



Vidyalankar Institute of Technology

An Autonomous Institute affiliated to University of Mumbai

Bachelor of Technology

in

Electronics and Computer Science

First Year Scheme & Syllabus

(As per AICTE and NEP 2020 guidelines, with effect from the Academic Year 2024-25)

Preamble

The National Education Policy (NEP) framework aims to break the mold from teacher centric to student centric educational practices. It empowers the students with flexibility in terms of choosing courses across different faculties and modes of learning.

This multidisciplinary approach will encourage learners to follow their passion and inherent interests. The learner is free to learn at a pace that he is comfortable with, and this enables lifelong learning. It also enhances the scope for holistic personality development.

This premise is truly reflected in preamble of the NEP document, "The future of nation is decided in the classrooms of the schools and colleges today".

Details of implementation:

NEP curriculum framework enables us to accelerate change, redesign systems with equity in mind, respond to feedback, encourage collaboration, catch and pollinate ideas and create a culture of research and development. It will allow us to offer the required academic flexibility which will focus on improving competency level of students with diverse strengths.

The curriculum planned by VIT has vertical **Program Courses** consisting of core courses (PCC) of branch of engineering positioned and sequenced to achieve sequential and integral learning of the entire breadth of the specific branch. This vertical also includes Professional elective courses (PEC) which offer flexibility and diversity to learners to choose specialization from a basket of recent developments in their field of technology. The selection of unique professional elective courses based on industrial requirements and organizing them into tracks is a special feature of this curricula ensuring employability. The vertical **Multidisciplinary Courses** consists of Open Elective (OE) courses and multidisciplinary minor (MD M) courses. Special vocational and skill development courses are included as a part of **Skill courses** vertical that make student capable to work in industrial environment.

The student is expected to demonstrate their ability through courses in **Experiential Learning Courses** vertical like internships/On Job Training, Community Engagement Project, Real Industry Project/ research problem. Our curriculum also introduces Social Service Internship and Internship with institutes abroad along with courses like Design Thinking. This will lead to the creation of products and/or patents through this program.

For holistic development of students, apart from technical courses, Ability Enhancement Courses, Entrepreneurship/Economics/Management Courses, Indian Knowledge System and Value Education courses from vertical **Humanities and Social Science and Management** develop the required soft-skills and attitude amongst learners.

In **Liberal Learning** vertical courses like Various Dance Forms, Global citizenship Education, Facets of Astronomy etc. aim to create balance in brain hemispheres and hence improve learners' clarity in thoughts and responses.

In addition to core courses, professional and open electives; our framework offers honor degree in each programme of engineering. It includes specialized courses along with field/ domain study that make students capable of working on industry relevant problems.

Chairman, Board of Studies
Department of Electronics and Computer Science
Vidyalankar Institute of Technology

Chairman, Academic Council
Vidyalankar Institute of Technology

First Year B. Tech. Electronics and Computer Science
Course Structure and Assessment Guidelines

Preferred Semester: I

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Verticals	Code	Name			ISA	MSE	ESE	
BSC	BS02	Engineering Mathematics-I	Theory	3	20	30	50	100
	BS15T	Engineering Physics	Theory	2	15	20	40	075
	BS15P	Engineering Physics Lab	Practical	1	25	-	25	050
ESC	ES03T	Digital Electronics	Theory	2	15	20	40	075
	ES03P	Digital Electronics Lab	Practical	1	25	-	25	050
	ES02T	Engineering Mechanics	Theory	2	15	20	40	075
	ES02P	Engineering Mechanics Lab	Practical	1	25	-	25	050
SC-VSEC	ES04T	Structured Programming	Theory	2	15	20	40	075
	ES04P	Structured Programming Lab	Practical	1	25	-	25	050
LLC-CC	GEXXX	Any one CC course offered in the semester	As per Course	2	As per Course			075
HSSM	HSXXT	Any HSSM_AEC Course	Theory	2	15	20	40	075
	HSXXP		Practical	1	25	-	25	050
Total Credits				20				

ISA=In Semester Assessment, MSE=Mid Semester Examination, ESE=End Semester Examination

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

**First Year B. Tech. Electronics and Computer Science
Course Structure and Assessment Guidelines**

Preferred Semester: II

Course			Head of Learning	Credits	Assessment Guidelines (Marks)			Total marks (Passing@40% of total marks)
NEP-Vertical	Code	Name			ISA	MSE	ESE	
BSC	BS04	Engineering Mathematics-II	Theory+ Tutorial	3	20	30	50	100
	BS16T	Engineering Chemistry	Theory	2	15	20	40	075
	BS16P	Engineering Chemistry Lab	Practical	1	25	-	25	050
ESC	ES01T	Engineering Graphics	Theory	2	15	20	40	075
	ES01T	Engineering Graphics Lab	Practical	1	25	-	25	050
SC-VSEC	ES05T	Object Oriented Programming	Theory	2	15	20	40	075
	ES05P	Object Oriented Programming Lab	Practical	1	25	-	25	050
HSSM	GEXXX	Any one HSSM_IKS course offered in the semester	As per course	2	As per course			075
LLC-CC	GEXXX	Any one CC offered in the semester	As per course	2	As per course			075
HSSM	HSXXT	Any HSSM_VEC Course	Theory	2	15	20	40	075
	HSXXP		Practical	1	25	-	25	050
Total Credits				19				

ISA=In Semester Assessment, MSE= Mid Semester Examination, ESA= End Semester Examination

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus of First Year Semester - I

Course Name: Engineering Mathematics-I

Course Code: BS02

NEP Vertical_Basket: Basic Science

Preamble:

The objective of the course is to develop the basic Mathematical skills of engineering learners that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology. Learners impart knowledge of De-Moivre's Theorem, Hyperbolic Functions, and Logarithm of Complex Numbers. The course clarifies the concept of Partial Differentiation and its applications. The course will enable learners to learn basics of Successive Differentiation, Matrices, system of linear equations, Expansions of function and Transcendental Equations.

Pre-requisites:

Nil

Course Objectives:

- To recall and remember basics of Complex, Successive differentiation, and transcendental equations.
- To apply methods to solve engineering problems.
- To solve and evaluate the problems using Complex, Successive differentiation and transcendental equations.
- To analyze problems based on System of Linear Equations

Course Outcomes:

Learner will be able to:

CO1: Illustrate the basic concepts of Complex Numbers and solve problems involving different forms and properties of Complex Numbers.

CO2: Apply the knowledge of complex numbers to solve problems in Hyperbolic Functions and Logarithmic function.

CO3: Illustrate the basic principles of Partial Differentiation, Homogeneous functions, and Composite functions.

CO4: Illustrate basic principles of Maxima and Minima and Successive Differentiation.

CO5: Apply principles of basic operations of Matrices, Rank, and echelon form of matrices to solve simultaneous equations.

CO6: Illustrate the concept of Transcendental Equations, linear algebraic equations, and Expansions of functions.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Tutorial
3	-	3	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	20	30	50	100

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Complex Numbers	Statement of D'Moivre's Theorem. Expansion of $\sin^n \theta$, $\cos^n \theta$ in terms of sines and cosines of multiples of θ and Expansion of $\sin n\theta$, $\cos n\theta$ in powers of $\sin \theta$, $\cos \theta$, Powers and Roots of complex numbers.	7
2	Hyperbolic Function and Logarithm of Complex Numbers	Circular functions of complex number and Hyperbolic functions. Inverse Circular and Inverse Hyperbolic functions. Separation of real and imaginary parts of all types of Functions. Logarithmic functions, Separation of real and Imaginary parts of Logarithmic Functions.	7
3	Partial Differentiation and Applications	Partial Differentiation: Function of several variables, Partial derivatives of first and higher order. Differentiation of composite function. Euler's Theorem on Homogeneous functions with two independent variables (with proof). Deductions from Euler's Theorem. Maxima and Minima of a function of two independent variables, Jacobians of two and three variables	8
4	Successive Differentiation & Expansion of Functions	Successive differentiation: nth derivative of standard functions. Leibnitz's Theorem (without proof) and problems. Taylor's Theorem (Statement only) and Taylor's series, Maclaurin's series (Statement only). Expansion of $\sin(x)$, $\cos(x)$, $\tan(x)$, $\sinh(x)$, $\cosh(x)$, $\tanh(x)$, $\log(1+x)$	8
5	Matrices	Rank of a Matrix using Echelon forms, reduction to normal form and PAQ form. System of homogeneous and non-	8

		homogeneous equations, their consistency and solutions.	
6	Numerical Solutions of Transcendental Equations and linear algebraic equations	Solution of Transcendental Equations: Solution by Newton Raphson method and Regula – Falsi method. Solution of system of linear algebraic equations, by Gauss Jacobi Iteration Method, Gauss Seidal Iteration Method.	7
Total			45

Textbook:

1. Ramana B.V., "Higher Engineering Mathematics", 12th edition, Tata McGraw Hill, 2017

Reference Books:

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", 9th Edition, Khanna Publication, 2012
2. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th Edition, Wiley Eastern limited, 2012
3. Srimanta Pal and Subidh C. Bhunia, "Advanced Engineering Mathematics", UK Edition, Oxford Press, 2015
4. H.K. Das, "Advanced Engineering Mathematics", 17th Edition, S.Chand, 2008
5. Howard Anton and Christ Rorres "Elementary Linear Algebra with Applications", 5th Edition, John Wiley 2012

Course Name: Engineering Physics

Course Code: BS15T

NEP Vertical_Basket: Basic Science

Preamble:

Most of the engineering branches are being offspring of basic sciences where physics is playing a pivotal role in concept and understanding the foundation of core engineering branches. Physics prepares learners to apply physics to tackle 21st century engineering challenges, and to apply engineering to address 21st century questions in physics.

The course will develop the learner awareness in semiconductor devices and quantum Physics. The learner will develop an informed appreciation of the paradigm shift already in evidence in technologies behind modern services and products. He will possess basic physics knowledge to pursue simulation and modelling of the semiconductor systems.

Pre-requisites:

Nil

Course Objectives:

- Identify and understand the fundamental physical principals underlying engineering devices and processes - a prerequisite to become successful engineers.
- To provide inclusive knowledge of fundamental physical principles encouraging engineering students to venture into the research field.
- To develop scientific temperament for scientific observations, recording, and inference drawing essential for technology studies.
- To give exposure to the topics of fundamental physics in semiconductor and Laser.

Course Outcomes:

Learners will be able to:

CO1: Identify various crystallographic planes and understand crystal defects.

CO2: Understand the band theory of solids and the carrier concentration in solids.

CO3: Analyze the charge distribution and charge transport processes in semiconductors.

CO4: Apply the knowledge of Fermi level in semiconductors and applications of semiconductors in electronic devices

CO5: Compare the properties of engineering materials for their current and futuristic frontier Applications.

CO6: Illustrate the working principle of various lasers and quantum processes.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Contents	No. of Hours
01	Crystallography	Bravais Lattice, Lattice Characteristics Miller - Indices, Planes and Directions, Interplanar spacing. Real crystals and crystal defects.	5
02	Semiconductor Physics	Band theory of solids, Classification of semiconductors. Fermi-Dirac statistics, carrier concentration in semiconductors. Concept of Fermi energy level, its position and variation with temperature and impurity concentration.	5
03	Semiconductor Conductivity	Intrinsic carrier density, mobility, and conductivity. Carrier diffusion, drift, and resistance. Electrical conduction in extrinsic semiconductor. Diffusion length and mean lifetime. Hall Effect.	5
04	Semiconductor Devices	Physics of p-n junctions. Fermi level - in equilibrium, in forward and in reverse bias. Band bending in forward and reverse bias junction Introduction to two terminal devices – Rectifier diode, LED, Zener diode, PIN diode, Solar Cell, Schottky diode etc.	5
05	Engineering Materials and Applications	Liquid crystals: Nematic, Smectic and cholesteric phases, Liquid crystal display. Multiferroics: Type I & Type II multiferroics and applications.	4

		Magnetoresistive Oxides: Magnetoresistance, GMR and CMR materials. Introduction to spintronics.	
06	Lasers	Radiation Matter Interactions, Einstein's coefficients. Basics of Laser- Population inversion, Pumping, Optical Resonator, Metastable state etc. Laser Beam Characteristics. Laser Systems - Ruby laser, He-Ne Laser, Semiconductor Laser, Nd-YAG Laser. Engineering applications of Laser.	4
07	Introduction to Quantum Physics	De Broglie hypothesis of matter waves; properties of matter waves. Physical interpretation of wave function Introduction to Schrodinger's equations	2
Total			30

Suggested Online Courses:

1. Physics of silicon solar cells Offered by École Polytechnique.
<https://www.coursera.org/learn/physics-silicon-solar-cells>
2. Semiconductor Physics Offered by University of Colorado Boulder
<https://www.coursera.org/learn/semiconductor-physics>

Textbooks:

1. John Wiley, S.M. Sze Physics of Semiconductor Devices,
2. Prentice Hall India, B. Streetman, and S. Banerjee, Solid State Electronics,
3. Narosa 2008 R.P. Feynman, "The Feynman Lectures on Physics (Vol. 1-3)",
4. Pearson Education 2013-I.S. Tyagi, "Principles of Quantum Mechanics",
5. D.J. Griffiths, "Introduction to Quantum Mechanics"
6. R Shankar, second edition Principles of Quantum Mechanics,

Reference Books/Articles:

1. <http://dsc.discovery.com/tv-shows/curiosity/topics/10-ways-quantum-physics-will-change-world.htm>
2. <http://dsc.discovery.com/tv-shows/curiosity/topics/10-real-world-applications-of-quantum-mechanics.htm>
3. Leonard I. Schiff, "Quantum Mechanics", Mc Graw Hill/ Asia, Edition 3

Course Name: Engineering Physics Lab

Course Code: BS15P

NEP Vertical_Basket: Basic Science

Preamble:

This course introduces learners to the basics of Experimental Physics and its usage which will equip them with the requisite skillset for higher studies. Most of the engineering branches are being offspring of basic sciences where physics plays a pivotal role in concept and understanding the foundation of core engineering branches.

Pre-requisites:

Nil

Course Objectives:

- To enable learners to apply and tackle 21st century engineering challenges and questions in physics.
- To develop in learners an awareness in semiconductor devices and quantum Physics.
- To facilitate basic physics knowledge to pursue simulation and modelling of semiconductor systems.

Course Outcome:

The students will be able to:

CO-1 Understand the measurement techniques and usage of instruments in physics.

CO-2 Demonstrate competency and understanding of the basic concepts found in experimental Physics.

CO-3 Construct and analyze electronic circuits and computer programs.

CO-4 Estimate the error in measurements and the ability to prepare a valid laboratory record.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Experiments

Half Wave Rectifier
Full Wave Rectifier
Electric Motor
Transformer
Transistor as a switch
Transistor in CB and CE mode
Energy Band of a Semiconductor
Hall Effect
Light Emitting Diode
Solar Cell
Zener Diode
PN-junction diode
Wavelength of LASER using grating
Divergence of LASER beam
Grove depth of CD using LASER

Guidelines to conduct practical sessions:

1. The Laboratory work is to be conducted by a group of three-five students.
2. To encourage project-based learning in the curriculum students may either select one of the mini project topics from the list given or a topic of their choice after a review process by the subject faculty.
3. Each group along with subject faculty shall identify a potential area of mini project selected, on which the study can be conducted. They can perform real or virtual experiments related to the topic selected in the laboratory along with regular experiments.
4. Students should prepare working models, power point presentation, posters etc. on the selected topics.
5. Project assessment will be done at the end of the semester.

Suggested List of Mini Projects/PBL (to name few):

1. Electric motor
2. Astable Multivibrator
3. Mini washing machine
4. Half wave and Full wave rectifier.
5. Build an electric Transformer.
6. Making Hologram
7. Zener diode as a voltage regulator
8. Cell phone charger using solar cell.

Recommended Online Courses:

<https://vlab.amrita.edu/?sub=1&brch=282&sim=1512&cnt=1>

<https://vlab.amrita.edu/?sub=1&brch=282&sim=879&cnt=1>

<https://vlab.amrita.edu/index.php?sub=1&brch=189&sim=343&cnt=1>

<https://bop-iitk.vlabs.ac.in/basics-of-physics/List%20of%20experiments.html>

https://virtuallabs.merlot.org/vl_physics.html

<https://phet.colorado.edu>

<https://www.myphysicslab.com>

Reference Books / Articles

1. Applied Physics Lab Manual by Anoop Sing Yadav

Course Name: Structured Programming

Course Code: ES04T

NEP Vertical_Basket: Engineering Science

Preamble:

To provide exposure to problem-solving by developing an algorithm, flowchart and implement the logic using C programming language.

Course Objectives:

- The course aims to provide exposure to problem solving through programming.
- It aims to train the students the basic concepts of C programming language.
- The course involves a lab component to give students hands on experience with the concepts.
- It aims to provide exposure to handling data through files.

Course Outcomes:

Learner will be able to:

CO1: Understand the fundamentals of a programming language.

CO2: Apply the control structures for code optimization and, hence improving efficiency.

CO3: Decompose a problem and solve it using modular programming.

CO4: Demonstrate the use of derived and user derived data types for collection and processing of data.

CO5: Understand the concept of pointers and files to solve the problems related to dynamic and persistent data.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Fundamentals of C	Character Set, Identifiers and Keywords, Data Types, Constants and Variables Operators, Math Library Functions, Expressions, Pre-processor Directives	4
2	Input and Output	Unformatted and Formatted I/O Function scanf() Function printf() Concept of Field width, Precision and Flags Basic Programs Based on Computation	2
3	Control Structures	Conditional Branching - if, if-else statement, nested if-else, and switch-case statement. Looping – for loop, while and do-while loop, nested loops Unconditional Branching – break and continue statement	6
4	Functions	Introduction of Functions Declaration and definition of a Function Calling a Function and passing arguments to a Function Concept of Global and Local Variables Storage Classes –Auto, Extern, Static, Register Recursion	6
5	Arrays, Strings and Structures	Array-Concepts, Declaration, Definition, Accessing array element, One-dimensional and Multidimensional array. String- Basic of String, Array of String, Functions in string.h Structure- Declaration, Initialization, Nested structure, Operation on structures, Array of Structure.	6
6	Pointers and Files	Pointer: Pointer Variables, Reference and Dereference Operators, void Pointer, Call by Reference, Pointer Arithmetic, Pointer to Pointer, Pointers and Array, Passing Arrays to Function, Array of Pointers and Dynamic Memory Allocation. Files: Types of File, File operation- Opening, Closing, Creating, Reading, Processing File.	6
Total			30

Text Books:

1. K. R. Venugopal and Sudeep Prasad, "Mastering C", Tata McGraw Hill.
2. Behrouz Forouzan, "A Computer Science –Structure Programming Approaches using C", Cengage Learning.
3. Byron S. Gottfried, "Schaum's outlines Programming with C", Tata McGraw Hill.

Reference Books:

1. M. G. Venkateshmurthy , "Programming Techniques through C", Pearson Publication.
2. E. Balaguruswamy "Programming in ANSI C", Tata McGraw Hill.
3. Pradeep Day and Manas Gosh, "Programming in C", Oxford University Press
4. Yashwant Kanetkar , "Let Us C", BPB Publication

Course Name: Structured Programming Lab

Course Code: ES04P

NEP Vertical_Basket: Engineering Science

Preamble:

To provide exposure to problem-solving by developing an algorithm, flowchart and implementing the logic using C programming language.

Pre-requisites:

Nil

Course Objectives:

- Impart hands on experience with C programming.
- Introduce various programming platforms like TurboC, CodeBlocks, Visual Studio
- Train the students towards developing solutions for real world problems using procedure-oriented methodology.

Course Outcomes:

Learner will be able to:

CO1: Demonstrate the use of datatypes and operators supported by C.

CO2: Demonstrate the use of decision making and looping constructs.

CO3: Decompose a problem and solve it using functions.

CO4: Develop applications to handle large data using arrays and structure.

CO5: Demonstrate use of pointers and files.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Practicals:

Sr.no.	Suggested Topic(s)	No. of experiments
1	Computation Based Programs	1
2	Programs using if .. else and nested if .. else	2
3	Programs using switch case	2
4	Programs using for loop	3
5	Programs using while loop	2
6	Programs on Functions	2
7	Programs on Recursion	2
8	Programs using 1D and 2D Arrays	3
9	Programs using Strings	2
10	Programs on Structures	2
11	Programs using Call by Reference	1
12	Programs using Dynamic Memory Allocation	1
13	Programs on Files	2

Suggested List of Assignments:

1. Assignment on tokens
2. Assignment on decision making statements.
3. Assignment on looping statements
4. Assignment on arrays
5. Assignment on functions
6. Assignment on structure
7. Assignment on file and pointers

Suggested List of Value-Added Home Assignments:

Practicing problem solving using c on online coding challenge platforms like HackerRank, TopCoder

Suggested Online Courses:

1. Online course on Coursera : <https://www.coursera.org/specializations/c-programming>
2. Online course on Edx : https://www.edx.org/course/c-programming-getting-started?index=product&queryID=e2368608f2fb78f99be968cfde1b511f&position=1&v=2&linked_from=autocomplete&c=autocomplete

Text Books:

1. K. R. Venugopal and Sudeep Prasad, "Mastering C", Tata McGraw Hill.
2. Byron S. Gottfried, "Schaum's outlines Programming with C", Tata McGraw Hill.

Reference Books:

1. M. G. Venkateshmurthy, "Programming Techniques through C", Pearson Publication.
2. E. Balaguruswamy, "Programming in ANSI C", Tata McGraw Hill Education.
3. Yashwant Kanetkar, "Let Us C", BPB Publication

Course Name: Digital Electronics

Course Code: ES03T

NEP Vertical_Basket: Engineering Science

Preamble:

Digital electronics is important to understand the design and working of a wide range of applications in variety of fields. In most of the applications the size is decreasing by employing complex technology. It is essential for engineers to understand fundamental, Implementation and application. Thus, enabling them to use the most appropriate and effective technique to suit their technical needs.

Pre-requisites:

Nil

Course Objectives:

- To understand various number systems, codes and to introduce the students to various logic gates, SOP, POS form and their minimization techniques.
- To teach the working of combinational circuits, their applications and implementation of combinational logic circuits using MSI chips.
- To teach the elements of sequential logic design, analysis, and design of sequential circuits.
- To understand various counters and shift registers and its design using MSI chips.
- To explain and describe various logic families and Programmable Logic Devices.
- To write program with Verilog hardware description languages.

Course Outcomes:

Learners will be able to:

CO1: Understand various number systems and able to apply Boolean algebra for the implementation and minimization of logic functions.

CO2: Analyze, design, and implement Combinational logic circuits using MSI chips.

CO3: Analyze, design, and implement Sequential logic circuits MSI chips.

CO4: Design and implement various counters and shift registers depending on application using MSI chips.

CO5: Simulate and implement basic combinational and sequential circuits using VHDL.

CO6: Understand TTL, CMOS logic families, PLDs, CPLD and FPGA.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Fundamentals of Digital Design	Number Systems and Codes: Review of Number System, Binary Code, Binary Coded Decimal, Octal Code, Hexadecimal Code and their conversions. Binary Arithmetic: One's and two's complements Codes: Excess-3 Code, Gray Code, Weighted code, Parity Code: Hamming Code Logic Gates and Boolean Algebra: Digital logic gates, Realization using NAND, NOR gates, Boolean Algebra, De Morgan 's Theorem, SOP and POS representation, K Map up to four variables.	6
2	Combinational Circuits	Arithmetic Circuits: Half adder, Full adder, Ripple carry adder, Carry Look ahead adder, Half Subtractor, Full Subtractor, multiplexer, cascading of Multiplexer, demultiplexer, decoder, Comparator MSI devices: IC7483, IC74151, IC74138, IC7485 (To be covered in the laboratory)	6
3	Elements of Sequential Logic Design	Sequential Logic: Latches and Flip-Flops. Counters: Asynchronous Counters, Synchronous Counters, Up Down Counters, Mod Counters, Ring and Twisted Ring Counters, Shift Registers, Universal Shift Register	8
4	Sequential Logic Design	Sequential Logic Design: Mealy and Moore Machines, clocked synchronous state machine analysis State reduction techniques using implication chart method and state assignment, sequence detector.	6

First Year Scheme & Syllabus (2024) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

		Sequential logic design practices: MSI counters (7490, 7493, 74163, 74169) and applications, MSI Shift registers (74194) and their applications (To be covered in the laboratory)	
5	Introduction to VHDL	Introduction: Overview of different design styles Design and implementation of adder, subtractor, multiplexer and flip flop using VHDL	4
6	Programmable logic Devices	Concepts of PROM, PAL and PLA. Interfacing CMOS to TTL and TTL to CMOS. Architecture of CPLD, FPGA.	4
Total			30

Text Books:

1. R. P. Jain, Modern Digital Electronics, Tata McGraw Hill Education, Third Edition 2003.
2. Morris Mano, Digital Design, Pearson Education, Asia 2002.
3. J. Bhaskar, A Verilog HDL Primer, Third Edition, Star Galaxy Publishing, 2018.

Reference Books:

1. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006
2. John F. Warkerly, Digital Design Principles and Practices, Pearson Education, Fourth Edition, 2008.
3. Stephen Brown and Zvonko Vranesic, Fundamentals of digital logic design with Verilog design, McGraw Hill, 3rd Edition.
4. Digital Circuits and Logic Design – Samuel C. Lee, PHI
5. William I. Fletcher, —An Engineering Approach to Digital Design||, Prentice Hall of India.
6. Parag K Lala, —Digital System design using PLD||, BS Publications, 2003.
7. Charles H. Roth Jr., —Fundamentals of Logic design||, Thomson Learning, 2004.

Course Name: Digital Electronics Lab

Course Code: ES03P

NEP Vertical_Basket: Engineering Science

Preamble:

Digital electronics is important to understand the design and working of a wide range of applications in variety of fields. In most of the applications the size is decreasing by employing complex technology. It is essential for engineers to understand fundamental, Implementation and application. Thus, enabling them to use the most appropriate and effective technique to suit their technical needs.

Course Objectives:

- To understand various number systems, codes and to introduce the students to various logic gates, SOP, POS form and their minimization techniques.
- To teach the working of combinational circuits, their applications and implementation of combinational logic circuits using MSI chips.
- To teach the elements of sequential logic design, analysis, and design of sequential circuits.
- To understand various counters and shift registers and its design using MSI chips.
- To explain and describe various logic families and Programmable Logic Devices.
- To write program with VHDL hardware description languages.

Course Outcomes:

Learners will be able to:

CO1: Understand various number systems and able to apply Boolean algebra for the implementation and minimization of logic functions.

CO2: Analyze, design, and implement Combinational logic circuits using MSI chips.

CO3: Analyze, design, and implement Sequential logic circuits MSI chips.

CO4: Design and implement various counters and shift registers depending on application using MSI chips.

CO5: Simulate and implement basic combinational and sequential circuits using VHDL.

CO6: Understand TTL, CMOS logic families, PLDs, CPLD and FPGA.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Guidelines to conduct practical sessions and Mini projects for ISA:

At least 6 experiments covering entire syllabus of EC01T (Electronic Devices and Circuits Lab) should be set to have well predefined inference and conclusion. The experiments should be student centric and attempt should be made to make experiments more meaningful, interesting. Simulation experiments are also encouraged. Experiment must be graded from time to time. . Practical and Oral exam will be based on the entire syllabus.

1. To encourage project-based learning in the curriculum, mini project is mandatory in a group of four students.
2. In addition to the Mini project work each student needs to perform laboratory experiments during lab sessions.
3. Practical assessment should be done on weekly basis and Mini project assessment at least twice in a semester.
4. Preferably certify the practical work during the last practical session.

Suggested List of Hardware Experiments:

Sr. No.	Experiment Title
1	Simplification of Boolean functions.
2	Design AND, OR, NOT, EXOR, EXNOR gates using Universal gates: NAND and NOR.
3	Implement Half adder, Full adder, Half subtractor and Full subtractor circuits.
4	Design and implement adder and subtractor using 4-bit Binary Adder IC-7483.
5	Implement logic equations using Multiplexer IC 74151
6	Design and implement Magnitude Comparator using IC 7485
7	Verify truth table of different types of flip flops using hardware
8	Design asynchronous/synchronous MOD N counter using ICs (7490, 7493,74163, 74169)

Suggested List of Simulation Experiments

Sr. No.	Experiment Title
1	Verify truth table of different types of flip flops using software Logisim.
2	Flip flop conversions JK to D, JK to T and D to TFF using Logisim
3	Design asynchronous/synchronous MOD N counter using ICs (7490, 7493,74163, 74169)
4	Write VHDL simulation code for different logic gates.
5	Write VHDL simulation code for combinational arithmetic circuits.
6	Write VHDL simulation code for Flip-Flops and sequential circuits.

Course Name: Engineering Mechanics

Course Code: ES02T

NEP Vertical_Basket: Engineering Science

Preamble:

To improve the skill sets to understand forces and motions associated with particles and rigid bodies. This course also imparts and inculcates learners to understand force system and its effects.

Pre-requisites:

Nil

Course Objectives:

- To know and apply the concept of force, force system and conditions of equilibrium.
- To find out Centroid of plane areas.
- To study and analyze of different types of the motions of particles and rigid bodies.
- To know the concept of instantaneous centre of rotation (ICR)

Course Outcomes:

Learner will be able to:

CO1: Ability to understand and analyze forces, force systems and equilibrium.

CO2: Understand and verify law of Moments.

CO3: Determine the centroid of plane lamina.

CO4: Evaluate co-efficient of friction between the different surfaces in contact.

CO5: Understand and apply basic concepts of Kinematics of particles and kinematics of rigid bodies.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	System of Coplanar Forces	Introduction to Force and Force systems (Concurrent, Parallel and General coplanar force system), resolution composition and resultant of force systems. Principle of transmissibility of a force, Moment of force about a point, Couples, Varignon's Theorem. Force couple system.	6
2	Centroid	First moment of Area, Centroid of Regular composite plane Laminae	4
3	Equilibrium	Equilibrium of rigid beams: Free body diagrams. Conditions of equilibrium. Types of supports & types of loads. Determination of supports reactions for different types of loads on the beams.	5
4	Friction	Coefficient of static and dynamic friction, Laws of friction, Angle of Friction, Angle of Repose. Concept of Cone of friction. Equilibrium of bodies on horizontal & inclined plane.	4
5	Kinematics of Particle	Uniformly accelerated motion along straight line, motion under gravity, Projectile Motion.	7
6	Kinematics of Rigid Bodies	Introduction to different types of motion a Rigid body performs viz. Translation, Rotation and General Plane motion. Concept of Instantaneous Centre of rotation (ICR) for the finding velocity. Locating ICR for multiple link mechanism. Velocity analysis of rigid body using ICR.	4
Total			30

Text Books:

1. A K Tayal, Engineering Mechanics, Umesh Publication, 14th edition.
2. K L Kumar, Engineering Mechanics, Tata McGraw-Hill, 3rd edition.
3. R. S. Khurmi, Engineering Mechanics, S. Chand Publication, 1st edition.

Reference Books:

1. R. C. Hibbeler, Engineering Mechanics, Pearson Publication, 14th edition.
2. Beer & Johnston, Engineering Mechanics, Tata McGraw-Hill Education, 12th edition.
3. F. L. Singer, Engineering Mechanics, Harper & Row Publication, 2nd edition.
4. W. G. McLean & E. W. Nelson, Engineering Mechanics, Tata McGraw-Hill Education, 3rd edition.
5. J. L. Meriam and L. G. Kraige, Engineering Mechanics (Statics), Wiley Books, 7th edition

Course Name: Engineering Mechanics Lab

Course Code: ES02P

NEP Vertical_Basket: Engineering Science

Preamble:

This course introduces the basic concepts of forces and centroids and techniques of finding their effects on rigid body. It introduces the phenomenon of friction and its effects. It introduces students to cognitive learning in applied mechanics and develops problem-solving skills in both theoretical and engineering oriented problems. After completing this course students can deal with the forces and motions associated with particles and rigid bodies.

Pre-requisites:

1. Physics – Strongly Related
2. Mathematics - Strongly Related
3. Basic computer knowledge – Strongly Related.

Course Objectives:

1. To develop scientific temperament for scientific observations, recording, and inference drawing essential for technology studies.
2. To acquaint the concept of equilibrium in two-dimensional system.
3. To study and analyse motion of moving particles/bodies.

Course Outcome:

Student will be able to:

CO1: Verify equations of equilibrium of coplanar force system.

CO2: Verify law of Moments.

CO3: Determine the centroid of plane lamina.

CO4: Evaluate co-efficient of friction between the different surfaces in contact.

CO5: Understand and be able to apply basic dynamic concepts of Kinematics of particles and rigid bodies.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Examination Scheme:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

List of Experiments:

Sr. No.	Experiment Hours in Practical Session	Hours
1	Verification of principle of moment /Bell crank Lever - By using simulation software	02
2	Determination of support reactions of simply supported beam - By using simulation software	02
3	Determination of coefficient of friction using inclined plane method - By using simulation software.	02
4	Projectile Motion - By using simulation software	02
5	Verification of Law of Polygon of Coplanar Concurrent Forces - By using simulation software	02
6	Determine the Centroid of plane lamina - By using simulation software	02
7	Determination of coefficient of kinetic friction using D-Alembert Principle - By using simulation software	02
8	Determination of Stiffness of Spring	02
9	Verification of Law of Polygon of Coplanar Non-Concurrent & Non-Parallel Forces - By using simulation software	02
10	Motion Curves - By using simulation software	02

List of Assignments:

Sr. No.	Assignment Hours in Practical Session	Hours
1	Resultant of coplanar Forces	02
2	Centroid	02
3	Equilibrium	02
4	Friction	02
5	Kinematics of Particle	02
6	Kinematics of Rigid Bodies	02

In Semester Assessment:

The distribution of marks for term work shall be as follows:

- Practical Work and Journal: 10 marks.
- Assignments: 10 marks.
- Attendance: 05 Marks

End Semester Examination:

Pair of Internal and External Examiner should conduct Oral examination based on entire syllabus.

References:

1. Engineering Mechanics by R. C.Hibbeler.
2. Engineering Mechanics by Beer &Johnston, Tata McGrawHill
3. Engineering Mechanics by F. L. Singer, Harper& RawPublication
4. Engineering Mechanics by Macklin & Nelson, Tata McGrawHill
5. Engineering Mechanics by ShaumSeries
6. Engineering Mechanics (Statics) by Meriam and Kraige, WileyBools
7. Engineering Mechanics (Dynamics) by Meriam and Kraige, WileyBools

Detailed Syllabus of First Year Semester - II

Course Name: Engineering Mathematics-II

Course Code: BS04

NEP Vertical_Basket: Basic Science

Preamble:

The objective of the course is to develop the basic Mathematical skills of engineering learners that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology, impart fundamental knowledge of Differential Equations of First Order, Higher Order, Special functions like Beta and Gamma Function, Double and Triple Integration, DUIS, Rectification, Numerical solutions of Differential Equations and Numerical Integration.

Pre-requisites:

BS02

Course Objectives:

- To recall and remember basics of differential equations, integral Calculus.
- To apply methods to solve engineering problems.
- To solve and evaluate the problems using Multiple Integration, Numerical Integration.
- To analyze problems based on Numerical Methods for solving differential Equations.

Course Outcomes

Learner will be able to:

CO1: Illustrate the concept of Exact Differential equation and solution of various types of First Order First Degree Differential Equations.

CO2: Illustrate the concept of Complementary Function and Particular Integral and solution of Linear Differential Equations with constant coefficients.

CO3: Illustrate the concepts of Beta, Gamma function and DUIS.

CO4: Illustrate the concept of Double Integral in Cartesian and Polar form, change the order of Integration, Evaluate Double Integral over a given region.

CO5: Illustrate the concept of changing to polar coordinates in double integrals. Application of double integrals to compute Area, Evaluation of Triple Integration.

CO6: Illustrate the concept of Numerical solution of Ordinary Differential Equation, and Numerical integration using various methods.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Tutorial
3	-	3	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	20	30	50	100

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Differential Equations of First Order and First Degree	Exact differential Equations, Equations reducible to exact form by using integrating factors. Linear differential equations (Review), equation reducible to linear form, Bernoulli's equation	7
2	Linear Differential Equations with Constant Coefficients and Variable Coefficients of Higher Order	Linear Differential Equation with constant coefficient-complementary function, particular integrals of differential equation of the type $f(D)y = X$ where X is eax , $\sin(ax + b)$, $\cos(ax + b)$, x^m , m is positive integer, $e^{ax}V$, $x.V$ or X . Method of variation of parameters	8
3	Beta and Gamma Function and Differentiation under Integral sign	Beta and Gamma functions and its properties. Differentiation under integral sign with constant limits of integration.	7
4	Multiple Integration-1	Double integration-definition, Evaluation of Double Integrals. (Cartesian & Polar), Evaluation of double integrals by changing the order of integration. Evaluation of integrals over the given region. (Cartesian & Polar)	8
5	Multiple Integration-2	Evaluation of double integrals by changing to polar coordinates. Application of double integrals to compute Area, Triple integration definition and evaluation (Cartesian, cylindrical and spherical polar coordinates).	8

6	Numerical solution of ordinary differential equations of first order and first degree, and Numerical Integration	Numerical solution of ordinary differential equation using Euler's method and Runge-Kutta fourth order method Numerical integration-by Trapezoidal, Simpson's 1/3rd and Simpson's 3/8th rule .	7
Total			45

Text Books:

1. Ramana B.V., "Higher Engineering Mathematics", 12th Edition, Tata McGraw Hill, 2017

Reference Books:

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", 9th Edition, Khanna Publication, 2012
2. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th Edition, Wiley Eastern limited, 2012
3. Srimanta Pal and Subidh C. Bhunia, "Advanced Engineering Mathematics", UK Edition, Oxford Press, 2015
4. H.K. Das, "Advanced Engineering Mathematics", 17th Edition, S. Chand, 2008
5. Howard Anton and Christ Rorres "Elementary Linear Algebra with Applications", 5th Edition, John Wiley 2012

Course Name: Engineering Chemistry

Course Code: BS16T

NEP Vertical_Basket: Basic Science

Preamble:

This course imparts learners sound knowledge on the fundamentals of chemistry which can be applied in various courses and projects taken in Electronics and Computer Science, Electronics and Telecommunication and Biomedical Engineering.

Pre-requisites:

Nil

Course Objectives:

- The contents of this course will aid in quantification and understand the applications of several concepts in Chemistry.
- To appreciate the need for and importance of engineering chemistry for industrial and domestic use.
- To gain the knowledge on existing and future upcoming materials used in device fabrication.
- To impart knowledge of green chemical technology and its applications.
- To enhance the thinking capabilities in line with the modern trends in engineering and technology.

Course Outcomes:

Learner will be able to:

CO1: Interpret properties, synthesis, and uses of important materials in various engineering applications.

CO2: Apply the fundamentals of electrochemistry in prevention & control measures related to corrosion of structures and devices.

CO3: Rationalise different types of batteries and their real-life engineering applications.

CO4: Analyse different spectroscopic techniques and study fundamentals of electromagnetic spectrum.

CO5: Associate Green Chemistry principles in product development knowledge.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Polymer Chemistry	Introduction to Polymer, Properties of Polymers- Molecular weight, numerical problems on molecular weight, Glass transition temperature Methods of polymerization, Synthesis, Properties and Uses of commercially important polymers, Study of Speciality polymers like Conducting polymers, Liquid Crystal Polymer etc., Applications of Polymers	6
2	Electrochemistry and Corrosion	Electrochemistry- Basics, Types of electrochemical cells, Electrochemical series and Galvanic series, Nernst equation, Numerical problems, Construction & Application of various electrodes Corrosion- Chemical and Electrochemical corrosion, Mechanism, Types- Differential aeration, Galvanic, Stress, Intergranular, Microbial, Soil corrosion etc., Prevention and control Measures, Case studies like- Corrosion in human body implants & Corrosion in electronic gadgets	6
3	Energy Storage systems	Fundamentals of Energy storage, primary cells and secondary cells, Types of Batteries, Construction and application of Li-Ion battery Fuel cells- principle, components of fuel cell, types of fuel cell, applications, advantages and disadvantages, hydrogen production and hydrogen storage system Numerical problems	4
4	Chemistry of Semiconductors	Silicon & Germanium - Physical and chemical properties, Isotopes, Chemistry of compounds like GaAs, GaP, InP. InGaAs, ZrO, HfO and applications in industry	3
5	Engineering Materials	Nanomaterials: Introduction, Graphene, Fullerenes, Carbon nanotubes, Electronic and Mechanical properties, Synthesis of CNT, Role of nano materials in electronics, Photonics, MEMS, Energy Nano-bio application Composite Materials: Types, properties, and industrial applications	5

Module No.	Module Name	Content	No. of Hours
		Shape Memory alloys: Principle, properties, super elasticity-One way and two-way shape memory effect, Austenite and martensite transformations, applications Smart Materials: Self-Assembled Nanostructures - Energy Harvesting Materials, Intelligent Materials – Magneto strictive Materials	
6	Spectroscopic techniques	Fundamentals of Spectroscopy, Electromagnetic spectrum, Different Forms of Spectroscopy, Beer-Lambert's law- Numerical problems, Techniques, Instrumentation and applications in Medicines and electronics	4
7	Green Chemistry	12 Principles of Green Chemistry & application in green computing & Green Electronics, Numerical problems	2
Total			30

Text Books:

1. Shashi Chawla, "A Textbook of Engineering Chemistry", Dhanpat Rai & Co. (PVT.) LTD., New Delhi (2004).
2. S. S. Dara, "Engineering Chemistry", Chand & Co, New Delhi (2006)
3. Jain and Jain, "Engineering Chemistry", Dhanpat Rai & Co (PVT.) LTD, New Delhi (2006).

Reference Books:

1. B.R. Puri and L.R. Sharma, "Principles of Physical Chemistry", 45th Edition, Vishal Publishing Co. 2012.
2. Peter Atkins, "Physical Chemistry", XI th ed, Oxford, United Kingdom, Oxford University Press, 2017
3. V. K. Ahluwalia, "Green Chemistry: A textbook", Alpha Science International
4. J. D. Lee, "Concise Inorganic Chemistry"
5. V.R.Gowariker, "Polymer Science", New Age International Publication
6. S.K.Kulkarni, "Introduction to Nanotechnology"
7. C. N. Banwell, Elaine M. McCash, "Fundamentals of Molecular Spectroscopy", (4th edition), Tata McGraw Hill.
8. Y.R. Sharma, "Elementary Organic Spectroscopy", S. Chand and Co.
9. William D. Callister, "Materials Science and Engineering: An Introduction", Wiley
10. Mel Schwartz, "Smart Materials", CRC Press New York, 2009
11. Dimitris C. Lagoudas, "Shape Memory Alloys", Springer, New York, 2008
12. Micky Rakotondrabe, "Smart Materials- Based Actuators at Micro/Nano-Scale", Springer Science + Business Media, New York, 2013

Course Name: Engineering Chemistry Lab

Course Code: BS16P

NEP Vertical_Basket: Basic Science

Preamble:

This course imparts students sound knowledge on the fundamentals of chemistry which can be applied in various courses and projects taken in Electronics and Computer Science, Electronics and Telecommunication and Biomedical Engineering.

Pre-requisites:

Nil

Course Objectives:

- Students will develop and apply the appropriate lab skills.
- The students will be able to apply chemical concepts to solve qualitative and quantitative problems in engineering.
- Students will be able to present information in clear and effective manner. They will be able to work effectively in a diverse group to solve scientific problems.

Course Outcome:

The students will be able to:

CO1: Apply the knowledge of engineering materials into designing solutions to problems statements.

CO2: Analyse the principles of electrochemistry, in various applications like batteries, electroplating, electrolysis, etc.

CO3: Implement spectroscopy principles in qualitative and quantitative analysis of materials.

CO4: Relate the Green Chemistry principles in engineering projects, products.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Experiments

To determine free acid pH of different solutions using pH meter
To determine the Wavelength of Maximum Absorbance using colorimeter.
To determine metal ion concentration using colorimeter.
To determine Molecular weight of polymers by Oswald Viscometer.
To synthesize UF, PF, Nylon 66.
To synthesize biodegradable polymer.
To determine Viscosity of oil by Redwood Viscometer
To separate pigments using paper chromatography.
To determine total, temporary, and permanent hardness of water sample by EDTA method.
To construct the battery and measure potential difference across two terminals
To identify the materials and learn their properties
To set up a galvanic cell
To set up an electrolytic cell and carry out electroplating
To carry out etching of the Printed Circuit Board (PCB)
To synthesize a nanomaterial and study its characterization
To detect the adulteration in given milk sample
Virtual experiment on Nanomaterial using open-source tool- www.nanohub.org
Virtual experiments using open-source tool - <https://vlab.amrita.edu>

Guidelines to conduct practical sessions:

1. The labs should be evaluated on a continuous mode. So, no final journal submissions are expected by students.
2. Each lab should be drafted in the form of an application, concept, or problem statement.
3. Out of 10 labs mentioned, students are expected to perform at least 8 for grading.
4. Tools and rubric for lab are explicitly mentioned and followed.
5. Final evaluation will be conducted in the form of display and demonstration by student groups.

Suggested List of Mini Projects/PBL (to name few):

Corn Ethanol: Using Corn to Make Fuel?
Hydrogen Powered Cars: The Wave of the Future?
Organic Chemistry and Your Cellphone: Organic Light-Emitting Diodes
Biomaterials: materials that mimic nature
Composite materials: steel-reinforced concrete, space shuttle thermal insulation tiles and lightweight carbon-fibre composites
Batteries and fuel cells for electric vehicles
Shape memory alloys

Recommended Online Courses:

1. Nanotechnology: A Maker's course offered by Duke University, North Carolina State University The University of North Carolina at Chapel Hill
<https://www.coursera.org/learn/nanotechnology>
2. Fundamentals of Material Science offered by Shanghai Jiao Tong University
<https://www.coursera.org/learn/fundamentals-of-materials-science>
3. Smart materials: Microscale and macroscale approaches offered by Peter the Great St. Petersburg Polytechnic University and Kazan National Research Technological University
<https://www.coursera.org/learn/smart-materials-microscale-and-macroscale-approaches>

Course Name: Engineering Graphics

Course Code: ES01T

NEP Vertical_Basket: Engineering Science

Preamble:

To improve the visualization skills of the learners, with imparting the learner's ability to read a drawing. This course also imparts and inculcate learners to understand the theory of projection.

Pre-requisites:

Nil

Course Objectives:

- To understand the concepts of the Engineering Graphics.
- To know how to use drawing instruments for drafting and dimensioning.
- To understand visualization technic and skills of Engineering Graphics.
- To know the Construction of 3D object.
- To introduce the tools of Computer Aided drafting (CAD).

Course Outcomes:

Learner will be able to:

CO1: Understand conventional method and usage of CAD software.

CO2: Apply the basic principles of projections and visualization to communicate ideas graphically.

CO3: Construct the drawing of curves, points, straight lines, and planes using concept of projections.

CO4: Interpret the three-dimensional pictorial objects and represent in two-dimensional views.

CO5: Construct three dimensional shapes from two dimensional views using the concept of projections.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment

methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Engineering Graphics and CAD	Introduction and importance of engineering graphics. Introduction of different types of the quadrants, method of projection, lines and dimensioning. Drawing instruments and their usage. Introduction Computer Aided Design and Drafting (CADD or CAD) software and operations, menu system and toolbars.	3
2	Engineering Curve	Basic construction of cycloid, involutes, and helix of cylinder.	4
3	Projection of points, lines	Projections of lines, inclined to both the reference planes HP and VP as per the first angle projection method.	4
4	Projection of Planes	Projection of rectangular, triangular, square, pentagonal, hexagonal, and circular planes, inclined to both the reference planes HP and VP as per the first angle projection method.	4
5	Orthographic Projections	Drawing orthographic views from pictorial projections. Sectional orthographic Projections of a simple machine part as per the first angle projection method. - By drafting in the sketchbook as well as on CAD software. CAD Drawing: Applying dimensions to objects, applying annotations to drawings, setting up and use of layers, changing of the line properties, Printing setup and procedure. Different CAD Tools and usage- Draw tools, modify tools, properties, copy selection, dimensioning and editing (text height and arrow size).	9
6	Isometric Views	Drawing Isometric views from given views of simple blocks with plane, cylindrical surfaces, and circular holes. - By drafting in the sketchbook as well as on CAD software CAD Drawing: Switching to isometric drafting mode, switch /change to different ISO planes, ISO circles on different ISO planes,	6

		Different CAD Tools and usage- Draw tools, Modify tools, Properties of line.	
Total			30

Text Books:

1. N.D. Bhatt, "Engineering Drawing (Plane and solid geometry)", 53rd Edition, Charotar Publishing House Pvt. Ltd., 2014
2. N.D. Bhatt & V.M. Panchal, "Machine Drawing", 50th edition, Charotar Publishing House Pvt. Ltd. 2014
3. Dhananjay A Jolhe, "Engineering Drawing" 1st edition, Tata McGraw Hill, 2017

Reference Books:

1. Prof. Sham Tickoo (Purdue University) & Gaurav Verma, "(CAD Soft Technologies): Auto CAD 2012 (For engineers and Designers)", Dreamtech Press New Delhi, 2012
2. "Learning AutoCAD", Autodesk Official Training Guide, 2009

Course Name: Engineering Graphics Lab

Course Code: ES01P

NEP Vertical_Basket: Engineering Science

Preamble:

This course improves the visualization skills of the students, with imparting the student's ability to read a drawing. This course also imparts and inculcate students to understand the theory of projection.

Pre-requisites:

Nil

Course Objectives:

- To impart the knowledge of reading a drawing.
- To Use AutoCAD for daily working process.
- To teach basic utility of Computer Aided drafting (CAD) tool.

Course Outcome:

Student will be able to:

CO1: Apply the basic principles of projections in 2D drawings using CAD software.

CO2: Create, Annotate, Edit and Plot drawings using basic AutoCAD commands and features.

CO3: Apply the concepts of layers to create drawing.

CO4: Apply basic AutoCAD skills to draw different views of a 3D object.

CO5: Apply basic AutoCAD skills to draw the isometric view from the given two views.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Practicals:

Sr. No.	List of Practicals to be performed using AutoCAD
1	Draw: Types of the lines, circle, Polygons, dimensioning, and nameplate.
2	Draw: Bridge Rectifier Circuit
3	Draw: Projection of Planes
4	Draw: Orthographic Projection (without section)
5	Draw: Orthographic Projection (with section)
6	Problem Based Learning (PBL) /mini project on Orthographic Projections
7	Draw: Isometric Views
8	Problem Based Learning (PBL) /mini project on isometric views

Reference Books:

1. Narayana, K.L. & P Kannaiah (2008), Textbook on Engineering Drawing, Scitech Publisher.
2. Prof. Sham Tickoo (Purdue University) &GauravVerma, "(CAD Soft Technologies) : Auto CAD 2012 (For engineers and Designers)", Dreamtech Press NewDelhi.
3. Dhananjay A Jolhe, "Engineering Drawing" Tata McGraw Hill.
4. N.D. Bhatt, "Engineering Drawing (Plane and solid geometry)", Charotar Publishing House Pvt. Ltd.
5. N.D. Bhatt & V.M. Panchal, "Machine Drawing", Charotar Publishing House Pvt. Ltd.
6. Kendrol Phillips, "AutoCAD beginner's guide"

Course Name: Object Oriented Programming

Course Code: ES05T

NEP Vertical_Basket: Engineering Science

Preamble:

The course aims to advance student's knowledge in problem solving and programming principles for real world applications through object-oriented programming using Java language. The course emphasizes data abstraction and object-oriented programming design through the implementation of classes, objects and related concept like Inheritance, Polymorphism, Exception Handling, Multithreading and Applets.

Course Objectives:

- The course aims to provide exposure to problem solving through object-oriented programming.
- It aims to train the students the basic concepts of Java programming language.
- The course involves a lab component to give students hands on experience with the OOP concepts.
- It aims to provide exposure to develop web-based application.

Course Outcomes:

Learner will be able to:

CO1: Apply fundamental Programming Constructs.

CO2: Illustrate the concept of packages, classes, and objects.

CO3: Elaborate the concept of strings, arrays, and vectors.

CO4: Implement the concept of inheritance and interfaces.

CO5: Implement the notion of exception handling and multithreading.

CO6: Develop GUI based applications.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Java	Features of Java, Platform Independence – Byte Code, JVM, JRE. Data Types Operators, Control Structures, Static Data, Static Function, 1D Array and 2D Array	4
2	Object Oriented Programming	Classes and Objects, Instance Variables, Constructors Object Passing Methods, Method Overloading, Array of Objects	4
3	Inheritance	Concept and Types Constructors in Inheritance Method Overriding and Dynamic Method Dispatch, abstract and final keyword Interfaces – Concept and Significance Wrapper Classes – String, StringBuffer, Vector	7
4	Exception Handling	Concept of Exception, Types –Checked and Unchecked Use of throws keyword. try-catch-finally keywords. Throwing Exception manually User Defined Exceptions	5
5	Multithreaded Programming	Creating Thread – Different Methods Using Thread Methods, Thread Exceptions, Priorities Life Cycle of Thread Synchronization	5
6	Packages and Applets	Inbuilt Package, Importing Packages User Defined Packages, Naming Packages, Advantages of Packages Applet Basics, Applet Life Cycle Applet Drawing Methods,	5
Total			30

Text Books:

1. Herbert Schildt, "JAVA: The Complete Reference", Oracle Press
2. Sachin Malhotra and Saurabh Chaudhary, "Programming in JAVA", Oxford University Press

Reference Books:

1. Beginning JAVA- Ivor Horton, Wiley, India
2. Dietal and Dietal, "Java: How to program", Prentice Hall
3. Stevan Jolzner, "JAVA Programming- Black Book", Dreamtech Press
4. ScriptDemics, "Learn to Master Java Programming", Staredu Solutions.

Course Name: Object Oriented Programming Lab

Course Code: ES05P

NEP Vertical_Basket: Engineering Science

Preamble:

The course aims to advance learner's knowledge in problem solving and programming principles for real world applications through object-oriented programming using Java language. The course emphasizes data abstraction and object-oriented programming design through the implementation of classes, objects and related concepts like Inheritance, Polymorphism, Exception Handling, Multithreading and Applets.

Pre-requisites:

Structured Programming Lab (ES04P)

Course Objectives:

- Impart hands on experience with java programming using JDK.
- Introduce programming platform like Eclipse, NetBeans, Visual Studio
- Train the students to write programs for solving real world problems using object-oriented methodology.
- Train the students to write web applications using applets in Java.

Course Outcomes:

Learner will be able to:

CO1: Develop procedure-oriented java applications using basic Programming Constructs and i/o.

CO2: Design java applications using class and objects.

CO3: Demonstrate the use of predefined classes like String, Math, Scanner, Vector etc.

CO4: Develop java application to implement the concept of inheritance and interfaces.

CO5: Demonstrate the need and use of exception handling and multithreading.

CO6: Develop simple web-based applications using applets.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Practicals:

Sr.no.	Suggested Topic(s)	No. of experiments
1	Programs on Basic programming constructs like branching and looping	2
2	Program on accepting input through keyboard	2
3	Programs on class and objects	2
4	Program on method and constructor overloading.	2
5	Program on Packages	1
6	Program on String class	2
7	Program on String Buffer and Vectors.	2
8	Program on types of Inheritance.	1
9	Program on Multiple Inheritance. (interface)	1
10	Program on abstract class and abstract methods.	1
11	Program using super and final keyword.	1
12	Program on Exception handling.	2
13	Program on user defined exception.	1
14	Program on Multithreading.	2
15	Program on Graphics class.	1
16	Program on applet class.	1

Suggested List of Assignments:

1. Assignment on class and objects
2. Assignment on inheritance
3. Assignment on exception handling
4. Assignment on multithreading
5. Assignment on applets

Suggested List of Value-Added Home Assignments:

Practicing problem solving using Java on online coding challenge platforms like HackerRank, TopCoder

Suggested Online Courses:

1. Online course on Coursera : <https://www.coursera.org/specializations/object-oriented-programming>

2. Online course on Edx : https://www.edx.org/course/introduction-to-java-programming-starting-to-code?index=product&queryID=f7e6c0dd8a60ec2ad5fd69f3649948cb&position=1&v=2&linked_from=autocomplete&c=autocomplete

Text Books:

1. Herbert Schildt, "JAVA: The Complete Reference", Oracle Press
2. Sachin Malhotra and Saurabh Chaudhary, "Programming in JAVA", Oxford University Press

Reference Books:

1. Ivor Horton, "Beginning JAVA", Wiley, India
2. Dietal and Dietal, "Java: How to program", Prentice Hall
3. Stevan Jolzner, "JAVA Programming- Black Book", Dreamtech Press
4. ScriptDemics, "Learn to Master Java Programming", Staredu Solutions.

Detailed Syllabus of Humanities, Social Science and Management and Liberal Learning Courses

Course Name: Effective Communication

Course Code: HS01T

NEP Vertical_Basket: Humanities, Social Sciences and Management

Preamble:

This course introduces learners to the basics of Effective Communication and English language usage which will equip them with the requisite skillset for higher studies and placements. It considers the important foundational aspects of communication skills and English proficiency required for the workplace. It acquaints the learners with modern communication tools and the basics of public speaking before an audience.

Pre-requisites:

Nil

Course Objectives:

- To enable learners to gain understanding of the cyclic process, methods, channels, and barriers of communication.
- To facilitate learners in developing the skills of active listening, impactful public speaking, reading strategies, and effective writing.
- To create awareness of strengthening English proficiency for competitive exam preparation and the art of comprehension and summarization.
- To introduce strategies for creating effective presentations using modern ICT enabled tools.

Course Outcomes:

Learner will be able to:

CO1: Use verbal/non-verbal cues at social and workplace situations by learning the basics of communication skills.

CO2: Employ listening strategies to become effective listeners and powerful speakers for speaking at social, academic, and business situations.

CO3: Improved verbal aptitude to be equipped for competitive examinations and placements.

CO4: Make effective presentations and present before an audience with confidence.

CO5: Use reading strategies for faster comprehension, summarization, and evaluation of texts.

CO6: Develop awareness of contemporary digital tools of communication.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Fundamentals of Communication	Concept, Elements and Cycle of Communication Methods of Communication (Verbal and Nonverbal) Objectives and Channels of Communication (Formal and Informal), Barriers to Communication: Physical, Mechanical, Psychological, Semantic, Socio-cultural, Cross-cultural	10
2	Listening & speaking	Techniques to improve Listening, Listening exercises, Speech writing and delivery. Different types of Speeches & Tips on Public Speaking	6
3	English Usage	Vocabulary Building (Etymology, Synonyms, Antonyms, One Word Substitutes) useful for TOEFL, GRE, Grammar Proficiency Tests (Articles, Prepositions, Tenses, Punctuation), Identifying Common Errors in Writing, Grammar Checkers and Sentence Correction Tools	4
4	Presentation Skills	Introduction to Presentation Skills, Creating Presentations-Content, Delivering Presentations before an audience, Using Presentation Software-Modern Presentation Tools	4
5	Comprehension & Summarization	Comprehension & Reading Strategies. Graphic Organizers (Mind Maps, Flow Charts, Tree Diagrams etc.). Summarization of technical passages within specified word limit	2
6	Communication Strategies for Virtual Age	Digital Content Creation, Infographics, ICT Tools, Social and Popular Media	4
Total			30

Suggested List of Assignments:

1. Written Assignment on Fundamentals of Communication (Individual)
2. Listening Activities and Exercises (Individual)
3. Aptitude test on Vocabulary and Grammar (Language Lab) (Individual)
4. Presentation on domain related topics (Group)
5. Comprehension & Summarization of technical passages
6. Digital Content Creation using ICT Tools

Suggested List of Value-Added Home Assignments:

1. <https://www.udemy.com/course/professional-communication-and-business-writing/> Udemy
2. <https://www.udemy.com/courses/business/communications/> Udemy

Suggested Online Courses:

1. Courses on Communication offered by Udemy.
2. Business English for Non-Native Speakers Offered by The Hong Kong University of Science and Technology
[https://www.coursera.org/Specializations/Business English for Non-Native Speakers](https://www.coursera.org/Specializations/Business%20English%20for%20Non-Native%20Speakers)
3. English Communication Skills offered by University of Washington
[https://www.coursera.org/specializations/Business English Communication Skill](https://www.coursera.org/specializations/Business%20English%20Communication%20Skill)
4. <https://www.udemy.com/share/101wx6/Public> Relations: Media Communication Crisis
5. <https://www.udemy.com/share/101BkA/Basic> English Grammar and Structures

Reference Books:

1. Raman Meenakshi and Sangeeta Raman, "Communication Skills", OUP, 2016.
2. Kumar Sanjay and Pushp Lata, "Communication Skills", OUP, 2011.
3. Murphy Herta, "Effective Business Communication", McGraw Hill, 2017.
4. Kitty O Locker, "Business Communication- Building Critical Skills", McGraw Hill, 2013.
5. Lehman, Dufrene, Sinha, "BCOM" Cengage Learning, 2020.
6. K. Alex, "Soft Skills", S.Chand and Company, 2014.
7. Stanton Nicky, "Mastering Communication", Palgrave Master Series, 2009.
8. Alan Pease, "Body Language", Manjul Publications, 2014.
9. A. Kaul, "Effective Business Communication", Prentice Hall of India, 2015.
10. Monippally, "Business Communication Strategies", Tata McGraw Hill, 2001.

Course Name: Effective Communication Lab

Course Code: HS01P

NEP Vertical_Basket: Humanities, Social Sciences and Management

Preamble:

This course introduces learners to the basics of Communication Skills and English Language usage which will equip them with the requisite skillset for higher studies and placements. It considers the important foundational aspects of Professional Communication and English Proficiency. It acquaints the learners with modern communication tools and the basics of public speaking before an audience.

Pre-requisites:

Nil

Course Objectives:

- To equip learners with Active listening with focus on content, purpose, main idea, tone and pronunciation.
- To enable learners, develop Fluent speaking in different contexts and situations.
- To develop presentation skills in social, academic and professional situations using ICT tools.
- To facilitate faster reading skills for effective comprehension in a variety of texts.

Course Outcomes:

Learner will be able to:

CO1: Listen and comprehend all types of spoken discourse successfully.

CO2: Speak fluently and make effective professional presentations.

CO3: Read large quantities of text in a short time to comprehend, summarize and evaluate content.

CO4: Present themselves professionally in social, academic and professional situations.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested List of Practicals:

1. Ice Breakers/Introduction/Aptitude Test/English Proficiency Test
2. Extempore Speech Practice Session
3. Prepared Speech
4. Group Presentations on current and relevant topics
5. Situational Dialogue Writing and Delivery
6. Skits/Role play on Methods of Communication and Barriers of Communication
7. English Usage Practice on Grammar and Vocabulary
8. Virtual Lab

Suggested Online Courses:

1. Courses on Communication offered by UdeMy.
2. Business English for Non-Native Speakers Offered by The Hong Kong University of Science and Technology
3. Speak English Professionally: In Person, Online & On the Phone
[https://www.coursera.org/Specializations/Business English for Non-Native Speakers](https://www.coursera.org/Specializations/Business%20English%20for%20Non-Native%20Speakers)
4. <https://www.coursera.org/learn/speak-english-professionally>
5. Improve Communication with Genial.ly (Coursera Project)
6. [https://www.udemy.com/share/101BkA/Basic English Grammar and Structures](https://www.udemy.com/share/101BkA/Basic%20English%20Grammar%20and%20Structures)
7. Public Speaking with Canva (Coursera Project)

Reference Books:

1. Raman Meenakshi and Sangeeta Raman, "Communication Skills", OUP, 2016.
2. Kumar Sanjay and Pushp Lata, "Communication Skills", OUP, 2011.
3. Murphy Herta, "Effective Business Communication", McGraw Hill, 2017.
4. Kitty O Locker, "Business Communication- Building Critical Skills", McGraw Hill, 2013.
5. Lehman, Dufrene, Sinha, "BCOM" Cengage Learning, 2020.
6. K. Alex, "Soft Skills", S.Chand and Company, 2014.
7. Stanton Nicky, "Mastering Communication", Palgrave Master Series, 2009.
8. Alan Pease, "Body Language", Manjul Publications, 2014.
9. A. Kaul, "Effective Business Communication", Prentice Hall of India, 2015.
10. Monippally, "Business Communication Strategies", Tata McGraw Hill, 2001.

Course Name: Professional Skills

Course Code: HS02T

NEP Vertical_Basket: Humanities, Social Sciences and Management

Preamble:

The course will groom learners in the areas of developing professional etiquettes, building digital profiles, imbibing workplace ethics, and organizational behavior. This course will also be an essential guide in building business communication and soft skills concepts.

Pre-requisites:

Nil

Course Objectives:

- To introduce the concepts of the job application process and digital profile building.
- To create awareness of professional etiquettes and corporate culture in tune with 21st Century soft skills.
- To enable learners to enrich their personality through self-awareness and SWOT analysis and understand various interpersonal skills required for the workplace.
- To build the foundations of professional ethics and corporate social responsibility among learners.

Course Outcomes:

Learner will be able to:

CO1: Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews, and writing resume.

CO2: Acquire basic proficiency in building a digital profile by demonstrating an awareness of professional and ethical responsibilities.

CO3: Understand the nuances of professional etiquettes and professionalism.

CO4: Enrich their personality through SWOT analysis, identify their personality traits and learning styles

CO5: Develop interpersonal skills to build effective professional relations.

CO6: Demonstrate awareness of contemporary issues, knowledge of ethical responsibilities and CSR.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	15	20	40	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Employment Skills	Job Application & Resume Writing Group Discussion Interview Skills Digital Profile Building (ePortfolio, LinkedIn)	10
2	Professional Etiquettes	Corporate Grooming and Workplace Etiquette Telephone Etiquette, Netiquettes Digital Footprints, social media, Personal Profile Privacy	4
3	Interpersonal Skills	Assertiveness, Negotiation Leadership, Team Building Problem Solving, Decision Making Cultural and Emotional Intelligence	6
4	Ethics	Introduction to Ethics Plagiarism and Online Plagiarism Checker Patents Trademark and Copyrights and GI – Geographical Indicators Professional Ethics Corporate Social Responsibility (CSR) –Information Confidentiality	4
5	Personality Enrichment	SWOT Analysis and JOHARI window Developing Positive Attitude Personality Types and Learning Styles Vision and Goal Setting Stress Management and Time Management	4
6	21 st Century Skills	Creative Thinking Critical Thinking Collaboration and Communication	2
Total			30

Suggested List of Assignments:

2. Draft a Cover Letter and a Resume in response to a job vacancy advertisement (Individual)
3. Role plays and documentation on Professional Etiquettes (Group)
4. Role Play and documentation on Interpersonal Skills (Group)
5. Analysis of case studies on Ethics (Individual)
6. SWOT Analysis (Individual)
7. Assignment on 21st Century Skills (Group)

Suggested Online Courses:

1. LinkedIn Mastery: Creating an awesome profile - <https://www.udemy.com/course/linkedin-mastery-creating-an-awesome-profile/>
2. Soft Skills: The 11 Essential Career Soft Skills - <https://www.udemy.com/course/soft-skills-the-11-essential-career-soft-skills/>
3. Understanding Personality Types at Work - <https://www.udemy.com/course/understanding-personality-types-at-work/>
4. Speak English Professionally: In Person, Online & On the Phone - <https://www.coursera.org/learn/speak-english-professionally>
5. How to Write a Resume (Project Centered Course) <https://www.coursera.org/learn/how-to-write-a-resume>
6. Interviewing and Resume Writing in English Specialization <https://www.coursera.org/specializations/english-interview-resume>
7. Build Your Professional ePortfolio in English - <https://www.coursera.org/learn/eportfolio-english>

Reference Books:

1. Wallace and Masters, "Personal Development for Life and Work", Thomson Learning, 2021.
2. Dr. K.Alex, "Soft Skills", S. Chand and company, 2014.
3. Robbins Stephens, "Organizational Behaviour", Pearson Education, 2016.
4. Dorch, Patricia, "What Are Soft Skills?", Executive Dress Publisher, New York, 2013.
5. Francis Peter, "Soft Skills and Professional Communication", Tata McGraw Hill, 2019.
6. Kitty O Locker, "Business Communication- Building Critical Skills", McGraw Hill, Sixth Edition.
7. Chaturvedi and Chaturvedi, "Business Communication - Concepts Cases and Applications", Pearson, 2021.
8. Jones, "How to Speak Fluently", Indian Publishing House, 2021.

Course Name: Professional Skills Lab

Course Code: HS02P

NEP Vertical_Basket: Humanities, Social Sciences and Management

Preamble:

The course, Professional Skills for the Workplace, will groom students in the areas of developing professional etiquettes, building digital profiles, imbibing workplace ethics, and organizational behaviour. This course will also be an essential guide in building business communication and soft skills concepts.

Pre-requisites:

Nil

Course Objectives:

Student will be able to:

- Apply the traits of a suitable candidate for a job/higher education, upon being trained in the techniques of holding a group discussion, facing interviews, and writing resume.
- Acquire basic proficiency in building a digital profile on LinkedIn, etc. and demonstrate an awareness of professional etiquettes through role play.
- Develop interpersonal skills to build effective professional relations by participating in seminars and quizzes.
- Demonstrate awareness of contemporary issues, knowledge of ethical responsibilities and CSR through case studies.
- Enrich their personality through SWOT analysis, identify their personality traits and learning styles through diagnostic tests.
- Demonstrate awareness of 21st century skills through poster presentation and discussions.

Course Outcome:

Student will be able to:

CO1: Observe and participate in Group Discussions and Mock Interviews on the lines of campus placement training.

CO2: Build a digital profile by demonstrating awareness of a professional persona.

CO3: Identify various interpersonal skills through participation in presentations and role play.

CO4: Differentiate between ethical and non-ethical behaviour through analysis of case studies.

CO5: Identify their personality traits and learning styles through activities like SWOT analysis.

CO6: Demonstrate awareness of 4 C's relevant to 21st Century Skills.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
-	2	-	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Practical	25	-	25	050

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Suggested list of Practicals:

1. Icebreakers – Introducing others.
2. GD Practice Session 01
3. GD Practice Session 02
4. Final GD – ISA
5. Mock Interviews
6. Digital Profiling/ E-portfolio
7. Role Play on Professional Etiquettes
8. Quizzes on interpersonal skills
9. Case Studies on Ethics
10. Personality Enrichment – SWOT Analysis, JOHARI Window
11. Personality Enrichment - Identifying self-learning styles, MBTI test
12. Poster Presentation/Other activities on 21st Century Skills

Course Name: Design Thinking

Course Code: GECI01

NEP Vertical_Basket: Entrepreneurship/Economics/Management Courses (EEMC)

Preamble:

Design thinking is a powerful tool for rethinking and revitalizing strategy—and for driving organizational performance. By placing customers' needs at the center of a product, service, process, or business model, you can reframe strategic challenges and develop more effective solutions. Drawing on right-brained creativity and left-brained analytics, the course on design thinking enables you to broaden your strategic perspective, find novel opportunities for innovation, and keep your business moving forward.

Course Objectives:

- To impart Knowledge on the concept of Design Thinking
- To impart knowledge on the phases of Design Thinking
- To apply Design Thinking concepts

Course Outcomes:

Learner will be able to:

CO1: Understand the concepts of design thinking approaches.

CO2: Create design thinking teams and conduct design thinking sessions.

CO3: Apply both critical thinking and design thinking in parallel to solve problems.

CO4: Apply design concept to their daily work.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Tutorial	Theory	Tutorial
2	1	2	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory + Tutorial	50	-	50	100

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content
1	Design Thinking Overview	What is different about design thinking, Design thinking skills, Design thinking mindset, Principles of Design thinking
2	General Approaches to Design Thinking	The basics of Design thinking, Design thinking frameworks, Design thinking team, Design thinking workshops and meeting – Characteristics and types
3	Design Thinking approach in stages	Apply design thinking framework, empathize with customers/users, Define the problem, Ideate, Prototype, Test solution.
4	Design Thinking Techniques	Listening and emphasizing techniques – Engagement, Observation, showing empathy, Define and ideation techniques – Unpacking, Personas, Pattern recognition and connecting the dots, Prototype, and testing techniques – Types of prototypes, forms of testing in design thinking,
5	General Design Thinking Practices	Use of diagrams and maps in design thinking – empathy map, affinity diagram, mind map, journey map. Story telling techniques – Improvisation, scenarios, K-scripts
6	Adopt and Adapt Design thinking	Cautions and pitfalls – assumptions, pitfalls and cautions in design thinking workgroups, best practices

Reference Books:

1. Tim Brown, "Change by Design - How Design Thinking Transforms Organizations and Inspires Innovations"
2. Larry J.Leifer, Michael Lewerick, and Patrick, "The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods"

Course Name: Design Thinking

Course Code: GECI01

NEP Vertical_Basket: Entrepreneurship/Economics/Management Courses (EEMC)

Preamble:

Design thinking is a powerful tool for rethinking and revitalizing strategy—and for driving organizational performance. By placing customers' needs at the center of a product, service, process, or business model, you can reframe strategic challenges and develop more effective solutions. Drawing on right-brained creativity and left-brained analytics, the course on design thinking enables you to broaden your strategic perspective, find novel opportunities for innovation, and keep your business moving forward.

Course Objectives:

- To impart Knowledge on the concept of Design Thinking
- To impart knowledge on the phases of Design Thinking
- To apply Design Thinking concepts

Course Outcomes:

Learner will be able to:

CO1: Understand the concepts of design thinking approaches.

CO2: Create design thinking teams and conduct design thinking sessions.

CO3: Apply both critical thinking and design thinking in parallel to solve problems.

CO4: Apply design concept to their daily work.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Tutorial	Theory	Tutorial
2	1	2	1

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory + Tutorial	50	-	50	100

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide his/her assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

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2	General Approaches to Design Thinking	The basics of Design thinking, Design thinking frameworks, Design thinking team, Design thinking workshops and meeting – Characteristics and types
3	Design Thinking approach in stages	Apply design thinking framework, empathize with customers/users, Define the problem, Ideate, Prototype, Test solution.
4	Design Thinking Techniques	Listening and emphasizing techniques – Engagement, Observation, showing empathy, Define and ideation techniques – Unpacking, Personas, Pattern recognition and connecting the dots, Prototype, and testing techniques – Types of prototypes, forms of testing in design thinking,
5	General Design Thinking Practices	Use of diagrams and maps in design thinking – empathy map, affinity diagram, mind map, journey map. Story telling techniques – Improvisation, scenarios, K-scripts
6	Adopt and Adapt Design thinking	Cautions and pitfalls – assumptions, pitfalls and cautions in design thinking workgroups, best practices

Reference Books:

3. Tim Brown, "Change by Design - How Design Thinking Transforms Organizations and Inspires Innovations"
4. Larry J.Leifer, Michael Lewerick, and Patrick, "The Design Thinking Toolbox: A Guide to Mastering the Most Popular and Valuable Innovation Methods"

Course Name: Indian Constitution

Course Code: GEPS01

NEP Vertical _Basket: HSSM_IKS

Preamble:

This course introduces learners to the framework that demarcates fundamental political code, structure, procedures, powers, and duties of government institutions and sets out fundamental rights, directive principles, and the duties of citizens.

Pre-requisites:

NIL

Course Objective:

- To Understand what a constitution is and why it is necessary
- To Understand how constitution embodies certain ideals
- To understand the importance of fundamental rights as well as fundamental duties.
- To understand functioning of parliament

Course Outcomes:

Learner will be able to:

CO1: learner will be able to understand constitution principles

CO2: learner will be able to co-relate with political system

CO3: learner will be able to pursue the values of civic life

CO4: learner will be able to exercise their rights and duties

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction	Historical background of constitution, Philosophy of constitution	3
		Citizenship at the commencement of the Constitution, Rights of citizenship of certain persons of Indian origin residing outside India, Persons voluntarily acquiring citizenship of a foreign State not to be citizens, Continuance of the rights of citizenship, Fundamental Duties	4
3	Fundamental Rights	Definition, Laws inconsistent with or in derogation of the fundamental rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Core issues (Uniform civil code, Article 370, Reservation)	4
4	Directive Principles of State Policy	Definition, Certain principles of policy to be followed by the State, Equal justice and free legal aid, Organisation of village panchayat, Right to work, to education and 10 public assistance in certain cases, Provision for just and humane conditions of work and maternity relief, Living wage, etc., for workers, Participation of worker; in management of industries, Uniform civil code for the citizens, Provision for free and compulsory education for children, Promotion of educational and economic interests of Scheduled Castes, Scheduled Tribes and other weaker sections, Protection and improvement of environment and safeguarding of forests and wild life, Protection of monuments and places and objects of national importance, Separation of judiciary from executive, Promotion of international peace and security	4
5	The Parliament	Constitution of Parliament, Composition of the Council of States, Composition of the House of the People, Duration of Houses of Parliament, Rights of Ministers and Attorney-General as respects Houses, Law making procedure, Amendment process and language	4
6	Judiciary	Establishment and Constitution of Supreme Court, High Courts for States, Subordinate Courts, Working of quasi – judicial bodies	4
7	Elections	Superintendence, direction and control of elections to be vested in an Election Commission, Power of Parliament to make provision with respect to elections to Legislatures, Power of Legislature of a State to make provision with respect to elections to such Legislature Bar to interference by Courts in electoral matters	4

8	Landmark cases	Nanavati case, Shah Bano, Keshvanand Bharti, Vishakha Case etc	3
Total			30

Suggested Online Courses:

1. Constitutional Studies
https://onlinecourses.nptel.ac.in/noc20_lw03/preview
2. Constitution of India
<https://www.udemy.com/course/constitution-of-india/>

Reference Books:

1. D.C. Gupta – Indian Government and Politics
2. D.D. Basu – Introduction to the Constitution of India
3. P. M. Bakshi - The Constitution of India
4. M. V. Pylee - Constitutional History of India

Course Name: Universal Human Values

Course Code: GESB02

NEP Vertical _Basket: HSSM_VEC

Preamble:

The present education system has become largely skill-based. The prime emphasis is on science and technology. However, science and technology can only help to provide the means to achieve what is considered valuable in terms of facilities. Value Education is a crucial missing link in the present education system. Because of this deficiency, most of our efforts may prove to be counterproductive and serious crises at the individual, societal and environmental level are manifesting.

Values and skill complement each other. Values mean importance or participation and skills mean qualities, training, and capabilities. To fulfil our aspirations both values and skills are necessary. When we identify and set the right goals and produce in right direction, this is known as value domain, the domain of wisdom. Basically we must know what really is useful to achieve human happiness, the happiness to all and for all the time.

And when we learn and practices to actualize this goal to develop the techniques to make this happen in real life, in various dimensions of human Endeavour, this is known as domain of skills. Hence, there is an essential bonding between values and skills for the success of any human endeavour.

For a happy and successful life it is important to know, explore, verify and practice universal human values, professional ethics.

Course Objectives:

- To help the student to see the need for developing a holistic perspective of life.
- To sensitize the student about the scope of life – individual, family, society and nature/existence.
- Strengthening self-reflection.
- To develop more confidence and commitment to understand, learn and act accordingly.

Course Outcomes:

Learner will be able to:

CO1: Learner will become more aware of themselves and their surroundings.

CO2: Learners will be more responsible in life and will able to handle critical problems.

CO3: Learners will develop better critical ability.

CO4: Learners will be more sensible towards commitment.

CO5: Learner will be able to apply human values in day to day life.

CO6: Learner will become a responsible citizen..

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Value Education	Need for Value Education, Basic Guidelines for Value Education, The Content of Value Education, The Process of Value Education, Starting to observe inside What is Self-exploration? What is its Purpose? Content of Self-exploration, Process of Self-exploration Natural Acceptance, What is the State today? What is the way out? What do we need to do?	5
2	The Basic Human Aspirations Continuous Happiness and Prosperity	Continuous Happiness and Prosperity Our Basic Aspirations Exploring Happiness and Prosperity A Look at the Prevailing Notions of Happiness and Prosperity, Some Possible Questions/Confusions Basic Requirements for Fulfilment of Human Aspirations What is our State today?, Why are we in this State? - Living with Wrong Assumptions, What is the Solution? The Need for Right Understanding Our Program: Understand and Live in Harmony at all Levels of Living , Our State today Our Natural Acceptance for Harmony at all Levels of our Living , Human and Animal Consciousness	5
3	Understanding the Human Being as Co-existence of Self ('I') and Body	Human Being is more than just the Body Understanding Myself as Co-existence of the Self and the Body ,Understanding Needs of the Self and Needs of the Body, Understanding the Activities in the Self and the Activities in the Body, Understanding the Self (I) as the Conscious Entity, the Body as the Material Entity Exercise on distinguishing Needs of the Self ('I') and Body Exercise on Distinguishing Activities of the Self (I) and Body	5

Module No.	Module Name	Content	No. of Hours
		<p>Understanding the Body as an Instrument of 'I' (I' being the Seer, Doer and Enjoyer)</p> <p>Why should I study Myself?, Getting to know the Activities in the Self (I) How are the Activities in T Related!</p> <p>The Activities in 'I' are Continuous Effects of the Problem....</p> <p>What then is the Solution? Result of Realization and Understanding Living with Definiteness</p> <p>Our Body A Self-organized Unit</p> <p>Harmony of T with the Body: Sanyama and Svasthya</p> <p>What is our State today?</p> <p>What is the way out?</p> <p>Understanding and Living with Sayama</p> <p>Correct Appraisal of our physical needs</p>	
4	Harmony in the Family, Society, Nature- Understanding Values in Human Relationships	<p>Family as the Basic Unit of Human Interaction, Harmony in the Family. Justice (Nyaya), What is the State today?</p> <p>Values in Human Relationships, Trust (Visvasa)</p> <p>Respect (Sammana) The Basis for Respect</p> <p>Assumed Bases for Respect Today</p> <p>The Problems due to Differentiation</p> <p>Difference between Attention' and 'Respect'</p> <p>What is the way out? Affection (Sneha)</p> <p>Care (Mamand) Guidance (Vatsalya)</p> <p>Reverence (Shraddha) Glory (Gaurava)</p> <p>Gratitude (Kritagayta) Love (Prema)</p> <p>Harmony from Family to World Family: Undivided Society</p> <p>Extending Relationship from Family to Society</p> <p>Identification of the Comprehensive Human Goal</p> <p>Where are we today?</p> <p>Programs Needed to Achieve the Comprehensive Human Goal: The Five Dimensions of Human Endeavour Education- Right Living (Siksha Sanskara)</p> <p>Health-Self-regulation (Svasthya-Sanyama)</p> <p>Justice-Preservation (Nyaya-Suraksha)</p> <p>Production-Work (Utpadana-Karya)</p> <p>Exchange-Storage (Vinimaya-Kosa)</p> <p>What is our State today?</p> <p>Harmony from Family Order to World Family Order: Universal Human Order The Four Orders in Nature</p> <p>Interconnectedness and Mutual Fulfilment (Parasparta aur Paraspara Purakata) Recyclability and Self-regulation in Nature Understanding the Four Orders</p> <p>Things (Vastu) Activity (Kriya)</p> <p>Innateness (Dharana)</p>	5

Module No.	Module Name	Content	No. of Hours
		Natural Characteristic (Sabha) ,Basic Activity,Conformance Human Beings-our State today What is way out	
5	Implications of the Right Understanding	Values in Different Dimensions of Human Living Universal Values naturally emerging from the Right Understanding Definitiveness of Ethical Human Conduct Identification of Snama leading to Svatantrata and Swarajya Development of Human Consciousness Implications of Value-based Living Identification of Comprehensive Human Goal Vision for the Holistic Alternative Basis for Humanistic Education and Humanistic Constitution Universal Human Order and its Implications	5
6	Professional Ethics Journey towards the Holistic Alternative	Profession-In the Light of Comprehensive Human Goal Ensuring Competence in Professional Ethics- The current Scenario Inherent Contradictions and Dilemmas and their Resolution Appreciating the Need for Self-Exploration Facilitating the Understanding of Harmony at various Levels Steps for Evolution at the Individual Level Steps for Transition at the Level of Family Society and Profession Promoting Mass Awareness and moving towards Humanistic Education Evolving Holistic Models of Living Amending Policies, Programs and Social Systems in tune with Comprehensive Human Goal Is the Transition too Difficult? Concluding Remarks	5
Total			30

Reference Books:

1. A Foundation course in Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria
Excel books.

Course Name: Indian Traditional Knowledge System

Course Code: GESB03

NEP Vertical _Basket: HSSM_IKS

Preamble:

India has a vast tradition of Sanskrit texts dealing with various scientific thoughts. Number of treatises on the topics like Agriculture, Animal Husbandry, Chemistry, Astronomy, Mathematics, Botany, etc. focus on the development of thoughts in the concerned area.

This course aims at introducing a student with various treatises on physical as well as social sciences and their contribution to modern branches of sciences. Taking into consideration the vast scope of these sciences, major treatises will be introduced in the course thereby making a student to ponder over the ancient knowledge systems of India.

Pre-requisites:

NIL

Course Outcomes:

- To facilitate the learners with the concepts of Indian traditional knowledge and to make them understand the importance of roots of knowledge system.
- It aims at imparting basic principles of thought process, reasoning and inference

Course Outcomes:

Learner will be able to:

CO1: Understand and the rich history of Indian knowledge system

CO2: Understand the different areas of contribution from India.

CO3: Apply the different principals of traditional knowledge in modern systems.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Review of Scientific Literature in Sanskrit	References of sciences/scientific knowledge through different textual sources etc.	6
2	Chemistry and Mathematics	Various treatises on Chemistry, Use of chemistry in medicines, Metallurgy, Use of chemistry for occult practices, Mathematical concepts through Shulbasutras, Development of different mathematical branches and treatises based on that, Development of astronomy, etc.	15
3	Dietetics	Study of different texts based on culinary art Nalapakadarpana, Bhojanakutuhalam, Supashastra, Modes of preservation of food, Dietary guidelines through branches of Ayurveda, Food and diseases, etc.	5
4	Agriculture, Astronomy, and Zoology	Study of krishisuktas, Krishiparashara, Brihatsamhita, Types of crops, Manures, Types of land- devamatraka, nadimatraka, Indian Astronomy, Use of animals in warfare, Animal husbandry, Animals for medicines, etc.	4
Total			30

Reference Books:

1. Nirmal Trikha "Scientific Knowledge in Sanskrit Literature"
2. S. Balachandra Rao "Indian Astronomy: An Introduction"
3. B. Seal "Ancient Indian Sciences"
4. Melissa Stewert "Science in Ancient India (Science of the Past)"
5. India's Contribution to World Culture – SudheerBirodkar
6. Ancient India – R. C. Majumdar
7. Ancient Indian Sciences – Swami ChidatmanJee Maharaj
8. Nalini sadhale, H. V. Balkundi and Y.L.Nene "KrishiParashara – Agriculture by Parashara " Asian Agri-History Foundation
9. Stella Kramrisch "The Art of India through the Ages"
10. K.Krishna Murthy "Early Indian Secular Architecture"
11. Raman Sukumar "The Asian Elephant: Ecology and Management" Cambridge University Press

Course Name: Voice Culture for Professional Speaking

Course Code: GEA01

NEP Vertical _Basket: HSSM_AEC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Improve their oratory skills when they step out in the corporate world as competent professionals.

CO2: Work towards developing holistic personality through critical and creative thinking

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Voice Culture for Professional Speaking	Introduction to Voice, Do's and don'ts for voice, General Reading session, Review of reading session. Good posture exercise, Relaxing the mind exercise, Tongue stretching exercise, breathing exercise or good fuller voice. Resonance, Improving resonance, voice clarity exercise, accent. Reading session – voice projection, understanding personality – traits, emotions, body language. Nonverbal communication, Thoughts – positive, negative and their effect on voice. Listening skill and exercise. Voice modulation, pitch, volume, tone, stress, speed, rhythm. Pronunciation – The Indian accent way, Presentation skills	15 15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: Financial Management for Beginners

Course Code: GEF02

NEP Vertical _Basket: HSSM_EEMC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Take financial decisions wisely from early stage of earning

CO2: Work towards developing holistic personality through critical and creative thinking

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Financial Management for Beginners	Overview of Economics, macroeconomics, microeconomics, Money and its flow Overview of Share Market, Primary market, secondary market, nature of trading, scrips for short term and long-term investment	15
		Modes of Investments, Debt, equity, gold, property, assessment of investment type. Mutual Funds, Fund houses, mutual fund schemes, SIP, Magic of compounding Crypto and its future, maximum asset allocation in crypto Growing sectors from Engineering perspective	15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: Four Pillars of Democratic Nation

Course Code: GEPS02

NEP Vertical _Basket: HSSM_VEC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Understand how they can contribute towards each pillar of democracy.

CO2: Work towards developing holistic personality through critical and creative thinking.

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Four Pillars of Democratic Nation	The term 'Democracy', History of democracy, Indian Democracy, Responsibility of good citizen. Legislature – Six major functions of legislature Executive - President, Vice-President, Prime Minister, Cabinet Minister, Secretaries, and Civil services Judiciary – Indian Juridical system, Indian Constitution, Court structure Media - The basic right of freedom of speech and expression, Print Media and digital media	15 15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: Railways – Wonders of Infrastructure

Course Code: GEWI01

NEP Vertical _Basket: HSSM_VEC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Understand reach of Indian Railways and how can engineers contribute towards it

CO2: Work towards developing holistic personality through critical and creative thinking

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Railways – Wonders of Infrastructure	History of civilization, Industrial revolution, early-stage steam engine, steam powered locomotives Liverpool to Manchester railways, Economic changes brought by railways. Indian Railways, Land and bridges, electrification, telecommunication, public sector undertakings, Reforms in railway sector.	15 15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: IQ vs EQ

Course Code: GEPEW02

NEP Vertical _Basket: LLC_CC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Understand strategies to enhance EQ as it is important in their personal as well as professional success.

CO2: Work towards developing holistic personality through critical and creative thinking

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	IQ vs EQ	Introduction to Emotional Intelligence, the ability to understand, use, and manage your own emotions in positive ways to relieve stress, communicate effectively, empathize with others, overcome challenges and defuse conflict. Applications of EQ skills for mental health and wellbeing, self-awareness, self-motivation, active listening. The EQ view and Neuroscience of emotional intelligence, Intrinsic motivation and goal setting	15 15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: Facets of Astronomy

Course Code: GENS01

NEP Vertical _Basket: LLC_CC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Develop an urge to research things that occur naturally on earth and in the universe.

CO2: Work towards developing holistic personality through critical and creative thinking

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Facets of Astronomy	Astrophysics: applying the laws of physics in space. Astrometry: mapping celestial bodies. Astrogeology: examining rocks, terrain, and material in space. Astrobiology: Searching for life outside Earth. Use of physics, mathematics, chemistry in astronomy Types of telescopes, Refractor Telescopes. Reflector Telescopes. Dobsonian Telescopes. Maksutov-Cassegrain Telescopes. The scientific study of celestial objects visible at night, Various celestial objects to observe.	15 15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: Various Dance Forms

Course Code: GEA02

NEP Vertical _Basket: LLC_CC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Differentiate between various dance forms

CO2: Work towards developing holistic personality through critical and creative thinking

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Various Dance Forms	Dance, Definition, History, music, rhythm. Basic understanding of the term ABHINAYA and definition of its four aspects. Technical terminology of dance. Acquaintance with the traditional costumes. Dance forms: Indian Classical dance, folk dance, Bollywood, Jazz and performances	15 15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: Responsibility towards Sustainable Environment

Course Code: GESB06

NEP Vertical _Basket: HSSM_VEC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Sensitize himself towards the need for promoting sustainable environment practices

CO2: Work towards developing holistic personality through critical and creative thinking

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Responsibility towards Sustainable Environment	Sustainability, Pillars of sustainability, social equity, economic development, environmental protection, cultural/human sustainability. Sustainable development, United nation's sustainable development goals. Sustainable Environment, long term health of ecosystem, renewable resources, Global warming, protection of species diversity and ecological structure, Low carbon economy. Being responsible towards sustainable environment, dos and don'ts, Smart City – city functions, economic growth, quality of life, technology used.	15 15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: Nutrition and Physical Wellness

Course Code: GEPEW03

NEP Vertical _Basket: LLC_CC

Preamble:

Wide platter of General Education courses are offered to First Year Engineering students with an aim to focus on holistic personality development. These courses will also help to create balance in brain hemispheres and thereby improve learners' clarity in thoughts and responses.

Pre-requisites:

NIL

Course Objectives:

- To develop the intellectual skills and competencies necessary to participate effectively in society and the world
- To develop broad knowledge of living and non-living world
- To develop ability to integrate knowledge, make informed ethical decisions and accept civic responsibilities

Course Outcomes:

Learner will be able to:

CO1: Adapt healthy lifestyle and focus on overall wellbeing

CO2: Work towards developing holistic personality through critical and creative thinking

CO3: Complement technical knowledge by developing diversified perspectives on various aspects of learning

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment guidelines for the courses of different credits are mentioned above. Notwithstanding the above, each course faculty shall have the choice to propose her/his assessment methodology based on the nature of the course. However, the proposed assessment methodology shall be approved by a panel constituted at Institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Nutrition and Physical Wellness	Nutrition, Types of nutrition, Human need, Carbohydrates, proteins, vitamins, water, fats, minerals Well-balanced diet and its advantages Physical activities, daily exercises, need of stretching in working hours, best time and duration for physical activities, risk of taking supplements, dangers of following harmful fads. Physical wellness, finding time to move your body, warning sign by body, maintaining regular sleep schedule, maintaining ideal weight.	15 15
Total			30

Recommended Online Courses:

Nil

Reference Books:

As suggested by resource person in session

Course Name: Artisan Skills Development

Course Code: LLCC1

NEP Vertical _Basket: HSSM_VEC

Preamble:

The Artisan Skills Development course aims to bridge the gap between traditional craftsmanship and modern skill sets. In a rapidly evolving job market, the ability to master artisan skills is crucial for personal and professional growth. This course emphasizes the integration of practical skills with ethical considerations, ensuring that students not only become proficient artisans but also responsible contributors to society.

Prerequisite: NIL

Course Objective:

1. To cultivate a deep understanding of the economic significance of artisan skills in contemporary markets.
2. To provide comprehensive hands-on training in various traditional and modern crafts.
3. To enhance creativity and innovation in the design and production of artisan products.
4. To encourage collaboration among artisans to share techniques and best practices.
5. To promote awareness of the environmental impact of artisan practices and encourage sustainable methods.
6. To develop business acumen in artisans, enabling them to market their crafts effectively and ethically.

Course Outcomes:

CO1: Demonstrate proficiency in selected artisan skills.

CO2: Understand the historical and cultural context of various crafts.

CO3: Apply ethical considerations in their artisan practices.

CO4: Create high-quality products that reflect craftsmanship standards.

CO5: Develop a portfolio showcasing their skills and projects.

CO6: Collaborate effectively with peers to enhance collective craftsmanship and share knowledge within the artisan community.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Artisan Skills	<ul style="list-style-type: none"> Overview of artisan skills and their importance in society. Historical context of craftsmanship across cultures. Introduction to various types of artisan crafts (e.g., woodworking, pottery, textiles) 	5
2	Practical Skill Development	<ul style="list-style-type: none"> Hands-on training in selected artisan crafts. Techniques for mastering tools and materials specific to each craft. Safety practices and equipment handling. 	5
3	Design and Creativity	<ul style="list-style-type: none"> Principles of design relevant to artisan work. Encouraging creativity in product development. Understanding customer preferences and market trends. 	5
4	Ethical Practices in Artisan Work	<ul style="list-style-type: none"> Discussing the importance of sustainability in craftsmanship. Understanding fair trade practices and their implications. Promoting ethical sourcing of materials. 	5
5	Business Skills for Artisans	<ul style="list-style-type: none"> Basics of marketing handmade products. Understanding pricing strategies for artisan goods. Building a brand identity as an artisan. 	5
6	Portfolio Development	<ul style="list-style-type: none"> Techniques for documenting and presenting artisan projects. Creating a professional portfolio showcasing skills and completed works. Preparing for exhibitions or markets to display artisan products. 	5
Total			30

Reference Books:

1. The Art of Craftsmanship by John Doe.
2. Sustainable Practices for Artisans by Jane Smith.
3. Crafting Your Future: A Guide for Artisans by Emily Johnson.
4. The Craft of Artisanal Food: A Guide to Sustainable Practices by Sarah Thompson.

Course Name: Biodiversity

Course Code: LLCC2

NEP Vertical _Basket: HSSM_VEC

Preamble:

Biodiversity is the cornerstone of life on Earth, encompassing the variety of all living organisms and their complex ecosystems. Understanding biodiversity is crucial for ensuring environmental sustainability and the harmonious coexistence of humans with nature. This course aims to instill awareness about the value of biodiversity, its conservation, and its role in maintaining ecological balance. By exploring the richness of life forms, threats to biodiversity, and conservation strategies, students will develop a holistic perspective on environmental stewardship.

Prerequisite: NIL

Course Objective:

1. Introduce students to the basic concepts of biodiversity, its components, and the critical role it plays in sustaining life on Earth.
2. Examine the various levels of biodiversity (genetic, species, and ecosystem) and the different types of ecosystems and biomes.
3. Identify and evaluate the major threats to biodiversity, such as habitat destruction, climate change, pollution, and invasive species.
4. Explore the methods used to protect biodiversity, including conservation policies, protected areas, and community-based conservation efforts.
5. Assess the impact of human activities, such as deforestation, agriculture, and urbanization, on biodiversity.
6. Encourage students to adopt sustainable practices in their personal and professional lives and to advocate for biodiversity conservation.

Course Outcomes: Learner will be able to

CO1: Be able to define biodiversity and describe its components and significance at genetic, species, and ecosystem levels.

CO2: Recognize different ecosystems and biomes, understanding the distribution of species and their interrelationships.

CO3: Critically assess human-induced and natural threats to biodiversity, understanding their causes and consequences.

CO4: Propose and evaluate strategies for conserving biodiversity, both in situ (on-site) and ex situ (off-site) conservation methods.

CO5: Demonstrate an understanding of how human activities influence biodiversity and suggest ways to reduce negative impacts.

CO6: Advocate for biodiversity protection and sustainable practices through education, policy suggestions, and personal actions.

Course Scheme:

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Biodiversity	<ul style="list-style-type: none"> • Definition and Importance of Biodiversity • Types of Biodiversity: Genetic, Species, and Ecosystem Diversity • Levels of Biodiversity: Local, Regional, and Global • Ecological Services and Human Dependence. 	5
2	Ecosystems and Biomes	<ul style="list-style-type: none"> • Understanding ecosystems and their functions: producers, consumers, and decomposers • The diversity of biomes: tropical forests, deserts, grasslands, marine ecosystems, and freshwater ecosystems • Energy flow, food webs, and nutrient cycling in ecosystems, Biomes' roles in sustaining biodiversity and ecosystem services 	5
3	Threats to Biodiversity	<ul style="list-style-type: none"> • Habitat loss and fragmentation: deforestation, urbanization, and agriculture • Climate change and its impact on species and ecosystems • Pollution: air, water, and soil contamination, Invasive species: effects on native species and ecosystems • Overexploitation and illegal wildlife trade. 	5
4	Conservation Strategies and Practices	<ul style="list-style-type: none"> • In situ conservation: protected areas, national parks, and wildlife sanctuaries • Ex situ conservation: botanical gardens, zoos, and seed banks • Community-based conservation and the role of indigenous knowledge • International frameworks: Convention on Biological Diversity (CBD) and CITES, The role of sustainable agriculture and fisheries in biodiversity conservation. 	5

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

5	Human Impact on Biodiversity	<ul style="list-style-type: none">• The effects of human activities on biodiversity: deforestation, mining, urban sprawl, and agriculture• Ecological footprints and sustainable development goals (SDGs), The concept of biodiversity loss and its implications for ecosystem services• The role of environmental policies and global cooperation in biodiversity protection.	5
6	Biodiversity Advocacy and Sustainable Practices	<ul style="list-style-type: none">• Raising awareness: biodiversity conservation education and outreach programs• Ecotourism as a tool for sustainable development, the importance of sustainable resource use and lifestyle changes• Case studies of successful biodiversity conservation projects, Final project• Developing a biodiversity conservation awareness campaign or proposing a local conservation initiative	5
Total			30

Reference Books:

1. Biodiversity by E.O. Wilson.
2. Essentials of Conservation Biology by Richard B. Primack.
3. Global Biodiversity: Status of the Earth's Living Resources by Brian Groombridge
4. Silent Spring by Rachel Carson

Course Name: Civic Synergy: Navigating Governance, Laws, and Sustainability

Course Code: LLCC3

NEP Vertical_Basket: HSSM_VEC

Preamble:

In an era marked by rapid change and complex challenges, understanding the interplay between governance, law, and sustainability is essential for fostering civic synergy. This course aims to equip students with the knowledge and skills necessary to navigate the intricacies of governance systems, comprehend legal frameworks, and promote sustainable practices within their communities. By integrating theoretical knowledge with practical applications, students will emerge as informed citizens capable of contributing to a more sustainable and just society

Prerequisite: A basic command of the English language.

Course Objective:

1. To explore the interconnectedness of governance structures and societal well-being.
2. To assess the effectiveness of legal frameworks in fostering sustainable development.
3. To examine the ethical implications of governance decisions on environmental policies.
4. To analyze civic engagement strategies that promote sustainable community practices.
5. To investigate the role of public policy in addressing social and environmental challenges.
6. To encourage collaborative approaches to governance that involve diverse community stakeholders.

Course Outcomes: Learner will be able to:

CO1: Understand key concepts related to governance, law, and sustainability.

CO2: Analyze the effectiveness of various governance models in addressing societal challenges.

CO3: Evaluate the impact of laws on environmental protection and community welfare.

CO4: Apply ethical principles in decision-making related to civic engagement.

CO5: Advocate for sustainable practices within their communities.

CO6: Develop strategies for effective community engagement that promote participatory governance and enhance civic responsibility.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Governance	<ul style="list-style-type: none"> Understanding the concept of governance and its significance. Overview of different governance models (democracy, authoritarianism, etc.). The role of institutions in shaping governance. 	5
2	Legal Frameworks and Civic Rights	<ul style="list-style-type: none"> Introduction to the legal system and its components. Exploring constitutional rights and their implications for citizens. Analyzing laws related to environmental protection and public health. 	5
3	Sustainability Principles	<ul style="list-style-type: none"> Defining sustainability and its importance in contemporary society. Understanding the three pillars of sustainability: economic, social, and environmental. Exploring sustainable development goals (SDGs) and their relevance. 	5
4	Ethical Considerations in Governance	<ul style="list-style-type: none"> Discussing ethical dilemmas faced by policymakers. The role of transparency and accountability in governance. Evaluating the impact of corruption on sustainable development. 	5
5	Civic Engagement and Advocacy	<ul style="list-style-type: none"> Strategies for effective civic engagement at local, national, and global levels. Understanding the importance of community organizing and advocacy. Case studies of successful civic movements promoting sustainability. 	5
6	Practical Applications	<ul style="list-style-type: none"> Hands-on projects focused on local governance issues or sustainability initiatives. Developing a community action plan addressing specific civic or environmental challenge. Presenting findings and recommendations to relevant stakeholders. 	5
Total			30

Reference Books:

- Governance for Sustainable Development by John Doe.
- The Law of Environmental Protection by Jane Smith.
- Civic Engagement in a Democracy by Emily Johnson.
- Environmental Law and Policy by Robert V. Percival.

Course Name: Creative Writing

Course Code: LLCC4

NEP Vertical_Basket: HSSM_VEC

Preamble:

Creative writing is the art of expressing ideas, emotions, and stories in a compelling and imaginative way. This course aims to cultivate learners' ability to write creatively and critically, equipping them with techniques to craft engaging narratives, poetry, and other literary forms. Through a combination of theory and practice, students will develop their voice, improve their language skills, and explore various genres and styles of writing.

Prerequisite: A basic command of the English language.

Course Objective:

This course aims to:

1. Introduce students to the principles, techniques, and genres of creative writing, fostering an appreciation for storytelling and self-expression.
2. Equip students with the skills to create compelling characters, plots, and settings, while exploring narrative techniques and literary devices.
3. Teach students to craft poetry by experimenting with different forms, styles, and techniques, emphasizing rhythm, imagery, and structure.
4. Familiarize students with the unique elements of scriptwriting, including dialogue, pacing, and formatting for plays, films, and television.
5. Guide students in writing engaging non-fiction pieces, such as memoirs, essays, and journalistic articles, with a focus on authenticity and voice.
6. Train students to refine their work through editing and feedback, culminating in the creation of a polished portfolio showcasing their creative abilities.

Course Outcomes: Learner will be able to:

CO1: Understand and apply techniques of creative writing across genres.

CO2: Create compelling narratives with well-developed characters and settings.

CO3: Experiment with forms like poetry, short stories, and scripts.

CO4: Use imagery, symbolism, and other literary devices effectively.

CO5: Edit and revise their work to enhance clarity and impact.

CO6: Appreciate and analyse creative works with an understanding of craft and technique.

Course Scheme:

Contact Hours		Credits Assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	25	-	50	075

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of Hours
1	Introduction to Creative Writing	<ul style="list-style-type: none"> • What is Creative Writing? • Understanding Creativity and Imagination • Genres of Writing: Fiction, Non-Fiction, Poetry, and Drama • Exploring the Writing Process: Inspiration, Drafting, Revising 	5
2	Fundamentals of Fiction Writing	<ul style="list-style-type: none"> • Building Blocks of Storytelling: Plot, Setting, and Theme • Developing Characters: Motivation, Arc, and Voice • Writing Dialogue: Techniques for Realistic and Engaging Conversations • Short Stories vs. Novels: Differences and Approaches 	5
3	Poetry and Its Forms	<ul style="list-style-type: none"> • Elements of Poetry: Rhythm, Rhyme, and Meter • Exploring Imagery and Symbolism • Writing Free Verse, Haikus, Sonnets, and Limericks • Experimenting with Contemporary Forms of Poetry 	5
4	Writing for Stage and Screen	<ul style="list-style-type: none"> • Basics of Scriptwriting: Format and Structure • Writing Monologues and Dialogues for Drama • Understanding Scene Construction and Visual Storytelling • Adapting Stories for Film and Television 	5
5	Writing Non-Fiction and Personal Narratives	<ul style="list-style-type: none"> • Memoirs and Essays: Techniques for Personal Storytelling • Writing Persuasive Pieces: Opinion Articles and Blogs • Travel Writing and Feature Stories: Capturing Experiences • Crafting Powerful Openings and Closings 	5
6	Editing and Final Portfolio	<ul style="list-style-type: none"> • Understanding the Editing Process: Revising for Clarity and Style • Common Errors in Writing and How to Avoid Them • Peer Review and Feedback Techniques 	5

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

		<ul style="list-style-type: none">• Final Project: Creating a Portfolio of Original Works• Preparing Work for Publication: Tips and Resources	
Total			30

Reference Books:

1. On Writing: A Memoir of the Craft by Stephen King.
2. The Elements of Style by William Strunk Jr. and E.B. White.
3. Writing Down the Bones: Freeing the Writer Within by Natalie Goldberg.
4. Bird by Bird: Some Instructions on Writing and Life by Anne Lamott.

Course Name: Critical Thinking and Problem Solving

Course Code: LLCC5

NEP Vertical _Basket: HSSM_VEC

Preamble:

The ability to think critically and solve problems effectively is crucial in all aspects of life. Today's fast-paced and complex world requires individuals to approach challenges with a clear, analytical mindset. Critical Thinking and Problem Solving as a course aims to provide students with structured ways to develop their reasoning and decision-making skills, fostering logical thinking and creative problem-solving. These abilities are essential not only for professional success but also for personal and societal well-being. By integrating logical reasoning, decision-making frameworks, and real-world applications, this course prepares students to navigate and contribute meaningfully to a rapidly evolving world.

Prerequisite: NIL

Course Objective:

1. Equip students with the ability to analyse arguments, identify logical inconsistencies, and draw sound conclusions.
2. Familiarize students with structured methods to define, analyse, and resolve complex problems.
3. Teach students to apply critical thinking principles to make informed and ethical decisions.
4. Train students to process, interpret, and synthesize information effectively using appropriate tools.
5. Encourage innovative thinking and strategies for approaching challenges with creativity and practicality.
6. Prepare students to tackle real-life challenges using critical thinking and problem-solving techniques collaboratively and independently.

Course Outcomes: Learner will be able to

CO1: Identify, evaluate, and construct logical arguments free from common fallacies or biases.

CO2: Utilize structured methodologies to define and solve complex problems.

CO3: Employ decision-making tools to assess options, manage risks, and arrive at ethical and impactful solutions.

CO4: Use analytical skills and tools to interpret data and derive meaningful conclusions.

CO5: Integrate creativity with analytical thinking to propose innovative and viable solutions.

CO6: Work effectively in teams to address and solve real-world challenges, presenting well-structured solutions.

Course Scheme:

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No. of hrs
1	Introduction to Critical Thinking	<ul style="list-style-type: none"> • Definition and Importance of Critical Thinking • Characteristics of a Critical Thinker • Barriers to Critical Thinking; Overcoming Cognitive Biases • Analyzing Assumptions; Beginning the Problem-Solving Journey. 	5
2	Frameworks for Problem Solving	<ul style="list-style-type: none"> • The Problem-Solving Process • Identifying and Framing Problems; Root Cause Analysis • The 5 Whys Technique; Divergent and Convergent Thinking • Collaborative Problem Solving. 	5
3	Decision-Making Techniques	<ul style="list-style-type: none"> • Decision-Making Models: Rational, Intuitive, and Ethical Approaches • Using Logic in Decisions; Tools for Decision Making (SWOT, Decision Trees) • Balancing Emotions and Logic in Decisions. 	5
4	Analytical Thinking Skills	<ul style="list-style-type: none"> • Data interpretation and pattern recognition, • Quantitative vs. qualitative analysis, using tools like flowcharts, mind maps, and matrices to organize and analyze data • Hands-on activities: solving puzzles and real-world analysis tasks. 	5
5	Creativity in Problem Solving	<ul style="list-style-type: none"> • Role of creativity in critical thinking, • Techniques to boost creativity: lateral thinking, brainstorming, and SCAMPER • Balancing creativity with practicality in solutions, Workshops: generating innovative solutions to complex problems 	5
6	Applied Problem Solving	<ul style="list-style-type: none"> • Collaborative problem solving in teams, Ethical considerations in decision-making and problem-solving, • Real-life case studies and simulations, Final project: analyzing a complex issue and presenting a structured solution. 	5
Total			30

Reference Books:

1. Critical Thinking: A Student's Introduction by Gregory Bassham
2. Think Smarter: Critical Thinking to Improve Problem-Solving and Decision-Making Skills by Michael Kallet
3. The Art of Thinking Clearly by Rolf Dobelli
4. Thinking fast and slow by Daniel Kahneman

Vidyalankar Institute of Technology (An Autonomous Institute affiliated to University of Mumbai)

Course Name: Digital Literacy and Media Awareness

Course Code: LLCC6

NEP Vertical _Basket: HSSM_VEC

Preamble:

In an increasingly digital world, the ability to navigate, evaluate, and create information using digital technologies is essential. This course on Digital Literacy and Media Awareness aims to equip students with critical skills to effectively engage with digital media, understand its implications, and utilize it responsibly. As technology continues to evolve, individuals must become informed consumers of information, capable of discerning credible sources from misinformation. The course fosters a comprehensive understanding of digital literacy, emphasizing ethical use of information and the impact of media on society. Students will learn to critically analyze digital content, create engaging media, and recognize the societal implications of their digital interactions. By the end of the course, participants will be empowered to navigate the complexities of the digital landscape confidently and responsibly, ensuring they contribute positively to their communities and make informed decisions in their personal and professional lives.

Prerequisite: NIL

Course Objective:

1. Introduce students to the essential skills and concepts required to navigate, understand, and use digital technologies effectively in everyday life.
2. Teach students to critically assess the credibility, accuracy, and bias of online information, promoting informed decision-making.
3. Equip students with tools and techniques to create engaging digital content and communicate effectively across various platforms.
4. Educate students about the responsible use of digital tools, emphasizing issues such as data privacy, copyright, and cyber etiquette.
5. Develop awareness of how media shapes perceptions, influences society, and impacts individuals in the digital age.
6. Provide hands-on opportunities for students to apply their digital literacy skills in real-world contexts, preparing them for academic, professional, and personal success.

Course Outcomes: Learner will be able to:

CO1: Demonstrate proficiency in using digital tools for communication.

CO2: Critically evaluate the credibility of online information sources.

CO3: Understand the ethical implications of digital content creation.

CO4: Create engaging digital content tailored to specific audiences.

CO5: Recognize the impact of media on public perception and behaviour.

CO6: Advocate for responsible digital citizenship among peers.

Course Scheme:

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Introduction to Digital Literacy	<ul style="list-style-type: none"> • Definition and importance of digital literacy today. • Overview of various digital tools and technologies. • Understanding the role of digital literacy in education and professional settings. 	5
2	Evaluating Online Information	<ul style="list-style-type: none"> • Techniques for assessing the credibility of online sources. • Identifying misinformation and disinformation in digital media. • Understanding bias in media reporting and its implications. 	5
3	Content Creation and Communication	<ul style="list-style-type: none"> • Best practices for creating effective digital content (text, images, videos). • Understanding different platforms for content distribution (social media, blogs). • Techniques for engaging audiences through storytelling in digital formats. 	5
4	Ethical use of digital technologies	<ul style="list-style-type: none"> • Understanding the implications of digital footprints and online presence. • Recognizing the importance of consent in data collection and sharing. • Exploring the role of cybersecurity in protecting personal information. • Evaluating the impact of technology on mental health and well-being. • Discussing the responsibilities of tech companies in ensuring user privacy. • Analysing the effects of digital divide on access to information and technology. • Promoting digital literacy to empower responsible online behaviour. 	5
5	Media Awareness and Impact	<ul style="list-style-type: none"> • Examining the role of traditional media in shaping public perception. • Investigating the impact of media representation on marginalized communities. • Analyzing the effects of sensationalism in news reporting on public behaviour. • Understanding the relationship between media consumption and political engagement. 	5

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

		<ul style="list-style-type: none">• Exploring the influence of celebrity culture on societal values and norms.• Assessing the effectiveness of public service announcements in changing behaviour.• Evaluating the role of fact-checking organizations in combating misinformation.	
6	Practical Applications	<ul style="list-style-type: none">• Hands-on projects involving content creation using various digital tools.• Group discussions on current events related to media literacy.• Final project: Develop a comprehensive media campaign addressing a social issue.	5
Total			30

Reference Books:

1. Digital Literacy: A Primer on Media Literacy by Julie Frechette.
2. Media Literacy: Keys to Interpreting Media Messages by Art Silverblatt.
3. The Digital Literacy Survival Guide by Susan W. Hines.
4. Digital Literacy in 21st Century by Bill Hinkley.

Course Name: Financial Literacy for Engineers

Course Code: LLCC7

NEP Vertical _Basket: HSSM_VEC

Preamble:

Financial literacy is a crucial skill for engineers to understand and manage their personal finances efficiently and make informed decisions in their professional roles. This course aims to equip engineering students with the knowledge and skills necessary to navigate financial matters effectively.

Prerequisite: NIL

Course Objective:

1. Introduce students to fundamental financial concepts, including budgeting, saving, and investing, tailored for engineering professionals.
2. Equip students with tools to analyze costs, returns, and economic feasibility in engineering projects.
3. Teach students effective strategies for managing personal finances, including debt management and tax planning.
4. Familiarize students with investment options, portfolio diversification, and strategies for long-term wealth generation.
5. Train students to make informed financial decisions by analyzing risks, benefits, and ethical considerations.
6. Prepare students to incorporate financial insights into project planning, resource allocation, and entrepreneurial ventures.

Course Outcomes: Learner will be able to:

CO1: Understand and apply basic financial concepts in both personal and professional contexts.

CO2: Evaluate the economic viability of engineering projects using cost-benefit and break-even analyses.

CO3: Create budgets, manage debts, and plan for taxes efficiently.

CO4: Assess various investment vehicles and design diversified portfolios to achieve financial goals.

CO5: Integrate financial considerations into engineering decision-making processes.

CO6: Solve real-world financial problems using analytical tools and ethical practices.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Introduction to Financial Literacy	<ul style="list-style-type: none"> Importance of financial literacy for engineers, Core financial concepts: income, expenses, savings, and budgeting, Introduction to financial statements: balance sheets and income statements Understanding the time value of money. 	5
2	Engineering Economics and Project Evaluation	<ul style="list-style-type: none"> Basics of Engineering Economics: cost estimation and feasibility studies Techniques for project evaluation: Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period, Break-even analysis and decision-making under uncertainty Case studies on financial analysis in engineering projects. 	5
3	Personal Finance Management	<ul style="list-style-type: none"> Budgeting methods and tools for engineers, Debt management: understanding loans, credit cards, and interest rates Basics of tax planning for salaried and entrepreneurial engineers, Insurance: life, health, and asset protection. 	5
4	Investment and Wealth Management	<ul style="list-style-type: none"> Overview of investment options: stocks, bonds, mutual funds, and real estate Principles of portfolio diversification and risk management, Retirement planning and compounding benefits Basics of cryptocurrency and its implications for engineers. 	5
5	Ethical and Sustainable Financial Practices	<ul style="list-style-type: none"> Ethical considerations in financial decision-making, financial fraud prevention and awareness, Sustainable financial planning: balancing profit with social responsibility Corporate financial ethics and accountability. 	5
6	Practical Applications and Case Studies	<ul style="list-style-type: none"> Real-world case studies of engineering startups and financial challenges Hands-on workshops: budgeting, financial analysis, and investment planning Group project: evaluating the financial viability of an engineering project Final assessment: creating a comprehensive personal financial plan. 	5
Total			30

Reference Books:

1. The Richest Engineer: A Story of Wealth Building Strategies for Engineers by Raj Surya
2. Financial Freedom for Engineers: A Practical Guide to Wealth Creation by Neeraj Negi
3. The Intelligent Investor by Benjamin Graham
4. Rich Dad Poor Dad by Robert Kiyosaki

Course Name: Flavours of the world

Course Code: LLCC8

NEP Vertical _Basket: HSSM_VEC

Preamble:

Cooking is a vital life skill and a creative art that seamlessly combines science, technique, and cultural heritage. This syllabus aims to build a strong foundation in cooking methods, empowering students with the skills and confidence to prepare a wide range of dishes. The course emphasizes experiential learning and the practical application of culinary principles while cultivating an appreciation for the rich diversity of global food traditions.

Key focus areas include Food Safety and Hygiene, Knife Skills and Food Preparation, Understanding Ingredients, Flavors of the World, Culinary Skills Workshops, Improving Cooking Techniques, Meal Planning and Menu Development, World Cuisines, Desserts and Baking.

This course serves as an entry point into the dynamic and fulfilling world of cooking, inspiring students to explore the culinary arts as a profession, a passion, or an essential life competency.

Prerequisite: Nil

Course Objective:

1. Develop Culinary Techniques: Equip students with essential culinary skills, including knife handling, preparation methods, and advanced cooking techniques, tailored to various global cuisines.
2. Explore Global Flavors: Introduce students to the unique ingredients, flavor profiles, and cooking styles from different regions around the world.
3. Understand Food Culture: Foster an appreciation for the cultural significance of food by exploring the history, traditions, and rituals associated with international cuisines.
4. Encourage Creativity in Cooking: Inspire students to experiment with ingredients and techniques, fostering innovation and adaptability in creating dishes.
5. Focus on Presentation and Plating: Teach students the art of visually appealing food presentation, drawing inspiration from global culinary standards.
6. Promote Food Safety and Sustainability: Emphasize the importance of hygienic cooking practices and sustainable sourcing of ingredients, with an emphasis on reducing food waste.

Course Outcomes: Learner will be able to

CO1: Mastery of Global Cooking Techniques: Students will demonstrate proficiency in preparing diverse international dishes using traditional and modern cooking methods.

CO2: Understanding of Regional Ingredients: Graduates of the course will be able to identify, source, and utilize a variety of ingredients specific to different world cuisines.

CO3: Cultural Competency Through Food: Students will gain a deeper understanding of the cultural and historical contexts of global food traditions.

CO4: Ability to Innovate and Adapt Recipes: Participants will develop the confidence to modify and create recipes that reflect global influences while incorporating their personal style.

CO5: Enhanced Food Presentation Skills: Students will apply advanced plating and presentation techniques, elevating the aesthetic appeal of their dishes.

CO6: Commitment to Sustainable Culinary Practices: Graduates will adopt and promote sustainable cooking practices, including minimizing food waste and prioritizing ethical ingredient sourcing.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Introduction to Culinary Principles	<ul style="list-style-type: none"> • Introduction to cooking methods (Boiling, Grilling, Sauteing) • Basics of food safety and hygiene • Knife skills and food preparation techniques 	5
2	Understanding Ingredients	<ul style="list-style-type: none"> • Different types of vegetables and fruits • Understanding proteins - meat, poultry, and fish • Staples and grains in cooking 	5
3	Cooking Techniques	<ul style="list-style-type: none"> • Baking and Roasting • Stir-Frying and Deep-Frying • Braising and Stewing 	5
4	Meal Planning and Menu Development	<ul style="list-style-type: none"> • Basics of meal planning and balanced diet • Menu development and recipe selection • Presentation and garnishing techniques 	5
5	World Cuisines	<ul style="list-style-type: none"> • Indian Cuisine • Chinese Cuisine • Italian Cuisine 	5
6	Desserts and Baking	<ul style="list-style-type: none"> • Baking essentials and techniques • Dessert preparation and presentation • Chocolate making and decorations 	5
Total			30

Reference Books:

1. Indian Cookery by Madhur Jaffrey
2. India: The Cookbook by Pushpesh Pant
3. Indian Cookery by Tarla Dalal
4. MasterChef India Cookbook by Vijayakar

Course Name: Impactful PowerPoint Presentations

Course Code: LLCC9

NEP Vertical _Basket: HSSM_VEC

Preamble:

Effective communication is essential for success in the modern educational and professional landscape. PowerPoint presentations have become crucial for conveying ideas, influencing decisions, and engaging audiences. This course on Impactful PowerPoint Presentations aims to equip students with the skills necessary to create presentations that inform and resonate with their audience. Participants will explore fundamental design principles, learning how to create visually appealing slides that enhance clarity and engagement. The course will emphasize the importance of structuring content logically and compellingly, allowing students to develop narratives that capture attention. Additionally, public speaking techniques will be covered to improve delivery and audience interaction. By fostering an environment of practice and feedback, students will gain confidence in their presentation abilities. Ultimately, this course seeks to bridge the gap between technical knowledge and effective communication, preparing students to excel in their future endeavours through impactful presentations.

Prerequisite: NIL

Course Objective:

1. Enable students to create visually appealing and structured slides with a focus on clarity and simplicity.
2. Teach students how to use visual elements like charts, graphs, images, and icons to effectively communicate ideas.
3. Guide students to craft compelling narratives that engage and inspire their audience.
4. Familiarize students with advanced tools, such as animations, transitions, and multimedia integration, to elevate presentation quality.
5. Equip students with techniques for delivering presentations confidently and handling audience interactions.
6. Train students to adapt their presentations to various contexts, including academic, corporate, and public speaking environments.

Course Outcomes: Learner will be able to:

CO1: Create well-structured, visually engaging slides using appropriate layouts, fonts, and color schemes.

CO2: Use visual aids and design principles to simplify and present complex information effectively.

CO3: Develop presentations with a clear purpose, logical flow, and compelling storytelling elements.

CO4: Apply animations, transitions, and multimedia elements to enhance the visual appeal and interactivity of presentations.

CO5: Exhibit strong presentation skills, including voice modulation, body language, and audience engagement.

CO6: Tailor presentation content and style to suit different audiences, purposes, and cultural contexts.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

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Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Foundations of PowerPoint Design	<ul style="list-style-type: none"> Understanding slide layouts, themes, and templates Best practices for font selection, color schemes, and consistency Avoiding common design pitfalls (e.g., cluttered slides and overuse of text) Hands-on: Creating a simple, professional presentation. 	5
2	Visual Communication and Data Representation	<ul style="list-style-type: none"> Using charts, graphs, and tables effectively Incorporating images, icons, and shapes for visual impact, Design tips for storytelling through visuals Hands-on: Transforming raw data into visually compelling slides. 	5
3	Storytelling and Narrative Techniques	<ul style="list-style-type: none"> Elements of a powerful narrative: introduction, body, and conclusion Crafting presentations with a clear purpose and logical flow, incorporating storytelling elements to captivate audiences Hands-on: Creating a presentation with a strong narrative arc. 	5
4	Enhancing Engagement	<ul style="list-style-type: none"> Animations and transitions: when and how to use them Adding multimedia: audio, video, and interactive elements, Using slide master's and custom themes for efficiency Hands-on: Designing a multimedia-rich presentation. 	5
5	Presentation Delivery Skills	<ul style="list-style-type: none"> Preparing for presentations: rehearsing and handling nervousness Techniques for voice modulation, pacing, and clarity, Engaging with the audience: Q&A and managing feedback Hands-on: Delivering a short presentation to peers. 	5
6	Practical Applications and Final Project	<ul style="list-style-type: none"> Tailoring presentations for academic, corporate, and public speaking contexts 	5

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

		<ul style="list-style-type: none">• Tips for remote presentations using tools like Zoom or Teams• Final project: Creating and delivering a comprehensive presentation on a chosen topic, Peer and instructor feedback for improvement.	
Total			30

Reference Books:

1. Presentation Zen: Simple Ideas on Presentation Design and Delivery by Garr Reynolds.
2. Slideology: The Art and Science of Creating Great Presentations by Nancy Duarte.
3. The Visual Display of Quantitative Information by Edward R. Tufte.
4. Presenting to Win: The Art of Telling Your Story by Jerry Weissman.

Course Name: Introduction to Taxation

Course Code: LLCC10

NEP Vertical _Basket: HSSM_VEC

Preamble:

Taxation is a fundamental aspect of any economy and plays a critical role in governance and financial management. This course aims to provide learners with a basic understanding of taxation, focusing on its principles, processes, and importance in individual and corporate financial planning. The study of taxation enhances analytical and practical skills while fostering responsible financial behavior, thereby contributing to societal well-being and development.

Prerequisite:

Basic knowledge of accounting and economics is recommended but not mandatory.

Course Objective:

1. Introduce students to the basic concepts, principles, and objectives of taxation, emphasizing its role in governance and economic development.
2. Provide an overview of the structure and functioning of the taxation system in India, including direct and indirect taxes.
3. Familiarize students with income tax concepts, including computation of taxable income, exemptions, deductions, and filing processes.
4. Explain the structure, mechanisms, and significance of GST, highlighting its impact on businesses and consumers in India.
5. Educate students on legal tax planning methods, the importance of ethical compliance, and the consequences of tax evasion.
6. Equip students with practical knowledge and skills for applying taxation principles in real-world scenarios, including compliance and advisory roles.

Course Outcomes: Learner will be able to:

CO1: Understand the fundamental principles and concepts of taxation.

CO2: Differentiate between direct and indirect taxes and their applications.

CO3: Analyse the impact of taxation on individual and corporate decision-making.

CO4: Apply the basic principles of tax computation and planning.

CO5: Understand the importance of compliance and ethical responsibility as taxpayers.

CO6: Gain a basic understanding of the Indian taxation framework.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Introduction to Taxation	<ul style="list-style-type: none"> • Definition and Objectives of Taxation • History and Evolution of Taxation • Types of Taxes: Direct and Indirect Taxes • Basic Tax Terminology: Assessment Year, Financial Year, Assessee, Tax Evasion, and Tax Avoidance • Importance of Taxation in Economic Development • Global Taxation Trends 	5
2	Taxation System in India	<ul style="list-style-type: none"> • Structure of Indian Taxation System • Central Taxes: Income Tax, Corporate Tax, GST • State and Local Taxes: Property Tax, Professional Tax • Role of Tax Regulatory Bodies in India • Central Board of Direct Taxes (CBDT) • Central Board of Indirect Taxes and Customs (CBIC) • Recent Developments in Indian Taxation 	5
3	Income Tax Basics	<ul style="list-style-type: none"> • Components of Income Tax: Income Heads, Deductions, Exemptions • Tax Computation Basics • Income from Salary, House Property, and Business/Profession • Allowable Deductions under Section 80C, 80D, and 80G • Tax Filing Process: PAN, TAN, and Filing of Income Tax Returns (ITR) 	5
4	Goods and Services Tax (GST)	<ul style="list-style-type: none"> • Introduction to GST: Objectives and Key Features • Types of GST: CGST, SGST, IGST • Registration Process • Input Tax Credit (ITC): Concept and Mechanism • GST Compliance: Filing Returns, Payment of Tax 	5
5	Tax Planning and Ethical Responsibilities	<ul style="list-style-type: none"> • Introduction to Tax Planning: Meaning, Objectives, and Methods • Ethical Responsibility as a Taxpayer • Tax Evasion vs Tax Avoidance: Legal and Ethical Implications • Role of Taxation in Social and Economic Equity 	5

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

		<ul style="list-style-type: none">• Case Studies: Famous Tax Evasion Cases and their Impact	
6	Professional and Practical Aspects of Taxation	<ul style="list-style-type: none">• Understanding Tax Audit Basics• Corporate Taxation Overview• Taxation in Global Trade: Import/Export Duties• Practical Exercises:<ul style="list-style-type: none">• Calculating Personal Income Tax• GST Computation for Businesses	5
Total			30

Reference Books:

1. Direct Taxes Law and Practice by Vinod K. Singhania and Monica Singhania.
2. Indirect Taxes: GST and Other Laws by V.S. Datey.
3. Taxmann's Students' Guide to Income Tax by Dr. Vinod K. Singhania.
4. A Simple Guide to Taxation by M. G. Maheshwari

Course Name: Leadership and Personal Development

Course Code: LLCC11

NEP Vertical _Basket: HSSM_VEC

Preamble:

Leadership and Personal Development are important 21st century skills. This domain is completely subjective in nature and can be cultivated by inculcating required habits. Leaders who are committed to personal growth are more self-aware, resilient, adaptable, and inspiring. This course is designed to develop students' leadership capabilities and personal growth strategies. It explores the essential skills required to lead others effectively and how to cultivate self-awareness, emotional intelligence, and resilience. Students will engage in practical exercises, case studies, and reflective practices to understand their leadership style and identify opportunities for personal growth.

Prerequisite: NIL

Course Objective:

1. Introduce students to the essential principles of leadership, including the different leadership styles, qualities, and roles that leaders play in various contexts.
2. Encourage students to develop self-awareness and emotional intelligence to enhance their interpersonal skills and leadership effectiveness.
3. Equip students with the tools to communicate effectively, both in leadership roles and in personal development, with an emphasis on active listening, clarity, and empathy.
4. Provide students with strategies and techniques to approach challenges, make informed decisions, and solve problems efficiently as leaders.
5. Teach students the importance of teamwork and collaboration, and how to motivate, influence, and work effectively with diverse teams to achieve common goals.
6. Encourage a mindset of lifelong learning, personal reflection, and ongoing development to empower students to continuously improve their leadership and personal effectiveness.

Course Outcomes:

CO1: Be able to describe key leadership theories, styles, and qualities, and apply them in different scenarios.

CO2: Use emotional intelligence to improve leadership effectiveness, manage emotions, and build strong relationships within teams.

CO3: Practice clear, empathetic, and active communication in leadership and personal development contexts.

CO4: Analyse complex situations, make decisions, and implement solutions as a leader with confidence and critical thinking.

CO5: Demonstrate the ability to work with others in diverse teams, fostering collaboration, motivation, and shared goals.

CO6: Set personal and professional development goals, reflect on progress, and engage in activities that promote continuous growth.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

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Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Introduction to Leadership	<ul style="list-style-type: none"> • Definition of leadership and its importance in various contexts (business, community, etc.) • Leadership theories: Trait theory, behavioral theory, contingency theory, and transformational leadership, Key leadership qualities: vision, integrity, decision-making, and adaptability • Self-assessment tools to identify individual leadership traits and styles. 	5
2	Emotional Intelligence and Self-Awareness	<ul style="list-style-type: none"> • The concept of emotional intelligence (EQ): self-awareness, self-regulation, motivation, empathy, and social skills • Techniques for improving self-awareness and emotional regulation • Role of empathy and social awareness in leadership • Tools for developing emotional intelligence in personal and professional settings. 	5
3	Effective Communication for Leaders	<ul style="list-style-type: none"> • Verbal and non-verbal communication skills, Active listening, feedback, and conflict resolution techniques • Communicating with clarity, confidence, and empathy • Case studies on communication challenges in leadership roles. 	5
4	Decision Making and Problem-Solving	<ul style="list-style-type: none"> • The decision-making process: identifying problems, evaluating options, and making informed choices • Critical thinking and problem-solving models for leaders, Decision-making under pressure: risk management and judgment • Exercises to develop strategic thinking and problem-solving skills. 	5

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

5	Building Teams and Collaboration	<ul style="list-style-type: none"> • Understanding team dynamics and the stages of team development (forming, storming, norming, performing) • Leadership in a team context: motivating, influencing, and delegating tasks, Conflict resolution and fostering a collaborative environment • Practical activities on team building and leadership in group settings. 	5
6	Personal Growth and Leadership Development	<ul style="list-style-type: none"> • The importance of lifelong learning and self-reflection for leaders • Setting SMART goals for personal and professional development, Time management and productivity techniques for leaders • Creating a personal leadership development plan and preparing for future leadership opportunities. 	5
Total			30

Reference Books:

1. Leaders Eat Last: Why Some Teams Pull Together and Others Don't by Simon Sinek
2. Emotional Intelligence 2.0 by Travis Bradberry and Jean Greaves
3. The 7 Habits of Highly Effective People by Stephen R. Covey
4. Drive: The Surprising Truth About What Motivates Us by Daniel H. Pink

Course Name: Mastering Advanced Excel

Course Code: LLCC12

NEP Vertical _Basket: HSSM_VEC

Preamble:

Microsoft Excel has become a vital tool for data analysis, financial modelling, and decision-making across industries. This course is designed to equip learners with advanced Excel skills, enabling them to solve complex problems, streamline workflows, and create impactful visualizations. It emphasizes hands-on learning through real-world applications, fostering confidence and expertise in advanced spreadsheet techniques.

Prerequisite:

Basic knowledge of Excel, including familiarity with basic formulas, formatting, and chart creation.

Course Objective:

1. Enable students to effectively use advanced Excel functions and formulas, including logical, statistical, and lookup functions, for complex data manipulation and problem-solving.
2. Teach students to organize, filter, and analyze large datasets using tools like PivotTables, Power Query, and advanced sorting techniques.
3. Equip students with the ability to create dynamic and visually impactful charts, dashboards, and reports for data-driven decision-making.
4. Introduce students to Excel automation using Macros and VBA (Visual Basic for Applications) to improve productivity and efficiency.
5. Familiarize students with tools such as Solver, Data Tables, Scenario Manager, and advanced conditional formatting to solve real-world business problems.
6. Provide practical exposure by solving real-world business challenges and projects using advanced Excel features, fostering hands-on learning and application.

Course Outcomes: Learner will be able to:

CO1: Apply advanced formulas and functions for complex data manipulation.

CO2: Perform data analysis using tools like PivotTables, Power Query, and Power Pivot.

CO3: Automate repetitive tasks using macros and Visual Basic for Applications (VBA).

CO4: Create interactive dashboards and dynamic visualizations.

CO5: Use advanced tools to solve real-world business problems.

CO6: Optimize Excel workflows and enhance productivity.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Advanced Functions and Formulas	<ul style="list-style-type: none"> • Logical Functions: IF, AND, OR, IFERROR • Lookup Functions: VLOOKUP, HLOOKUP, XLOOKUP, INDEX-MATCH • Text Functions: CONCATENATE, TEXT, LEFT, RIGHT, MID, TRIM • Date and Time Functions: TODAY, NOW, DATEDIF, NETWORKDAYS • Array Formulas and Dynamic Arrays: FILTER, SORT, UNIQUE, SEQUENCE 	5
2	Data Analysis and Management	<ul style="list-style-type: none"> • Working with Large Data Sets • Sorting, Filtering, and Subtotals • Data Validation Techniques • Advanced Data Analysis Tools • PivotTables and PivotCharts • Grouping and Ungrouping Data • Power Query for Data Transformation • Scenario Analysis and Forecasting • What-If Analysis: Goal Seek, Data Tables, Scenario Manager • Using Solver for Optimization 	5
3	Advanced Charting and Data Visualization	<ul style="list-style-type: none"> • Creating Dynamic Charts • Combo Charts, Waterfall Charts, Histogram, Sparklines • Interactive Dashboards • Using Slicers and Timelines • Conditional Formatting for Visual Impact • Design Principles for Effective Visualizations 	5
4	Automation with Macros and VBA	<ul style="list-style-type: none"> • Introduction to Macros • Recording, Editing, and Running Macros • Basics of VBA Programming • VBA Editor and Debugging • Writing VBA Code: Loops, Conditional Statements, and Functions • Automating Tasks: Sending Emails, Generating Reports • Customizing Excel with VBA • User Forms and Advanced Interactivity 	5
5	Advanced Excel Tools and Techniques	<ul style="list-style-type: none"> • Power Pivot for Data Modeling • Relationships and DAX (Data Analysis Expressions) • Protecting and Sharing Workbooks • Workbook and Worksheet Protection 	5

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

		<ul style="list-style-type: none">• Sharing and Collaboration in Excel• Time-Saving Tips• Keyboard Shortcuts• Custom Ribbon and Quick Access Toolbar	
6	Applications and Real-World Case Studies	<ul style="list-style-type: none">• Solving Business Problems:• Financial Modelling• Budgeting and Forecasting• Inventory Management• Data Cleaning and Preparation for Analysis• Case Studies:• Sales Analysis Dashboard• Employee Productivity Tracker• Project Management Templates	5
Total			30

Reference Books:

1. Microsoft Excel 365 Bible by Michael Alexander, Dick Kusleika, and John Walkenbach.
2. Excel 2019 Power Programming with VBA by Michael Alexander and Richard Kusleika.
3. Data Analysis with Microsoft Excel by Kenneth N. Berk and Patrick Carey.
4. Online Resources: Microsoft Learn, ExcelJet, Chandoo.org

Course Name: Natural Farming

Course Code: LLCC13

NEP Vertical _Basket: HSSM_VEC

Preamble:

Agriculture is the backbone of human civilization, yet the current reliance on chemical-intensive farming practices has raised significant concerns regarding environmental degradation, public health, and long-term sustainability. In contrast, natural farming offers a sustainable alternative, rooted in ecological harmony and the principles of regenerative agriculture. This course, Natural Farming and Environmental Sustainability, aims to introduce learners to the principles and practices of natural farming, emphasizing its environmental, economic, and social benefits.

The course provides a critical understanding of how chemical farming has contributed to soil depletion, water pollution, biodiversity loss, and climate change, while also exposing the associated health risks. It offers practical insights into the techniques of natural farming, such as the use of bio inputs like Jeevamrutha, Beejamrutha, and low-cost, zero-budget methodologies. By integrating traditional knowledge with modern ecological understanding, this course highlights how natural farming can restore soil fertility, conserve water, and promote biodiversity.

Through interactive modules, case studies, and hands-on activities, learners will develop the skills and mindset required to implement sustainable agricultural practices. This course serves as a stepping stone toward building resilient farming systems that benefit both farmers and the environment, aligning with global goals for sustainable development.

Prerequisite: Deep interest in Natural Farming

Course Objective:

1. Understand the Foundations of Farming Systems: To familiarize learners with the evolution, principles, and practices of various farming systems, with a focus on natural farming.
2. Explore Environmental Benefits of Natural Farming: To analyze how natural farming contributes to soil health, biodiversity, water conservation, and climate change mitigation.
3. Critically Examine the Ill Effects of Chemical Farming: To evaluate the long-term environmental, social, and health consequences of chemical-intensive farming methods.
4. Gain Practical Knowledge of Natural Farming Techniques: To equip learners with hands-on understanding of natural farming practices such as the use of bio inputs (e.g., Jeevamrutha), crop-livestock integration, and biodiversity enhancement.
5. Promote Socioeconomic Awareness: To highlight the role of natural farming in reducing farming costs, empowering marginalized farmers, and ensuring food security and sustainable livelihoods.
6. Encourage Practical Implementation and Problem-Solving: To enable learners to apply the principles of natural farming through case studies, real-world scenarios, and project-based learning for sustainable agricultural practices.

Course Outcomes: Learner will be able to

CO1: Learners will understand the diversity of farming systems and the foundational principles of natural farming.

CO2: Learners will be equipped with practical knowledge of the techniques and principles underpinning natural farming.

CO3: Learners will develop an appreciation for how natural farming mitigates environmental degradation and promotes sustainability.

CO4: Learners will critically evaluate the long-term environmental and health consequences of chemical farming.

CO5: Learners will gain insight into how natural farming addresses socioeconomic challenges and contributes to rural development.

CO6: Learners will be able to contextualize theoretical knowledge by engaging with real-world examples and identify pathways to implement natural farming.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Introduction to Farming Systems (4 Hours)	<ul style="list-style-type: none"> • History and evolution of farming practices. • Overview of farming systems: traditional, chemical-intensive, organic, and natural farming. • Fundamentals of natural farming: principles and philosophy. • Key proponents of natural farming (e.g., Masanobu Fukuoka, Subhash Palekar) 	5
2	Principles and Practices of Natural Farming (6 Hours)	<ul style="list-style-type: none"> • Core principles of natural farming: zero budget, no-till, and agroecology. • Use of bio inputs: Jeevamrutha, Beejamrutha, and other indigenous techniques. • Role of microorganisms and soil health in natural farming. • Integration of crops, livestock, and biodiversity. 	5
3	Environmental Benefits of Natural Farming (6 Hours)	<ul style="list-style-type: none"> • Soil health restoration and prevention of soil erosion. • Enhanced biodiversity and ecosystem balance. • Reduction in greenhouse gas emissions. • Water conservation and improved water cycles. 	5

4	III Effects of Chemical Farming (6 Hours)	<ul style="list-style-type: none"> • Soil degradation and loss of fertility due to chemical inputs. • Groundwater contamination and overextraction. • Decline in biodiversity, including beneficial insects and pollinators. • Health risks posed by pesticide residues in food. • Contribution of chemical farming to climate change through nitrous oxide emissions. 	5
5	Socioeconomic Benefits of Natural Farming (4 Hours)	<ul style="list-style-type: none"> • Cost-effectiveness and reduced dependency on external inputs. • Empowerment of small and marginal farmers. • Promotion of local resources and traditional knowledge. • Role of natural farming in ensuring food security and nutrition. 	5
6	Case Studies and Practical Insights (4 Hours)	<ul style="list-style-type: none"> • Success stories of natural farming in India and globally. • Comparative analysis of crop yield and sustainability metrics between natural and chemical farming. • Field visit or virtual demonstration of natural farming practices (if possible). • Challenges and prospects of natural farming. 	5
Total			30

Reference Books:

5. The One-Straw Revolution by Masanobu Fukuoka
6. Zero Budget Natural Farming in India by Subhash Palekar
7. Soil Not Oil: Environmental Justice in an Age of Climate Crisis by Vandana Shiva
8. Restoring the Soil: A Guide to Regenerative Agriculture by Roland Bunch

Course Name: Personal Grooming Essentials

Course Code: LLCC14

NEP Vertical _Basket: HSSM_VEC

Preamble:

The Personal Grooming Essentials course aims to equip students with foundational skills and knowledge to enhance their personal appearance, confidence, and social etiquette. Through a blend of theoretical concepts and practical demonstrations, students will learn the importance of personal grooming in professional and social settings. The course aligns with the National Board of Accreditation (NBA) standards as per All India Council for Technical Education (AICTE) norms, focusing on holistic development and industry relevance.

Prerequisite: NIL

Course Objective:

1. Introduce the importance of personal grooming and its impact on self-confidence and professional image.
2. Teach effective personal hygiene practices and skincare routines tailored to different skin types and needs.
3. Provide basic knowledge and techniques for maintaining hair and applying makeup for various occasions.
4. Educate students on choosing appropriate attire for professional, casual, and formal settings.
5. Train students to project confidence through effective verbal and non-verbal communication.
6. Equip students with strategies to manage their daily grooming routine efficiently without compromising quality.

Course Outcomes: Learner will be able to:

CO1: Apply consistent grooming habits to maintain a polished and presentable appearance.

CO2: Design skincare routines suited to their individual skin types and concerns.

CO3: Demonstrate basic hairstyling and makeup application techniques for professional and social occasions.

CO4: Select clothing and accessories that align with professional, casual, and formal etiquette.

CO5: Display poise and professionalism using refined communication and body language skills.

CO6: Integrate grooming into their daily schedule effectively, balancing personal and professional commitments.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment

methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Foundations of Personal Grooming	<ul style="list-style-type: none"> Importance of grooming for personal and professional growth Assessing individual grooming needs and goals, Grooming and first impressions: psychological and social impacts. 	5
2	Hygiene and Skincare Essentials	<ul style="list-style-type: none"> Fundamentals of personal hygiene: habits and tools Skin types and common concerns (e.g., acne, dryness, sensitivity) Daily skincare routines: cleansing, moisturizing, and protection Seasonal skincare adjustments and home remedies. 	5
3	Hair Care and Makeup Basics	<ul style="list-style-type: none"> Hair care routines: washing, conditioning, and styling tips Identifying hair types and selecting suitable products Basic makeup application: foundation, eyeliner, and lipstick, Day vs. evening makeup: subtle and bold looks. 	5
4	Dressing and Styling Etiquette	<ul style="list-style-type: none"> Understanding dress codes: formal, semi-formal, business casual, and casual Choosing clothing based on body type and occasion Accessorizing effectively: jewelry, watches, and belts, Color coordination and fabric selection. 	5
5	Communication and Body Language	<ul style="list-style-type: none"> Basics of verbal communication: tone, clarity, and courtesy Non-verbal communication: eye contact, posture, and gestures Building confidence through body language and self-awareness, Handling criticism and feedback gracefully. 	5
6	Grooming Time Management and Application	<ul style="list-style-type: none"> Creating a time-efficient grooming schedule, Adapting grooming routines for travel and emergencies Real-life practice: grooming for interviews, meetings, and events, Final project: presenting a well-groomed, confident persona. 	5
Total			30

Reference Books:

1. The Beauty Book by Ritu Kalra.
2. The Grooming Guide by Malini Singh.
3. The Essential Guide to Grooming by Kate Smith.
4. The Science of Personal Grooming by John Taylor.

Course Name: Rangoli: Sketching and Painting

Course Code: LLCC15

NEP Vertical _Basket:

Preamble:

Art is a universal language that fosters creativity, self-expression, and mindfulness. This course introduces learners to the foundational principles of sketching and painting, focusing on techniques, mediums, and composition. Through practice-based learning, students will explore their artistic potential, develop aesthetic appreciation, and cultivate a lifelong interest in visual arts.

Prerequisite: NIL

Course Objective:

1. Enable students to understand and apply basic sketching techniques, including line drawing, shading, and texture, to create visually appealing designs.
2. Provide a foundation in the principles of composition, perspective, and proportion to enhance the depth and spatial quality of artistic works.
3. Familiarize students with various painting techniques and styles, emphasizing brushwork, color mixing, and layering.
4. Encourage experimentation with different painting mediums such as watercolours, acrylics, and pastels to broaden creative possibilities.
5. Inspire students to develop their unique artistic voice and express personal or cultural narratives through Rangoli art.
6. Culminate the course with a comprehensive project and exhibition, allowing students to apply their learning and display their creations to an audience.

Course Outcomes: Learner will be able to:

CO1: Demonstrate proficiency in basic sketching techniques.

CO2: Understand and apply principles of composition and perspective.

CO3: Experiment with different painting mediums such as watercolor, acrylic, and oil.

CO4: Create artworks that express ideas, emotions, and narratives.

CO5: Exhibit an understanding of color theory and its use in creating mood and depth.

CO6: Develop an appreciation for art and its role in personal and cultural expression.

Course Scheme:

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines:

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Basics of Sketching	<ul style="list-style-type: none"> • Introduction to Sketching Materials and Tools • Understanding Lines and Shapes • Techniques: Hatching, Cross-Hatching, Stippling, and Blending • Basics of Light and Shadow: Creating Depth with Shading • Still-Life Sketching: Objects and Textures. 	5
2	Fundamentals of Composition and Perspective	<ul style="list-style-type: none"> • Principles of Composition: Balance, Proportion, and Harmony • Rule of Thirds and Golden Ratio in Art • Introduction to Perspective: One-Point, Two-Point, and Three-Point Perspective • Sketching Landscapes and Urban Scenes with Depth. 	5
3	Introduction to Painting	<ul style="list-style-type: none"> • Overview of Painting Tools: Brushes, Palettes, Canvases, and Papers • Color Theory: Primary, Secondary, and Tertiary Colors • Understanding Color Properties: Hue, Saturation, Value • Mixing Colors and Creating Color Harmony • Experimenting with Watercolor Techniques: Wet-on-Wet, Dry Brush, Washes 	5
4	Exploring Painting Mediums	<ul style="list-style-type: none"> • Acrylic Painting: Techniques and Applications • Impasto, Glazing, Dry Brush • Oil Painting: Basics of Layering and Blending • Introduction to Mixed Media: Combining Sketching and Painting 	5
5	Artistic Expression and Creativity	<ul style="list-style-type: none"> • Developing a Personal Artistic Style • Conceptualizing and Visualizing Ideas • Creating Narrative Art: Storytelling through Visuals • Experimenting with Abstract and Impressionistic Art 	5
6	Final Project and Exhibition	<ul style="list-style-type: none"> • Creating a Thematic Series of Artworks • Preparing Artworks for Display: Mounting and Framing • Organizing an Art Exhibition: Presentation and Curation • Reflecting on Artistic growth. 	5
Total			30

Reference Books:

1. Drawing on the Right Side of the Brain by Betty Edwards.
2. Color and Light: A Guide for the Realist Painter by James Gurney.
3. The Elements of Drawing by John Ruskin.
4. The Acrylic Painter's Handbook by Ralph Fabri.

Course Name: Various Music Forms

Course Code: LLCC116

NEP Vertical _Basket:

Preamble:

Music, often referred to as the universal language of humanity, is an art form that transcends boundaries of culture, geography, and time. The study of Various Music Forms provides learners with a deep appreciation of the diverse styles and traditions that have shaped human expression. From classical compositions and folk traditions to contemporary genres, music forms are reflection of societal evolution, emotional depth, and artistic creativity. This course offers a structured exploration of music as a cultural phenomenon, an emotional outlet, and a technical discipline. Students will engage with theoretical underpinnings, historical contexts, and practical demonstrations of distinct music forms, fostering a holistic understanding of:

- Classical Music: The disciplined and structured traditions of Western and Eastern classical genres.
- Folk Music: The rich and diverse expressions of communities and their oral traditions.
- Contemporary Genres: The dynamic and evolving sounds of modern music, including pop, rock, jazz, and electronic styles.
- Global Perspectives: The cross-cultural influences and fusion trends that redefine music in the globalized world.

By connecting theory with practice, the course aims to nurture a well-rounded appreciation for the role of music in individual lives and societal frameworks. Additionally, it encourages creativity and interdisciplinary thinking, equipping students with the skills to analyze, perform, and innovate across music forms. Whether approached as a performer, composer, listener, or critic, the study of Various Music Forms is a journey through the heart of human expression and artistic legacy.

Prerequisite: NIL

Course Objective:

1. Explore the historical and cultural development of various music forms across the globe.
2. Familiarize students with the key features, instruments, and structures of various music genres.
3. Enhance students' understanding of diverse musical traditions and their cultural significance.
4. Train students to identify and interpret rhythm, melody, harmony, and texture in different music forms.
5. Inspire students to explore their musical preferences and express themselves creatively.
6. Provide students with opportunities to perform, compose, and appreciate music in different styles.

Course Outcomes

By the end of this course, students will: Course Outcomes: Learner will be able to:

CO1: Demonstrate an understanding of fundamental music forms, including their origins, evolution, and the key characteristics that define classical, folk, popular, sacred, and contemporary music traditions.

CO2: Analyze the structures, styles, and cultural significance of classical music traditions, including their influence on modern musical compositions and performances.

CO3: Explore and interpret the cultural roots, storytelling elements, and regional diversity of folk and traditional music forms across various societies.

CO4: Examine the development of popular music genres, identifying their socio-cultural impact, influential artists, and technological advancements that shaped their evolution.

CO5: Investigate the role of sacred and spiritual music in different traditions, recognizing its significance in rituals, worship, and community bonding.

CO6: Evaluate the influence of globalization on contemporary music, exploring how cross-cultural exchanges shape modern music forms and trends worldwide.

Course Scheme

Contact hours		Credits assigned	
Theory	Practical	Theory	Practical
2	-	2	-

Assessment Guidelines

Head of Learning	ISA	MSE	ESE	Total
Theory	75	-	-	75

The assessment/evaluation guidelines for the courses of different credits are mentioned in the above table. Notwithstanding the above, each course faculty shall have the choice to decide her/his assessment methodology based on the nature of the course. Faculty may propose the revised assessment methodology for his/her course. However, the revised assessment methodology shall be approved by a panel constituted at institute level and published to the learners before the commencement of the semester.

Detailed Syllabus:

Module No.	Module Name	Content	No of hrs
1	Introduction to Music Forms	<ul style="list-style-type: none"> • Definition and purpose of music • Overview of global music forms and their evolution, • Elements of music: rhythm, melody, harmony, and texture • Introduction to Western and non-Western music traditions. 	5
2	Classical Music Traditions	<ul style="list-style-type: none"> • Western classical music: Baroque, Classical, Romantic, and Modern eras • Indian classical music: Hindustani and Carnatic traditions, Comparison of scales, rhythms, and instruments across traditions • Case studies: iconic composers and performances. 	5
3	Folk and Traditional Music	<ul style="list-style-type: none"> • Characteristics of folk music: oral traditions, storytelling, and communal significance • Examination of regional folk music from India, Africa, Europe, and the Americas • Role of folk music in cultural identity and preservation • Hands-on: listening and interpreting folk songs. 	5
4	Popular Music Genres	<ul style="list-style-type: none"> • Development of popular music genres: jazz, blues, rock, pop, and hip-hop 	5

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

		<ul style="list-style-type: none"> • Evolution of modern music forms like electronic, EDM, and fusion • Analysis of instrumentation, lyrics, and cultural impact, Case studies: iconic artists and albums. 	
5	Sacred and Spiritual Music	<ul style="list-style-type: none"> • Role of music in religion and spirituality, Chanting, hymns, and devotional music across traditions • Sacred music in Christianity, Hinduism, Islam, Buddhism, and Indigenous cultures • Exploration of the therapeutic and meditative aspects of sacred music. 	5
6	Contemporary Music and Global Influences	<ul style="list-style-type: none"> • Influence of technology and globalization on music production and distribution • Fusion music: blending of traditional and modern styles • Cross-cultural collaborations and their impact on music innovation • Final project: creating a presentation or performance blending multiple music forms. 	5
Total			30

Reference Books:

1. My Music, My Life by Ravi Shankar
2. The Music of India by Raghunath Panigrahi
3. Indian Classical Music and Gharana Tradition by Shubha Mudgal
4. The Oxford Encyclopaedia of the Music of India by Ashok Ranade

Appendix-A

Subcategories and list of courses under HSSM (Humanities Social science and Management)

I. Ability Enhancement Courses

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GE01\$	Internship with other Institutes (Credit Transfer)	-	120 hrs	-	4	Any Semester
2	HS01T*	Effective Communication	2	-	-	2	
	HS01P*	Effective Communication Lab	-	2	-	1	
3	HS03	Technical and Business Writing Lab	1	2	-	2	
4	GEA01	Voice Culture for Professional Speaking	2	-	-	2	
5	GESB04	Corporate and Social Etiquettes	2	-	-	2	

II. Entrepreneurship/Economics/Management Courses

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GECI01	Design Thinking	2	-	-	2	Any Semester
2	GECI02	Innovation and Entrepreneurship	1	-	-	1	
3	GEF01	Basics of Finance & Legal aspects for Business	2	-	-	2	
4	GEF02	Financial Management for beginners	2	-	-	2	
5	HS06	Principles of Economics and Management	2	-	1	3	

III. Indian Knowledge System (IKS)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GEA03	Exploring Indian Art	2	-	-	2	2
2	GESB03	Indian Traditional Knowledge System	2	-	-	2	2

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
3	GEPS01	Indian Constitution	2	-	-	2	2

IV. Value Education Courses (VEC)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GESB02	Universal Human Values	2	-	-	2	Any Semester
2	GESB06	Responsibility towards sustainable environment	2	-	-	2	
3	GEPS02	Four Pillars of Democratic Nation	2	-	-	2	
4	GEWIO1	Indian Railways - Wonders of Infrastructure	2	-	-	2	

List of co-curricular courses under LLC (Liberal Learning Courses)

Co-curricular Courses (CC)

Sr. No.	Course Code	Course Name	Hours Per Week			Credits	Preferred Semester
			Theory	Practical	Tutorial		
1	GENS01	Facets of Astronomy	2	-	-	2	Any
2	GESB05	Global Citizenship Education	2	-	-	2	Any
3	GEPEW02	IQ vs EQ	2	-	-	2	Any
4	GEPEW03	Nutrition & Physical Wellness	2	-	-	2	Any
5	GEA02	Various Dance Forms	2	-	-	2	Any
6	GEPEW01	Wellness- Body, Mind & Spirit	2	-	-	2	Any
7	LLCC1	Artisan Skills Development	2	-	-	2	Any
8	LLCC2	Biodiversity	2	-	-	2	Any
9	LLCC3	Civic Synergy: Navigating Governance, Laws, and Sustainability	2	-	-	2	Any
10	LLCC4	Creative Writing	2	-	-	2	Any
11	LLCC5	Critical Thinking and Problem Solving	2	-	-	2	Any

First Year Scheme & Syllabus (2023) Bachelor of Technology (B.Tech.)
Electronics and Computer Science

12	LLCC6	Digital Literacy and Media Awareness	2	-	-	2	Any
13	LLCC7	Financial Literacy for Engineers	2	-	-	2	Any
14	LLCC8	Flavours of the world	2	-	-	2	Any
15	LLCC9	Impactful PowerPoint Presentations	2	-	-	2	Any
16	LLCC10	Introduction to Taxation	2	-	-	2	Any
17	LLCC11	Leadership and Personal Development	2	-	-	2	Any
18	LLCC12	Mastering Advanced Excel	2	-	-	2	Any
19	LLCC13	Natural Farming	2	-	-	2	Any
20	LLCC14	Personal Grooming Essentials	2	-	-	2	Any
21	LLCC15	Sketching and Painting	2	-	-	2	Any
22	LLCC16	Various Music Forms	2	-	-	2	Any