next Big Idea, Pearson Education Publication, London
6. A K Bandyopadhyay, Nano Materials, Newage International (p) limited

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering**

Code: 101EN72

ENGLISH LANGUAGE LAB-II

L	T	P/D	C
---	---	2	1

Introduction:

The introduction of the English Language lab is considered essential at third year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalize context. The proposed course should be an integrated theory and lab course to enable students to use good English and perform the following:

- Gather ideas and information, to organize ideas relevantly and coherently
- Engage in debates
- Participate in group discussions
- Face interviews
- Write project/research reports/technical reports
- Make oral presentations
- Write formal letters
- Transfer information from non-verbal to verbal texts and vice versa
- To communicate effectively in informal and formal situations

Objectives:

The lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

1. To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
2. Further they would be required to communicate their ideas relevantly and coherently in writing

Syllabus:

1. Functional English –Starting a conversation-responding appropriately and relevantly-using the right body language-role plays based on different situations
2. Vocabulary building – Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, etymology, analogy, idioms and phrases
3. Reading Comprehension – Reading for facts, guessing meanings from the context, scanning, skimming, inferring meaning and critical reading
4. Report Writing Strategies– Types of formats and styles, subject matter – organization, clarity, coherence, and style, planning, data collection, tools and analysis
5. Debate

Minimum Lab Requirement:

The English language lab shall have two parts:

- a. The Computer Aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English Language software for self-study by learners.
- b. The Communication Skills lab with movable chairs and audio visual aids with a PA system. A T V, Digital stereo-audio and video system and camcorder etc.

Suggested Software:

- ❖ Hi Class system Monitoring Software
- ❖ Globerena English Lab Plus software
- ❖ GRE Computer based test (booklet + CD)
- ❖ GMAT Computer based test (booklet + CD)
- ❖ GRE computer based test (booklet + CD)
- ❖ IELTS preparatory guide CD

REFERENCES:

1. Communicate or Collapse: A Handbook of Effective Public Speaking
2. Group Discussions and Interviews by Pushpa Lata & Kumar, Prentice Hall of India
3. Academic Writing – A practical Guide for students by Stephen Bailey, Rontledge Falmer, London and New York, 2004

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering**

Code: 101CS71 DATASTRUCTURES AND C++ LAB

L	T	P/D	C
---	---	3	2

1. Write a C program that implement stack and its operations using arrays
2. Write a C program that implement Queue and its operations using arrays.
3. Write a C program that uses Stack operations to perform the following
 - i) Converting infix expression into postfix expression
 - ii) Evaluating the postfix expression
4. Write a C program that uses functions to perform the following operations on singly linked list:
 - i) Creation ii) Insertion iii) Deletion iv) Traversal
5. Write a C program that uses functions to perform the following operations on doubly linked list:
 - i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways
6. Write a C program that uses functions to perform the following:
 - i) Creating a Binary Tree of integers
 - ii) Traversing the above binary tree in preorder, inorder and postorder.
7. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :
 - i) Linear search ii) Binary search
8. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
 - i) Bubble sort ii) Quick sort
9. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
 - i) Insertion sort ii) Merge sort iii) Selection Sort
10. Write a C++ program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a,b,c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.
11. A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and Subsequent terms are found by adding the preceding two terms in the sequence. Write a C++ program to generate the first n terms of the sequence.
12. Write a C++ program that checks whether a given string is palindrome or not.

TEXT BOOKS:

- 1.Data Structure Through C by Yashavant Kanetkar.
- 2.The complete reference C++ By Herb Schildt.

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering
ENGINEERING WORKSHOP – II**

Code: 101ME72

L	T	P/D	C
---	---	3/2	1

1. Fitting

To make a Step Fitting as per the dimensions
To make a Half Round Fitting as per the dimensions

2. Tin Smithy

To prepare a T-Joint
To prepare a Corner Joint

3. Smithy

- Fabrication of S - Shape
- Fabrication of Hook shape

4. Plumbing (demonstration)

Preparation of pipes, Elbow joint, T-joint, assembly of Gate valve, non-return valves, couplings, taps.

**Syllabus for B. Tech. I Year II semester
Mechanical Engineering
ENGINEERING PHYSICS LAB-II**

Code: 101PH72

L	T	P/D	C
---	---	3/2	1

1. Hall effect
2. Dielectric constant of a given material
3. Characteristics of Laser diode.
4. Numerical aperture of optical fiber.
5. Bending loss of optical fiber.
6. Stewart & Gee's Experiment (Determination of magnetic induction flux density along the axis of a circular coil).
7. Newton's rings
8. Determination of rigidity modulus of a given metal wire - Torsional Pendulum
9. Determination of the acceleration due to gravity by compound pendulum.
10. Ultrasonic velocity

Note: Minimum any Six of the above Ten Experiments are to be conducted

**Syllabus for B. Tech. II Year I semester
Mechanical Engineering**

Code: 101MA06

MATHEMATICAL METHODS

(Common to EEE and Mechanical)

L	T	P/D	C
3	1	---	3

UNIT-I:

SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

INTERPOLATION: Introduction-- Finite differences- Forward Differences- Backward differences – Central differences –Newton’s formulae for interpolation – Gauss Central Difference Formulae (without proofs)

UNIT-II:

INTERPOLATION WITH UNEVENLY SPACED POINTS – Lagrange’s Interpolation formula – Newton’s divided difference method.

CURVE FITTING: Fitting a straight line – Second degree curve – exponential curve – power curve by method of least squares

UNIT-III:

Numerical Integration– Trapezoidal rule – Simpson’s 1/3 Rule – Simpson’s 3/8 Rule, Gaussian quadrature rule. Numerical solution of Ordinary Differential equations: Solution by Taylor’s series – Picard’s Method of successive Approximations – Euler’s Method – Runge-Kutta Methods (without proofs).

UNIT IV:

PARTIAL DIFFERENTIAL EQUATIONS: Partial differential equations : Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – Solutions of first order linear equation – Non-linear (Standard type) equations. Method of separation of variables. Applications of Partial Differential Equations ,Heat Equation, Wave Equation and Laplace Equation

UNIT –V :

FOURIER TRANSFORMS: Fourier transformation, sine and cosine transformations, Finite Fourier transforms, parseval’s identities. Applications of Fourier Transforms to solve boundary value problems.

UNIT-VI:

INTRODUCTION TO SPECIAL FUNCTIONS: Beta-Gamma Functions-Bessel’s Functions-properties-Legendre’s Polynomials and properties.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S. Grewal , Khanna Publications, New Delhi.
2. Engineering Mathematics, B.V.Ramana, Tata McGraw Hill Publishing Company Ltd.

REFERENCES:

1. A text Book of KREYSZIG’s Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications
2. A Text book of Engineering Mathematics, M.Venkata Krishna, Jaico Publishing House, 2010.
3. Jain, S.R.K, Advanced Engineering Mathematics, Narosa Publishing House, London 2002.

**Syllabus for B. Tech. II Year I semester
Mechanical Engineering**

Code: 101EC01 ELECTRONICS FOR MECHANICAL ENGINEERING

L	T	P/D	C
3	1	---	3

UNIT-I

Basic Electronic Devices & their operations: Diode, Transistor, Zener diode characteristics, Half-wave, Full-wave rectifiers, D.C. power supplies & Zener voltage regulators, transistor characteristics.

UNIT-II

Other Electronic Devices & their operation: Operation characteristics of SCR, UJT, JFET, MOS Transistor and their applications in power supplies and amplifiers.

UNIT-III

Operational amplifiers & their characteristics, adders multipliers, Analog to Digital Converters, Digital to analog converters, voltage regulators analog & digital signal interfacing.

UNIT-IV

Digital circuits – Boolean algebra, basic digital gates and Flip simple applications of gates in address, decoders and multiplexers. Applications of Flip Flops in Counters, Shift Registers, Timers.

UNIT-V

Introduction to Microprocessors and Microcontrollers. Instruction Set, Addressing Modes of 8085 & 8051. Interfacing of sensors and actuators to microprocessors & microcontrollers. Robot controllers, Automobile controllers. Assemblers and compilers for program development.

UNIT-VI

Analog and digital communication: Analog modulation, Radio Systems, super heterodyne receivers, Standard interfaces like RS-232C, USB and Wireless Communication.

TEXT BOOKS:

1. Electronic Devices and Circuits: David. A. Bell; PHI, New Delhi, 2004.
2. Electrical and Electronics & Computer Engineering for Scientists and Engineering Second Edition – K.A. Krishnamurthy & M.R.
3. Microprocessors & interfacing, Douglas V. Hall.

Syllabus for B. Tech. II Year I semester
Mechanical Engineering
THERMODYNAMICS

Code: 101ME06

L	T	P/D	C
3	1	---	3

UNIT – I

Introduction: Basic Concepts : System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic view points, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State and in Transition, Types, Work and Heat, Point and Path function.

UNIT – II

zeroth law of thermodynamics – Concept of quality of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale – PMM-I - Joule's Experiments – First law of Thermodynamics – Corollaries – First law - applied to a Process and applied to a flow system – Steady Flow Energy Equation.

UNIT – III

Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase – Energy Equation, Availability and Irreversibility – Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations – Elementary Treatment of the Third Law of Thermodynamics.

UNIT – IV

Pure Substances, p-V-T surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations – Triple point at critical state, properties during change of phase, Dryness Fraction – Clausius–Clapeyron Equation, Property tables. Mollier charts – Various Thermodynamic processes and energy Transfer – Steam Calorimetry.

UNIT - V

Perfect Gas Laws – Equation of State, Specific and Universal Gas constants – various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy – Throttling and Free Expansion Processes – Flow processes – Deviations from perfect Gas Model – Vander Waals Equation of State – Compressibility charts – variable specific Heats – Gas Tables. Mixtures of perfect Gases – Mole Fraction, Mass fraction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction, Volume fraction and partial pressure, Equivalent Gas const. and Molecular Internal Energy, Enthalpy, sp. Heats and Entropy of Mixture of perfect Gases and Vapour,

Psychrometry – Properties of moist air - saturated air, Vapour pressure, Degree of saturation – Adiabatic Saturation, Carrier's Equation – Psychrometric chart.

UNIT – VI

Power Cycles : Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Ericsson Cycle, Lenoir Cycle – Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis – comparison of Cycles.

Refrigeration Cycles: Brayton and Rankine cycles – Performance Evaluation – combined cycles, Bell-Coleman cycle, Vapour compression cycle- Performance Evaluation.

TEXT BOOKS:

1. Engineering Thermodynamics / PK Nag /TMH, III Edition
2. Fundamentals of Thermodynamics – Sonntag, Borgnakke and Van Wylen / John Wiley & Sons (ASIA) Pvt. Ltd.

REFERENCES:

1. Engineering Thermodynamics – Jones & Dugan
2. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
3. Thermodynamics – J.P.Holman / McGrawHill
4. An introduction to Thermodynamics / YVC Rao / New Age
5. Engineering Thermodynamics – K. Ramakrishna / Anuradha Publishers.

Syllabus for B. Tech. II Year I semester
Mechanical Engineering
MECHANICS OF SOLIDS

Code: 101ME07

L	T	P/D	C
3	1	---	3

UNIT – I

Simple Stresses & Strains: Elasticity, plasticity – Types of stresses-uniaxial, biaxial & triaxial and strains–Hooke’s law, stress-strain diagram for Mild steel, Working stress, Factor of safety, Lateral strain, Poisson’s ratio, volumetric strain, Elastic moduli & the relationship between them – Bars of varying section – composite bars – Temperature stresses, .Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT – II

Principal stresses, strains, Mohr’s circle and it’s application, Torsion of shafts

UNIT – III

Shear Force and Bending Moment: Definition of beam, Types of beams, Concept of SF and BM, SF and BM diagrams for cantilever, simply supported and overhanging beams subjected to point loads, UDL, UVL and combination of these loads, Point of Contra flexure – Relation between SF, BM and rate of loading at a section of a beam.

UNIT – IV

Flexural Stresses: Theory of simple bending, Assumptions, Derivation of bending equation: $M/I = f/y = E/R$, Neutral axis, Determination bending stresses, section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

Shear Stresses: Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T angle sections.

UNIT – V

Deflection of Beams: Bending of Beam into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay’s methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads,-UDL, UVL. Mohr’s theorems – Moment area method – application to simple cases including overhanging beams.

UNIT – VI

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in dia, and volume of thin cylinders – Riveted boiler shells – Thin spherical shells.

Thick cylinders: Lamé’s equation – cylinders subjected to inside & out side pressures – compound cylinders.

TEXT BOOKS:

1. Strength of materials by S.Ramamrutham
2. Strength of materials by Bhavikatti, Lakshmi publications.

REFERENCES:

1. Strength of Materials -By Jindal, Umesh Publications.
2. Analysis of structures by Vazirani and Ratwani.
3. Mechanics of Structures Vol-III, by S.B.Junnarkar.
4. Strength of Materials by S.Timshenko
5. Strength of Materials by Andrew Pytel and Ferdinond L. Singer Longman.
6. Solid Mechanics, by Popov

**Syllabus for B. Tech. II Year I semester
Mechanical Engineering**

Code: 101ME08 MATERIAL SCIENCE AND METALLURGY

L	T	P/D	C
3	1	---	3

UNIT-I

Mechanical Behavior of Metals: Concept of single and polycrystals; Dislocation theory and slip phenomenon; Deformation behavior of BCC, FCC and HCP crystal structures. *Theory of strain hardening:* effect of temperature; Dislocation pile-up; Theory of cold-working and hot-working. *Intermediate Annealing:* Introduction, recovery, recrystallization and grain growth; recrystallization temperature, effect of grain size on strength and ductility. *Creep:* Mechanism of creep, creep-curve.

UNIT II

Fatigue and Theory of Fracture: S-N curve, types of fatigue loading, effect of mean stress on fatigue. **Types of Fracture:** Brittle & ductile fractures in Tension, Compression and pure Torsion. Fracture surfaces; Fatigue and creep fracture surfaces.

UNIT III

Solidification of Metals and Binary alloys: Binary Phase diagrams (Al-Si, Cu-Zn, Cu-Sn, Cu-Ni, Al-Cu), Phase rule, invariant reactions (eutectic, eutectoid, peritectic, peritectoid); Lever rule, cooling-curves of pure metals, binary alloys. Concepts of nucleation & grain growth; directional-solidification; dendritic growth and equiaxed grain growth.

UNIT IV

Non ferrous metals & Alloys and their BIS codes: Aluminum based alloys: Cast alloys, Wrought alloys and their applications. Copper based alloys: Brasses, Bronzes and their applications. Magnesium based alloys: Cast alloys, wrought alloys and their applications. Titanium based alloys: aerospace alloys, bio-compatible alloys. Nimonic alloys – their compositions and applications.

Fe-Fe₃C phase diagram: and description of phases (Ferrite, Austenite, Cementite, Pearlite, hypo and hyper eutectoid steels; hypo and hyper eutectic cast irons). *Steels:* (low carbon, medium carbon, high carbon, stainless, Hadfield, High speed) steels, their compositions, microstructures and applications. *Cast Irons:* Types of cast irons; compositions, microstructures and applications of (Grey, White, Spheroidal graphite, Malleable) Cast Irons.

UNIT V

Heat Treatment: *Steels:* Types of Heat treatments (Annealing, Tempering, Normalizing, Hardening, Spheroidizing); TTT diagram; Effect of cooling rate on the phase-transformations; case-hardening methods (carburizing, Nitriding, carbo-nitriding, cyaniding, shot-peening, Induction Hardening, Flame Hardening)

UNIT VI

An Introduction to Advanced Materials: *Composites:* Classification, Metal Matrix Composites (MMCs), Cermets, C-C composites, Polymer matrix composites; applications of various composites. *Bulk Metallic Glasses:* Introduction, synthesis methods, properties and applications. *SMART Materials:* Introduction, properties and applications.

TEXT BOOKS:

1. Introduction to Physical Metallurgy / Sidney H. Avener.
2. Essential of Materials science and engineering/ Donald R.Askeland/Thomson.

REFERENCES:

1. Material Science and Metallurgy/Kodgire.
2. Materials Science and engineering / William and Collister.
3. Elements of Material science / V. Raghavan
4. Engineering Materials-2, An Introduction to Microstructure, Processing and Design – Micheal F Ashby & David R H Jones
5. Mechanical Metallurgy / G.E. Dieter

Syllabus for B. Tech. II Year I semester
Mechanical Engineering
MACHINE DRAWING

Code: 101ME09

L	T	P/D	C
1	---	6	4

1) Machine Drawing Conventions

- a) Sectional views: section planes and drawing of sections, Types of sectional views – Full sectional view, half sectional view, auxiliary sectional views, Parts not usually sectioned
- b) Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.

2) Drawing of simple machine parts

Selection of Views, additional views for the following machine parts with easy drawing proportions.

- a) Popular forms of Screw threads like V, Metric, BSW, Buttress, Square, ACME, Worm nuts like square and hexagonal headed, Bolts like square and hexagonal headed, eye bolt, foundation bolts, stud bolts, set screws, washers
- b) Keys, cotters & joints and knuckle joint.

3) Assembly Drawings of Engine parts

Stuffing box, Cross head, Eccentric, Connecting rod - Drawings of assembled views for the part drawings using conventions and easy drawing proportions

4) Assembly Drawings of Machine parts

Screws jack, Tailstock, Machine Vice, Plummer block, foot step bearing - Drawings of assembled views for the part drawings using conventions and easy drawing proportions

5) Assembly Drawings of Valves and Detailed drawings

Steam stop valve, spring loaded safety valve, feed check valve and air cock - Drawings of assembled views for the part drawings using conventions and easy drawing proportions

Detailed drawings: Drawing of parts from assembly drawings for the following Screws jack, Eccentric and Stuffing boxe.

6) Drawing of machine elements

Selection of Views, additional views for the following machine elements and parts with easy drawing proportions

Riveted joints for plates, Shaft coupling: Flange, Split-Muff, Flexible couplings, Claw, Oldham's, Universal

NOTE : First angle projection to be adopted. The student should be able to provide working drawings of actual parts.

TEXT BOOKS :

1. Machine Drawing – Dhawan, S.Chand Publications
2. Machine Drawing –K.L.Narayana, P.Kannaiah & K. Venkata Reddy / New Age/ Publishers

REFERENCES :

1. Machine Drawing – P.S.Gill.
2. Machine Drawing – Luzzader
3. Machine Drawing – Rajput
4. Machine Drawing – ND Bhat

**Syllabus for B. Tech. II Year I semester
Mechanical Engineering**

**Code: 101EN73 FUNCTIONAL AND COMMUNICATIVE WRITTEN
ENGLISH**

L	T	P/D	C
---	----	2	2

Course Description : This course provides a platform to the learners to practice written communication to excel and sustain in the industry. It emphasizes on the techniques of collecting, organizing, and presenting the information in formal settings. The focus is also on the use of appropriate vocabulary using different formats and templates to communicate in different professional situations.

Learning Objectives

By the end of this course, students will be equipped with:

1. Good written communication skills
2. Will perform all written tasks with clarity and coherence
3. Effective written employment communication
4. Report Writing and documentation skills
5. Become adept using electronic communication

UNIT I

An introduction to Technical writing

- **The writing process: an overview**
- **The process in practice**
- **Objectives in Technical Writing**

UNIT II

Correspondence

- **Memos**
- **Letters**
- **Résumé**

UNIT III

Visual Appeal

- **Document Design**
- **Graphics**
- **Three dimensional graphics**
- **Criteria for effective graphics**
- **Types of graphics**

UNIT IV

Electronic Communication

- The Internet- The “Information Superhighway”
- The Internet – A Company’s Internal Web
- The Extranet – A Web within a Web

UNIT V

Technical Applications

- **Technical Description**
- **Instructions and User's Manuals**

UNIT VI

Report Strategies

- **The Summary**
- **Reports**
- **Proposals**

TEXTBOOK:

1. **Technical Writing: Process and Product by Sharon J Gerson; Fifth edition. Pearson Publishers.**

REFERENCES:

1. Strategies for Engineering Communication: Stevenson Susan and Steve Whitmore: Wiley, India.
2. Technical Report Writing Today
3. How to build a better vocabulary –Nurnberg Maxwell & Morris Rosenblum: Grand Central Publishing
4. Six weeks to words of power –Funk Wilfred: W.R.Goyal Publishers & Distributors
5. Word power made easy – Norman Lewis
6. Norman Lewis, How to read better and faster: W.R.Goyal Publishers, New Delhi

**Syllabus for B. Tech. II Year I semester
Mechanical Engineering**

Code: 101EE91 BASIC ELECTRICAL ENGINEERING LAB

L	T	P/D	C
---	----	3/2	1

1. Swinburne's test on D.C. shunt machine. (Predetermination of efficiency of a given D.C. Shunt machine working as motor and generator.)
2. OC and SC tests on single phase transformer (Predetermination of efficiency and regulation at given power factors)
3. Brake test on 3-phase Induction motor (Determination of performance characteristic)
4. Regulation of alternator by Synchronous impedance method. In addition to the above four experiments, any one of the experiments from the following list is required to be conducted:
5. Speed control of D.C. Shunt motor by
 - a) Armature Voltage control b) Field flux control method
6. Brake test on D.C. Shunt Motor

**Syllabus for B. Tech. II Year I semester
Mechanical Engineering**

Code: 101EC84 BASIC ELECTRONICS ENGINEERING LAB

L	T	P/D	C
---	----	3/2	1

1. Transistor CE Characteristics (Input and Output)
2. Full wave Rectifier with and without filters.
3. CE Amplifiers.
4. RC Phase Shift Oscillator
5. Class A Power Amplifier
6. Micro Processor

Syllabus for B. Tech. II Year I semester
Mechanical Engineering
METALLURGY LAB

Code: 101ME73

L	T	P/D	C
---	----	3/2	1

1. Metallographic Preparation and microstructural study of pure metals (Fe, Cu, Al)
2. Metallographic Preparation and microstructural study of mild steel, low-carbon steel, high carbon steel
3. Microstructural study of Cast Iron
4. Microstructural study of Heat treated Steels
5. Jominy End quench test (hardness of the samples to be tested in “Mechanics of Solid Lab)
6. Melting of aluminum (or its alloy) and casting in sand molds, chilled sand molds and steel molds, and microstructural study of the samples (Hardness study of the samples will be done in “ Mechanics of Solids Lab)

Syllabus for B. Tech. II Year I semester
Mechanical Engineering
Code: 101ME74 MECHANICS OF SOLIDS LAB

L	T	P/D	C
---	----	3/2	1

1. Direct Tension Test
2. Bending Test on simply supported and cantilever beams
3. Torsion Test
4. Brinell and Rockwell hardness tests (of samples obtained from Jominy End quench Test & samples of various treated and untreated steels obtained from Metallurgy Lab)
5. Test on Springs
6. Compression Test on Cube
7. Impact Test

**Syllabus for B. Tech. II Year II semester
Mechanical Engineering**

Code: 101CH03

ENVIRONMENTAL STUDIES

L	T	P/D	C
3	1	---	3

UNIT I:

Ecology and Ecosystems: Component of nature, Definition, S Scope and importance, Eco system Definition and concept, Structure and function, Food chain and food web, Ecological pyramids, Biogeo chemical cycles, Ecological niche and succession, Classification (forest, grass land, desert, pond, river, marine, estuarine, wet lands). Environmental organizations (UNEP, WWF, IPCC, MOEN, TERI), Environmental activists- Sunderlal Bahuguna, Baba Amte, Anna Hazare, Medha Patkar, Arundathi Roy, AL Gore.

UNIT II:

Metal Ions in Biological System: Nitrogen Fixation, Oxygen transport (Hemo globin, Mayoglobin), Electron transfer reaction, Porphyrines(Chlorophil), Metallo enzymes, photo system (PSI, PS II).

UNIT III:

Environmental Chemistry: Atmosphere definition, layers, state(weather and climate) acid rain, Green house effect, PAN, Smog, Preliminary concepts of climate change, Ozone layer depletion, Seasons in India, Monsoons, El Nino, ENSO, Global warming, Kyoto protocol, Montreal Protocol, Carbon Trading, Hydrosphere-definition, Types (surface and ground water), Distribution, Water conservation, Use and over exploitation, Floods, Drought, dams-benefits and problems, Conflicts over water, Litho sphere- chemical composition of earth (core,montle,crust), Minerals resources- Environmental Effects of mining, Rocks and Soils, Plate tectonics.

UNIT IV:

Bio Diversity and its Conservation: Introduction, Definition, Genetic species and Eco system diversity, Value of bio diversity, Hot spots, Threats to bio diversity, Conservation strategies: Insitu and Exsitu conservation, Biological Diversity Act 2002, Wild life Protection Act.

UNIT V:

Environmental Pollution: Air pollution definition, causes, Effects and Control measures, Environment protection Act, Air (prevention and control of pollution) Act 1981, Case study: Bhopal gas tragedy, London Smog, Chernobyl disaster, Water pollution- Definition, types, Characteristics of domestic and industrial effluents-water quality parameters, BOD, COD, DO, Drinking Water treatment and Standards.

UNIT VI:

Pollution Control: Waste water treatment, Case studies: Ganga water pollution, Mercury pollution- Minamatabay disease, Water(prevention and control of pollution) Act 1974, Definition, Causes, Effect and Control measures: Soil pollution, Noise Pollution and Marine Pollution, Waste management- Solid waste Hazardous waste and E-Waste Management, Disaster Management Floods, Earth quakes and Cyclones.

TEXT BOOKS:

1. Introduction To Environmental Science –by Dr.Y.Anjaneyulu, B.S.Publications 2004.
2. Environmental Studies by Erach bharucha 2005, University grants commission, University press.

REFERENCE BOOKS:

1. Environmental Sciences-A New Approach by Purohit, shammi and Agarwal, Agrobios (India) 2004.
2. Environmental Sciences-A Text book for Undergraduate by Dr. K.Mukkanti, S. Chand & Company Ltd., 2010.

**Syllabus for B. Tech. II Year II semester
Mechanical Engineering
Code: 101MA09 **PROBABILITY AND STATISTICS FOR
MACHANICAL ENGINEERING****

L	T	P/D	C
3	1	---	3

UNIT – I

Probability Sample spaces and Events – Counting – Probability – The Axioms of probability – some Elementary Theorems – Conditional probability – Baye’s Theorem .

UNIT – II

Probability Distributions Random variable – Discrete and continuous – Distribution – Distribution function – Distributions, Expectation. Binomial, Poisson and normal distributions – related properties.

UNIT – III

Sampling Distributions: Populations and samples – Sampling distribution of the Mean (known) – The sampling distribution of the mean (unknown), proportions, sums and differences . Applications of central Limit Theorem

UNIT – IV

Estimation: Point estimation – Interval estimation – Bayesian estimation

Inferences Concerning Means And Proportions : Tests of Hypotheses, type –I and type-II errors, Hypotheses concerning means and proportions for large size samples.

UNIT – V

Test of significance-Student t-test, F-tests, χ^2 test, goodness of fit, independence of attributes.

UNIT – VI

Quality Control Methods: Introduction to quality control, control charts for process location, process variation, attributes. Cusum procedures, Acceptance sampling- Designing a single sample plan, double sampling plan.

TEXT BOOKS:

1. Higher Engineering Mathematics, B.S. Grewal , Khanna Publications, New Delhi.
2. Engineering Mathematics, B.V.Ramana, Tata McGraw Hill Publishing Company Ltd.

REFERENCE BOOKS:

1. Probability and Statistics for Engineers: Miller and John E. Freund, PHI Publishers, 6th Edition.
2. Probability and Statistics –M.Venkata Krishna & G.Shankar Rao, BS Publications
3. Fundamentals of Mathematical Statistics: Gupta and Kapoor – S. Chand and Co.
4. Probability and Statistics for Engineers- Jay L.Devore

**Syllabus for B. Tech. II Year II semester
Mechanical Engineering**

Code: 101ME10

APPLIED THERMODYNAMICS – I

L	T	P/D	C
3	1	---	3

UNIT – I

Actual Cycles and their Analysis: Introduction, Comparison of Air Standard and Actual Cycles, Time Loss Factor, Heat Loss Factor, Exhaust Blow down - Loss due to Gas exchange process, Volumetric Efficiency, Loss due to Rubbing Friction, Actual and Fuel-Air Cycles of CI Engines.

UNIT-II

I.C. Engines : Classification - Working principles, Valve and Port Timing Diagrams, Air Standard, Air-fuel and Actual cycles - Engine systems – Fuel Carburetor, Fuel Injection System, Multipoint fuel Injection, Ignition, Cooling and Lubrication.

UNIT – III

Combustion in S.I. Engines : Normal Combustion and Abnormal combustion – Importance of flame speed and effect of engine variables – Type of Abnormal combustion, pre-ignition and knocking (explanation of) – Fuel requirements and fuel rating, anti knock additives – combustion chamber – requirements, types.

Combustion in C.I. Engines : Four stages of combustion – Delay period and its importance – Effect of engine variables – Diesel Knock– Need for air movement, suction, compression and combustion induced turbulence – open and divided combustion chambers and nozzles used – fuel requirements and fuel rating.

UNIT – IV

Testing and Performance : Parameters of performance - measurement of cylinder pressure, fuel consumption, air intake, exhaust gas composition, Brake power – Determination of frictional losses and indicated power – Performance test – Heat balance sheet and chart.

UNIT – V

Compressors – Classification –positive displacement and roto-dynamic machinery – Power producing and power absorbing machines, fan, blower and compressor – positive displacement and dynamic types – reciprocating and rotary types.

Reciprocating: Principles of operation, work required, Isothermal efficiency, volumetric efficiency and effect of clearance, stage compression, under cooling, saving of work, minimum work condition for stage compression.

UNIT VI

Rotary (Positive displacement type): Roots Blower, vane sealed compressor, Lysholm compressor – mechanical details and principle of working – efficiency considerations.

Centrifugal Compressors: Mechanical details and principle of operation – velocity and pressure variation. Energy transfer-impeller blade shape- losses, slip factor, power input factor, pressure coefficient and adiabatic coefficient – velocity diagrams – power input calculations.

Axial Flow Compressors: Mechanical details and principle of operation – velocity triangles and energy transfer per stage, degree of reaction, work done factor - isentropic efficiency- pressure rise calculations – Polytropic efficiency.

TEXT BOOKS:

1. I.C. Engines / V. GANESAN- TMH
2. Thermal Engineering / Rajput / Lakshmi Publications.

REFERENCES:

1. IC Engines – Mathur & Sharma – Dhanpath Rai & Sons.
2. Thermodynamics & Heat Engines / B. Yadav/ Central Book Depot., Allahabad
3. I.C. Engines / Heywood /McGraw Hill.
4. IC Engines/ Ramalingam/ Scitech publishers
5. “A Treatise on Turbo Machines”, G.Gopalakrishnan, & D.Prithviraj, Scitech Publications (India) Pvt. Limited (2002.)

**Syllabus for B. Tech. II Year II semester
Mechanical Engineering
Code: 101ME11 MANUFACTURING PROCESSES**

L	T	P/D	C
3	1	---	3

UNIT – I

Casting : History of castings, Steps involved in making a casting, Casting terms, Sand mould making procedure, Moulding materials, Moulding sand composition, Testing sand properties, Sand casting, CO₂ moulding, Shell moulding — Patterns and Pattern making – Types of patterns – Materials used for patterns, pattern allowances and their construction, Principles of Gating, Gating ratio and design of Gating systems

UNIT – II

Solidification of casting – Concept – Solidification of pure metal and alloys, short & long freezing range alloys.

Risers – Types function and design, casting design considerations, special casting processes 1) Centrifugal 2) Die, 3) Investment.

Methods of Melting: Crucible melting and cupola operation,
Fettling of casting and casting defects,
Advantages and limitations and applications of casting processes

UNIT – III

Metal Forming Process: Nature of plastic deformation, hot working and cold working

Rolling: Rolling fundamentals, Theory of rolling, types of Rolling mills and products, Forces in rolling and power requirements

UNIT – IV

Forging: Principles of forging – Tools and dies – Types of Forging – Smith forging, Drop Forging – Roll forging – Forging hammers, Rotary forging – forging defects.

Extrusion: Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion Hydrostatic extrusion

UNIT- V

Sheet Metal Operations: Stamping, forming and other cold working processes : Blanking and piercing – Bending and forming – coining – Hot and cold spinning, stretch forming, Embossing and coining – Types of presses and press tools. Forces and power requirement in the above operations

Plastics: Processing of Plastics: blow moulding, transfer moulding, compression moulding and injection moulding

UNIT - VI

Metal Fabrication Process: Introduction to fabrication process, classification

Welding : Classification of welding process types of welds and welded joints and their characteristics, design of welded joints, Gas welding, Arc welding, Forge welding, resistance welding, Thermit-welding and Plasma welding. Inert Gas welding, TIG & MIG, welding, Friction welding, Induction welding, Explosive welding, Laser welding

Cutting of Metals: Oxy – Acetylene Gas cutting, water plasma. Cutting of ferrous, non-ferrous metals, Soldering & Brazing. Heat affected zones in welding; welding defects – causes and remedies – destructive nondestructive testing of welds.

TEXT BOOKS:

1. Manufacturing Technology / P.N. Rao/TMH
2. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Education

REFERENCES:

1. Principles of Metal Castings / Rosenthal/Mc Graw Hill Professional
2. Production Technology / R.K. Jain/Khanna Publishers
3. Welding Engineering and Technology / RS Parmar / Khanna Publishers
4. Production Technology /Sharma P C/Chand Publishers

Syllabus for B. Tech. II Year II semester
Mechanical Engineering
Code: 101ME12 FLUID MECHANICS AND HYDRAULIC
MACHINERY

L	T	P/D	C
3	1	---	3

UNIT I

Fluid statics : Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT II

Fluid kinematics : Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non uniform, laminar, turbulent, rotational, and irrotational flows-equation of continuity for one dimensional flow.

Fluid dynamics : Surface and body forces –Euler’s and Bernoulli’s equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT III

Closed conduit flow: Reynold’s experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line.

Measurement of flow: pitot tube, venturimeter, and orifice meter, Flow nozzle, Turbine flow meter

Basics of turbo machinery : Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

UNIT IV

Hydroelectric power stations : Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

UNIT V

Hydraulic Turbines : Classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design –draft tube theory functions and efficiency.

Performance of hydraulic turbines : Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer, Hydraulic Ram.

UNIT VI

Centrifugal pumps : Classification, working, work done – manometric head- losses and efficiencies specific speed- pumps in series and parallel-performance characteristic curves, NPSH.

Reciprocating pumps : Working, Discharge, slip, indicator diagrams.

TEXT BOOKS :

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.

REFERENCES :

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Fluid Mechanics and Machinery by D. Rama Durgaiyah, New Age International.
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.
4. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley
 ,John Wiley & Sons Inc. 2004
5. Hydraulic Machines Including Fluidics PB by Jagdish Lal Metropolitan Book Co. Pvt. Ltd. , 1994.

**Syllabus for B. Tech. II Year II semester
Mechanical Engineering**

Code: 101ME13

KINEMATICS OF MACHINERY

L	T	P/D	C
3	1	---	3

UNIT – I

Mechanisms : Elements or Links – Classification – Rigid Link, flexible and fluid link – Types of kinematic pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs – closed and open pairs – constrained motion – completely, partially or successfully constrained and incompletely constrained.

Machines : Mechanism and machines – classification of machines – kinematic chain – inversion of mechanism – inversion of mechanism – inversions of quadric cycle, chain – single and double slider crank chains.

UNIT - II

Kinematics: Velocity and acceleration – Motion of link in machine – Determination of Velocity and acceleration diagrams – Graphical method – Application of relative velocity method four bar chain.

Analysis of Mechanisms: Analysis of slider crank chain for displacement, velocity and acceleration of slider – Acceleration diagram for a given mechanism, Kleins construction, Coriolis acceleration, determination of Coriolis component of acceleration.

Plane motion of body: Instantaneous center of rotation, centroids and axodes – relative motion between two bodies – Three centres in line theorem – Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT – III

Steering Mechanisms: Conditions for correct steering – Davis Steering gear, Ackermans steering gear – velocity ratio.

Hooke's Joint: Single and double Hooke's joint – Universal coupling – application – problems.

Straight Line Motion Mechanisms : Exact and approximate copiers and generated types – Peaucellier, Hart and Scott Russel – Grasshopper – Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

UNIT –IV

Cams: Definitions of cam and followers – their uses – Types of followers and cams – Terminology – Types of follower motion - Uniform velocity – Simple harmonic motion and uniform acceleration. Maximum velocity and maximum acceleration during outward and return strokes in the above 3 cases.

Analysis of motion of followers : Roller follower – circular cam with straight, concave and convex flanks.

UNIT – V

Higher pairs, friction wheels and toothed gears – types – law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloidal and involute profiles. Velocity of sliding – phenomena of interferences – Methods of interference.

Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact – Introduction to Helical, Bevel and worm gearing.

Gear Trains: Introduction – Train value – Types – Simple and reverted wheel train – Epicyclic gear Train. Methods of finding train value or velocity ratio – Epicyclic gear trains. Selection of gear box-Differential gear for an automobile.

UNIT – VI

Belt Rope and Chain Drives : Introduction, Belt and rope drives, selection of belt drive- types of belt drives, V-belts, materials used for belt and rope drives, velocity ratio of belt drives, slip of belt, creep of belt, tensions for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, Chains-length, angular speed ratio, classification of chains.

TEXT BOOKS:

1. Theory of Machines and Mechanisms-S.S.Rattan, Tata McGraw Hill Publishers
2. Theory of Machines R.S Khurmi & J.K Gupta

REFERENCES:

1. Theory of Machines by Thomas Bevan/ CBS
2. Theory of Machines / R.K Bansal
3. Theory of Machines Sadhu Singh Pearsons Edn
4. Mechanism and Machine Theory / JS Rao and RV Dukupati / New Age
5. The theory of Machines /Shiegley/ Oxford.
6. Theory of machines – PL. Balaney/khanna publishers.

Syllabus for B. Tech. II Year II semester
Mechanical Engineering
Code: 101EN74 EFFECTIVE ENGLISH COMMUNICATION
AND SOFT SKILLS

L	T	P/D	C
---	---	2	2

Course Description: This course empowers the students for career opportunities, thus enhancing professional and personal growth. Effective communication and interpersonal skills are crucial to increase employment opportunities and to compete successfully in the business environment.

Soft skills provide students with a strong conceptual and practical framework to build, develop and manage teams. They play an important role in the development of the students' overall personality, thereby enhancing their career prospects. The soft skills training provides strong practical orientation to the students and helps them in building and improving their skills in communication, the effective use of English, business correspondence, presentations, team building, leadership, time management, group discussions, interviews, and inter-personal skills. This training also helps students in career visioning and planning, effective resume writing and dealing with placement consultants and headhunters.

The training is conducted in a very informal, interesting, and interactive manner, which gives ample scope for the students to interact with each other and face a wide variety of issues, topics, and situations that they are likely to come across as entry-level managers.

Learning Objectives:

By the end of the soft skills training program, the students will be able to:

- Develop effective communication skills (spoken and written).
- Develop effective presentation skills.
- Conduct effective business correspondence and prepare business reports which produce results.
- Become self-confident individuals by mastering inter-personal skills, team management skills, and leadership skills.
- Develop all-round personalities with a mature outlook to function effectively in different circumstances.
- Develop broad career plans, evaluate the employment market, identify the organizations to get good placement, match the job requirements and skill sets.
- Take part effectively in various selection procedures adopted by the recruiters.

UNIT – I

Soft Skills

Unit –II

Body Language

Unit –III

Group Discussion

UNIT – IV

Interview Skills

UNIT – V

Etiquette and Manners

UNIT – VI

Developing Positive Attitude

PRESCRIBED TEXT:

1. Soft Skills: Know Yourself and know the World by Dr.K.Alex
- S. Chand Publishing

REFERENCES:

1. Prof. Kevnair's - Fluency Dictionaries
2. Kleiser Grenville-Common Errors in English:Aph publishing corporation
3. Shaw Harry and Collins- Errors in English Language and ways to correct them.
4. Funk Wilfred-Six Weeks to Words of Power: W.R. Goyal Publishers & Distributors.
5. Body Language – Your success Mantra by Shalini Verma, S Chand, 2006

**Syllabus for B. Tech. II Year II semester
Mechanical Engineering
COMPREHENSIVE VIVA**

Code: 101ME75

L	T	P/D	C
---	---	---	1

Max Marks: 50

The Evaluation for Comprehensive Viva-Voce shall be conducted by a committee consisting of Four Senior Faculty members of the Department headed by HOD. The main aim of Comprehensive Viva-Voce is to assess the students understanding in various subjects he / she studied during the B. Tech. course of study. There are no internal marks for the Comprehensive Viva-Voce.

**Syllabus for B. Tech. II Year II semester
Mechanical Engineering**

Code: 101ME76 MANUFACTURING PROCESSES LAB

L	T	P/D	C
---	---	3	2

I. Metal Casting Lab:

1. Pattern Design and making - for one casting drawing.
2. Sand properties testing - Exercise -for strengths, and permeability – 1
3. Moulding Melting and Casting - 1 Exercise

II Welding Lab:

1. ARC Welding Lap & Butt Joint - 2 Exercises
2. Spot Welding - 1 Exercise
3. TIG Welding - 1 Exercise
4. Plasma welding and Brazing - 2 Exercises
(Water Plasma Device)

III Mechanical Press Working:

1. Blanking & Piercing operation and study of simple, compound and progressive press tool.
2. Hydraulic Press : Deep drawing and extrusion operation.
3. Bending and other operations

IV Processing Of Plastics:

1. Injection Moulding
2. Blow Moulding

A Minimum of 12 Exercises need to be performed

**Syllabus for B. Tech. II Year II semester
Mechanical Engineering
Code: 101ME77 FLUID MECHANICS & HYDRAULIC
MACHINERY LAB**

L	T	P/D	C
---	---	3	2

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Turbine flow meter.

Note : Any 10 of the above 12 experiments are to be conducted.

COURSE STRUCTURE AND DETAILED SYLLABUS

for

B.Tech – III and IV Year

in

MECHANICAL ENGINEERING

(Applicable from the Academic Year 2010-2011)



SREENIDHI INSTITUTE OF SCIENCE & TECHNOLOGY
(An Autonomous Institution approved by UGC and affiliated to JNTUH)
Yamnampet, Ghatkesar, R.R.District-501 301.

SREENIDHI INSTITUTE OF SCIENCE & TECHNOLOGY (AUTONOMOUS)**B.Tech in Mechanical Engineering**
COURSE STRUCTURE & SYLLABUS**I Year – I Semester**

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101EN01	English-I	3	---	---	3	30	70
2	101MA01	Engineering Mathematics-I	3	1	---	3	30	70
3	101PH01	Engineering Physics-I	3	1	---	3	30	70
4	101CH01	Engineering Chemistry	2	1	---	2	30	70
5	101IT01	Computer Programming	3	1	---	3	30	70
6	101ME01	Engineering Drawing-I	2	---	4	4	30	70
7	101EN71	English Language Lab-I	---	---	2	1	25	50
8	101PH71	Engineering Physics Lab – I	---	---	3/2	1	25	50
9	101CH71	Engineering Chemistry Lab	---	---	3/2	1	25	50
10	101IT71	Computer Programming Lab	---	---	3	2	25	50
11	101ME71	Engineering Workshop - I	---	---	3/2	1	25	50
12	101IT72	IT workshop-I	---	---	3/2	1	25	50
Total			16	4	15	25	330	720

I Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101EN02	English-II	3	---	----	2	30	70
2	101MA03	Engineering Mathematics-II	3	1	---	3	30	70
3	101CS01	Data Structures and C++	3	1	---	3	30	70
4	101ME02	Engineering Drawing-II	1	---	3	2	30	70
5	101EE41	Basic Electrical Engineering	3	2	---	3	30	70
6	101ME03	Engineering Mechanics	4	1	---	4	30	70
7	101PH03	Applied Physics	3	1	---	3	30	70
8	101EN72	English Language Lab-II	---	---	2	1	25	50
9	101CS71	Data Structures and C++ Lab	---	---	3	2	25	50
10	101ME72	Engineering Workshop-II	---	---	3/2	1	25	50
11	101PH72	Engineering Physics Lab-II	---	---	3/2	1	25	50
Total			20	6	11	25	310	690

II Year – I Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101MA06	Mathematical Methods	3	2	---	3	30	70
2	101EC01	Electronics for Mechanical Engineering	3	1	---	3	30	70
3	101ME06	Thermodynamics	3	1	---	3	30	70
4	101ME07	Mechanics of Solids	3	1	---	3	30	70
5	101ME08	Material Science & Metallurgy	3	1	---	3	30	70
6	101ME09	Machine Drawing	1	---	6	4	30	70
7	101EN73	Functional and Communicative Written English	---	---	2	2	25	50
8	101EE91	Basic Electrical Engineering Lab	---	---	3/2	1	25	50
9	101EC84	Basic Electronics Engineering Lab	---	---	3/2	1	25	50
10	101ME73	Metallurgy Lab	---	---	3/2	1	25	50
11	101ME74	Mechanics of Solids Lab	---	---	3/2	1	25	50
Total			16	6	14	25	305	670

II Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101CH03	Environmental Studies	3	1	---	3	30	70
2	101MA09	Probability and Statistics for Mechanical Engineering	3	2	---	3	30	70
3	101ME10	Applied Thermodynamics-I	3	1	---	3	30	70
4	101ME11	Manufacturing processes	3	1	---	3	30	70
5	101ME12	Fluid Mechanics & Hydraulic Machinery	3	1	---	3	30	70
6	101ME13	Kinematics of Machinery	3	1	---	3	30	70
7	101EN74	Effective English Communication and Soft Skills	---	---	2	2	25	50
8	101ME75	Comprehensive Viva	---	---	---	1	---	50
9	101ME76	Manufacturing Processes Lab	---	---	3	2	25	50
10	101ME77	Fluid Mechanics & Hydraulic Machinery Lab	---	---	3	2	25	50
Total			18	7	8	25	255	620

III Year – I Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1		Open Elective-I (Foreign Language)	2	2	---	2	30	70
2	101ME14	Dynamics of Machinery	3	1	---	3	30	70
3	101ME15	Metal Cutting & Machine Tools	3	1	---	3	30	70
4	101ME16	Applied Thermodynamics-II	3	1	---	3	30	70
5	101ME17	Design of Machine Members-I	4	---	---	4	30	70
6	101ME18	Metrology & Instrumentation	3	1	---	3	30	70
7	101MA71	Logical Reasoning-I	---	---	2	2	25	50
8	101ME78	Group Project	---	---	3	1	25	50
9	101ME79	Applied Thermodynamics Lab	---	---	3	2	25	50
10	101ME80	Metrology & Machine Tools Lab	---	---	3	2	25	50
Total			18	6	11	25	280	620

Open Elective – I

101FL01	Basic Spanish Language
101FL02	Basic French Language
101FL03	Basic German Language
101IT06	Computer Graphics
101IT03	Data Base Management System
101MB57	Total quality management

III Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101MB01	Managerial Economics and Financial Analysis	3	1	---	3	30	70
2	101CS03	OOP Through Java	3	1	---	3	30	70
3	101ME19	Design of Machine Members-II	4	---	---	4	30	70
4	101ME20	Heat Transfer	3	2	---	3	30	70
5	101ME21	CAD/CAM	3	1	---	3	30	70
7	101BT37	Human Values, Ethics & IPR	2	---	---	2	30	70
8	101MA72	Quantitative Aptitude	---	---	2	2	25	50
9	101ME81	Comprehensive Viva	---	---	---	1	-	50
10	101ME82	Heat Transfer Lab	---	---	3	2	25	50
11	101CS74	OOPS through Java Lab	---	---	3	2	25	50
Total			18	5	8	25	255	620

*** Industry Oriented Min Project will be conducted by all students in summer vacation of III/IV B.Tech, II semester for a period of One month. The report must be submitted in IV/IV B.Tech I-Semester and will have to be defended. Marks allotted are “75” and Two Credits are provided.

IV Year – I Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101ME22	Operation Research	3	1	---	3	30	70
2	101ME23	Principle of Finite Element Method	3	1	---	3	30	70
3	101ME24	Automobile Engineering	3	1	---	3	30	70
4		Professional Elective-I	3	1	---	3	30	70
5		Professional Elective-II	3	1	---	3	30	70
6		Open Elective-II	3	---	---	3	30	70
7	101MA73	Logical Reasoning-II	---	---	2	2	25	50
8	101ME83	Pre Project Seminar	---	---	---	2	50	---
9	101ME84	Industry Oriented Mini Project***	---	---	---	2	25	50
10	101ME85	CAD/CAM Lab	---	---	3	2	25	50
11	101ME86	Production Drawing Practice Lab	---	---	3/2	1	25	50
12	101ME87	Instrumentation Lab	---	---	3/2	1	25	50
Total			18	5	8	28	355	670

Professional Elective – I

101ME25	Refrigeration & Air Conditioning
101ME26	Nano Technology
101ME27	Non-conventional Source of energy

Professional Elective – II

101ME28	Robotics
101ME29	Mechatronics
101ME30	Automation in Manufacture

Open Elective - II

101MB56	Banking Operations, Insurance and Risk Management
101MB55	Entrepreneurship
101MB54	Logistics and Supply Chain Management

IV Year – II Semester

S.No.	Subject Code	Subject	L	T	P/D	C	Max. Marks	
							INT	EXT
1	101MB01	Management Science	4	---	---	4	30	70
2		Professional Elective - III	4	---	---	4	30	70
3	101ME88	Project	---	---	---	10	50	150
4	101ME89	Comprehensive Viva	---	---	---	2	---	50
5	101ME90	Technical Seminar	---	---	---	2	25	---
Total			8	---	---	22	135	340

Professional Elective – III

101ME31	Jet propulsion and Rocket Engines
101ME32	Computational Fluid Dynamics
101ME33	Composite Materials

Syllabus for B. Tech. III Year I semester Mechanical Engineering

Code: 101FL01

BASIC SPANISH LANGUAGE

L	T	P/D	C
2	2	-	3

UNIT-I

Functional Aspects

Greetings, introductions, identifying others; tools to ask meaning, pronunciation and spellings; different nationalities and their languages; Hispanic names, family relations and professions; days of the week, Months.

Grammatical Aspects

Basic structure of spelling and pronunciation; present indicative of the regular verbs ('ar/er/ir) and 'querer'; subject pronouns; interrogative sentences with 'Por que', and 'quien'; causal phrase with 'porque'; 'ser' and 'estar'; negative sentences; adjectives of nationality.

UNIT-II

Functional Aspects

Ordinal and cardinal numbers: quantities; to go shopping, identifying Material, color, size etc; to go to a restaurant, food habits of Spanish and Latin American people.

Grammatical Aspects

Gender and number of nouns and adjectives; the verb 'tener'; interrogative Sentences; demonstrative and qualitative adjectives.

UNIT-III

Functional Aspects

To express opinions on something contradict someone in modest ways; Suggest something, to value things aesthetically and intellectually; Expression of likes and dislikes; expression and reaction to certain things, (agreement or disagreement)

Grammatical Aspects

Qualitative adjectives, forms and usage, gradations, superlative adjectives, Exclamatory sentences; the verb 'gustar', forms and syntax; personal Pronouns; definite and indefinite pronouns, direct object pronouns Prepositions; verbs like 'parecer' and 'encontrar and preferir, their form And syntax, interrogative pronouns.

UNIT-IV

Functional Aspects

Invitations; accepting and rejecting invitations; how to fix an appointment; Inviting through e-mail or telephone

Grammatical Aspects

Present indicative of irregular verbs, expressions with 'tener' and estar Prepositional pronouns; interrogative sentences

UNIT-V

Functional Aspects

Expression of time; Spanish and Latin American time tables and
Comparison with Indian time tables, festivals Indian and Hispanic

Grammatical Aspects

Time with 'ser', expressions relating to festivals.

UNIT-VI

Functional Aspects

Expressions relating to climate, weather of the day seasons, vacations, planning of holiday and brochures,
hotel reservations, offers

Grammatical Aspects

Expressions with verbs, 'ser' and 'hacer' and other verbs.

Text Book:

1. NOUVEAU ELE INICIAL 1

Reference Books:

1. Espanol sin Fronteras, A. Sanchez, M. Rios, J.A. Metella, SGEL. Madrid, 1997
2. Entre Nosotros A. Sanchez, M. Rios, J.A. Metella, SGEL. Madrid, 1997

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101FL02**BASIC FRENCH LANGUAGE**

L	T	P/D	C
2	2	-	3

UNITÉ – I :

Professions et nationalités, vie quotidienne et loisirs, descriptions physiques et psychologiques, nombres cardinaux. Articles définis et indéfinis, genre et nombre des noms et des adjectifs, interrogation et négation, conjugaison du présent.

UNITÉ – II

Intonation, liaison, voyelles orales et nasales. Faire connaissance, inviter et répondre à une invitation, décrire les personnes.

UNITÉ – III

Paris, monuments et lieux publics. La vie de quatre parisiens de professions différentes. Logement et nourriture, vêtements et couleurs, fêtes et faits divers, nombres ordinaux.

UNITÉ – IV

Articles partitifs, adjectifs démonstratifs et possessifs, prépositions et adverbes de quantité et de lieu, pronoms toniques, l'impératif, verbes pronominaux. Intonation, semi-voyelles, liaison, consonnes sonores et sourdes.

UNITÉ – V

Exprimer l'ordre et l'obligation, demander et commander, évaluer et apprécier, féliciter et remercier. Une région de France: la Bourgogne, vie quotidienne à la campagne.

UNITÉ – VI

Teaching passé composé through the above lessons.

Text Book:

1. Dominique, Philippe, *et al.* 1999. *Le Nouveau sans Frontières -I* (Including Exercise Book). Paris: Clé, International (Indian Edition).

Reference Books:

1. Alter Ego I & II. Published by Hachette
2. Connexion I & II. Published by Didier
3. Echo I & II. Clé International publishers
4. Latitude I & II. Published by Didier

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101FL03**BASIC GERMAN LANGUAGE**

L	T	P/D	C
2	2	-	3

Unit –I

- Definite and Indefinite articles(including negation)
- Noun: Gender and Plural forms, cases (nominative, accusative, dative & genitive)

Unit –II

- Verb: Strong and Weak verbs, Verbs with separable and inseparable prefixes, modal verbs, position of verb in the main and subordinate clauses, auxiliary verbs, reflexive verbs in accusative and dative cases, imperative constructions

Unit –III

- Pronouns: personal, possessive, reflexive, interrogative and demonstrative
- Prepositions: with the accusative, dative and with both these cases

Unit –IV

- Adjective :declension with the
 - Indefinite article
 - Definite article
 - Without article
 - With the indefinite pronoun
 - Degrees of comparison (also adverbs),ordinal numbers, adjectives as nouns
- Conjunctions: subordinating and coordinating with respect to the position of the verb

Unit –V

- Pretaritim of sein and haben
- Perfect tense

Unit –VI

- Negatin :of a sentence and words therein.
- Sentence structure: general principles observed in German Language.

Text Book

1. Hermann Funk, Christina Kuhn, Oliver Bayerlein., Studio d A 1.2005 Comelsen Verlag, Berlin.

Reference Books

1. Rosa –Marie Dallapiazza, Eduard von Jan, Till Schonherr,unter Mitarbeit von Jutta Orth-Chambah
Tangram aktuell 1 –Lektion 1-4, Lektion 5 - 8
Max Hueber Verlag. Munchen. 2009
2. Jutta Muller, Thomas Storz, 2006. Laguna. Heuber Veerlag, Ismaning. Deutschland

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101IT06

COMPUTER GRAPHICS

L	T	P/D	C
3	1	-	3

UNIT I:

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices. Output primitives : Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms.

UNIT II:

Filled area primitives: Scan line polygon fill algorithm, boundary-fill and flood-fill algorithms 2-D geometrical transforms : Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

UNIT III :

2-D Viewing : The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm

UNIT IV :

3-D Object Representation : Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods. 3-D Geometric transformations : Translation, rotation, scaling, reflection and shear transformations, composite transformations.

UNIT V :

3-D Viewing : Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping Visible surface detection methods : Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub-division and octree methods

UNIT VI :

Computer Animation : Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications. (p.nos 604- 16 of text book -1, chapter 21 of text book-2).

TEXT BOOKS :

1. “Computer Graphics C version”, Donald Hearn and M.Pauline Baker, Pearson Education.
2. “Computer Graphics Principles & practice”, second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.

REFERENCES :

1. “Computer Graphics”, second Edition, Donald Hearn and M.Pauline Baker, PHI/Pearson Education.
2. “Computer Graphics Second edition”, Zhigand xiang, Roy Plastock, Schaum’s outlines, Tata Mc- Graw hill edition.
3. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
4. “Principles of Interactive Computer Graphics”, Neuman and Sproul, TMH.
5. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.
6. Computer Graphics, Steven Harrington, TMH

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101IT03 DATA BASE MANAGEMENT SYSTEMS

L	T	P/D	C
3	1	-	3

UNIT I :

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor, History of Data base Systems. Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT II :

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT III :

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT IV :

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT V :

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity, Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

UNIT VI :

Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

TEXT BOOKS :

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES :

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

**Code: 101MB57 TOTAL QUALITY MANAGEMENT
(OPEN ELECTIVE-I)**

L	T	P/D	C
2	2	---	2

UNIT - I:

Introduction: The concept of TQM, Quality and Business performance, attitude and involvement of top management, communication, culture and management systems. Management of Process Quality: Definition of quality, Quality Control, a brief history, Product Inspection vs, Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling.

UNIT – II:

Customer Focus and Satisfaction: Process Vs. Customer, internal customer conflict, quality focus, Customer Satisfaction, role of Marketing and Sales, Buyer - Supplier relationships. Bench Marketing: Evolution of Bench Marketing; meaning of Bench marketing, benefits of bench marketing, the bench marketing process, pitfalls of bench marketing.

UNIT – III:

Organizing for TQM: The systems approach, Organizing for quality implementation, making the transition from a traditional to a TQM organizing, Quality Circles.

UNIT - IV:

Productivity, Quality and Reengineering: The leverage of Productivity and Quality, Management systems V s. Technology, Measuring Productivity, Improving Productivity Re-engineering.

UNIT - V:

The Cost of Quality: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost Information, Accounting Systems and Quality Management.

UNIT - VI:

IS09000: Universal Standards of Quality: ISO around the world, The IS09000 ANSI/ASQCQ-90. Series Standards, benefits of IS09000 certification, the third party audit, Documentation IS09000 and services, the cost of certification implementing the system.

REFERENCE BOOKS:

1. "Total Quality Management" by Joel E.Ross.
2. "Beyond TQM" by Robert L.Flood.
3. "Statistical Quality Control" by E.L.Grant.

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101ME14**DYNAMICS OF MACHINERY**

L	T	P/D	C
3	1	---	3

UNIT – I: FRICTION, CLUTCHES, BRAKES & DYNAMOMETERS:

FRICTION: Inclined plane, friction of screw and nuts, pivot and collar, uniform pressure, uniform wear, friction circle and friction axis : lubricated surfaces, boundary friction, film lubrication.

CLUTCHES: Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch.

BRAKES AND DYNAMOMETERS: Simple block brakes, internal expanding brake, band brake of vehicle. Dynamometers – absorption and transmission types. General description and methods of operations.

UNIT – II**GYROSCOPIC AND PRECESSIONAL MOTION:**

Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships. Static and dynamic force analysis of planar mechanisms.

UNIT –III**TURNING MOMENT DIAGRAM AND FLY WHEELS:**

Dynamics of Reciprocating Parts, Turning moment – Inertia Torque connecting rod angular velocity and acceleration, crank effort and torque diagrams – Fluctuation of energy – Fly wheels and their design.

UNIT-IV**GOVERNERS:**

Watt, Porter and Proell governors. Spring loaded governors – Hartnell and hartung with auxiliary springs. Sensitiveness, isochronism and hunting.

UNIT – V**BALANCING:**

Balancing of rotating masses: Single and multiple – single and different planes.

Balancing of Reciprocating Masses: Primary, Secondary, and higher balancing of reciprocating masses. Analytical and graphical methods. Unbalanced forces and couples – examination of “V” multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing – Hammer blow, Swaying couple, variation of tractive efforts.

UNIT – VI

VIBRATION: Introduction, Definitions, Types of vibrations, Free longitudinal vibrations, Damped vibrations, forced damped vibrations, Vibration Isolation & Transmissibility, Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

TEXT BOOKS:

1. Theory of Machines / Jagadish Lal & J.M.Shah / Metropolitan.
2. Theory of Machines / S.S Rattan/ Mc. Graw Hill Publ.
3. Theory of machines / Khurmi/S.Chand.

REFERENCES:

1. Mechanism and Machine Theory / JS Rao and RV Dukupati / New Age
2. Theory of Machines / Shiegly / MGH
3. Theory of Machines / Thomas Bevan / CBS Publishers

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101ME15 METAL CUTTING & MACHINE TOOLS

L	T	P/D	C
3	1	---	3

UNIT – I

Metal cutting theory – Elements of cutting process – Geometry of single point tool and angles, Chip formation and types of chips – chip breakers. Mechanics of orthogonal cutting –Merchant’s Force diagram- Problems, cutting speeds, feed, depth of cut, Tool wear, Tool life-Taylor’s Equation- Problems, Cutting Fluids, Machinability, Tool materials. Economics of machining – Tool life for minimum cost and maximum production - Problems

UNIT – II

Lathe – Principle of working, specification of lathe – types of lathe – Lathe operations & Important Accessories – Taper turning & thread turning-Problems-machining time calculations. Turret and Capstan lathes – Differences – tool holding devices - tool layout, examples.

Shaping and Planing machines –Differences- Principles of working – Quick return mechanisms- Principal parts – specification, classification, operations performed, machining time calculations.

UNIT – III

Drilling and Boring Machines – Principles of working, types of drilling machines, operations performed – Elements of twist drill – Machining time, Boring machines – Fine boring machines – Jig Boring machine.

UNIT – IV

Milling machine – Principle of working – specifications – classifications of milling machines – Principal features, Milling methods–Up & Down Milling, Milling operations, Geometry of End milling cutter – Indexing Methods - Problems – Machining time in milling.
Broaching -Types-Classification-Broach elements-Advantages-Limitations.

UNIT –V

Grinding machine – cutting action – classification of grinding machines – cylindrical and surface grinding machine –Different types of abrasives and bonds, Specification and selection of a grinding wheel, Truing and Dressing the grinding wheels, Lapping and Honing – comparison to grinding

UNIT - VI

Jigs and fixtures- Applications-differences- Elements of Jigs & Fixtures – Principles of location and clamping – Types of Locating and clamping devices, Types of Jigs and Fixtures.
Unconventional Machining: Principles of working and applications of USM, AJM, EDM, ECM, LBM and EBM.

TEXT BOOKS:

1. A course in Workshop Technology Vol II (Machine tools) – B.S.Raghu Vamshi – Dhanpat Rai & Co.
2. Production Technology by R.K. Jain and S.C. Gupta.
3. Manufacturing Science, Amithabha Ghosh and Mallik, Affiliated East West Press

REFERENCES:

1. Production Technology by H.M.T. (Hindustan Machine Tools).
2. Production Engineering / P.C.Sharma / S.Chand & Co.

Syllabus for B. Tech. III Year I semester Mechanical Engineering

Code: 101ME16 **APPLIED THERMODYNAMICS - II**

L	T	P/D	C
3	1	---	3

UNIT – I

Basic Concepts: Rankine cycle - Schematic layout, Thermodynamic Analysis, Concept of Mean Temperature of Heat addition, Methods to improve cycle performance – Regeneration & reheating

UNIT II

Boilers : Classification – Working principles – with sketches including H.P.Boilers – Mountings and Accessories – Working principles, Boiler horse power, equivalent evaporation, efficiency and heat balance – Draught, classification – Height of chimney for given draught and discharge, condition for maximum discharge, efficiency of chimney – artificial draught, induced and forced.

UNIT – III

Steam Nozzles : Function of nozzle – applications - types, Flow through nozzles, thermodynamic analysis – assumptions -velocity of nozzle at exit-Ideal and actual expansion in nozzle, velocity coefficient, condition for maximum discharge, critical pressure ratio, criteria to decide nozzle shape: Super saturated flow, its effects, degree of super saturation and degree of under cooling - Wilson line.

UNIT – IV

Steam Turbines: Classification – Impulse turbine; Mechanical details – Velocity diagram – effect of friction – power developed, axial thrust, blade or diagram efficiency – condition for maximum efficiency. De-Laval Turbine - its features. Methods to reduce rotor speed-Velocity compounding and pressure compounding, Velocity and Pressure variation along the flow – combined velocity diagram for a velocity compounded impulse turbine.

Reaction Turbine: Mechanical details – principle of operation, thermodynamic analysis of a stage, degree of reaction –velocity diagram – Parson’s reaction turbine – condition for maximum efficiency.

UNIT V

Steam Condensers : Requirements of steam condensing plant – Classification of condensers – working principle of different types – vacuum efficiency and condenser efficiency – air leakage, sources and its affects, air pump- cooling water requirement.

Gas Turbines : Simple gas turbine plant – Ideal cycle, essential components – parameters of performance – actual cycle – regeneration, inter cooling and reheating –Closed and Semi-closed cycles – merits and demerits, Brief concepts about compressors, combustion chambers and turbines of Gas Turbine Plant.

UNIT – VI

Jet Propulsion : Principle of Operation –Classification of jet propulsive engines – Working Principles with schematic diagrams and representation on T-S diagram - Thrust, Thrust Power and Propulsion Efficiency – Turbo jet engines – Needs and Demands met by Turbo jet – Schematic Diagram, Thermodynamic Cycle, Performance Evaluation Thrust Augmentation – Methods.

Rockets: Application – Working Principle – Classification – Propellant Type – Thrust, Propulsive Efficiency – Specific Impulse – Solid and Liquid propellant Rocket Engines.

TEXT BOOKS:

1. Thermal Engineering / R.K. Rajput / Lakshmi Publications
2. Gas Turbines – V.Ganesan /TMH

REFERENCES:

1. Thermodynamics and Heat Engines / R. Yadav / Central Book Depot
2. Gas Turbines / Cohen, Rogers and Saravana Muttou / Addison Wesley – Longman
3. Thermal Engineering-R.S Khurmi/JS Gupta/S.Chand.
4. Thermal Engineering-P.L.Bellaney/ khanna publishers.
5. Thermal Engineering-M.L.Marthur & Mehta/Jain bros.

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101ME17 DESIGN OF MACHINE MEMBERS - I

L	T	P/D	C
4	0	---	4

UNIT I: Introduction:

Basic design process and requirements of machine design, use of standards in design, design synthesis; Engineering materials, stress-strain diagrams, mechanical properties of engineering materials; Materials selection in mechanical design.

Design against static loading:

Stresses due to axial loads, bending moment, torsional moment and eccentric axial loading, factor of safety, principal stresses, theories of elastic failure; Design of shafts under combined loading, design for strength and rigidity, concept of stiffness in tension / compression, bending and torsion

UNIT II: Design against Fluctuating Loads:

Stress concentration & its factors, fluctuating stresses, fatigue failure, endurance limit, Soderberg, Goodman, Modified-Goodman and Gerber criterion, Fatigue design under combined stresses. Design for finite and infinite life. Shaft design against fluctuating and shock loads.

UNIT III: Design of Keys:

Types of keys, Design of saddle, sunk, feather, Woodruff and Kennedy keys.

UNIT IV: Design of springs:

Types of springs, terminology of helical spring, stress and deflection equations, spring materials, helical spring design against static and fluctuating loads, concentric springs, surge in springs

UNIT V: Design of Joints - I:

Design of Threaded joints: Bolted joint design with static loads and fluctuating loads, eccentrically loaded bolted joints.

Design of Riveted joints: Types riveted joints, failures of riveted joints, design of lap and butt riveted joints, Eccentric loading of riveted joints.

UNIT VI: Design of Joints - II:

Welded joints: Types of welded joints, strength of butt and fillet joints, axially loaded symmetrical and unsymmetrical welded joints, bending moment and tensional moment, welded joints subjected to eccentric and variable loading.

TEXTBOOKS:

1. **Design of Machine Elements** – Third Edition / V.B.Bhandari / Tata McGraw-Hill Pub.
2. **Mechanical Engineering Design** / J.E.Shigley, C.R.Mischke / Tata McGraw-Hill Pub.

REFERENCE BOOKS:

1. **Fundamentals of Machine Elements** / Bernard Hamrock, Steven Schmid, Bo Jacobson / Tata McGraw Hill
2. **Materials Selection in Mechanical Design** / Michael F. Ashby
3. **A Text of Machine Design** – Kurmi
4. **Design of machine Elements** -Kulakarni

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101ME18 METROLOGY & INSTRUMENTATION

L	T	P/D	C
3	1	---	3

A. METROLOGY :

UNIT – I

Systems of limits and fits: Introduction, normal size, tolerance limits, deviations, allowance, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly, Indian standard system-Problems

Linear Measurement: Length standard, line and end standard, slip gauges – calibration of the slip gauges, Dial indicator, micrometers.

Measurement Of Angles And Tapers: Bevel protractor, angle slip Gauges, spirit levels, Sine bar, rollers and spheres used to determine the tapers, problems.

UNIT – II

Limit Gauges: Taylor’s principle – Design of go and No go gauges, plug, ring, snap, gap gauges, Problems.

Optical Measuring Instruments: Tool maker’s microscope and its uses

Surface Roughness Measurement: Differences between surface roughness and surface waviness-Numerical assessment of surface finish – CLA, R.M.S Values, Rz value, Methods of measurement of surface finish-profilograph, Talysurf, Problems

UNIT- III

Screw Thread Measurement: Elements of measurement – errors in screw threads – measurement of effective diameter, angle of thread and thread pitch.

Gear Measurement: Gear measuring instruments, Gear tooth profile measurement. Measurement of diameter, pitch, pressure angle and tooth thickness.

B. INSTRUMENTATION:

UNIT – IV

Introduction and Basic principles of Measurement – Measurement systems, Generalized configuration and functional descriptions of measuring instruments – examples. Dynamic performance characteristics, Sources of error, Classification and elimination of error.

UNIT – V

Measurement of Pressure: Units – classification – different principles used. Manometers, Bourdon pressure gauges, Bellows – Diaphragm gauges. Low pressure measurement – Thermal conductivity gauges – ionization pressure gauges, McLeod pressure gauge.

Measurement of Temperature: Classification – Ranges – Various Principles of measurement – Expansion, Electrical Resistance – Thermistor – Thermocouple – Pyrometers – Temperature Indicators.

UNIT – VI

Measurement of Displacement: Theory and construction of various transducers to measure displacement – Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers, Calibration procedures.

Measurement of Force And Torque - Elastic force meters, load cells, Torsion meters, Strain gauge Rosettes.

Measurement of Acceleration and Vibration: Different simple instruments – Principles of Seismic instruments – Vibro meter and accelerometer using this principle.

TEXT BOOKS:

1. Engineering Metrology / I C Gupta./ Danpath Rai
2. Engineering Metrology / R.K. Jain / Khanna Publishers
3. Measurement Systems: Applications & Design by D.S Kumar.
4. Mechanical Measurements / BeckWith, Marangoni, Linchard, PHI / PE

REFERENCES:

1. Production Engineering/P.C.Sharma
2. Measurement systems: Application and Design, Doebelin Earnest. O. Adaptation by Manik and Dhanesh/ TMH
3. Instrumentation and Control systems/ S.Bhaskar/ Anuradha Agencies.
4. Experimental Methods for Engineers / Holman.

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101MA71

**LOGICAL REASONING – I
(Common to all branches)**

L	T	P/D	C
-	-	2	2

UNIT I

Series Completion: Number Series, Alphabet Series, Alpha – Numeric Series.

UNIT II

Analogy: Completing the Analogous Pair, Simple Analogy, Choosing the Analogous pair, Double Analogy, Word Analogy, and Number Analogy.

UNIT III

Classification / Odd One Out: Word Classification, Number Classification, Letter Classification.

UNIT IV

Coding – Decoding: Letter Coding, Number Coding, Matrix Coding, Substitution, Deciphering Message Word Codes, Jumbled Coding.

UNIT V

Blood Relations: Deciphering Jumbled up Descriptions, Relation Puzzle – Direction sense test.

UNIT VI

Number, Ranking & Time Sequence Test – Arithmetical Reasoning – Mathematical Operations.

TEXT BOOKS

Verbal and Non Verbal Reasoning by R.S.Agarwal.

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101ME78

GROUP PROJECT

L	T	P/D	C
---	3	---	1

A group project shall be carried out by a group of students consisting of 2 to 3 in number in third year first semester. This work shall be carried out under the guidance of the teacher and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also. There will be 75 marks in total with 25 marks of internal evaluation.

The **internal evaluation** shall consist of:

Day to day work	10 marks
Report	05 marks
Demonstration / presentation	10 marks
 End examination	 50 Marks.

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101ME79 APPLIED THERMODYNAMICS LAB

L	T	P/D	C
---	--	3	2

Note: Minimum of 10 experiments to be performed

1. I.C. Engines Valve / Port Timing Diagrams
2. I.C. Engines Performance Test (4 -Stroke Diesel Engines)
3. I.C. Engines Performance Test on 2-Stroke Petrol
4. Evaluation of Engine friction by conducting Morse test on 4-Stroke Multi cylinder Petrol Engine retardation and motoring test on 4- stroke diesel engine
5. Heat Balance on I.C. Engines
6. Determination of Air/Fuel Ratio and Volumetric Efficiency on IC Engines.
7. Determine of Economical speed test for fixed load on 4-stroke Engine.
8. Determine optimum cooling water temperature on IC Engine
9. Dis-assembly/Assembly of Engines
10. Performance Test on Reciprocating Air – Compressor Unit
11. Performance test on variable compression ratio petrol engine.
12. Study of Boilers

**Syllabus for B. Tech. III Year I semester
Mechanical Engineering**

Code: 101ME80 METROLOGY & MACHINE TOOLS LAB

L	T	P/D	C
---	--	3	2

Note: Minimum 5 experiments to be conducted from each section

Section A:

METROLOGY

1. Measurement of lengths, heights, diameters by vernier calipers micrometers etc.
2. Measurement of bores by internal micrometers and dial bore indicators.
3. Use of gear tooth vernier for checking the chordal addendum and chordal height of spur gear.
4. Thread measurement by Two wire/ Three wire method
5. Tool makers microscope and its application.
6. Angle and taper measurements by Bevel protractor and Sine bar.
7. Surface roughness measurement by Taly Surf.
8. Alignment test on Lathe

Section B:

MACHINE TOOLS

1. Introduction of general purpose machines -Lathe, Drilling machine, Milling machine, Shaper, Planing machine, slotting machine, Cylindrical Grinder, surface grinder and tool and cutter grinder.
2. Lathe Operations-I: Step turning and Taper turning
3. Lathe Operations-II: Thread cutting and Knurling
4. Drilling Machine Operations: Drilling, Boring, Counter boring, Counter sinking and Tapping
5. Shaping and Planing Operations
6. Slotting Operations
7. Milling Operations
8. Cylindrical and Surface Grinding Operations
9. Tool and Cutter Grinder: Grinding of Tool angles.

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101MB01 MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

L	T	P/D	C
3	1	---	3

UNIT – I: INTRODUCTION TO MANAGERIAL ECONOMICS:

Definition, Nature and Scope of Business Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand and Demand Forecasting.

UNIT – II: THEORY OF PRODUCTION AND COST ANALYSIS:

Production Function – Isoquants and Isocosts, Internal and External Economies of Scale, Laws of returns. Cost Analysis: Cost concepts, different types of costs, cost control and cost efficiency. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems).

UNIT – III: INTRODUCTION TO MARKETS:

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Pricing strategies, transfer pricing and performance measurement, Price-Output Determination in case of Perfect Competition and Monopoly. Business Environment: forms of Business organization, Features of Joint Stock Company, Public Enterprises and their types. Liberalization, Globalization and Privatization (LPG).

UNIT – IV: FUNDAMENTALS OF FINANCIAL ACCOUNTING:

Concepts and conventions, principles of Double-Entry, Book Keeping, Journal, Ledger, Trial Balance, Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.

UNIT – V: CAPITAL BUDGETING TECHNIQUES:

Nature and scope of Capital Budgeting, Methods of Capital Budgeting: Traditional methods and Discounting Cash Flow methods.

UNIT – VI: RATIO ANALYSIS:

Introduction to Ratio analysis – Leverage ratios – Liquidity ratios – Turnover ratios – Profitability ratios, Du-point chart. (Simple problems)

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
3. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
4. Suma Damodaran, Managerial Economics, Oxford University Press.
5. Lipsey & Chrystel, Economics, Oxford University Press.

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101CS03

**OOP THROUGH JAVA
(COMMON TO ECM, CSE, IT)**

L	T	P/D	C
3	1	-	3

UNIT-I

History of Java, Java buzzwords, datatypes, variables, simple java program, scope and life time of variables, operators, expressions, control statements, type conversion and casting, arrays, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, recursion, string handling.

UNIT-II

Inheritance – Definition, single inheritance, benefits of inheritance, Member access rules, super class, polymorphism- method overriding, using final with inheritance, abstract classes, Base class object.

UNIT-III

Interfaces :definition, variables and methods in interfaces, differences between classes and interfaces, usage implements and extends keyword, an application using interfaces, uses of interfaces. Packages: Definition, types of packages, Creating and importing a user defined package

UNIT-IV

Exception handling -exception definition, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Multi-Threading:-Thread definition, types of multitasking, uses of multitasking, creating threads using Thread class and Runnable interface, synchronizing threads, thread life cycle.

UNIT-V

Advantages of GUI over CUI, The AWT class hierarchy, Component, Frame, Event handling:

Delegation event model, closing a Frame, mouse and keyboard events, Adapter classes.

user interface components- labels, button, scrollbars, text components,

check box, check box groups, choices, lists panels – scrollpane, menubar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grid bag.

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.

UNIT-VI

Networking – Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, sending file from server to client, parallel search server.

TEXT BOOKS

1. Java; the complete reference, 6th edition, Herbert schildt, TMH.
2. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.

REFERENCES

1. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
2. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101ME19 DESIGN OF MACHINE MEMBERS-II

L	T	P/D	C
4	--	---	4

UNIT I: Design of Bearings:

Sliding Contact Bearings: Classification bearings, basic modes of lubrication, Petroff's equation, McKee equation, bearing design, selection of parameters.

Rolling contact bearings:

Types of rolling contact bearings, static load carrying capacity, dynamic load carrying capacity, equivalent bearing load, load-life relationship, load factors, bearing reliability, selection of bearing from manufacturers catalogues.

UNIT II: Design of I.C. Engine parts:

Design of Cylinder, piston, connecting rod and crank shaft. Material selection

UNIT III: Design of Spur:

Classification of gears, gear terminology, undercutting, gear tooth failures; Force analysis; Strength analysis: bending strength (Lewis equation), beam and wear strength of gear tooth, checking for dynamic (Buckingham equation) and wear considerations; design procedure for spur gears (estimation of module, centre distance, face width etc).

UNIT IV: Design of Helical gears. Introduction, Terms of helical gears, Formative no.of teeth, proportion of helical gears, Design equations of helical gears.

UNIT V: Design of Cylinders and Pressure Vessels:

Thin and thick cylinders under internal and external pressures; Design of cylinders: Lame's equation, Clavarino's and Birnie's equations, Barlow's equation. Compound cylinders; thin spherical vessels; Design of end closures

UNIT VI: Statistical Considerations in Design:

Frequency distribution, frequency curves, measures of central tendency and dispersion, probability distribution, Normal curve, design and natural tolerances; Probabilistic aspects of variations in geometry of machine elements, material properties, external loading and initial / boundary conditions, probabilistic approach to design, reliability.

TEXTBOOKS:

1. **Design of Machine Elements** – Third Edition / V.B.Bhandari / Tata McGraw-Hill Pub.
2. **Mechanical Engineering Design** / J.E.Shigley, C.R.Mischke / Tata McGraw-Hill Pub.

REFERENCE BOOKS:

1. **Fundamentals of Machine Elements** / Bernard Hamrock, Steven Schmid, Bo Jacobson / Tata McGraw Hill
2. Probabilistic Mechanical Design / Edward B. Haugen
3. A Text Book of Machine Design -Kurmi

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101ME20

HEAT TRANSFER

L	T	P/D	C
3	2	---	3

UNIT – I

Introduction: Modes and mechanisms of heat transfer – Basic laws of heat transfer –General discussion about applications of heat transfer.

Conduction Heat Transfer: Fourier rate equation – General heat conduction equation in Cartesian, Cylindrical and Spherical coordinates.

UNIT – II

Simplification and forms of the field equation – steady, unsteady and periodic heat transfer – Initial and boundary conditions.

One Dimensional Steady State Conduction Heat Transfer: Homogeneous slabs, hollow cylinders and spheres – overall heat transfer coefficient – electrical analogy – Critical radius of insulation

One Dimensional Steady State Conduction Heat Transfer: Variable Thermal conductivity – systems with heat sources or Heat generation. Extended surface (fins) Heat Transfer – Long Fin, Fin with insulated tip and Short Fin, Application to error measurement of Temperature.

One Dimensional Transient Conduction Heat Transfer : Systems with negligible internal resistance – Significance of Biot and Fourier Numbers - Chart solutions of transient conduction systems- Concept of Functional Body

UNIT – III

Convective Heat Transfer : Classification of systems based on causation of flow, condition of flow, configuration of flow and medium of flow – Dimensional analysis as a tool for experimental investigation – Buckingham Pi Theorem and method, application for developing semi – empirical non- dimensional correlation for convection heat transfer – Significance of non-dimensional numbers – Concepts of Continuity, Momentum and Energy Equations.

Forced convection: External Flows: Concepts about hydrodynamic and thermal boundary layer and use of empirical correlations for convective heat transfer -Flat plates and Cylinders.

Internal Flows: Concepts about Hydrodynamic and Thermal Entry Lengths – Division of internal flow based on this –Use of empirical relations for Horizontal Pipe Flow and annulus flow.

UNIT – 1V

Free Convection: Development of Hydrodynamic and thermal boundary layer along a vertical plate – Use of empirical relations for Vertical plates and pipes.

UNIT V

Heat Transfer with Phase Change: Boiling: – Pool boiling – Regimes Calculations on Nucleate boiling, Critical Heat flux and Film boiling.

Condensation: Film wise and drop wise condensation –Nusselt’s Theory of Condensation on a vertical plate - Film condensation on vertical and horizontal cylinders using empirical correlations.

Heat Exchangers:

Classification of heat exchangers – overall heat transfer Coefficient and fouling factor – Concepts of LMTD and NTU methods - Problems using LMTD and NTU methods.

UNIT VI**Radiation Heat Transfer:**

Emission characteristics and laws of black-body radiation – Irradiation – total and monochromatic quantities – laws of Planck, Wien, Kirchoff, Lambert, Stefan and Boltzmann– heat exchange between two black bodies – concepts of shape factor – Emissivity – heat exchange between grey bodies – radiation shields – electrical analogy for radiation networks.

TEXT BOOKS:

1. Heat Transfer – P.K.Nag/ TMH
2. Fundamentals of Engg. Heat and Mass Transfer / R.C.SACHDEVA / New Age International

REFERENCE BOOKS:

1. Heat Transfer / HOLMAN/TMH
2. Heat Transfer – Ghoshdastidar – Oxford University Press – II Edition
3. Heat and Mass Transfer –Cengel- McGraw Hill.
4. Heat and Mass Transfer – R.K. Rajput – S.Chand & Company Ltd.
5. Essential Heat Transfer - Christopher A Long / Pearson Education
7. Heat and Mass Transfer – D.S.Kumar / S.K.Kataria & Sons
8. Heat and Mass Transfer-Kondandaraman
9. Fundamentals of Heat Transfer & Mass Transfer- Incropera & Dewitt / John Wiley Pub.

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101ME21**CAD/CAM**

L	T	P/D	C
3	1	---	3

UNIT – I

Computers in Industrial Manufacturing, Product cycle, scope of CAD/CAM, Applications of CAD/CAM, brief treatment of interactive input/output devices, Graphic terminals, display devices, hard copy devices, storage devices.

UNIT – II

Computer Graphics: Raster scan graphics coordinate system, Line drawing algorithms windowing, line clipping algorithm, transformation of geometry, 2D & 3D transformations, mathematics of projections, hidden surface removal, database structures for graphic modeling.

UNIT – III

Geometric modeling: Requirements, geometric models, geometric construction models, curve representation methods, surface representation methods, modeling facilities desired.

Drafting and Modeling systems: Basic geometric commands, layers, display control commands, editing, dimensioning, solid modeling.

UNIT – IV

Numerical control: NC, NC modes, NC elements, NC machine tools, structure of CNC machine tools, features of Machining center, turning center, CNC Part Programming : fundamentals, manual part programming methods, Computer Aided Part Programming.

UNIT – V

Group Tech: Part family, coding and classification, production flow analysis, advantages and limitations, Computer Aided Processes Planning, Retrieval type and Generative type.

Computer Aided Quality Control: Terminology in quality control, the computer in QC, contact inspection methods, noncontact inspection methods-optical, noncontact inspection methods-nonoptical, computer aided testing, integration of CAQC with CAD/CAM.

UNIT – VI

Computer integrated manufacturing systems: Types of Manufacturing systems, Machine tools and related equipment, material handling systems, computer control systems, human labor in the manufacturing systems, CIMS benefits.

TEXT BOOK:

1. CAD / CAM A Zimmers & P.Groover/PE/PHI
2. CAD / CAM Theory and Practice / Ibrahim Zeid / TMH

REFERENCES:

1. Automation , Production systems & Computer integrated Manufacturing/ Groover/P.E
2. CAD / CAM / CIM / Radhakrishnan and Subramanian / New Age
3. Principles of Computer Aided Design and Manufacturing / Farid Amirouche / Pearson
4. CAD/CAM: Concepts and Applications/Alavala/ PHI
5. Computer Numerical Control Concepts and programming / Warren S Seames / Thomson

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

**Code: 101BT37 HUMAN VALUES, ETHICS & IPR
(Common to all branches)**

L	T	P/D	C
2	-	-	2

UNIT -I:**A: INDIAN CULTURE- HUMAN VALUES AND VALUE EDUCATION:**

Purpose of Education – Indian Perspective, Civilization and Culture, Wisdom of selflessness and sacrifice, ancient wisdom on good governance and Happy life, bunch of thoughts and contribution of ancient to modern sages/ monks on Indian culture, need for interfaith understanding, cultural unity of India, what sages, seers said about knowledge devotion, meditation and happiness in life.

Concept of Human Values, Morals, Ethics, Characteristics of Values, Principles and Types of Values, Core Values , Rules of Behaviour, Distinguishing and Defining ‘Human’ Values.Truth Love and Caring, Peace, Responsibility, Justice, Human Values Applied in Practice, Values and Psychic Health, The Hierarchy of Human Values, Values of Nature, **Values of the Person**, Moral Values, **Value Education**, Basic Guidelines, content and process of Value Education.

UNIT- II:

B:ENGINEERING AND PROFESSIONAL ETHICS: Engineering and professionalism. Types of ethics and morality. Ethics in various professions. Professional codes of conduct and organizational mission vision and culture. Engineering Standards. Social and Global dimension of professions vis-a-vis Technology and Growth. Trust and Reliability. Role of Transparency, Honesty, Integrity and sincerity in Professional life.

UNIT -III:**C: HUMAN VALUES AND ETHICS:**

Understanding Relationship between Ethics, Morality, Law, Characteristics of an Ethical Person. Professional Ethics, Professional Responsibility, Codes of conducts, Practice, Dos and DON'Ts of various professions. Ethical Behavior and issues in various professions (like business, marketing, media and advertising, legal, medical, financial, Education, public services and Governance Etc- through case studies). Impact of Ethical behavior and Violations on society at large (Law, culture, religion and life style). Ethical issues arising from modern technology like communications and computers. Ethical Standards, Ethics in Engineering. General Business and Ethics, Religious Views on Business Ethics, Work Ethics, Criticisms of Work Ethic Concept, Working with Ethics.

UNIT -IV:**D: RELEVANCE OF ANCIENTS WISDOM AND PRACTICES FOR PROFESSIONALS IN MODERN AGE:**

Problems of Modernity and impact on modern life (self, family and society). Problems of freedom in Individual centric vs family centric social structure. Health issues related to Individual freedom, competition and professional life. Relevance of Indian wisdom on individual, family and social life. Relevance of yogic and spiritual practices in modern times for intellect-mind-body harmony. Science and religion, concentration and meditation, peace of mind, Hinduism in view of Mahatma Gandhi, Role of expanse of Technology in Third Millennium. Indian literature and cultural identity, Teacher- Student relationship. Need for balance and harmonious growth in all stages of life and Development into holistic professional.

UNIT- V

E: INTELLECTUAL PROPERTY RIGHTS (IPR)

Invention and Creativity, Basic Types of Property, Need for Protection of IPR, IP Types – Industrial Property (Patents, Trade Marks, Trade Secrets, Industrial Designs and Integrated Circuits), Copyrights and Related Rights, Geographical Indications.

UNIT-VI

WIPO Mission and Activities, GATT & Trips, Indian Position on WTO and strategies, Indian IPR legislations-commitments to WTO-Patent Ordinance and the Bill, Draft of a National Intellectual Property Policy, Case Studies on IP.

TEXT BOOKS

1. Charles E. Harris, Michael S .Pritchard & Michael J . Rabins “Engineering Ethics” –CENGAGE Learning
2. I.V. Chalapati Rao “Ancient Wisdom, Modern Insights” - Sri Yabaluri Raghavaiah Memorial Trust
3. Smriti Srivastava “Human Values and Professional Ethics” – S.K. Kataria & Sons.
4. Anitha Rao R & Bhanoji Rao “Intellectual Property Rights- A Primer”, Eastern Book Company, 2008.

REFERENCES:

1. Govindarajan M, Natarajan S, Senthil Kumar V.S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004.
2. Charles D. Fleddermann, “Engineering Ethics”, Pearson Education/Prentice Hall, New Jersey, 2004(Indian Print)
3. Deborah E. Bouchoux “ Intellectual Property Rights” CENGAGE Learning

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101MA72

QUANTITATIVE APTITUDE

L	T	P/D	C
-	-	2	2

UNIT I

Number System: Test for Divisibility, Test of prime number, Division and Remainder – HCF and LCM of Numbers - Fractions.

UNIT II

Average: Average of different groups, Replacement of some of the items - Percentage - Profit and Loss.

UNIT III

Ratio and Proportion: Properties of Ratio, Comparison of Ratios, Useful Simple Results on Proportion – Partnership and Share – Mixtures.

UNIT IV

Simple Interest: Effect of change of P, R and T on Simple Interest - Compound Interest: Conversion Period, Difference between Compound Interest and Simple Interest – Time and Work – Time and Distance.

UNIT V

Mensuration: Area of Plane Figures, Volume and Surface Area of Solid Figures .

UNIT VI

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, Line Graphs.

TEXT BOOKS

1. Quantitative Aptitude by R.S. Agarwal
2. Quantitative Aptitude by Abhijit Guha

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101ME81

COMPREHENSIVE VIVA

L	T	P/D	C
---	---	---	1

There are no sessional marks. The end examination shall be conducted by a committee consisting of an External examiner, Head of the department and two senior faculty members. It carries marks 50.

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101ME 82

HEAT TRANSFER LAB

L	T	P/D	C
---	---	3	2

Note: A minimum of 10 experiments are to be conducted

1. Composite Slab Apparatus – Overall heat transfer co-efficient.
2. Heat transfer through lagged pipe.
3. Heat Transfer through a Concentric Sphere
4. Thermal Conductivity of given metal rod.
5. Heat transfer in pin-fin
6. Experiment on Transient Heat Conduction
7. Heat transfer in forced convection apparatus.
8. Heat transfer in natural convection
9. Parallel and counter flow heat exchanger.
10. Emissivity apparatus.
11. Stefan Boltzman Apparatus.
12. Heat transfer in drop and film wise condensation.
13. Critical Heat flux apparatus.
14. Study of heat pipe and its demonstration.
15. Study of Two – Phase flow.

**Syllabus for B. Tech. III Year II semester
Mechanical Engineering**

Code: 101CS74

**OOP THROUGH JAVA LAB
(Common to CSE, IT, ECM)**

L	T	P/D	C
-	-	3	2

1

- A) Write a program to print prime numbers up to a given number.
 B) Write a program to print roots of a quadratic equation $ax^2+bx+c=0$.
 C) Write a program to print Fibonacci sequence up to a given number.
 D) Write a program to print the following format.

```
*
 * *
 * * *
 * * * *
```

2.

- A) Define a class to represent a bank account and include the following members Instance variables:
 (i) Name of depositor
 (ii) Account No
 (iii) Type of account
 (iv) Balance amount in the account

Instance Methods:

- (i) To assign instance variables (Constructors-Zero argument and parameterized)
 (ii) To deposit an amount
 (iii) To withdraw amount after checking the balance
 (iv) To display name and address

Define ExecuteAccount class in which define main method to test above class.

- B) In the above account class, maintain the total no. of account holders present in the bank and also define a method to display it. Change the main method appropriately.
 C) In main method of ExecuteAccount class, define an array to handle five accounts.
 D) In Account class constructor, demonstrate the use of "this" keyword.
 E) Modify the constructor to read data from keyboard.
 F) Overload the method deposit() method (one with argument and another without argument)
 G) In Account class, define set and get methods for each instance variable.

Example:

For account no variable, define the methods
 getAccountNo() and setAccountNo(int accno)

In each and every method of Account class, reading data from and writing data to instance variables should be done through these variables.

3.

- A) Define Resister class in which define the following members:
 Instance variables:
 resistance
 Instance Methods:
 giveData(): To assign data to the resistance variable
 displayData(): To display data in the resistance variable
 constructors

Define subclasses for the Resistor class called SeriesCircuit and ParallelCircuit in which define methods : calculateSeriesResistance() and calculateParallelResistance() respectively. Both the methods should

take two Resistor objects as arguments and return Resistor object as result. In main method, define another class called ResistorExecute to test the above class.

- B) Modify the above two methods which should accept array of Resistor objects as argument and return Resistor object as result.
- C) Write a program to demonstrate method overriding.
- D) Write a program to demonstrate the uses of “super” keyword (three uses)
- E) Write a program to demonstrate dynamic method dispatch (i.e. Dynamic polymorphism).
- 4)
- A) Write a program to check whether the given string is palindrome or not.
- B) Write a program for sorting a given list of names in ascending order.
- C) Write a program to count the no. of words in a given text.
- 5)
- A) Define an interface “GeometricShape” with methods area() and perimeter() (Both method’s return type and parameter list should be void and empty respectively). Define classes like Triangle, Rectangle and Circle implementing the “GeometricShape” interface and also define “ExecuteMain” class in which include main method to test the above class
- B) Define a package with name “sortapp” in which declare an interface “SortInterface” with method sort() whose return type and parameter list should be void and empty. Define “subsortapp” as subpackage of “sortapp” package in which define class “SortImpl” implementing “SortInterface” in which sort() method should print a message linear sort is used. Define a package “searchingapp” in which declare an interface “SearchInterface” with search() method whose return type and parameter list should be void and empty respectively. Define “searchingimpl” package in which define a “SearchImpl” class implementing “SearchInterface” defined in “searchingapp” package in which define a search() method which should print a message linear search is used. Define a class ExecutePackage with main method using the above packages (classes and its methods).
- 6) Modify the withdraw() method of Account class such that this method should throw “InsufficientFundException” if the account holder tries to withdraw an amount that leads to condition where current balance becomes less than minimum balance otherwise allow the account holder to withdraw and update the balance accordingly.
- 7)
- A) Define two threads such that one thread should print even numbers and another thread should print even numbers.
- B) Modify the Account class to implement thread synchronization concept.
- C) Define two threads such that one thread should read a line of text from text file and another thread should write that line of text to another file. (Thread communication example).
- D) Write a program to implement thread priority.
- 8) Design the user screen as follows and handle the events appropriately.

Add Window

First Number

Second Number

Result

9) Write a program to simulate a calculator

10) Write a program to create feedback form
Feedback Form

Date: 2/5/2020

Faculty Name: Vengal Rao

Subject: DSP
1st Sem

Year/Semester: III/IV

Optional

Student Name : FORMTEXT

Roll Number: FORMTEXT

Branch : FORMDROPDOWN

Review Guidelines					
Complete this peer review, using the following scale: <ul style="list-style-type: none"> NA = Not Applicable 1 = Unsatisfactory 2 = Marginal 3 = Meets Requirements 4 = Exceeds Requirements 5 = Exceptional 					
Evaluation					
	(5) = Exceptional	(4) = Exceeds Requirements	(3) = Meets Requirements	(2) = Marginal	(1) = Unsatisfactory
Required Skills And Knowledge in the Class	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX
Response To Questions	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX
Ability To Learn And Teach New Skills	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX
English Speaking Skills	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX
Making Students To Involve In The Class	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX
The Way Syllabus is Covered	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX	FORMCHECKBOX

11) Develop a simple client server program(one way communication)

12) Develop a client that sends data to the server and also develop a server that sends data to the client(two way communication)

13) Develop a client/server application in which client read a file name from keyboard and send the file name to the server , and server will read the file name from client and send the file contents to the client.

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101ME22

OPERATION RESEARCH

L	T	P/D	C
3	1	---	3

UNIT – I

INTRODUCTION: Development – Definition– Characteristics and Phases – Types of models – operation Research models – applications.

LINEAR PROGRAMMING PROBLEM- Formulation – Graphical solutions, Simplex method, Artificial variables techniques -Two–phase method, Big-M method -Degeneracy, Duality Principle.

UNIT – II

TRANSPORTATION PROBLEM – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.

ASSIGNMENT PROBLEM – Formulation – Optimal solution - Variants of Assignment Problem- Unbalanced, Traveling Salesman problem.

UNIT – III

SEQUENCING – Introduction – Flow Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through ‘m’ machines.

REPLACEMENT: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, Group replacement.

UNIT – IV

THEORY OF GAMES: Introduction – Pure strategies-Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Mixed Strategies-Rectangular games without saddle points- Dominance principle – 2 X 2 games , m X 2 & 2 X n games -Graphical method.

UNIT – V

WAITING LINES: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

INVENTORY : Introduction – Single item Deterministic models without shortages– Single item inventory models with one price break and multiple price breaks – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost.

UNIT – VI

SIMULATION: Definition – Types of simulation – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Computers in Simulation.

DYNAMIC PROGRAMMING: Introduction – Bellman’s Principle of optimality – Applications of dynamic programming- shortest path problem -capital budgeting problem — linear programming problem.

TEXT BOOKS:

1. Operations research / Hira & Gupta
2. Operation Research /J.K.Sharma/MacMilan publishers.

REFERENCES:

1. Operations Research / S.D.Sharma/Kedarnath publishers
2. Operations research/V.K.Kapoor

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101ME23 PRINCIPLES OF FINITE ELEMENT METHOD

L	T	P/D	C
3	1	---	3

UNIT-I:

FUNDAMENTALS OF FEM:

Introduction, Historical back ground, strain displacements, strain stress, equilibrium, potential energy principal, Ray leigh – Ritz method, Galerkin’s method.

FINITE ELEMENT MODELING OF ONE DIMENSIONAL PROBLEMS (BAR ELEMENT):

Elements, nodes, number scheme, coordinate systems, shape functions, element stiffness matrix & force vectors using potential energy approach, Assembly of the local stiffness matrices and load vectors, quadratic shape functions, temperature effect on bar element.

UNIT-II:

FINITE ELEMENT MODELING OF TRUSSES:

Plane trusses, local and global coordinate systems, direction cosines, stiffness matrix, Stress calculation, temperature effects.

FINITE ELEMENT MODELING OF BEAMS:

Potential energy approach to derive stiffness and load matrices, shear force and bending moment calculations.

UNIT-III:

FINITE ELEMENT MODELING OF TWO-DIMENTIONAL PROBLEMS USING TRIANGULAR ELEMENTS:

Introduction, Isoparametric representation of triangular element, potential energy approach to derive element stiffness and force matrices.

AXISYMMETRIC FORMULATION: using triangular element, boundary conditions in long cylinder subjected to internal pressures.

UNIT-IV:

TWO DIMENSIONAL ISOPARAMETRIC ELEMENTS:

Introduction to isoparametric formulation, shape functions of four node quadrilateral and eight node quadrilateral elements. Concept of numerical Integration

INTRODUCTION TO 3D ELEMENTS:

Tetrahedral and Hexahedral elements for three dimensional problems.

UNIT-V:

FINITE ELEMENT MODELING OF HEAT TRANSFER:

Galerkin approach, Steady state one-dimensional heat conduction problems, steady state heat transfer in thin fins, Two dimensional steady state heat conduction with triangular element.

UNIT-VI:

FINITE ELEMENT MODELING OF DYNAMIC PROBLEMS:

Introduction, solid elements with distributed mass, Langrargian method, element mass matrices, evaluation of eigen values and eigen vectors for axial vibrating members and beams.

INTRODUCTION TO FEM SOFTWARES: Name of commercial soft wares, convergence criteria, FEM concept of mesh generation, geometry isotropy, pre-processing and post-processing, Type of errors in FEM.

TEXT BOOKS:

1. Tirupathi R-Chandrupatla: “Introduction to finite elements in engineering”, PHI publishers
2. Singiresu S.Rao -The finite element methods in Engineering , BH, Elsevier publishers

REFERENCES:

1. George R.Buchan, Finite elements analysis, Schhaum’s outlines-tata MC graw –hill edition,
2. David V.Hutton “Fundamentals of finite elements analysis”.

Syllabus for B. Tech. IV Year I semester Mechanical Engineering

Code: 101ME24 AUTOMOBILE ENGINEERING

L	T	P/D	C
3	1	---	3

UNIT – I

Introduction : Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, re boring,

UNIT – II

Fuel System: S.I. Engine: Fuel supply systems, Mechanical and electrical fuel pump – filters – carburettor – types – air filters – petrol injection.

C.I. Engines : Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps.

UNIT – III

Cooling System : Cooling Requirements, Air Cooling, Liquid Cooling, Thermo, water and Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporating cooling – pressure sealed cooling – antifreeze solutions.

Ignition System : Function of an ignition system, battery ignition system, constructional features of storage, battery, auto transformer, contact breaker points, condenser and spark plug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

Unit – IV

Emission from Automobiles – Pollution standards National and international – Pollution Control – Techniques – Multipoint fuel injection for SI Engines. Common rail diesel injection Energy alternatives – Solar, Photo-voltaic, hydrogen, Biomass, alcohols, LPG,CNG, liquid Fuels and gaseous fuels, electrical-their merits and demerits.

Electrical System : Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

UNIT – V

Transmission System : Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box , over drive torque converter.

Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.

UNIT – VI

Steering System : Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

Suspension System : Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber, Independent suspension system.

Braking System : Mechanical brake system, Hydraulic brake system, Master cylinder, wheel cylinder tandem master cylinder Requirement of brake fluid, Pneumatic and vacuum brakes.

TEXT BOOKS:

1. Automotive Mechanics – Vol. 1 & Vol. 2 / Kirpal Singh.
2. Automobile Engineering / William Crouse

REFERENCES:

1. Automotive Engineering / Newton Steeds & Garrett
2. Automotive Mechanics / G.B.S. Narang
3. Automotive Mechanics / Heitner
4. Automotive Engines / Srinivasan
5. Automobile Engineering – K.K. Ramalingam / Scitech Publications (India) PVT. LTD.

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

**Code: 101ME25 REFRIGERATION & AIR CONDITIONING
(PROFESSIONAL ELECTIVE-I)**

L	T	P/D	C
3	1	---	3

UNIT – I

Introduction to Refrigeration: Necessity and applications – Unit of refrigeration and C.O.P. – Mechanical Refrigeration – Types of Ideal cycles of refrigeration.

Air Refrigeration: Bell Coleman cycle and Brayton Cycle, Open and Dense air systems – Actual air refrigeration system problems – Refrigeration needs of Air crafts.

UNIT – II

Vapour compression refrigeration – working principle and essential components of the plant – simple Vapour compression refrigeration cycle – COP – Representation of cycle on T-S and p-h charts – effect of sub cooling and super heating – cycle analysis – Actual cycle Influence of various parameters on system performance – Use of p-h charts – numerical Problems.

UNIT III

System Components: Compressors – General classification – comparison – Advantages and Disadvantages.

Condensers – classification – Working Principles

Evaporators – classification – Working Principles

Expansion devices – Types – Working Principles

Refrigerants – Desirable properties – classification refrigerants used – Nomenclature – Ozone Depletion – Global Warming.

UNIT IV

Vapor Absorption System – Calculation of max COP – description and working of NH₃ – water system and Li Br –water (Two shell & Four shell) System. Principle of operation Three Fluid absorption system, salient features. Steam Jet Refrigeration System – Working Principle and Basic Components.

Principle and operation of (i) Thermoelectric refrigerator (ii) Vortex tube or Hilsch tube.

UNIT – V

Introduction to Air Conditioning: Psychometric Properties & Processes – Characterization of Sensible and latent heat loads — Need for Ventilation, Consideration of Infiltration – Load concepts of RSHF, GSHF- Problems, Concept of ESHF and ADP.

Requirements of human comfort and concept of effective temperature- Comfort chart –Comfort Air conditioning – Requirements of Industrial air conditioning , Air conditioning Load Calculations.

UNIT – VI

Air Conditioning systems: Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, fans and blowers. Heat Pump – Heat sources – different heat pump circuits.

TEXT BOOKS:

1. Refrigeration and Air Conditioning / CP Arora / TMH.
2. A Course in Refrigeration and Air conditioning / SC Arora & Domkundwar / Dhanpatrai

REFERENCES:

1. Refrigeration and Air Conditioning / Manohar Prasad / New Age.
2. Principles of Refrigeration - Dossat / Pearson Education.
3. Refrigeration and Air Conditioning-P.L.Bellaney
4. Basic Refrigeration and Air-Conditioning – Ananthanarayanan / TMH
5. Refrigeration and Air Conditioning – R.S. Khurmi & J.K Gupta – S.Chand – Eurasia Publishing House (P) Ltd.

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101ME26

**NANO TECHNOLOGY
(PROFESSIONAL ELECTIVE-I)**

L	T	P/D	C
3	1	---	3

UNIT-I

General Introduction: Basics of Quantum Mechanics, Harmonic oscillator, magnetic Phenomena, band structure in solids, Mossbauer and Spectroscopy, optical phenomena bonding in solids, Anisotropy.

UNIT-II

Silicon Carbide: Application of Silicon carbide, nano materials preparation, Sintering of SiC, X-ray Diffraction data, electron microscopy sintering of nano particles,

Nano particles of Alumina and Zirconia: Nano materials preparation, Characterization, Wear materials and nano composites,

UNIT-III

Mechanical properties: Strength of nano crystalline SiC, Preparation for strength measurements, Mechanical properties, Magnetic properties,

Electrical properties: Switching glasses with nanoparticles, Electronic conduction with nano particles

Optical properties: Optical properties, special properties and the coloured glasses

UNIT-IV

Process of synthesis of nano powders, Electro deposition, important nano materials

Investigating and manipulating materials in the nanoscale: Electron microscopics, scanning probe microscopics, optical microscopics for nano science and technology, X-ray diffraction.

UNIT-V

Nanobiology : Interaction between biomolecules and nanoparticle surface, Different types of inorganic materials used for the synthesis of hybrid nano-bio assemblies, Application of nano in biology, nanoprobes.

Analytical Applications-A new Methodology in medical diagnostics and Biotechnology, Current status of nano Biotechnology, Future perspectives of Nanobiology, Nanosensors.

UNIT-VI

NanoMedicines : Developing of Nanomedicines Nanosystems in use, Protocols for nanodrug Administration, Nanotechnology in Diagnostics applications, materials for used in Diagnostics and Therapeutic applications,

Molecular Nanomechanics, Molecular devices, Nanotribology, studying tribology at nanoscale, Nanotribology applications.

TEXT BOOKS:

1. Nano Materials- A.K.Bandyopadhyay/ New Age Publishers.
2. Nano Essentials- T.Pradeep/TMH

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

**Code: 101ME27 NON CONVENTIONAL SOURCE OF ENERGY
(PROFESSIONAL ELECTIVE-I)**

L	T	P/D	C
3	1	---	3

UNIT – I

PRINCIPLES OF SOLAR RADIATION : Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects.

UNIT-III

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT-IV

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT-V

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India.

OCEAN ENERGY : OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

UNIT-VI

DIRECT ENERGY CONVERSION : Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joul Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, Hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects.

Fuel cells: principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa
2. Non-Conventional Energy Sources /G.D. Rai

REFERENCES:

1. Renewable Energy Sources /Twidell & Weir
2. Solar Energy /Sukhatme
3. Solar Power Engineering / B.S Magal Frank Kreith & J.F Kreith.
4. Principles of Solar Energy / Frank Krieth & John F Kreider.
5. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
6. Non-Conventional Energy Systems / K Mittal /Wheeler
7. Renewable Energy Technologies /Ramesh & Kumar /Narosa

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101ME28 ROBOTICS (PROFESSIONAL ELECTIVE-II)

L	T	P/D	C
3	1	---	3

UNIT – I

Introduction: An over view and applications of Robotics, classification by coordinate system and control system. Different types of robot actuators: pneumatic, hydraulic and electric

UNIT – II

Motion Analysis and Manipulator Kinematics: Specifications of matrices, Homogeneous transformations as applicable to rotation and translation, D-H notation, Differential transformations, Jacobians; Forward and inverse kinematics – problems.

UNIT – III

Statics and Dynamics of manipulators: Force and moment balance, Use of Jacobian, Velocity analysis, Lagrange – Euler and Newton – Euler formations for dynamics of manipulators – Problems.

UNIT - IV

Trajectory Planning: Path planning, Skew motion, joint integrated motion – straight line motion.

UNIT - V

Control of Manipulators: Introduction to control systems: open and closed loop control, transfer functions, characteristics of linear and nonlinear systems and their control schemes; model of a manipulator joint, actuator; control schemes applied in robotics: PID

UNIT - VI

Robot Sensors and Vision: Classification of sensors, sensors in robotics; introduction to machine vision, image representation and processing.

TEXT BOOKS:

1. Robotics and Control / Mittal R K & Nagrath I J / TMH.
2. Robotics / Fu K S/ McGraw Hill.

REFERENCES:

1. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons
2. Robotic Engineering / Richard D. Klafter, Prentice Hall

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101ME29 MECHATRONICS (PROFESSIONAL ELECTIVE-II)

L	T	P/D	C
3	1	---	3

UNIT - I:

INTRODUCTION: Definition, Traditional and mechatronic approaches, Measurement systems, Control systems, open loop and closed loop controls, Controllers, Response of systems; Examples of mechatronic systems

UNIT – II:

ACTUATION SYSTEMS AND FEEDBACK DEVICES: Mechanical, Pneumatic, Hydraulic, Electrical / electronic actuation systems, their comparison; important elements of each of the systems; selection criteria for each. Feedback Devices: Classification, position and velocity sensors, Proximity Sensors – inductive, capacitive, infrared.

UNIT – III:

INTRODUCTION TO CONTROL SYSTEMS: System models and their building blocks, associated mathematical aspects: differential equations in time domain, use of Laplace transform technique for obtaining model in s-domain; individual and combined system transfer functions, open loop and closed loop systems and their transfer functions, systems in series and parallel configurations; zeroes and poles of systems

UNIT – IV:

RESPONSE OF SYSTEMS: Approaches: time and frequency domain analysis. Modeling first and second-order systems, transient and steady-state responses; stability aspects: Bode and Nyquist plots

UNIT – V:

CLOSED LOOP CONTROLLERS: Control modes; proportional, derivative, integral and combined methods; Introduction to digital control: ADC (Analog-to-Digital Conversion), DAC (Digital-to- Analog Conversion),

UNIT – VI:

PROGRAMMABLE LOGIC CONTROLLERS: Basic Structure – Programming : Ladder diagram – Timers, Internal Relays and Counters – Shift Registers – Master and Jump Controls – Data Handling – Analog input/output – PLC Selection – Application.

TEXT BOOKS:

1. Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, by W. Bolton, Pearson Education Press, 3rd addition 2005.
2. Modern Control Engineering, Katsuhiko Ogata

REFERENCES:

1. Mechatronics System Design, Shetty, D and Kolk, R.A., Thomson Learning
2. Mechatronics, H.M.T Ltd., Tata McGraw-Hill

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

**Code: 101ME30 AUTOMATION IN MANUFACTURE
(PROFESSIONAL ELECTIVE-II)**

L	T	P/D	C
3	1	---	3

UNIT – I

Introduction: Production system, Automated manufacturing systems, Reasons, Principles and strategies of automation, Basic elements of automated system, pneumatic and hydraulic circuit components,

UNIT – II

Assembly system and line balancing: Manual Assembly process, and work transport systems, Line pacing, Analysis of manual assembly lines, line balancing methods-problems, ways of improving line balance lines.

UNIT – III

Analysis of Automated flow lines: System configuration, Workpart transfer, General terminology and analysis of transfer lines without and with buffer storage.

Automated Assembly systems: Fundamentals and Design of assembly systems.

UNIT – IV

Automated material handling: Principles, Types of equipment, functions, analysis and design of material handling systems, conveyor systems, automated guided vehicle systems-technology, Analysis of material transport systems.

Automated storage systems: Basic terminology, AS/RS; Carousel storage, work in process storage,

UNIT – V

Adaptive control systems: Introduction, Adaptive control with optimization, Adaptive control with constraints, Application of A.C. in Machining operations. Use of various parameters such as cutting force, Temperature, vibration and acoustic emission.

UNIT – VI

Concept of Concurrent Engineering, MRP,MRP II, Techniques of Rapid Proto typing.

TEXT BOOK:

1. Automation, Production Systems and Computer Integrated Manufacturing: M.P. Groover./PE/PHI

REFERENCES:

1. Computer control of Manufacturing Systems by Yoram Coreom.
2. CAD / CAM/ CIM by Radhakrishnan.

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

**Code: 101MB56 BANKING OPERATIONS, INSURANCE AND
RISK MANAGEMENT
(OPEN ELECTIVE – II)**

L	T	P/D	C
3	-	-	3

UNIT I

INTRODUCTION TO BANKING BUSINESS:

Banking Sectors- Retail, Corporate, Rural, and International; Non-banking financial intermediaries; Types of advances and deposits in a bank, New Dimensions and Products. - Credit, Debit and Smart Cards, and e-Banking Structure of the Indian Banking System's. Commercial Banks – Public and Private Sector and Foreign Banks. Cooperative Banks.

UNIT II

BANKING REFORMS AND REGULATION:

Banking Regulation Act, 1949, Reserve Bank of India Act 1934, and Reserve Bank's Instruments of Credit Control. Deficiencies in Indian Banking including Problems Accounts and Non-Performing Assets, Banking Sector Reforms.

UNIT III

INSURANCE:

Need for and importance of insurance, branches of insurance (life and general insurance) policy and procedure.

UNIT IV

INSURANCE BUSINESS ENVIRONMENT:

Mathematical basis of life insurance, reinsurance coverage, regulatory and legal frame work governing the insurance, business and economics of insurance, need for changing mindset; Latest trends.

UNIT V

INTRODUCTION TO RISK

Types of Risks facing Business and Individuals, Risk Management Process, Risk Management Methods, Risk Identification and Measurement, Risk Management Techniques: Non Insurance Methods.

UNIT VI

INSURANCE AS A RISK MANAGEMENT

Techniques Principles: Principle of Indemnity, Principle of Insurable Interest, Principle of Subrogation, Principle of utmost good Faith, Requisites of Insurable Risks, Requirements of an Insurance Contract, Distinguishes Characteristics of Insurance Contracts, Role of Agents and Brokers.

TEXT BOOKS

1. Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
2. General principles of Insurance - Harding and Evanly
3. Mark S.Dorfman: Risk Management and Insurance, Pearson, 2009.

REFERENCES

1. Scott E. Harringam Gregory R. Nichaus: Risk Management & Insurance, , TMH, 2009.
2. George E. Rejda: Principles of risk Management & Insurance, , 9/e, Pearson Education, 2009.
3. G.Koteshwar: Risk Management Insurance and Derivatives, Himalaya, 2008
4. Gulati: Principles of Insurance Management, Excel, 2009
5. James S Trieschmann, Robert E. Hoyt & David N. Sommer: Risk Management & Insurance, Cengage, 2009.
6. Dorfman: Introduction to Risk Management and Insurance, 8/e, Pearson, 2009.
7. P.K.Gupta: Insurance and Risk Management, Himalaya, 2009.
8. Vivek & P.N. Asthana: Financial Risk Management, Himalaya, 2009

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101MB55

**ENTREPRENEURSHIP
(OPEN ELECTIVE-II)**

L	T	P/D	C
3	--	---	3

UNIT I

NATURE OF ENTREPRENEURSHIP: Definition of entrepreneurship, Evolution of entrepreneurship Concept Categories of Entrepreneurship, Entrepreneurial Propensity, Entrepreneurial potential, Entrepreneurial Orientation, Schools of thought on Entrepreneurship, Essential features of Entrepreneurship, attitude and leadership of Entrepreneur, Characteristics of entrepreneur, Qualities and skills, functions of entrepreneur

UNIT II

FORMS OF ENTREPRENEURSHIP: Small Business, Importance in Indian Economy, Types of ownership, sole trading, partnership, Joint Stock Company, Important features of Various types of businesses, corporate entrepreneurship, entrepreneurship, Role of Government in the promotion of Entrepreneur, State Enterprises in India.

UNIT III

ASPECTS OF PROMOTION: Opportunity Analysis, SWOT Analysis, Internal and External Environment Analysis, Technological Competitiveness, Entrepreneurs and legal regulatory systems.

UNIT IV

PROJECT PLANNING AND FEASIBILITY STUDIES: The Concept of Project, Project Life Cycle, Project Planning, Feasibility, SWOT Analysis, Product and Process Development, Major steps in product development.

UNIT V

FINANCIAL ASPECTS OF THE ENTREPRENEURSHIP: Source of Capital, Debt-Equity Financing Commercial Banks, Bank Loans, Assessment of Benefits and Costs, Informal Agencies In financing entrepreneurs, Government Grants and Subsidies, Types of Investors and Private Offerings. Entrepreneurial Strategy: Generation of new entry opportunity, Decisions under Uncertainty, entry strategy, new entry exploitation, environmental instability and First-Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness, Marketing strategies for start-ups, Operational complexities in start-ups

UNIT VI

WOMEN ENTREPRENEURSHIP: Introduction, Problems faced by Women Entrepreneurs in India, Strategies to overcome obstacles faced by women entrepreneurs. The dynamic need, entrepreneurship in a Developing economy, the scope of entrepreneurship among women, promotional efforts supporting women entrepreneurs in India, Issues of employment generation.

REFERENCES:

- H. Nandan, Fundamentals of Entrepreneurship, Prentice Hall of India, First Edition, New Delhi, 2007.
- Robert D Hisrich, Michael P Peters, Dean A Shepherd, Entrepreneurship, Sixth Edition, New Delhi, 2006.
- Alfred E. Osborne, Entrepreneur's Toolkit, Harvard Business Essentials, HBS Press, USA, 2005.
- Madhurima Lall, Shikha Sahai, Entrepreneurship, Excel Books, First Edition, New Delhi, 2006.
- S.S. Khanka, Entrepreneurial Development, S. Chand and Company Limited, New Delhi, 2007.
- Thomas W. Zimmerer, Norman M. Scarborough, Essentials of Entrepreneurship And Small Business Management, Fourth Edition, Pearson, New Delhi, 2006
- S.R. Bhowmik, M. Bhowmik, Entrepreneurship-A tool for Economic Growth And A key to Business Success, New Age International Publishers, First Edition, (formerly Wiley Eastern Limited), New Delhi, 2007

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

**Code: 101MB54 LOGISTICS AND SUPPLY CHAIN MANAGEMENT
(OPEN ELECTIVE-II)**

L	T	P/D	C
3	---	---	3

The objective of the course is to give the student an overview of Supply Chain management principles and practices .

Prerequisite for the course: Knowledge of Production and Operations Management, Marketing Management and Basics of QABD

UNIT I

Logistics and Competitive strategy Understanding the Supply Chain. Objective and Importance of Supply Chain Process View of Supply Chain. Competitive and Supply Chain Strategies, Achieving Strategic Fit, Expanding Strategic Scope.

UNIT II

Supply Chain Drivers and Metrics :Drivers for Supply Chain Performance, Framework for Structuring drivers. Facilities, inventory, transportation, information, sourcing and pricing. Obstacles to Achieving fit. Designing the Supply Chain Network. Role of distribution in the Supply Chain, Factors influencing network design, the role of network in the Supply Chain Frame work for Network design decisions models for facility location and capacity allocation, network design in uncertain environment.

UNIT III

Demand Forecasting in Supply Chain Components of forecast and forecasting methods. Role of IT in forecasting. Aggregate Planning in Supply Chain Planning Supply and Demand in A Supply Chain, Managing Predictable Variability.

UNIT IV

Logistics and Supply chain relationships: Benchmarking the logistics process and SCM operations – Mapping the supply chain processes – Supplier and distributor benchmarking –setting benchmarking priorities –identifying logistics performance indicators –Channel structure – Economics of distribution – channel relationships –logistics service alliances.

UNIT V

Planning and Managing inventories in Supply Chain : managing Economies of Scale in Supply Chain, managing Uncertainty in a Supply Chain, Safety Inventory , determining optimal level of product inventory. Designing and Planning Transportation Networks, Transportation in a Supply Chain, Managing Cross Functional Drivers in a Supply Chain: Sourcing decisions in a Supply Chain, Pricing and Revenue Management in a Supply Chain, Information Technology and Coordination in a Supply chain..

UNIT VI

Managing global logistics and global supply chains: Logistics in a global economy – views of global logistics- global operating levels – interlinked global economy – The global supply chains -Global supply chain business processes –Global strategy –Global purchasing – Global logistics – Channels in Global logistics –Global alliances –Issues and Challenges in Global supply chain Management – case studies.

BOOKS RECOMMENDED:

- Sunil Chopra and Peter Meindl: *Supply chain Management: Strategy, Planning and Operation, 3/e*, Pearson Education, New Delhi 2007.
- Donald J. Bowersox and David J. Closs, *Logistical Management: The Integrated Supply Chain Process*, Tata McGraw Hill, 2006.

REFERENCES:

- Martin Christopher, *Logistics and Supply Chain Management*, Pitman, London.
- B.S. Sahay, *Supply Chain Management for Global Competitiveness*, Macmillan, New Delhi. 2003.
- Philip B. Schary, Tage Skjott-Larsen: *Managing the Global Supply Chain*, Viva, Mumbai, 2006.
- Monczka: *Purchasing and Supply Chain Management* Thomson, 2006.
- Ballou, *Business Logistics/Supply chain Management 5/e* Pearson Education.
- David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi, *Designing and Managing The Supply Chain 2nd ed.* Tata McGraw Hill Publishing Company Ltd., 2006

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101MA73**LOGICAL REASONING - II**

L	T	P/D	C
-	-	2	2

Unit – I

Data Sufficiency: Problems in which a question on any topic such as Coding – Decoding, Blood Relations, Directions, Arithmetical Reasoning etc.

Unit – II

Puzzle Test: Classification Type Questions, Seating Arrangements Comparison Type Questions, Sequential Order of Things, Selection Based on given conditions, Family – Based Puzzles, Jumbled Problems.

Unit – III

Assertions and Reason – Logical Venn Diagrams – Alpha Numeric Sequence Puzzle.

Unit – IV

Cubes and Dice – Analytical Reasoning

Unit – V

Logical Deduction: Logic, Statement – Arguments, Statement – Assumptions, Statement – Conclusions, Deriving Conclusions from Passages.

Unit – VI

Clocks & Calendar.

Text Books:

1. Verbal and Non Verbal Reasoning by R. S. Agarwal.

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101 ME 83**PRE-PROJECT SEMINAR**

L	T	P/D	C
---	---	---	2

A pre-project seminar in fourth year first semester will be evaluated for 50 marks as follows. This is aimed at the students to identify a project on which they are likely to continue for their project in final year second semester.

Preliminary Report on progress of the work	10 marks
Mid Semester presentation	10 marks
Final report	10 marks
Final Presentation and Defense before a departmental Committee consisting of head, a senior faculty and supervisor	20 marks

There shall be no external evaluation in pre-project seminar.

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101 ME 84 INDUSTRY - ORIENTED MINI PROJECT

L	T	P/D	C
---	---	---	2

There shall be an industry-oriented mini-Project in their specialization that may be carried out in collaboration with an industry / R & D organization / Academic Institution, to be taken up during the vacation after III year II Semester examinations. However, the mini project and its report shall be evaluated during IV year I Semester. The industry oriented mini project shall be evaluated for a total of 75 marks with 25 marks for internal assessment and 50 marks for end examination. The mini project must be submitted in report form and should be presented before a committee, consisting of an external examiner, head of the department, a senior faculty member of the department and supervisor of the mini project.

The pattern of internal evaluation is as follows:

Work in progress as evaluated by internal guide	:	05 marks
Work in progress as evaluated by External guide	:	10 marks
Report	:	05 marks
Seminar presentation and defense of project	:	05 marks

If the mini project is conducted within the college, the work in progress is evaluated by the supervisor for 15 marks.

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101 ME 85

CAD/CAM LAB

L	T	P/D	C
---	---	3	2

ANALYSIS

1. **Solid Modeling:** Generation of various 3D Models through Protrusion, revolve, shell sweep. Creation of various features. Study of parent child relation. Feature based and Boolean based modeling surface and Assembly Modeling. Study of various standard Translators. Design simple components.

2. a). Determination of deflection and stresses in 2D and 3D trusses and beams.

b). Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components.

c). Determination of stresses in 3D and shell structures (at least one example in each case)

d). Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.

e). Steady state heat transfer Analysis of plane and Axisymmetric components.

3. a). Development of process sheets for various components based on tooling Machines.

b). Development of manufacturing and tool management systems.

c). Study of various post processors used in NC Machines.

d). Development of NC code for free form and sculptured surfaces using CAM packages.

e). Machining of simple components on CNC lathe and CNC Mill by transferring NC Code / from a CAM package. Through RS 232.

f) Quality Control and inspection.

The following Software Packages may be used for the lab exercises:

Use of AUTOCAD, CATIA, Pro-E, ANSYS, HYPERMESH, CAEFEM, Master CAM

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101 ME 86 PRODUCTION DRAWING PRACTICE LAB

L	T	P/D	C
---	---	3/2	1

UNIT – I

Conventional representation of Materials – conventional representation of parts – screw joints, welded joints, springs, gears, electrical, hydraulic and pneumatic circuits – methods of indicating notes on drawings.

UNIT – II

Limits and Fits: Types of fits, exercises involving selection / interpretation of fits and estimation of limits from tables.

UNIT – III

Form and Positional Tolerances: Introduction and indication of the tolerances of form and position on drawings, deformation of run out and total run out and their indication.

UNIT – IV

Surface roughness and its indication: Definitions – finishes obtainable from various manufacturing processes, recommended surface roughness on mechanical components.
Heat treatment and surface treatment symbols used on drawings.

UNIT – V

Detailed and Part drawings: Drawing of parts from assembly drawings with indications of size, tolerances, roughness, form and position errors etc.

UNIT – VI

Part drawing using computer aided drafting by CAD software

Drafting: Development of part drawings for various components in the form of orthographic and isometric. Representation of Dimensioning and tolerances scanning and plotting. Study of script, DXE AND IGES FILES.

Text Books:

1. Production Drawing : P.N.Reddy and T.A.Janardhan Reddy/Hi-Tech Publishers
2. Production Drawing K.L.Narayana and P.Kannaiah /New AGE Publishers

References:

1. Geometric dimensioning and tolerancing-James D. Meadows/B.S. Publications.
2. Engineering Metrology, R.K. Jain, Khanna Publications

**Syllabus for B. Tech. IV Year I semester
Mechanical Engineering**

Code: 101 ME 87

INSTRUMENTATION LAB

L	T	P/D	C
---	---	3/2	1

1. Calibration of Pressure Gauges
2. Calibration of transducer for temperature measurement.
3. Study and calibration of LVDT transducer for displacement measurement.
4. Calibration of strain gauge for temperature measurement.
5. Calibration of thermocouple for temperature measurement.
6. Calibration of capacitive transducer for angular displacement.
7. Study and calibration of photo and magnetic speed pickups for the measurement of speed.
8. Calibration of resistance temperature detector for temperature measurement.
9. Study and calibration of a Rotometer for flow measurement.
10. Study and use of a Seismic pickup for the measurement of vibration amplitude of an engine bed at various loads.
11. Study and calibration of Mcleod gauge for low pressure.

**Syllabus for B. Tech. IV Year II semester
Mechanical Engineering**

Code:101MB02**MANAGEMENT SCIENCE**

L	T	P/D	C
3	1	-	3

UNIT I: INTRODUCTION TO MANAGEMENT:

Management- Definitions, Levels of Management, functions of management Planning: types of planning, planning process; Organizing: Organizational Design and structure, staffing; Directing; Maslow's Motivational theory, Leadership styles, Controlling: Basic control process.

UNIT II: INTRODUCTION TO OPERATIONS MANAGEMENT:

Plant Location, plant layout, types of production, Work Study, Method study and Work Measurement, Basic Procedures, Project Management: Network Analysis - Programme Evaluation and Review Techniques, Critical Path Method, Crashing of Simple Networks.

UNIT III: MATERIALS MANAGEMENT:

Objectives of Materials, Need for Inventory Control, Economic Order Quantity, ABC Analysis, Inventory Control Systems, Just In Time, Introduction to LSCM, Quality Control Techniques – Inspection, ISO standards, Six Sigma.

UNIT IV:

(i) Human Resources Management: Objectives of HRM, Challenges of HRM, HR Planning process, HR functions and policies – Recruitment, Selection, Training and Development, Performance Appraisal, Assessment of HR requirements.

(ii) Marketing Management: Concept of Marketing, Functions, Marketing Mix, Product Life Cycle, Marketing Strategies, Channels of Distribution, Differences between products and services

UNIT V: INTRODUCTION TO ORGANIZATIONAL BEHAVIOUR:

Definition, Nature and Scope, Perception – Perceptual selectivity and organization, Personality and Attitudes - Personality as a continuum – Meaning of personality, Communication – types - interactive communication in organizations –barriers to communication and strategies to improve the follow of communication.

UNIT VI: STRATEGY AND MANAGEMENT CONTROL SYSTEM:

Concepts in Strategic Management, Vision, Mission, Objectives, SWOT Analysis, Concept of Strategic Planning, Competitive Advantage, Concept of Core Competence. An overview, Process and its Implementation, Target Setting, Balanced Score Card, Management Control in Empowered Organization – Conflict between Creativity and Control.

REFERENCES

- 1 Dr. Y. Satyanarayana: Management control systems in competitive environment, Icfai books.
2. A R Aryasri: Management Science, Tata Mc Graw Hill
3. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005
4. Kotler Philip & Keller Kevin Lane: Market Management 12/e, PHI, 2005
- 5 Strategic Management, Text and Cases, VSP Rao, V Hari Krishna
6. Thomas N Duening & John M. Ivancevich Management – Principles and Guidelines, Biztantra, 2003.

**Syllabus for B. Tech. IV Year II semester
Mechanical Engineering**

Code: 101M31 JET PROPULSION & ROCKET ENGINEERING

(PROFESSIONAL ELECTIVE-III)

L	T	P/D	C
4	---	---	4

UNIT-I

Elements of Gas Turbine theory – Thermo dynamic Cycles, open closed and semi-closed – Parameters of performances – Refinements to simple cycle

Jet Propulsion: Historical sketch – Reaction Principle – Essential features of propulsion devices – Thermal Jet Engines, Classification of – Energy flow, thrust, thrust power and propulsion efficiency – Need for Thermal jet engines and applications.

UNIT – II

Turboprop and Turbojet – Thermo dynamic cycles, Plant layout, essential components, principles of operation – performance evaluation – Thrust Augmentation and Thrust reversal – Contrasting with Piston Engine Propeller plant.

UNIT – III

Ramjet – Thermo dynamic Cycle, plant lay-out, essential components – Principle of operation – performance evaluation – Comparison among atmospheric thermal jet engines – elementary treatment of Scram jet and pulse jet.

UNIT – IV

Rocket Engines: Need for, applications – Basic principle of operation and parameters of performance – Classification, solid and liquid Propellant rocket engines, advantages, domains of application – Propellants – Comparison of propulsion systems.

UNIT – V

Rocket technology-I: Flight mechanics, Application Thrust Profiles, Acceleration – staging of Rockets, need for – Feed systems, injectors and expansion nozzles – Rocket heat transfer and ablative cooling

UNIT – VI

Rocket technology-II – Testing & Instrumentation – Need for Cryogenics – Advanced Propulsion Systems, elementary treatment of Electrical Nuclear and Plasma Arc Propulsion.

TEXT BOOKS:

1. Fundamentals of I.C. Engines/Gill, Smith and Zierys
2. Rocket Propulsion / Sutton
3. Gas Turbines/V.Ganesan/TMH
4. Thermodynamics of Propulsion / Hill & Paterson

REFERENCE BOOK:

1. Gas Turbines / Cohen, Rogers & Sarvana Muttou / Addison Wesley & Longman
2. Compressible fluid flow by Yahya

**Syllabus for B. Tech. IV Year II semester
Mechanical Engineering**

**Code: 101ME32 COMPUTATIONAL FLUID DYNAMICS
(PROFESSIONAL ELECTIVE-III)**

L	T	P/D	C
4	---	---	4

UNIT-I

Elementary details in numerical Techniques: Number system and errors, Representation of integers, Fractions, Floating point Arithmetic, loss of significance and error propagation, condition and instability, computational methods for error estimation, Convergence of Sequences.

UNIT – II

Applied Numerical Methods: Solution of a system of simultaneous Linear Algebraic Equations, iterative schemes of Matrix Inversion, Direct Methods for Matrix inversion, Direct Methods for banded matrices.

UNIT - III

Finite Difference Applications in Heat conduction and Convection – Heat conduction, steady heat conduction in a rectangular geometry, transient heat conduction, finite difference application in convective heat transfer, closure.

UNIT - IV

Finite Differences, discretization, consistency, stability, and Fundamentals of fluid flow modeling: Introduction, elementary finite difference quotients, implementation aspects of finite-difference equations, consistency, explicit and implicit methods.

Introduction to first order wave equation, stability of hyperbolic and elliptic equations, fundamentals of fluid flow modeling, conservative property, the upwind scheme.

UNIT - V

Review of Equations Governing Fluid Flow and Heat Transfer: Introduction, conservation of mass, Newton's second law of motion, expanded forms of Navier-stokes equations, conservation of energy principle, special forms of the Navier-stokes equations. Steady flow, dimensionless form of Momentum and Energy equations, Stokes equation, conservative body force fields, stream function - Vorticity formulation.

UNIT -VI

Finite Volume Method: Approximation of surface integrals, volume integrals, interpolation and differentiation practices, Upwind interpolation, Linear interpolation and Quadratic interpolation.

TEXT BOOK:

1. Numerical heat transfer and fluid flow / Suhas V. Patankar- Butter-worth Publishers
2. Computational fluid dynamics - Basics with applications - John. D. Anderson / Mc Graw Hill.

REFERENCES:

1. Computational Fluid Flow and Heat Transfer/ Niyogi, Pearson Publications
2. Fundamentals of Computational Fluid Dynamics – Tapan K. Sengupta / Universities Press.

**Syllabus for B. Tech. IV Year II semester
Mechanical Engineering**

Code: 101ME33

**COMPOSITE MATERIALS
(PROFESSIONAL ELECTIVE-III)**

L	T	P/D	C
4	---	---	4

UNIT – I

Introduction: Definition, classification of composite materials, advantages and disadvantages of composites, applications of composite materials

UNIT – II

Fibers and Matrices: Materials for fibers and matrices, their functional requirements, characteristics / properties, concepts of lamina, laminate

UNIT – III

Mechanics of Composite Materials: Approaches (macro- and micro- mechanics approaches), their features and differences; Fundamentals: Strain-displacement, Stress – strain and equilibrium relationships; engineering constants, classification of materials based on engineering constants (anisotropic to isotropic), stiffness and compliance matrices, transformation laws for stresses and strains (or stress-strain relations at arbitrary orientations)

Macromechanical Behaviour of Lamina: Plane stress and plane strain problems

UNIT - IV

Micromechanical Behaviour of Lamina: Volume and weight fractions, assumptions and limitations, approaches to the micromechanics study of composite materials – their features and differences; mechanics of materials approach to stiffness: determination of Young's modulus, Poisson's ratio and modulus of rigidity for an orthotropic material; problems

UNIT - V

Strength of a Laminate – Classical Lamination Theory (CLT): Types of laminate configurations, laminate engineering constants, stress – strain relationships, variation of stresses and strains in a laminate; problems

UNIT - VI

Theories of Failure: Maximum Stress Failure criterion, maximum strain failure criterion, Tsai-Hill failure criterion, Tsai-Wu failure criterion; summary of failure criteria and problems

TEXT BOOKS:

1. Mechanics of Composite Materials and Structures / Madhujit Mukhopadhyay / Universities Press
2. Mechanics of Composite Materials – Second Edition / Robert M. Jones / Taylor and Francis – Special Indian Edition

REFERENCES:

1. Mechanics of Composite Materials / Autar K. Kaw / CRC Press
2. Fiber-Reinforced Composites: Materials, Manufacturing, and Design / P.K.Mallick / CRC Press

**Syllabus for B. Tech. IV Year II semester
Mechanical Engineering**

Code: 101ME88

PROJECT

L	T	P/D	C
---	---	---	10

Out of total 200 marks for project work (in the final year second semester), 50 marks shall be for Internal Evaluation and 150 marks for the External Evaluation at the end of the Semester.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the chief superintendent. The committee consists of an external examiner, HOD, a senior faculty member and internal guide.

The pattern of Internal Evaluation is as follows:**Division of marks for internal assessment – 50 marks**

- Progress of Project work and the corresponding interim report as evaluated by internal guides at the end of 5 weeks : 05 Marks
- Seminar at the end of 5 weeks : 05 Marks
- Progress of Project work as evaluated by guides at the end of 10 weeks : 05 Marks
- Seminar at the end of 10 weeks : 05 Marks
- Evaluation by the Guides (at the end of 15 weeks) : 10 Marks
- Project Report : 05 Marks
- Final presentation and defense of the project : 15 Marks

If the project is conducted internally the marks supposed to be given by external guide will be given by internal guide himself.

Division of Marks for External Evaluation – 150 Marks**Pattern of External Evaluation for Project**

- Final Project Report : 30 Marks
- Presentation : 20 Marks
- Demonstration / Defense of Project : 100 Marks

**Syllabus for B. Tech. IV Year II semester
Mechanical Engineering**

Code: 101ME89

COMPREHENSIVE VIVA

L	T	P/D	C
-	-	-	2

There shall be a Comprehensive Viva-Voce in IV year II Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of an external examiner, Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the B.Tech. course of study up to IV Year. The Comprehensive Viva-Voce is valued for 50 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

**Syllabus for B. Tech. IV Year II semester
Mechanical Engineering**

Code: 101ME90

TECHNICAL SEMINAR

L	T	P/D	C
---	---	---	2

The evaluation is purely internal and will be conducted as follows:

Preliminary Report on progress of the work and viva	05 marks
Final report	05 marks
Presentation and Defence before a departmental committee consisting of Head, a senior faculty and supervisor	15 marks