Bansilal Ramnath Agarwal Charitable Trust’s

Vishwakarma Institute of Technology
(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Structure & Syllabus of
Department of Engineering, Sciences &
Humanities (DESH)

Pattern ‘A-16’
F. Y. B. Tech. (ECIT Group)
Effective from Academic Year 2016-17

Prepared by: - Board of Studies in Engineering, Sciences & Humanities

Approved by: - Academic Board, Vishwakarma Institute of Technology, Pune

Signed by,

Chairman – BOS   Chairman – Academic Board
## Content

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Program Outcomes

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
### F.Y. B. Tech. Structure for ECIT Group: Core Module Semester I and Semester II

**Course Code** | **Course Type** | **Course Name** | **Teaching Learning Scheme** | **Assessment Scheme (100 mark scale)** |
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<td>Grand Total (Semester II)</td>
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</tbody>
</table>

General Proficiency Courses [Please see Annexure I]
Course Name: Algebraic Structures

Course Code: ES101   Course Type: THT

Credits: 3     Teaching Scheme: Theory: 2 Hours / Week
              Tut : 1 Hours / Week

Unit I: Groups I         (5 Hours)
Binary Operation, Semi group, Monoid, Group, Finite Group, Composition table, Abelian
group, Subgroup

Unit II: Groups II          (5 Hours)
Permutation Group, Cyclic Group, Normal Subgroup, Lagrange Theorem, Coset, Quotient
Group, Direct product

Unit III: Residue Arithmetic       (5 Hours)
Congruence relation, properties of congruence relation, Unique factorization theorem, modular
representation, Euler \( \varphi \) function, properties of Euler \( \varphi \) function,

Unit IV: Rings and Fields        (5 Hours)
Groups under addition and multiplication (mod p), Ring, Polynomial Ring, Integral Domain,
Field, Finite field \( \mathbb{Z}_p^* \times \mathbb{Z}_n^* \), Diffie-Hellman Algorithm.

Unit V: Vector Spaces         (5 Hours)
Rank of matrix, System of linear equations, Vector Space, Euclidean Vector space, Subspace,
Span of a set, Spanning Set, Linear Dependence, Independence, Basis and dimension of a
vector space

Unit VI: Linear Transformations       (5 Hours)
Matrix as a Linear Transformation, Euclidean Inner Product, Orthogonal Transformation,
Geometric properties of linear operators on \( \mathbb{R}^2 \) and \( \mathbb{R}^3 \), Fundamental Subspaces

List of Tutorials:

<table>
<thead>
<tr>
<th>Tutorial Number</th>
<th>Topic</th>
<th>Mode of Conduct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Binary Operation, Semi group, Monoid, Group, Finite Group</td>
<td>Instructions, Basic problem solving, Home Assignment</td>
</tr>
<tr>
<td>2</td>
<td>Composition table, Abelian group, Subgroup</td>
<td>Problem Solving, Home Assignment</td>
</tr>
<tr>
<td>3</td>
<td>Permutation Group, Cyclic Group, Normal Subgroup</td>
<td>Problem Solving, Group Activity(Applications), Home Assignment</td>
</tr>
<tr>
<td>Chapter</td>
<td>Topic</td>
<td>Assignments</td>
</tr>
<tr>
<td>---------</td>
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<td>-------------</td>
</tr>
</tbody>
</table>
| 4 | Lagrange Theorem, Coset, Quotient Group, Direct product | • Problem Solving  
 • Home Assignment |
| 5 | Congruence relation, properties of congruence relation, Unique factorization theorem, modular representation | • Problem Solving  
 • Home Assignment |
| 6 | Euler \( \phi \) function, properties of Euler \( \phi \) function, | • Problem Solving  
 • Group Project  
 • Home Assignment |
| 7 | Mid semester Assessment | • Viva/MCQ test/Quiz |
| 8 | Groups under addition and multiplication (mod p), Ring, Polynomial Ring | • Problem Solving  
 • Home Assignment |
| 9 | Problems on \( (\mathbb{Z}_p^+)^n \) and \( (\mathbb{Z}_p^*)^n \), Finite field, Integral domain | • Problem Solving  
 • Group Activity(Applications)  
 • Home Assignment |
| 10 | Rank of matrix, System of linear equations, Euclidean Vector space, Subspace | • Problem solving  
 • Use of calculator  
 • Home Assignment |
| 11 | Span of a set, Spanning Set, Linear Dependence, Independence, Basis and dimension of a vector space | • Problem solving  
 • Group activity(Task)  
 • Home Assignment |
| 12 | Matrix as a Linear Transformation, Euclidean Inner Product, Orthogonal Transformation | • Problem Solving  
 • Use of calculator  
 • Home Assignment |
| 13 | Geometric properties of linear operators on \( \mathbb{R}^2 \) and \( \mathbb{R}^3 \), Fundamental Subspaces | • Problem Solving  
 • Home Assignment |
| 14 | End semester assessment | • Viva/MCQ test/Quiz |

**Text Books:**

**Reference Books:**
Course Outcomes:
The student will be able to –
1. acquire the concepts of algebraic structures and linear algebra
2. use properties of congruence relations and relate matrices to linear transformations and interpret geometrically
3. demonstrate the knowledge of permutation groups, cyclic groups, rings, fields, linear dependence/independence
4. Recognize the concepts of Euler φ function, span, spanning set, basis, dimension linear transformation, inner product, orthogonal transformation
5. set up and solve system of linear equations, polynomials and compute computational table, order and inverse of an element in \( \mathbb{Z}_p \) and \( \mathbb{Z}_p^* \).
Course Name: Computer Programming

Course Code: CS101   Course Type: THL
Credits: 5   Teaching Scheme: Theory: 3 Hours / Week
           Lab : 4 Hours / Week

Unit I: Introduction to programming (8 Hours)
Problem solving using computers; algorithms and flowcharts; using simplecpp graphics
commands; notion of syntax and semantics; Repeating a block of commands; Nested repeat;
numerical functions; comments; Data types; identifiers; initialization; const; Input and Output;
Arithmetic operators; programming idioms; Compound assignment; blocks; scope and
shadowing.

Unit II: Flow of Control (7 Hours)
Conditional Constructs: Relational and Logical Operators, various forms of if..else statements,
ternary operator, switch..case statement;
Loops: Types of Loops, while, do..while, for, break and continue, goto statement.

Unit III: Array, Strings and Pointers (10 Hours)
Arrays: Definition, syntax, element operations, memory representation, initialization. Two
dimensional array, row and column major;
Applications of arrays: sorting, searching and matrix operations;
Pointers: Definition, syntax, address of operator, pointer variables, relevance of data type in
pointer variables, dereferencing operator, Pointer to pointer, address arithmetic;
Array and Pointers: Accessing array elements using pointers;
Strings: Introduction, Array of characters, output, input, character string constant, Accepting
multiword string, Array of strings.

Unit IV: Functions and Recursion (7 Hours)
Functions: Introduction; definition; anatomy of function; execution of function; Scope of
various types of variable; scope; local and global variables; nested function call; returning
values from function; Menu driven programs;
Function and Pointers: Call by value v/s call by address, Passing array to function, returning
pointers from function, dangling pointers;
Function and strings: Library functions from string.h library, building user defined functions
for string operations;
Recursive Function: Definition, Examples, Types of recursion.

Unit V: Structures (6 Hours)
Structure: Need, Definition, syntax, declaration and initialization, structure variables, accessing
and assigning values to structure variables, “dot” operator;
Applications of structure: Functions and structures, array and structure, structure within a
structure, pointers and structures.
Unit VI: File handling
(4 Hours)
Introduction to file handling, using file pointers, file opening modes, reading from file, writing into file, closing file.

List of Practical:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Graphics: Drawing basic diagrams using SimpleCpp</td>
</tr>
<tr>
<td>2</td>
<td>Making computer calculate stuff : calculating average, finding roots of quadratic equation, complex numbers etc.</td>
</tr>
<tr>
<td>3</td>
<td>Switch statement: controlling the turtle</td>
</tr>
<tr>
<td>4</td>
<td>Loops, Conditionals and Arithmetic operations: Converting base of a number, Generating arithmetic and geometric progressions, Buttons on Canvas, Reversing n digit number etc.</td>
</tr>
<tr>
<td>5</td>
<td>Example: marks display program, find min/max Generate roll numbers</td>
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<tr>
<td>6</td>
<td>Linear and Binary Search</td>
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<tr>
<td>7</td>
<td>Bubble sort</td>
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<tr>
<td>8</td>
<td>Insertion and Selection Sort</td>
</tr>
<tr>
<td>9</td>
<td>Matrix arithmetic</td>
</tr>
<tr>
<td>10</td>
<td>Demonstrating pointer to pointer, pointer arithmetic</td>
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<tr>
<td>11</td>
<td>Assignment on functions – menu driven programs, etc.</td>
</tr>
<tr>
<td>12</td>
<td>Using library functions</td>
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<tr>
<td>13</td>
<td>Implementing User defined string functions</td>
</tr>
<tr>
<td>14</td>
<td>Calculate factorial, generating progressions, GCD, LCM using recursion</td>
</tr>
<tr>
<td>15</td>
<td>Create Structures for: student result, employee payroll, library book issuing</td>
</tr>
<tr>
<td>16</td>
<td>File handling: Store employee records in a file</td>
</tr>
</tbody>
</table>

Text Books:

Reference Books:
3. Kalicharan Noel, C By Example, UK, Cambridge University Press

Course Outcomes:
Upon completion of the course, graduates will be able to –
1. List procedural programming benefits to solve real world problems using generic prototype
2. Develop visual representation of problem in hand
3. Apply available algorithmic principles to generate efficient solutions.
4. Justify modular programming approach by making use of elementary as well as superior data structures
5. Apply programming fundamentals to solve real-world problems using generic prototype.
6. Evaluate and manipulate given solutions in reengineered view.
Course Name: Electrical Engineering

Course Code: ES103

Credits: 4

Course Type: THL

Teaching Scheme: Theory : 3 Hours / Week
Lab : 2 Hours / Week

Unit I: D.C. Circuits
Ohm’s law, Kirchhoff’s law, Network reduction, Superposition theorem, Thevenin’s theorem, Norton’s theorem, Maximum power transfer theorem. Numericals.

Unit II: A.C. Circuits: Single phase

Unit III: A.C. Circuits: Three phase
3 Phase a.c. supply, phase sequence, concept of line, phase, neutral etc. Phasor diagram, power calculation, 3 phase balanced star/delta connection. Numericals.

Unit IV: Transformer
Single phase and three phase transformer, working principle, e.m.f. equation, ideal and practical transformer, loss, regulation, efficiency calculation. Special transformers CT/PT, ferrite core transformers. No numericals.

Unit V: D.C. Machines
Construction, working principle, back e.m.f. torque equations, motor types, motor characteristics, speed control methods, problems. Different starters of d.c. motors. Applications of d.c. motors.

Unit VI: A.C. Motors
Three phase induction motor, construction, RMF, working principles, slip ring and squirrel cage type, max torque, starting torque, full load torque, condition for max torque, slip torque characteristic, starters. Different starters of induction motors. Applications of a.c. motors.

List of Practical:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to electrical component.</td>
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<tr>
<td>2</td>
<td>Load test on 1 phase transformers.</td>
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<tr>
<td>3</td>
<td>Load test on d.c. shunt motor.</td>
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<tr>
<td>4</td>
<td>Speed control of d.c. shunt motor.</td>
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<tr>
<td>5</td>
<td>Study of star and delta circuit.</td>
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</tbody>
</table>
### Course Outcomes:
The student will be able to-
1. Understand different theorems and able to solve numericals on it.
2. Understand concept of single phase and three phase a.c. circuit
3. Find losses and efficiency of single phase transformer.
4. Understand construction and working of DC machines and solve numerical problems.
5. Understand construction and working of induction motor and the T-S characteristic.

### Text Books:
1. Edward Hughes; Electrical Technology.
2. B.L.Theraja Vol-2; Electrical Technology.
3. H.Cotton; Electrical Technology.

### Reference Books:
1. Electric Machinery, TMH(Sixth Edition)-Fitzgerald.
2. Electrical Machines, Drive and power system, Pearson education-Theodore Wildi.
3. Electric Machines, TMH-Nagrath Kothari.
4. Electrical Machines and transformers- Irving Kosow.

<table>
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<tr>
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<td>Load test on three phase induction motor.</td>
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<td>7</td>
<td>Lab Assignment : Electrical bill study</td>
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<td>8</td>
<td>Substation visit.</td>
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<tr>
<td>9</td>
<td>Study of D.C. motor starter.</td>
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<tr>
<td>10</td>
<td>Study of A.C. motor starter</td>
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Course Name: Electronics Engineering

Course Code: EC101       Course Type: TH

Credits: 3               Teaching Scheme: Theory :3 Hours / Week

Unit I: Electronic Devices (7 Hours)

Unit II: Logic Gates and Boolean Algebra (7 Hours)
Concepts of binary logic, Boolean Algebra, De-Morgan’s Theorem, Simplification of Boolean expressions, Concepts of K-Maps; Logic gates and Truth table, NAND and NOR gate as universal gate; Half Adder, Full Adder; Flip-Flops–JK and D; Logic families–TTL, CMOS.

Unit III: Integrated Circuits (7 Hours)
Concept of IC; Types of ICs–SSI, MSI, LSI, VLSI, ULSI; Package type of ICs–Metal CAN, Plastic dual in line, Ceramic flat package; Basics of Op-Amp–Symbol, Equivalent circuit, Parameters; Open loop Op–Amp configurations– Differential Amplifier, Inverting, Non-inverting, Closed loop Op–Amp configurations; 555 timer IC– Pin configuration and block diagram.

Unit IV: Analog Communication (7 Hours)
Need for analog communication, Communication system, Need for modulation, Types of modulation–AM, FM and PM; Amplitude modulation– Definition, Equation, Subtypes, Basic circuit, Spectrum , Bandwidth and power requirement; Receiver.

Unit V: Filters (7 Hours)
Concept of Fourier series, Concept of spectrum, Concept of Filters, Classification of filters– Passive and Active, AF and RF, Analog and Digital; Comparison of active and passive filters; Circuits for Passive filters; Active filters–Butterworth and Chebshew, Concept of Nth order filter; Design of first order low pass and high pass Butterworth filter.

Unit VI: Applications of Electronic Circuits (7 Hours)
Applications of diode as regulator and rectifier; Application of Transistor as an amplifier; Registers and Counters; Applications of Op-Amp– comparator, log amplifier, V-I and I-V converters, Integrator, Differentiator; AM using diode; Study of Datasheets–Diode 1N400X, BJT BC548, MOSFET 2N7000, Op-Amp IC741, 555 timer IC, Function Generator IC8038.

Text Books:
1. Thomas L. Floyd, Electronic Devices, Pearson Education.

Reference Books:

Course Outcomes:
The student will be able to –
1. Explain the basic concepts and working of electronic devices like diode, BJT and MOSFET.
2. Illustrate digital circuits using logic gates.
3. Elaborate open loop and closed loop configurations of integrated circuits.
4. Describe the need and types of analog modulation techniques.
5. Compare the frequency response of active and passive filters.
6. Discuss the applications of electronic circuits.
Course Name: Indian Philosophy and Ethics

Course Code: HS151  
Course Type: TH

Credits: 2

Teaching Scheme:Theory : 2 Hours / Week

Unit 1: Introduction & The Philosophy of Logic and Reasoning (Nyaya) (6 Hours)
Introduction to “The Six Systems of Indian Philosophy of Ancient India”. The Philosophy of Logic and Reasoning (Nyaya). Sources of Valid Knowledge with their merits and de-merits. Importance of Testimony and the Logic presented to argue for the sake of a creator v/s the argument presented against one. The various objects of knowledge (Prameya).

Unit 2: Dualism (Sankhya) and Analysis of Aspects of Reality (Vaisheshika) (6 Hours)
The Dualistic Model, French Philosopher Rene Descartes and his ideas on Dualism, Indian system of Dualism (Sankhya) : Analogies and Validations presented for the idea of self separate from the body, Reincarnation cases, Consciousness: The mysterious missing link. The three modes of material nature and their effects on consciousness. Analysis of aspects of Reality (Vaisheshika) : Effect of Illusion on the mind and the goal of the six systems of Indian philosophy.

Unit 3: Self Discipline for Self Realization (Yoga sutras) (4 Hours)
Detailed analysis of the nature of mind and the interaction of the mind and senses. The 8-fold path of Ashtanga Yoga as per Patanjali Yoga sutras and the purpose of the Yoga system.

Unit 4: The Higher Deliberation (Uttara Mimamsa) (4 Hours)
The Vedantic Model : The various aspects of Absolute Truth, The interaction between material nature (Prkrti), Self (Jiva) and Absolute Self (Purusha). Comparison of the Vedantic Model with other theistic philosophies. The Bhakti Yoga model as compared to Yoga Sutras of Patanjali.

Unit 5: Elevation through performance of duty (Karma Mimamsa) (4 Hours)
The Universal Law and Order (The web of Karma), Polytheistic model v/s Monotheistic model, Karma Yoga model. Universal utilities and the purpose of ritualism.

Unit 6: Ethics from Indian Epics (4 Hours)
Ethics related to Leadership, Cooperation, Team Spirit, Competitiveness, Wealth and Friendship from Chanakya Niti and Mahabharat.

Text Books:
2. Suhotra Dasa Tapovanachari,The Six systems of Vedic Philosophy, (Online PDF book)

Reference Books:

Course Outcomes:
The student will be able to –
1. Apply the most appropriate tool of acquiring knowledge for a suitable object of knowledge.
2. Discern the reasons for the dual model of self & body and effects of the three modes on consciousness.
3. Evaluate the purpose of the 8 steps of the Yoga sutras and their consequence on the human mind.
4. Contrast the aspects of Absolute truth as laid out by the Vedanta model with the world’s theistic philosophies.
5. Argue for the sake of Universal Law of Karma and the differences between monotheistic and polytheistic models.
6. Practice ethics in one’s personal, professional and family life.
Vishwakarma Institute of Technology

Course Name: Engineering Drawing

Course Code: ME101   Course Type: LTH

Credits: 3   Teaching Scheme: Theory: 2 Hours / Week
            Lab: 2 Hours / Week

Unit I: Orthographic Projections   (6 Hours)
Reference Planes, Types and Methods of projections with symbols, Projections of various objects, Various types of sectional views.

Unit II: Isometric Drawing   (5 Hours)
Types of pictorial projections, isometric Projections and Isometric views, Construction of Isometric views from given orthographic views.

Unit III: Projections of points, lines and planes   (5 Hours)
Projections of points in various quadrants, Projections of lines inclined to both reference planes (lines in first quadrant only), locating traces of lines, Projections of planes inclined to both reference planes.

Unit IV: Projections of Solid   (5 Hours)
Projections of Solids: Classification of solids, Projections of solids such as Prism, Pyramids, Cylinder, Cone, Cube, tetrahedrons inclined to both reference planes.

Unit V: Development of Lateral Surfaces   (4 Hours)
Development of Lateral Surfaces of Solids (DLS): Development of Lateral Surface-concept, methods, applications.

Unit VI: Limits, Fits and tolerances   (4 Hours)
Concepts of limits, fits and tolerances, its application and numerical

List of Practical:
1. Introduction to Lines, Lettering and Dimensioning   (2 Sessions)
   Students will learn various types of lines and their applications. They will also learn various standard practices of dimensioning and Lettering.

2. Orthographic Projections   (2 Sessions)
   Students will draw sectional orthographic projections of simple machine components.

3. Isometric Drawing   (1 Sessions)
   Students will draw isometric drawings of simple machine components.
4. Introduction to Solid Modeling with CATIA
   (5 Sessions)
   a. Introduction and use of sketcher workbench
      Drawing and constraining sketches, perform sketch analysis
   b. Creating base features (Part modeling)
      Using operations like extrude (pad), revolve (shaft), sweep (rib) to create 3D base features
   c. Boolean operations
      Creating additional reference elements like point, lines and planes. Performing Boolean operations like Add, Assemble, Remove, and Union trim to model machine components.
   d. Creating dress-up features
      Creating fillets, chamfers, draft, shell, split, close volume solids
   e. Drafting Tools
      Obtaining and editing 2D drawings from 3D models

Text Books:
4. Sham Tickoo; CATIA V5-6R2014 for Engineers and Designers; Dreamtech press.

Reference Books:
1. Warren J. Luzzader ; Fundamental of Engineering Drawing; Prentice Hall of India, New Delhi.

Course Outcomes:
The student will be able to –
1. To learn standard practices of lines, lettering and dimensioning in Engineering Drawing.
2. Visualize and draw orthographic projections of 3D object
3. Visualize the object and draw isometric views for simple machine components
4. To plot the projection of lines and planes.
5. To draw the projection of solids & develop lateral surfaces of solids.
6. To understand concepts of limits, fits and tolerances
7. To model machine components and generate drawings using CAD tool.
Course Name: Multivariate Calculus

Course Code: ES102  
Course Type: THT

Credits: 3  
Teaching Scheme: Theory: 2 Hours / Week  
Tut: 1 Hours / Week

Unit 1: Partial Differentiation  
Introduction to functions of two or more variables, surfaces, limits and continuity, Partial derivatives, chain rules, derivative of implicit function.

Unit 2: Applications of partial differentiation  
Homogeneous functions, Euler’s theorem, Jacobian, maxima and minima of functions of two variables, Method of Lagrange’s multipliers.

Unit 3: Double Integration  
Beta and Gamma function, Introduction to Cartesian and polar curves, Evaluation of double integrals, change of order, change of variables.

Unit 4: Triple Integration  
Co-ordinate systems in 3 Dimensions, Standard surfaces, Evaluation of triple integrals, Dirichlet’s integral, change of variables

Unit 5: Vector Differentiation  
Scalar and Vector point functions, tangential and normal components of velocity and acceleration, gradient, directional derivative, divergence and curl.

Unit 6: Vector Integration  
Line integral, work done, conservative vector field, Surface integral, Theorem of Green, Stokes and Gauss.

List of Tutorials:

<table>
<thead>
<tr>
<th>Tutorial Number</th>
<th>Topic</th>
<th>Mode of Conduct</th>
</tr>
</thead>
</table>
| 1               | Functions of two or more variables, surfaces, Evaluation of partial derivatives. | Instructions  
|                 |                                                                      | Basic problem solving  
|                 |                                                                      | Home Assignment                  |
| 2               | Chain rules for partial derivatives, derivative of implicit function. | Problem Solving  
|                 |                                                                      | Home Assignment                  |
| 3               | Homogeneous functions, Euler’s theorem, Jacobian.                    | Problem Solving  
<p>|                 |                                                                      | Home Assignment                  |
| 4               | maxima and minima of functions of two variables, Method of Lagrange’s multipliers. | Problem Solving                  |</p>
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Activities</th>
</tr>
</thead>
</table>
| 5    | Beta and Gamma function, Introduction to Cartesian and polar curves, Evaluation of double integrals. | • Group Project  
• Home Assignment |
| 6    | change of order, change of variables.                                | • Problem Solving  
• Demonstration on curves  
• Home Assignment |
| 7    | Mid semester assessment                                              | • Viva/MCQ test/Quiz                           |
| 8    | Co-ordinate systems in 3 Dimensions, Standard surfaces, Evaluation of triple integrals. | • Problem Solving  
• Demonstration on surfaces.  
• Home Assignment |
| 9    | Dirichlet’s integral, change of variables                            | • Problem Solving  
• Home Assignment |
| 10   | Scalar and Vector point functions, tangential and normal components of velocity and acceleration, gradient. | • Problem solving  
• Home Assignment |
| 11   | directional derivative, divergence and curl.                         | • Problem solving  
• Group activity(Task)  
• Home Assignment |
| 12   | Line integral , work done, conservative vector field, Surface integral, Theorem of Green | • Problem Solving  
• Group Project(Applications)  
• Home Assignment |
| 13   | Stokes and Gauss theorem.                                            | • Problem Solving  
• Home Assignment |
| 14   | End semester assessment                                              | • Viva/MCQ test/Quiz                           |

**Text Books:**

**Reference Books:**
Course Outcomes:
The student will be able to –
1. Acquire the knowledge of partial derivatives, vector differentiation and line integrals.
2. Apply the knowledge of partial derivative to find maxima and minima of functions of two variables, change of variables to evaluate double and triple integral.
3. Interpret and analyze properties of jacobians, gradient, curl and divergence.
4. Demonstrate the use of special functions in solving improper integrals, evaluation of multiple integrals.
5. Recognize, identify curves and surfaces, scalar and vector point functions, order of integration, homogeneous functions.
Course Name: Applied Physics

Course Code: ES104     Course Type: THL

Credits: 4     Teaching Scheme: Theory : 3 Hours / Week
              Lab : 2 Hours / Week

Unit 1: Optics  (7 Hours)
Interference: Thin film interference, Colours in thin films, Michelson’s interferometer,
Applications: Wavelength and thickness, Antireflection coatings, Interference filters,
Diffraction: Fresnel and Fraunhofer diffraction, Single slit Fraunhofer diffraction, diffraction
grating (Qualitative), Dispersive power, Rayleigh's criterion, Resolving power of grating and
telescope, X - ray diffraction, Bragg’s law,
Polarization: Brewster’s law, Malus law, Double refraction (Huygen’s theory), Retarders,
Quarter and half wave plate, circular and elliptical polarization, Applications: Polaroid goggles
and 3D – Movies, LCD

Unit 2: Electron Optics and Special Theory of Relativity  (7 Hours)
Electron Optics: Electron motion in electric (parallel and perpendicular) and transverse
magnetic field, Crossed Electric and Magnetic Fields, Electrostatic and Magneto-static
Focusing, Applications: Cathode Ray Tube, Scanning Electron Microscope,
Special Theory of Relativity: Physical Event, Frames of References, Galilean Relativity,
Michelson Morley Experiment (Qualitative), Lorentz Transformations of Space, Time and
Velocity, Einstein's formulation of special relativity, Length Contraction, Time Dilation,
Relativistic Mass (Qualitative), Momentum, Force, Mass and Energy, Applications: e.g.
Nuclear, Energy, (Gravitational and Relativistic Time Dilation Effects: Satellite
Communication, Global Positioning System (GPS))

Unit 3: Quantum Mechanics  (7 Hours)
Matter Waves: Limitations of classical mechanics (Rutherford’s atomic model, Black body
radiation, Photoelectric effect, Bohr atom model) and need of quantum mechanics, Wave
particle duality, de-Broglie's hypothesis, Davisson - Germer Experiment, Phase and Group
velocity, Heisenberg's uncertainty principle, Single slit electron diffraction, γ – ray microscope,
Applications of uncertainty principle,
Wave Equations: Wave function (ψ), Max Born’s interpretation, Physical significance of ψ and
ψ², Schrödinger’s wave equations and it’s applications: 1 D - Infinite potential well, Finite
potential well (Qualitative), Tunneling effect: Tunnel Diode, Scanning Tunneling Microscope
(STM)
Unit 4: Semiconductor Physics (7 Hours)

**Semiconductors:** Quantum numbers, Kronig-Penny Model (Qualitative), Band Theory of Solids, Energy Bands in C (Graphite, Diamond), Si, Ge, Sn, Ohm’s Law (Microscopic), Temperature Dependence of Conductivity, Hall Effect, Fermi Level, Fermi-Dirac Probability Distribution Function, Fermi Level in Intrinsic (derivation) and Extrinsic Semiconductors (Effect of Temperature and Doping Level on Fermi Energy), Working of PN Junction Diode from Energy Band Diagrams, Light Emitting Diodes, Photodiode, Photovoltaic Effect: Solar Cell Working and Characteristics.

**Introductory Nanotechnology:** Nanomaterials, Properties (Quantum size effects: optical, electrical, magnetic, structural and mechanical), 0, 1, 2 Dimensional Nanostructures, Nanomaterial Synthesis Techniques (Physical, Chemical etc.), Applications: Energy, Space, Electronics, Defense, Textile, Cosmetics, Medical, Environment, Automobiles.

Unit 5: Lasers and Fiber Optics (7 Hours)


**Fiber Optics:** Optical Fiber, Total Internal Reflection, Acceptance Angle and Cone, Fractional Refractive Index Change, Numerical Aperture, Modes of Propagation, Types of Optical Fibers, Losses in Optical Fiber, Applications: Fiber Optics Communication System, Fiber Optic Sensors

Unit 6: Magnetic Materials and Superconductivity (6 Hours)

**Magnetic Materials:** Magnetic field (B), Permeability, Magnetic Field Strength (H), Magnetization, The Bohr Magnetron, Curie’s Law, Hysteresis, Magnetic materials: Dia, para, ferromagnetic, ferrimagnetic, Applications: Transformer cores, Electromagnetic shielding, Magnetic memory storage devices,

**Superconductivity:** Properties (Zero Resistance, Meissner Effect, Critical Fields, Persistent Currents, Critical Current Density, London Penetration Depth, Isotope Effect), Type I and II Superconductors, BCS Theory, High Tc Superconductors and it’s preparation, DC and AC Josephson Effect, Applications: Superconducting Quantum Interference Devices (SQUID), Superconducting Computer, Transmission Lines, Superconducting Magnets, Maglev Trains,
List of Practical:
(Any Five Experiments as per following code of conduct)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Experiment</th>
<th>Mode of Conduct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Determination of Wavelength of Light using Michelson’s Interferometer</td>
<td>Use of diffraction grating for the determination of wavelength of spectral line and determination of resolution of spectral lines using diffraction grating and spectrometer</td>
</tr>
<tr>
<td>2.</td>
<td>Determination of Brewster’s angle for glass surface and refractive index of glass.</td>
<td>Demonstration of Lissajous figures using a CRO (Principle of interference) concepts of polarization – Plane, Circular and Elliptical Polarization Any one of two to be performed by students and other for demonstration of working principle.</td>
</tr>
<tr>
<td>5.</td>
<td>Study of diode characteristics (PN, Zener, Tunnel, Photodiode, Light Emitting Diode etc.)</td>
<td>Determination of wavelength and thickness of wire using LASER and determination of beam divergence of LASER. Optical fibre communication system</td>
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<tr>
<td>6.</td>
<td>Course Project Work</td>
<td>Projects will be allotted in groups at the beginning of semester.</td>
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<td>7.</td>
<td>Course Project Work</td>
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<td>8.</td>
<td>Course Project Work</td>
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<td>Course Project Work</td>
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<td>10.</td>
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<td>11.</td>
<td>Course Project Work</td>
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<tr>
<td>12.</td>
<td>Course Project Work</td>
<td></td>
</tr>
</tbody>
</table>

Text Books:

Reference Books:
2. *Young and Freedman, University Physics, 10th / 11th / 12th / 13th Edition, Pearson Education*

**Course Outcomes:**

The student will be able to

1. distinguish, analyze, determine the physical terms from thin film interference, diffraction, polarization and to measure experimentally (wavelength, spectral resolution etc.)
2. justify, infer, differentiate, calculate terms related to electron motion in electric, magnetic fields while mass, space, time, velocity, momentum, energy, mass – energy equivalence etc.) in relativistic situations and experiment on CRO.
3. recognize, effectuate, utilize, the fundamental principles of quantum mechanics to solve problems and to interpret the applications in the quantum regime.
4. derive, draw, evaluate, compute the physical terms in semiconductor physics (Fermi Energy, Energy band diagrams etc.), and to experiment the basic semiconductor devices(e.g. solar cell, pn junction diode etc.) and differentiate, analyze the properties at nano scale, nanomaterials and interpret their applications.
5. differentiate, correlate, different lasers (e.g. He-Ne laser, Ruby laser etc.) construe their working mechanism, also analyze, evaluate the fundamental terms in fibre optics (e.g. acceptance angle, numerical aperture etc.) their applications, experiment (on lasers fibre optics)
6. analyze, interpret, distinguish and calculate the basic terms, properties related with magnetism (magnetization, magnetic moment etc.) and superconductivity (e.g. critical temperature, penetration depth etc.) and elucidate their applications.
Course Name: Mechanical Engineering

Course Code: ME102  Course Type: TH

Credits: 3  Teaching Scheme: Theory : 3 Hours / Week

Unit I: Introduction to automobiles (9 Hours)
Power transmission devices: Construction, working, comparison and applications of Belt drive, rope drive, chain drive, gear drive (numerical), Mechanisms (Kinematic pair, chain, inversions). Introduction, classification, Basic parts (Motor Cycle & Car), Specifications, performance parameters (Descriptive treatment only).

Unit II: Thermal Engineering (7 Hours)
Thermodynamic system, properties, thermodynamic processes and cycles, laws and applications, heat sink, source, Carnot cycle, heat engine, heat pump, refrigeration system, air conditioning system.

Unit III: Power Engineering (10 Hours)
Power Producing Device: Types, working principles and applications - Boilers, Turbines, I.C. engines
Power Absorbing Devices: Types, working principles and applications - Pumps, compressors
Power Generation: Plant layout, components and functions of - Thermal, hydroelectric, solar, wind power plant

Unit IV: Heat transfer (6 Hours)

Unit V: Manufacturing Processes (6 Hours)
Manufacturing Processes: Casting (types, advantage, limitations, applications), metal forming (types, principles, advantages, defects, applications), Machining (shaping, planning, turning, boring, drilling, milling), metal joining (welding, soldering, brazing), plastic processing (injection moulding, blow moulding, extrusion).

Unit VI: Engineering Materials (4 Hours)
Engineering Materials: Mechanical properties of materials, material classification, factors affecting material selection, fiber reinforced composites

Text Books:

Reference Books:

Course outcomes:
Student will be able to-
1. Identify various mechanical elements, drives, mechanisms and learn basics of automobiles.
2. Understand basic concepts of thermal engineering.
3. Understand working principles of power plants and devices.
4. Understand different modes of heat transfer and their governing laws.
5. Understand various manufacturing processes
6. Understand mechanical properties of material
Course Name: Engineering Mechanics

Course Code: ES105  
Course Type: TH

Credits: 2  
Teaching Scheme: Theory : 2 Hours / Week

Unit I: Basics of Statics  
(5 Hours)
Review: Types of Mechanics, historical development, idealization, SI units, prefixes & their conversions, scope of study, force, surface forces, body force, internal force, various force systems, six fundamental principles of mechanics.

Coplanar Force System: Rectangular & skew resolution, composition of forces, resultant and equilibrium of particle, moment of force, Varignon’s theorem, couple, and equivalent force couple system, resultant of parallel and non concurrent non parallel force system.

Unit II: Non-coplanar Force System  
(5 Hours)
Vector representation of force, rectangular components of a force, direction angles, direction cosines, unit vector, position vector, dot product and cross product, moment of force about a point & about an axis, resultant and equilibrium of concurrent, parallel & general force systems, types of supports and support reactions.

Unit III: Equilibrium of Rigid Bodies  
(5 Hours)
Conditions of equilibrium for a body in coplanar and non coplanar force system Concept of free body diagram, types of supports, loads& beams, determination of reactions at supports for various types of loads on beams(simply supported,cantilever,compound) and simple frictionless rigid body assemblies.

Unit IV: Kinematics of Rectilinear Motion  
(5 Hours)
Review: concept of position, displacement, distance, speed, average & instantaneous velocity and acceleration, uniform motion, uniformly accelerated motion, constant acceleration equations, gravitational motion & its equations.
Variable acceleration: primary and secondary equations of motion, general approach for determination of motion of a particle, application to variable acceleration, motion curves.

Unit V: Kinematics of Curvilinear motion  
(5 Hours)
Motion along plane curved path, velocity and acceleration in three systems: rectangular coordinate (x-y), normal and tangential (n-t), radial and transverse (r-θ ).

Unit VI: Kinetics of a particle  
(5 Hours)
Force and acceleration: introduction to kinetics, Newton’s second law of motion, D-Alembert’s principle, dynamic equilibrium, concept of FBDE, application of $F = ma$ in (i) Rectangular components (ii) tangential and normal components.

Text Books:

Reference Books:

Course Outcomes:
Student will be able to-
1. Evaluation of resultant and moment and apply equilibrium equations to coplanar force system.
2. Find of resultant, moment and apply equilibrium equations for non-coplanar force system.
3. Apply equilibrium equations to beams and simple frictionless rigid body assemblies.
4. Define the differential equations of rectilinear motion and represent this motion graphically.
5. Investigate particle motion along a curved path using different coordinate systems.
6. Analyze the force-acceleration motion of particle using equations of motion with different coordinate systems.
Course Name: Biomedical Technology

Course Code: ES106  Course Type: TH

Credits: 2  Teaching Scheme: Theory : 2 Hours / Week

Unit I: Human Anatomy  (6 Hours)
[A] Delivery Content: Cardiovascular System; Structure and working of Heart, Electroconduction System of Heart, Circulatory System, Composition of Blood and its Functioning, Nervous System; The Neuron structure, Structure and Functions of CNS (Brain and Spinal cord), PNS and ANS, Respiratory system; Organs of Respiration, Mechanism of Breathing, Regulation of Respiration (Lung Functioning),
[B] Learner’s Assignment: Analysis of Haemogram and Lipid Profile Test data

Unit II: Physiological Parameters I  (3 Hours)
[A] Delivery Content: Basic Electrode Theory, Electrode Model Circuit, Types of electrodes (Passing Reference), Body Temperature Measurement System - Thermometer, Incubator, Electroencephalograph (EEG) and its Recording, Heart related Parameters such as Electrocardiograph (ECG) and its Recording
[B] Learner’s Assignment: Analysis of ECG and EEG for finding abnormalities in the functioning of Heart and Brain respectively (One analysis for three different groups)

Unit III: Physiological Parameters II  (3 Hours)
[A] Delivery Content: Heart related Parameters such as Blood Pressure Measurement, Pulse Rate Measurement, Pulse Oximeter, Blood Cell Counter, Spirometer and Pacemaker
[B] Learner’s Assignment: Case study of Blood Pressure Measurement, Pulse Rate Measurement, Pulse Oximeter data, Blood Cell Count and Spirogram (One of the case studies for each different group)

Unit IV: Imaging system  (6 Hours)
[A] Delivery Content: X-ray (Principal, Construction and Working of Equipment) and Computed Tomography (Principal, Construction and Working of Equipment), Magnetic Resonance Imaging (Principal, Construction and Working of Equipment), Ultrasonic Imaging (Principal, Construction and Working of Equipment), Positron Emission Tomography (Principal, Construction and Working of Equipment)
[B] Learner’s Assignment: Study differences between above imaging systems (X ray, CT, MRI, Ultrasound and PET)

Unit V: Anthropometry and Ergonomics  (5 Hours)
[B] Learner’s Assignment: To write an Assignment on ergonomics in different work places (ICU, CCU, Operation Theatre and Diagnostic Centre) with suitable Sketches / Layouts

Unit VI: Health Hazards (05 Hours)
[B] Learner’s Assignment: Power Point Presentation / group Discussion on Adverse effects of environmental factors on Heart, Brain, Lungs, GI tract, Eyes and Ears

Text Books:

Reference Books:
3. Erach Bharucha; Textbook of Environmental Studies for Undergraduate Courses; First Edition, University Press(India) Private Limited, Hyderabad, 2005

Course Outcomes:
Student will be able to-
1. Understand basic functions of human body parts and working of different systems.
2. Read and Diagnose Electrocardiograph (ECG) and Electroencephalograph (EEG).
3. Measure Blood pressure, Pulse rate and Study functioning of Pacemaker, Spirometer, Pulse oximeter and Blood cell counter.
4. Understand and Apply the basic tenets of fundamental technologies in X-ray, Computed Tomography, Magnetic Resonance Imaging, Ultrasonic Imaging and Positron Emission Tomography.
5. Identify and Explain the principles of Anthropometry in designing work places, tools and equipments to fit the human operator.
6. Assess / Predict the effect air pollution, water pollution, mobile radiation, sound and noise pollution on health.
Course Name: Behavioral Sciences

Course Code: HS152       Course Type: TH

Credits: 2       Teaching Scheme: Theory : 2 Hours / Week

Unit I: Title of the Unit: Foundations of Psychology  (4 Hours)
Definition of Psychology; Historical antecedents of Psychology and trends in the 21st century, Psychology and Scientific methods; Psychology in relation to other social sciences and natural, Application of Psychology to societal problems, Various branches of Psychology and its application to society

Unit II: Title of the Unit: Development of Human Behavior  (6 Hours)
Growth and Development; Principles of Development, Personality; Definition and concept; Role of genetic and environmental factors in determining human behavior; influence of cultural factors in socialization, Theories of personality( psychoanalytic theory, trait and type approaches), Training for personality development.

Unit III: Title of the Unit: Family Psychology  (4 Hours)
Concept of family, types of family, Significance of family on the wellbeing of an individual, Types of Conflicts and its consequences

Unit IV: Title of the Unit: Motivation and Emotion  (6 Hours)
Psychological and physiological basis of motivation and emotion; Measurement of motivation and emotion, Effects of motivation and emotion on behavior, Extrinsic and intrinsic motivation; factors influencing intrinsic motivation, Emotion competence and related issues.

Unit V: Title of the Unit: Intelligence(4 Hours)
Concept, definition, history, Theories of Intelligence, Concept of IQ, Aptitude- concept, definition, significance, measurement

Unit VI: Title of the Unit: Learning  (6 Hours)
Concept, Definition, Components of learning, Methods of learning, Creativity-concept and process, Problem solving techniques

Text Books:
Course Name: German

Course Code: HS10X  Course Type: LTH

Credits: 2  Teaching Scheme: Theory : 2 Hours / Week
          Lab :2 Hours / Week

Unit I: Introduction to German (4 Hours)
Alphabets and sounds. International words in German. Introducing oneself and others. Times of
the day. Greetings according to time of the day. Listening to conversations in day life situations

Unit II: Food and drinks (5 Hours)
Starting conversations. Meeting in Cafes. Vocabulary for food and drinks. Ordering food and
paying the bill. Numbers. 1-1000. Tell and understand telephone numbers. Dates. Cities and
countries. Nationalities and languages.
Grammar: Present and past tense of to be and have. Strong verbs. Forming and answering Wh
questions and closed questions. Definite, indefinite articles. Singular and plural.

Unit III: Living in Germany (5 Hours)
Types of Houses, Types of Rooms, Description of rooms. Furniture in the house. Countries,
nationalities and languages. Directions and telling location. Family and relationships. Hobbies
and pass time activities.
Grammar: Adjectives and Opposites. Nominative and Accusative cases. Negation

Unit IV: Time (5 Hours)
Writing E-Mails. Times of the day, weekdays and months. Learning clock hours, Taking formal
appointments and casual meetings. Describing daily routine. Giving excuses for delays and
absence. Professions and the describing responsibilities involved in that professions.
Grammar: Possessive pronouns. Seperable verbs

Unit V: Professions and responsibilities (5 Hours)
Asking for place of work and answering Mode of transport for the same. Orientation of a
workplace. Different professions and professional life. Responsibilities at the workplace.
Grammar: Wechsel prepositions and variable cases, Ordinal numbers

Unit VI: An excursion through Berlin (4 Hours)
Tourism in Berlin, culture, places worth visiting, planning trips with the help of city map and
bus / tram schedules. Narrating a trip. Asking for road directions and giving them to others.
Grammar: Modal verbs, writing a post card.
## List of Practicals:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Description</th>
<th>Mode of Conduct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Singing alphabet rap song to learn German alphabets. Listen and practice</td>
<td>Use of Audio, video sessions, group activities and games.</td>
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<tr>
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<td>different sounds that alphabets make in different combinations. Spelling</td>
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<td>each other’s names etc</td>
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<tr>
<td>2.</td>
<td>Starting the dialogues with self introduction. Basic conversations. Audio</td>
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<td>sessions from book</td>
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<td>3.</td>
<td>Practicing numbers. 0 – 1000. Practicing numbers in pairs asking each other’s</td>
<td>Audio sessions from book</td>
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<td>age, phone no. birth dates etc. Audio sessions from book</td>
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<td>4.</td>
<td>Classroom scene enactment; “first day of the course”. Audio sessions from</td>
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<td></td>
<td>book</td>
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<td>5.</td>
<td>Written exercises from book and work book based on first 2 topics</td>
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<tr>
<td>6.</td>
<td>Games based on vocabulary related to classroom like placing right name</td>
<td>Use of Audio, video sessions, group activities and games.</td>
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<td>chits on right item in the class. Audio sessions from book</td>
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<td>7.</td>
<td>Conversations in travel about countries and languages. Audio sessions from</td>
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<td>the book. Solving exercise in work books.</td>
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<tr>
<td>8.</td>
<td>Writing an essay on “my family”: Reading that in class.</td>
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<td>9.</td>
<td>Picture description: theme “Types of houses, rooms and things in houses”.</td>
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<td>Write description of their own house.</td>
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<td>10.</td>
<td>Writing emails and SMSs. Using time schedules given at different places,</td>
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<td>planning activities or taking appointments in formal / informal setting and</td>
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<td>cancelling it.</td>
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<td>11.</td>
<td>Practicing and enacting the telephonic conversation with friends for</td>
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<td>planning some social outing.</td>
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<td>12.</td>
<td>Practicing dialogues in pairs where you talk about the profession you are</td>
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<td>in and describe the responsibilities you have at work place. Writing an</td>
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<td></td>
<td>essay on an excursion.</td>
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</tbody>
</table>

### Text Books:

1. *Studio d A1 Deutscht als Fremdsprache – Kurs- und Uebungsbuch – by Funk, Kuhn and Demme* published by GOYAL SaaB and Cornelsen

### Course Outcomes:

The student will be able to –
1. Pronounce the words correctly according German language rules and formulate small and simple sentences in German using basic grammar structures.
2. Describe various types of houses and furniture items in various rooms of a house.
3. Make a conversation in German in daily life situations using vocabulary related to classrooms, family, restaurants, jobs, days, months etc
4. Write emails, SMS or small essays in German.
5. Read and understand small texts, advertisements, instructions in German.
6. Read and tell time and use it for making an appointment and cancelling it.
Course Name: Japanese

Course Code: HS10X  Course Type: LTH

Credits: 2  Teaching Scheme: Theory : 2 Hours / Week  Lab :2 Hours / Week

Unit I: Orientation (Jikoushokai, Aisatsu & Moji) (6 Hours)
- Theory: Orientation Lecture
- Introduction of Hiragana script with basic words
- Youon, Sokuon, Chouon – Methods of writing words
- Greetings and Classroom Expressions
- Etiquettes and mannerisms

Unit 2: Introduction Of Katakana (Moji Katakana) (4 Hours)
- Introduction of Katakana script
- Introduction of Katakana rules
- Katakana words used in daily life

Unit 3: Calendar & Numbers (Suji, Youbi, Hizuke, Jikan) (4 Hours)
- Introduction of numbers
- Writing Days of the week, Dates, Time, Months in Hiragana
- Special Greetings used in different situations in Japan

Unit 4: Basic Grammar Pattern (Bunnokatachi, Keiyoushi-To, Doushi) (4 Hours)
- Introduction of ~は～です pattern
- Affirmative, Negative and interrogative sentences
- Introduction of demonstrative pronouns
- Learning いい and な adjectives and opposites
- Introduction of some basic and useful verbs and their simple present tense

Unit 5: Introduction Of 3rd Script Kanji (Kanji & Kanji Jukugo) (6 Hours)
- Basics of Kanji
- Kanji for Numbers (1-10)
- Kanji for basic words

Unit 6: Culture Of Japan (Nihon-No-Bunka) (4 Hours)
- Some festivals in Japan
- Arts of Japan
- Foods and Dress of Japan
- Islands and seasons of Japan
- Some special things about and in Japan
- Revision of all topics and paper

List of Practical:

<table>
<thead>
<tr>
<th>Sr. No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Practice vocab by showing picture cards. Revision test Assignment 1 ( Hiragana script &amp; words ).</td>
<td>Games, picture cards, listening cd’s of native speakers dialogues, chalk and board.</td>
</tr>
<tr>
<td>3.</td>
<td>Katakana script Renshuu. Writing own name, names of countries &amp; some loan words from different languages In Katakana. Revision test.</td>
<td>Games, picture cards, listening cd’s of native speakers dialogues, chalk and board.</td>
</tr>
<tr>
<td>4.</td>
<td>Write 2nd assignment on Katakana script &amp; words.</td>
<td>Games, picture cards, listening cd’s of native speakers dialogues, chalk and board.</td>
</tr>
<tr>
<td>5.</td>
<td>Oral revision of days, dates, months &amp; time. Practice of saying birth dates, todays date &amp; telephone nos.</td>
<td>Games, picture cards, listening cd’s of native speakers dialogues, chalk and board.</td>
</tr>
<tr>
<td>6.</td>
<td>Practice situational greetings. Write 3rd assignment on calendar &amp; nos.</td>
<td>Games, picture cards, listening cd’s of native speakers dialogues, chalk and board.</td>
</tr>
<tr>
<td>9.</td>
<td>Write dates, days, months, years &amp; time in Kanji. Practice nos. from 1 to 10000 in Kanji. Revision test.</td>
<td>Games, Dialogues, General conversation, cd listening and chalk and board.</td>
</tr>
<tr>
<td>10.</td>
<td>Write 5th assignment on calendar in Kanji.</td>
<td>Games, Dialogues, General conversation, cd listening and chalk and board.</td>
</tr>
</tbody>
</table>
Course Outcome:
The Student will be able to:
1. Greet formally and introduce himself/herself in Japanese language with appropriate etiquette and mannerism.
2. Read and write Hiragana, Katakana, Scripts along with basic words, numbers, dates, telephone nos., days of the week, months, year, time.
3. Read and write 3rd Script Kanji i.e Kanjis for nos., Days, dates, time, years as well as some basic words.
4. Read/Write sentences using basic sentence pattern including all three scripts.
5. Tell about his/her family. Describe things using basic adjectives and actions by using basic verbs.
6. They become familiar to fascinating country like Japan & Japanese culture.
Course Name: Sanskrit  
Course Code: HS10X  Course Type: LTH  
Credits: 2  
Teaching Scheme: Theory : 2 Hours / Week  
Lab :2 Hours / Week  

Unit I:  (6 Hours)  
• Samskrit as a language. (listening skills)  
• Why Samskrit? Introduction to Technical aspects.  
• Methods of using Samskrit as a Knowledge bank.  
• Shastra, concept.

Unit II:  (8 Hours).  
• Sentence construction, Usage.  
• Numbers, Varnas, Rules of writing.  
• Complex sentences.  
• Why to speak in Samskrit?  
• A language to be experienced.(Vibrations, Mantra)  
• Shabda, Dhatu, Nama, Ayyaya, Visheshana.

Unit III:  (8 Hours)  
• Text, reading and explaining in simple Samskrit.  
• Paragraph writing.  
• Presentation.  
• Comprehension.

Unit IV:  (6 Hours)  
• Tenses and Moods. (lakaraha 6)  
• Sandhihi (concept)  
• Samasa (Concept)  
• Pratyayavichar.(concept)

Activities in language lab  
1. Listen and repeat. 6 audio tracks to be completed.  
2. Listen and write. 4 audio tracks to be completed.  
3. Read and write. Text with 12 pages with time count.  
4. Loud drills with P.P.T.
5. Speak for five minutes on any topic.
6. Question formation after listening story.
7. Speak for five minutes on given topic.
8. Games
9. Organising exhibition for Sanskrit words related to machines and electronics.
10. Project preparations.
11. Communication sessions with unknown people.
12. A day outing with Sanskrit speakers.

Course Outcomes:
1. Students understand and experience the importance of Samskrit in Research and Development.
2. Students make small sentences and express themselves in Samskrit.
3. Students can read simple text.
4. Students understand some grammatical concepts and use them.
5. Students try to read some part of ancient text to choose some project.
6. Students know simple Samskrit, they get confidence for further study.
**Course Name:** Hardware Workshop  

**Course Code:** EC102  
**Course Type:** LTH  
**Credits:** 2  
**Teaching Scheme:** Theory :1 Hours / Week  
**Lab:** :2 Hours / Week

**List of Practicals:**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Basics of circuit assembly</strong></td>
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<tr>
<td></td>
<td>a. Identification of basic components</td>
</tr>
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<td></td>
<td>b. Understanding simple circuits</td>
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<tr>
<td></td>
<td>c. Process of PCB layout using DipTrace / Eagle</td>
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<td></td>
<td>d. Soldering techniques</td>
</tr>
<tr>
<td>2</td>
<td><strong>PCB Assembly</strong></td>
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<tr>
<td></td>
<td>a. Measurement and Testing</td>
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<td></td>
<td>b. Process of PCB fabrication</td>
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<td>c. Demonstration of PCB testing</td>
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<td></td>
<td>d. Testing of self-assembled PCBs</td>
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<tr>
<td>3</td>
<td><strong>Testing of assembled PCBs</strong></td>
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<tr>
<td></td>
<td>a. Verification of different PCBs Control Panel and Admin Tools</td>
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<td></td>
<td>b. Fault finding</td>
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<td></td>
<td>c. Quality verification</td>
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<td>4</td>
<td><strong>Enclosure Design</strong></td>
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<tr>
<td></td>
<td>a. Designing a front panel, rear panel of an electronic instrument</td>
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<td>b. Heat Sink mounting, Ventilation</td>
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<td></td>
<td>c. Testing of self-assembled PCBs</td>
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<tr>
<td>5</td>
<td><strong>Computer assembly</strong></td>
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<tr>
<td></td>
<td>a. Fixing a processor, RAM, cooling fan in a Mother Board. Fixing Mother Board in a cabinet.</td>
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<td></td>
<td>b. Assembling SMPS, hard disc drive, CD/DVD ROM in a cabinet.</td>
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<td>c. Connecting the cables from the SMPS to motherboard, hard disk, drives &amp; etc.</td>
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<td></td>
<td>d. Establishing data connection for motherboard, hard disk, drives.</td>
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<td></td>
<td>e. Fixing wires for power restart switches, fixing wires for power &amp; HDD.</td>
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<td></td>
<td>f. LED’s fixing wires for external USB and Audio Connections.</td>
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<tr>
<td>6</td>
<td><strong>Troubleshooting</strong></td>
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<tr>
<td></td>
<td>a. Locate and identify the sources of hardware problems, including running tests and various other fault-finding techniques.</td>
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<tr>
<td></td>
<td>b. Take action to correct these problems, including replacing or upgrading troublesome parts and making repairs.</td>
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<tr>
<td>7</td>
<td><strong>Introduction to Network Devices</strong></td>
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<tr>
<td></td>
<td>a. Routers</td>
</tr>
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<td></td>
<td>b. Switch</td>
</tr>
<tr>
<td></td>
<td>c. Firewall</td>
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</tbody>
</table>
8. **Configuration of Computer Network**
   a. LAN setup (IP address, DNS)
   b. Basic networking commands (ipconfig, ping, etc)
   c. Accessing Remote desktop
   d. Cable Crimping

9. **Welding**
   a. Principle of manual metal arc welding, equipment and its operation
   b. Welding electrodes, welding joints, welding symbols
   c. Safety precautions
   d. Demonstration and one job on mild steel

10. **Sheet Metal Work**
    a. Use of marking tools and hand tools such as steel rule, marker, scissors, centre punch, measuring gauge
    b. Safety precautions
    c. Demonstration and hands on experience of few operations such as marking, cutting, bending

11. **Fire Safety**
    a. Fire prevention precautions, fire extinguishers
    b. Necessity and rules of fire fighting, risk elements in fire fighting
    c. Demonstration of use of fire extinguishers

**Theory:**

**Unit 1: Electronic Components and Devices** (2 Hours)
Introduction to passive components like resistors, capacitors, inductors; Types of resistors, capacitors and inductors; ICs and reading datasheet; Types of switches; Types of fuses; Introduction to electronics devices like diodes, LEDs, transistors, 7 segment displays, LCD displays, buzzers, Heat Sink, Optocouplers, etc; Introduction to power devices like power transistors, MOSFET, SCR, TRIAC, IGBT and Bus Bars

**Unit 2: Introduction to Electronic Instruments** (2 Hours)
Introduction to power supplies like SMPS, fixed and variable; Functions of Digital Multi Meter; Use of IC Tester and LCRQ meter in electronics; Front panel and various controls of Signal Generator, CRO and DSO

**Unit 3: Soldering Techniques** (1 Hours)
Introduction to various soldering related tools like nose pliers, cutter, stripper, de-soldering pump, desolvik; Soldering techniques; De-soldering of components

**Unit 4: Layout, Artwork and Enclosure Designing** (1 Hours)
Introduction to PCB Materials: paper phenolic, glass epoxy, single sided, double sided, etc; Layout software; Manufacturing process of single sided PCB; Designing a front panel, rear panel of an electronic instrument
Unit 5: Computer Assembly (2 Hours)
Introduction to basic computer peripherals, Main memory: RAM, ROM, bit, byte, word; Processor: Processor speed/cores, Arithmetic unit, Control Unit; Input-output devices: Keyboard, display, disk, internal and external storage devices, hard disc drive, external USB; Network: Address, Control and Data bus

Unit 6: Troubleshooting (1 Hours)
Introduction to basic troubleshooting issues in computer

Unit 7: Introduction To Network Devices (1 Hours)
Introduction to network: LAN, WAN, WWW; Network Devices: Routers, switch, firewall, gateway, protocol, etc.

Unit 8: Configuration of Computer Network (2 Hours)
Networking terms: Client-server architecture, IP address, Domain Name Server (DNS), URL, crimping; Security: user account and access control, captcha, etc

Text Books:
1. Patil Mahesh, Basic Electronic Devices and Circuits, New Delhi, PHI Learning
7. Radhakrishnan M, Balsubramanian D, Computer Installation and Troubleshooting, New Delhi, Indian Society for Technical Education

Reference Books:
5. Curt Simmons, Dalan David, A+ Technicians on the Job, New Delhi Tata McGraw Hill
9. K. T. Kulkarni Introduction to Industrial Safety,

Course Outcomes:
Students will be able to
1. Identify the basic electronic components and instruments
2. Prepare and test PCB
3. Study computer organization and troubleshooting issues
4. Explain computer networking fundamentals
5. Perform welding and sheet metal work following safety practices
Course Name: Soft Skills

Course Code: HS153  Course Type: LTH

Credits: 2  Teaching Scheme: Theory :1 Hours / Week

Lab :2 Hours / Week

Unit 1: Introduction to soft skills and self analysis  (2 Hours)
- Goal setting and career planning: dreams and goals; Short term, medium and long term goals. Setting SMART goals
- Introduction and meaning of soft skills; difference between soft skills and hard skills, importance of soft skills in corporate world, Concepts of IQ, EQ and SQ
- Influence of cultural differences on soft skills
- Self analysis. Knowing yourself; birth dates, height, weight, etc.
- SWOT (activity based explanation)

Unit 2: Communication skills and listening skills  (2 Hours)
- Communication skills: Meaning, need, significance and types (written/oral, formal/informal, internal/external etc), Barriers in communication.
- How to start a communication? Communication process (Articulation of thought) Concept of KISS, Importance of non-verbal communication.
- Public speaking meaning, do’s and don’ts

Unit 3: Listening skills  (2 Hours)
- Meaning, difference between listening and hearing, process of listening
- Types: active, passive, evaluative, discriminative listening, intuitive, selective, pretence
- Barriers in listening. Physical barriers, People related barriers ( Physiological barriers, Psychological barriers), Tips for being a good listener

Unit 4: Team building and leadership  (3 Hours)
- Team building and leadership, Introduction to leadership skills.
- Concept of team: difference between team and group, process of team building, significance and methods to develop team spirit.
- Characteristics of a leader. Walk the talk. Difference between a leader and manager.

Unit 5: Time management and problem solving  (3 Hours)
- Creativity and problem solving, Introduction to problem solving concepts and techniques.
- Time management (Concept and importance), Abstract thinking and critical thinking.( Out of the box thinking)
Unit 6: Professional etiquettes (1 Hours)
- Etiquettes and manners: meaning and significance, Attitude, organizational ethics
- Telephonic etiquettes, table manners, professional etiquettes, hygiene and clothing manners.

List of Practicals:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Description</th>
<th>Mode of Conduct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Breaking the ice. Interaction with students with their introduction session and discussing their future plans. Demonstration and open discussions about cultural differences in soft skills</td>
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<tr>
<td>2.</td>
<td>Start with a small session of meditation where they are asked to focus on self, likes, dislikes, etc. Then ask to do SWOT test. Then again discuss their dreams and goals to align with their SWOT analysis.</td>
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<tr>
<td>3.</td>
<td>Asking the students to introduce themselves in the class and then explaining them importance of short and crisp introduction along with some examples.</td>
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<tr>
<td>4.</td>
<td>Role play to elaborate on the importance of communication skills and explain the students the dos and don’ts for good and effective communication.</td>
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<tr>
<td>5.</td>
<td>Students will be given a topic to prepare at home which they will be discussing or briefing in the class.</td>
<td>Use of Audio, video sessions, demonstrations, group activities and games, scene enactments.</td>
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<tr>
<td>6.</td>
<td>Some exercises based on reading and listening will be discussed and solved in the class.</td>
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<tr>
<td>7.</td>
<td>Students will be given some topics related to latest issues for which they will be given some preparation time; they will work in groups and discuss the same in the group (group discussion).</td>
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<tr>
<td>8.</td>
<td>Video session. In this session students will be shown a film on team building and then they will discuss based on the topic.</td>
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<tr>
<td>9.</td>
<td>Group activity like making maximum paper planes, where students have to exhibit their leadership qualities, team building skills and effective team playing as well.</td>
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<tr>
<td>10.</td>
<td>The teacher will identify some business problems which the students have to solve looking at the present scenario and the concept of problem solving and creativity.</td>
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<tr>
<td>11.</td>
<td>Video of Mr D.S. Kulkarni to be shown in the class and discussed ask students to get some more examples of people who have come far away in their lives.</td>
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<tr>
<td>12.</td>
<td>A game or an activity related to manners, etiquettes and hygiene.</td>
<td></td>
</tr>
</tbody>
</table>
Text Books:
1. *Soft Skills* by Dr. K Alex. S.Chand and company ltd.

Course Outcomes:
The student will be able to –
1. Set his / her goals for future and start preparing accordingly.
2. Apply proper communication skills and hence enable him to be an effective communicator.
3. Become a good listener and perform his / her tasks as per expectations.
4. Lead a team successfully and work as a good team player as well.
5. Apply creativity and time management skills to solve problems related to work.
6. Demonstrate professional etiquettes in a workplace.
Course Name: Foundation Mathematics

Course Code: ES107

Credits: Audit

Course Type: AU

Teaching Scheme: Theory :2 Hours / Week

Unit 1 Basic Set Theory and Logic (5 Hours)
Sets and their representations, Subsets , Power set, Universal set, Venn diagrams, Algebra of Sets, Set Identities, Computer representation of Set.

Unit 2 Basic Probability (5 Hours)
Factorial n (n!), Permutations and combinations, Random experiments: outcomes, sample spaces (set representation) Events, exhaustive events, mutually exclusive events, Axiomatic definition of Probability, Conditional Probability, Bayes Theorem.

Unit 4: Complex numbers (5 Hours)
Complex numbers as ordered pairs, Argand’s diagram, Triangle inequality, De Moiver’s Theorem, Hyperbolic functions.

Unit 5: Matrices and Determinants (4 Hours)
Algebra of matrices, Determinants and their properties, Inverse of a matrix, Cramer’s rule, basic vector algebra

Unit 6: Differentiation and Integration (5 Hours)
Elementary functions and their graphs, Inverse functions, Limit, Continuity, Derivative and its geometrical significance, Maxima and Minima, revision of methods of integration

Text Books:

Reference Books:
2. Bernard Kolman, Robert Busby, Sharon Ross, Discrete Mathematical Structures, 3rd Edition
3. Prentice Hall India Pvt. Ltd.
Course Outcomes:
The student will be able to – 
1. Apply the knowledge of set theoretic notations and basic concepts of logic. 
2. Identify and use of basic probability concepts, matrices and vectors. 
3. Formulate logical statements, solve problems on trigonometry, limit, continuity. 
4. Demonstrate the knowledge of complex numbers, hyperbolic functions 
5. Solve problems on matrices, determinants, derivatives and integration.
Course Name: English

Course Code: HS101  Course Type: AU

Credits: Audit  Teaching Scheme: Theory  :2 Hours / Week

Unit I: Vocabulary  (4 Hours)
• Word Formation
• Correct Usage
• Idiomatic Expressions

Unit II: Basic Grammar  (6 Hours)
• Articles
• Parts of Speech
• Sentence Structure
• Verbs and Concord
• Question tags
• short responses

Unit III: Listening Skills  (4 Hours)
• Kinds of Sentences
• Verbs Modals
• Conjunctions

Unit IV: Speaking Skills  (6 Hours)
• Direct and Indirect speech
• Description
• Narration
• Conversation

Unit V: Reading Skills  (4 Hours)
• Active Passive Voice
• Prepositions
• Improved Spelling

Unit VI: Writing Skills  (6 Hours)
• Paragraph Writing
• Punctuation
• Note-making
List of Practicals:

<table>
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<tr>
<th>Sr. No.</th>
<th>Description</th>
<th>Mode of Conduct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Self- Introduction</td>
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<tr>
<td>2.</td>
<td>Review a film clipping</td>
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<tr>
<td>3.</td>
<td>Guess the word, Telephonic Conversations</td>
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<tr>
<td>4.</td>
<td>Dumb Charades</td>
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<tr>
<td>5.</td>
<td>Dialogues, Situational conversation, Relay conversation.</td>
<td>Use of Audio, video sessions, demonstrations, group activities and games, scene enactments.</td>
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<tr>
<td>6.</td>
<td>Analyse a newspaper article</td>
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<td>7.</td>
<td>Spot the error, clues</td>
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<tr>
<td>8.</td>
<td>Newspaper articles, Reports, Editorials.</td>
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<td>9.</td>
<td>Picture Composition</td>
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<td>10.</td>
<td>Paragraph Writing</td>
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<tr>
<td>12.</td>
<td>Crossword Puzzles, Scramble</td>
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<tr>
<td>13.</td>
<td>Memory Games.</td>
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<tr>
<td>14.</td>
<td>Chinese Whispers, Follow Instructions</td>
<td></td>
</tr>
</tbody>
</table>

Text Books:

Reference Books:
1. Bansal and Harrison- Spoken English in India
2. Essentials of Grammar and Composition
3. Lewis- The New Roget’s Thesaurus in Dictionary Form
Course Name: Environmental Science
Course Code: HS155  Course Type: AU
Credits: Audit  Teaching Scheme: Theory :2 Hours / Week

Unit I Renewable and Non-renewable Resources:  (5 Hours)
Definition, scope, importance and multidisciplinary. Nature of Environmental Studies. Definition and types of resources based on different heads, Natural resources and associated problems, role of an individual in conservation of natural resources, equitable use of resources in achieving sustainable development.

Unit II Ecosystems:  (5 Hours)
Concept of an Ecosystem, Structure and Function of various components of an Ecosystem, Energy Flow in an Ecosystem, Ecological Succession, Ecological Pyramids for different types of Ecosystems, food chain, food web, interdependency of components of ecosystem over each other.

Unit III Biodiversity and its conservation:  (5 Hours)
Introduction, Definition, genetic, species and—ecosystem diversity, Biogeographical classification of India, Value of Biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation.

Unit IV Environmental Pollution:  (5 Hours)
Definition of Pollution, various terms related to pollution, types of pollution, pollutants, types of pollutants, causes, effects and remedial measures of different types of pollution, role of an individual to prevent the pollution.

Unit V Disaster and Hazardous Waste Management:  (5 Hours)

Unit VI Social Issues and Environment:  (5 Hours)
Urban problems related to energy, Water conservation, environmental ethics, wasteland reclamation, consumerism and waste products, EIA, Environment and human health, Human rights, value education, Public awareness, Role of modern technology.

Text Books:
Reference Books:
## Course Name: Software Workshop

Course Code: CS102  
Course Type: LTH  
Credits: 2  
Teaching Scheme: Theory: 1 Hours / Week  
Lab: 2 Hours / Week

### List of Practical:

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<tr>
<th>Sr. No.</th>
<th>Topic</th>
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<td>1</td>
<td><strong>Installation and Configuration of Operating system</strong></td>
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<tr>
<td></td>
<td>a. Disk partitioning (Dual boot)</td>
</tr>
<tr>
<td></td>
<td>b. Linux operating system installation and configuration</td>
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<td>c. Basic unix commands</td>
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<td>2</td>
<td><strong>Software Installations</strong></td>
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<td></td>
<td>a. Device drivers</td>
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<td>b. Anti-virus software</td>
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<td>c. Patching</td>
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<tr>
<td>3</td>
<td><strong>System Administration</strong></td>
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<td></td>
<td>a. Account Management</td>
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<td></td>
<td>b. Control Panel and Admin Tools</td>
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<td></td>
<td>c. Computer Management GUI tool</td>
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<td>4</td>
<td><strong>Disk Administration</strong></td>
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<tr>
<td></td>
<td>a. Disk Formatting</td>
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<td>b. Disk Defragmentation</td>
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<td></td>
<td>c. File and directory layout</td>
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<td>d. File permissions</td>
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<tr>
<td>5</td>
<td><strong>Introduction to MATLAB</strong></td>
</tr>
<tr>
<td></td>
<td>a. Installation</td>
</tr>
<tr>
<td></td>
<td>b. Basic commands</td>
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<td></td>
<td>c. Predefined libraries</td>
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<td>d. Introduction to Simulink</td>
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<td>6</td>
<td><strong>Introduction to SCILAB</strong></td>
</tr>
<tr>
<td></td>
<td>a. Installation</td>
</tr>
<tr>
<td></td>
<td>b. Basic commands</td>
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<tr>
<td></td>
<td>c. Predefined libraries</td>
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<tr>
<td>7</td>
<td><strong>Introduction to Circuit Simulation Software</strong></td>
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<tr>
<td></td>
<td>a. Installation</td>
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<td></td>
<td>b. Simulation of simple circuits</td>
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<tr>
<td>8</td>
<td><strong>Introduction to LaTeX</strong></td>
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<tr>
<td></td>
<td>a. Installation</td>
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<td></td>
<td>b. Basic commands</td>
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<td></td>
<td>c. Writing mathematical equations</td>
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<td>d. Scripting Tags</td>
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</tbody>
</table>
Theory:

Unit I: Installation and Configuration of Operating system (2 Hours)
Introduction to Linux operating system; basic commands of Unix; Disk Partitioning

Unit II: Software Installations (3 Hours)
Types of software: Application software, system software (device drivers, etc); Levels of programming language: Machine, Assembly, High level language; Software evolution: Procedure oriented, Object oriented, Rule Based, Applicative language (Event driven); Compilation model (Linker, loader, compiler, interpreter); Types of Virus and role of anti-virus software; plagiarism checker; Patching; Key-terms: Open source, free and paid software

Unit III: System Administration (1 Hours)
Account Management; Introduction to Control Panel and Admin Tools; Computer Management GUI tool

Unit IV: Disk Administration (1 Hours)
Disk Formatting; Disk Defragmentation; File and directory layout; File permissions

Unit V: Introduction to MATLAB (2 Hours)
Introduction; application development; working environment; handling graphics; libraries and tool boxes; Introduction to Simulink

Unit VI: Introduction to SCILAB (1 Hours)
Introduction; application development; working environment; equivalent operations

Unit VII: Introduction to Circuit Simulation Software (2 Hours)
Introduction; circuit development; working environment; Simulation of simple circuits

Unit VIII: Introduction to LaTeX (2 Hours)
Introduction; Basic commands; writing mathematical equations; Scripting Tags

Text Books:
Reference Books:
2. Kemp Juliet, LINUX System Administration Recipes, Apress Inc. USA, 2009

Course Outcomes:
The student will be able to:
1. Understand basics of operating system and software evolution.
2. Know system administration
3. Write simple programs for data processing
4. Use software for simulation of electronic circuits
5. Organize documents effectively
Course Name: General Seminar

Course Code: HS154   Course Type: L

Credits: 1   Teaching Scheme: Lab    2 Hours / Week

Unit I: Formal Written skills
- Office Drafting- Circulars , Notice , Memos.
- Job application with resume / CV
- Covering Letters for resume/ CV
- Report writing.

Unit II: Public speaking
- Mastering the ABCs of public speaking.
- Speech preparation.
- Public speaking meaning, do’s and don’ts
- How to be an effective public speaker.

Unit III: Presentations.
- Guidelines for a successful presentation.
- Effective Power point design using visual aids.
- Practicing delivery of presentation.

Unit IV: Project literature survey
- Guidelines for a literature survey.
- Difference between Literature survey and field survey.
- Making a literature survey.

Unit V: Group Discussion
- Introduction and meaning of group discussion.
- Essential elements of group discussion.
- Skills required / Initiation/ Techniques
- Movement and gestures to be avoided.
- Non verbal communication in group discussion.

Unit VI: Interview Techniques
- How to present well in Interviews.
- Basic tips and how to search a job effectively.
- Telephonic interviews.
- Dress code/ typical questions/ Interview mistakes.
### List of Practical:

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<tr>
<th>Sr. No.</th>
<th>Description</th>
<th>Mode of Conduct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Practice of application writing, reports, memos, circulars, and assignments</td>
<td>Use of Audio, video sessions, demonstrations, group activities and games, scene</td>
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<tr>
<td></td>
<td>to be conducted.</td>
<td>enactments.</td>
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<tr>
<td>2.</td>
<td>Extempore to be taken in class and each student to be given a topic to speak</td>
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<tr>
<td></td>
<td>on the same.</td>
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<td>3.</td>
<td>Topics to be allotted to students and with guidance of teacher making the</td>
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<tr>
<td></td>
<td>presentation in class.</td>
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<tr>
<td>4.</td>
<td>A mini project assigned in groups and elaborating the literature survey of</td>
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<td></td>
<td>the given topic.</td>
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<tr>
<td>5.</td>
<td>Students will be given a topic to prepare at home which they will be</td>
<td></td>
</tr>
<tr>
<td></td>
<td>discussing or briefing in the class.</td>
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<tr>
<td>6.</td>
<td>Public speaking topics to be discussed and students will be encouraged to</td>
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<tr>
<td></td>
<td>participate in class.</td>
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<tr>
<td>7.</td>
<td>Students will be given some topics related to latest issues for which they</td>
<td></td>
</tr>
<tr>
<td></td>
<td>will be given some preparation time; they will work in groups and discuss</td>
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<td></td>
<td>the same in the group (group discussion).</td>
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<tr>
<td>8.</td>
<td>Group discussion on a topic of their choice in which the coordination and</td>
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<td></td>
<td>leadership qualities of the student will be evaluated.</td>
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<td>9.</td>
<td>Various topic related activities will be conducted in class.</td>
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<td>10.</td>
<td>Mock interviews will be conducted and each and every student shall be</td>
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<td></td>
<td>evaluated during class.</td>
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<td>11.</td>
<td>Different videos, motivational speeches, inspirational guidance and knowledge</td>
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<td></td>
<td>will be imparted to the students.</td>
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<td>12.</td>
<td>Games and topic related activities will be conducted and every students</td>
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<td></td>
<td>participation will be encouraged.</td>
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</tbody>
</table>

**Text Books:**

1. Dr. K. Alex, *Soft skills*, S.Chand & Company Ltd.

**Course Outcomes:**

The student will able to

1. Gain confidence and will be able to face interviews.
2. Able to make professional presentations and reports.
3. Learn to be a Team member and cooperate.
4. Lead a team successfully and work as a good team player as well.
5. Will be able to stand out in a crowd with the skills provided.
6. Will be a thorough Professional with the above training provided.
Annexure I
List of General Proficiency Courses offered to F.Y. B.Tech. AY 2016-17

For Detail Syllabus Kindly refer GP course booklet

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Name of Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP101</td>
<td>Aerobics</td>
</tr>
<tr>
<td>GP102</td>
<td>Bharatnatyam</td>
</tr>
<tr>
<td>GP103</td>
<td>Chess</td>
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<tr>
<td>GP104</td>
<td>Drawing and Painting</td>
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<tr>
<td>GP105</td>
<td>Flute</td>
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<tr>
<td>GP106</td>
<td>Guitar</td>
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<tr>
<td>GP107</td>
<td>Harmonium</td>
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<tr>
<td>GP108</td>
<td>Photography</td>
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<tr>
<td>GP109</td>
<td>Tabla</td>
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<tr>
<td>GP110</td>
<td>Taekwondo</td>
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<tr>
<td>GP111</td>
<td>Vocal</td>
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<tr>
<td>GP112</td>
<td>Yoga and Pranayam</td>
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<tr>
<td>GP113</td>
<td>Ayurved</td>
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<tr>
<td>GP114</td>
<td>Constitution of India</td>
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<tr>
<td>GP115</td>
<td>Film Appreciation</td>
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<tr>
<td>GP116</td>
<td>Fundamentals of Banking</td>
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<tr>
<td>GP118</td>
<td>Homeopathy</td>
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<tr>
<td>GP119</td>
<td>Life Style management</td>
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<tr>
<td>GP120</td>
<td>Nutrition and Fitness</td>
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<tr>
<td>GP121</td>
<td>Shares and Stock</td>
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</table>