National Institute of Technology Srinagar

1st Semester (Group A)

Civil/ Mechanical/ Chemical/ Mett. & Mat Science

S. No	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
A11	HST101	Basic English and Communication Skills	Humanities	3	2	1	0	3
A12	MAT101	Mathematics I	Mathematics	3	2	1	0	3
A13	EET101	Basic Electrical Engineering	Electrical	3	2	1	0	3
A14	ITT101	Computer Programming	Information Technology	3	2	1	0	3
A15	CHT101	Engineering Chemistry	Chemistry	3	2	1	0	3
A16	CVT102	Engineering Drawing	Civil	3	1	0	4	5
A17	CHL101	Chemistry Laboratory	Chemistry	1	0	0	2	2
A18	ITL101	Computer Programming Laboratory	Information Technology	1	0	0	2	2
A10	**NBA101**	**Fundamental Knowledge of Accreditation****	**NBA Instt. Cell**	**0**	**2**	**0**	**0**	**2**
		Total		**20**	**13**	**5**	**10**	**26**

**** Compulsory Audit Course**

1st Semester (Group B)

Electrical/ Electronics & Comm. /Computer Science / Information Technology

S. No	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
B11	HST101	Basic English and Communication Skills	Humanities	3	2	1	0	3
B12	MAT101	Mathematics I	Mathematics	3	2	1	0	3
B13	MET101	Elements of Mechanical Engineering	Mechanical	3	2	1	0	3
B14	PHT101	Engineering Physics	Physics	3	2	1	0	3
B15	CHT102	Environmental Studies	Chemistry	3	2	1	0	3
B16	CVT102	Engineering Mechanics	Civil	3	2	1	0	3
B17	HSL101	English Language Laboratory	Humanities	1	0	0	2	2
B18	PHL101	Engineering & Applied Physics Laboratory	Physics	1	0	0	2	2
B19	WSL101	Workshop Practice	Workshop	2	0	0	4	4
		Total		**22**	**12**	**6**	**8**	**26**

National Institute of Technology Srinagar

2nd Semester (Group A)

Civil/ Mechanical/ Chemical/ Mett. & Mat Science

S. No	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
A21	HST102	Advanced English and Comm. Skills	Humanities	3	2	1	0	3
A22	MAT102	Mathematics II	Mathematics	3	2	1	0	3
A23	MET101	Elements of Mechanical Engineering	Mechanical	3	2	1	0	3
A24	PHT101	Engineering Physics	Physics	3	2	1	0	3
A25	CHT102	Environmental Studies	Chemistry	3	2	1	0	3
A26	CVT101	Engineering Mechanics	Civil	3	2	1	0	3
A27	HSL101	English Language Laboratory	Humanities	1	0	0	2	2
A28	PHL101	Engineering & Applied Physics Laboratory	Physics	1	0	0	2	2
A29	WSL101	Workshop Practice	Workshop	2	0	0	4	4
		Total		**22**	**12**	**6**	**8**	**26**

2nd Semester (Group B)

Electrical/ Electronics & Comm. /Computer Science / Information Technology

S. No	Course Code	Course Title	Department Offering	Credit	Contact Hours			
					L	T	P	Total
B21	HST102	Advanced English and Comm. Skills	Humanities	3	2	1	0	3
B22	MAT102	Mathematics II	Mathematics	3	2	1	0	3
AB23	EET101	Basic Electrical Engineering	Electrical	3	2	1	0	3
B24	ITT101	Computer Programming	Information Technology	3	2	1	0	3
B25	CHT101	Engineering Chemistry	Chemistry	3	2	1	0	3
B26	CVT102	Engineering Drawing	Civil	3	1	0	4	5
B27	CHL101	Chemistry Laboratory	Chemistry	1	0	0	2	2
B28	ITL101	Computer Programming Laboratory	Information Technology	1	0	0	2	2
A10	**NBA101**	**Fundamental Knowledge of Accreditation****	**NBA Instt. Cell**	**0**	**2**	**0**	**0**	**2**
		Total		**20**	**13**	**5**	**8**	**26**

**** Compulsory Audit Course**

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (1st Semester)	Basic English and Communication Skills	HST 101	3-0-0-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Apply the basic knowledge of English phonetics correctly.	3
CO2	Make use of vocabulary and grammar components properly in English communication.	3
CO3	Interpret a text effectively by demonstrating improved reading and comprehension skills.	5
CO4	Compose paragraphs and essays using the formal writing strategies.	6

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	**English Phonetics** Sounds/Phonemes of English (Vowels and Consonants) Phonemic Transcription of Simple Words Syllable Structure Word Stress	(10 Hours)
Module 2	**Vocabulary and Grammar** Word Formation (Prefixes and Suffixes) [Textbook Pages 4-8 and 57-62] Synonyms and Antonyms [Textbook Pages 33-35] Articles, Prepositions [Textbook Pages 8-15, 112-113, and 127-129] Punctuation [Textbook Pages 19-22]	(11 Hours)
Module 3	**Reading** Techniques for Good Comprehension [Textbook Pages 40-42] Skimming and Scanning [Textbook Pages 71-75] Local and Global Comprehension [Textbook Pages 92-95] Reading Prescribed Comprehension Passages [Textbook Pages 1-4, 29-33, and 40-42]	(10 Hours)
Module 4	**Writing** Phrases and Clauses[Textbook Pages16-19] Redundancies and Clichés [Textbook Pages 89-92 and 116] Paragraph Writing [Textbook Pages23-28and76-84] Essay Writing[Textbook Pages98-102]	(11 Hours)

Books Recommended:

1. N. P. Sudharshana and C. Savitha, *English for Engineers*, Cambridge, 2018.
2. dictionary.cambridge.org/help/phonetics.html [For Unit1, Sounds of English]
3. howjsay.com/ [ForUnit1, Transcription/Pronunciation]
4. myenglishlanguage.com/linguistics-language-guide/english-phonology/syllables-and- stress/ [For Unit 1, Syllable and Stress]

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (1st & 2nd Semester)	Mathematics-I	MAT-101	3-0-0-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: A student should have basic knowledge of differential calculus and matrices.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Solve linear and nonlinear differential equations by various methods	3
CO2	Make use of ordinary differential equations for solving various problems.	3
CO3	Examine the problems related to rank of matrix, Cayley-Hamilton theorem, solutions of equations by matrix method.	4
CO4	Estimate eigen values, eigen vectors and quadratic forms.	5

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	Exact differential equations, Necessary and sufficient condition for exact differential equations, Equations reducible to exact form, Linear differential equations of second and higher order with constant and variable coefficients, Cauchy's Homogeneous Linear equation, Legendre's linear equation, Simultaneous differential equations of first and second order, Simultaneous differential equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$,Nonlinear differential equation.	**12**
Module 2	Method of Variation of parameters, Method of undetermined coefficients, Series solution of ordinary differential equations (Frobenius method). Applications of ordinary differential equations viz. law of growth and decay, Newton's law of cooling, Electric circuits, Chemical reaction and solutions.	**12**
Module 3	Rank of a matrix, Equivalent matrices, Elementary transformations, normal form, Inverse of a matrix, Cayley- Hamilton theorem, Applications of Cayley-Hamilton theorem for finding Inverse and higher powers of a matrix, Solution of simultaneous equations by elementary operations, Similar matrices.	**10**
Module 4	Special matrices viz. orthogonal matrix, Idempotent matrix, unitary matrix. Eigen values and Eigen vectors of a matrix, Properties of eigenvalues and eigenvectors. Quadratic forms, Value class of quadratic form	**8**

Books Recommended:

1. Jain, R.K and Iyengar, S.R.K.(2008) .*Advanced Engineering Mathematics*, Third Edition, Narosa Pub. House.
2. Kreyszig, E. (2006).*Advanced Engineering Mathematics*, 9th Edition, John Wiley Sons.
3. Piaggio, H.T.H. *Differential Equations*, CBS publishers.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (1st & 2nd Semester)	Basic Electrical Engineering	EET101	3-0-0-3
Evaluation Policy	**Mid-Term**	**InternalAssessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Develop a comprehensive understanding of DC circuits and their elements through application of KVL/KCL and various network theorems.	3
CO2	Analyse and evaluate AC circuits, calculate Power in AC Circuits, and have a basic understanding of three phase circuits.	4
CO3	Assess the working principle and characteristics of transformers& evaluate performance indices of transformers.	5
CO4	Examine the working principles of various DC & AC machines and acquire working knowledge of basic measurement instruments.	4

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	**DC Circuits:**Introduction to Electric Circuits and their Elements, Energy Sources & their types (Ideal/Practical & Dependent/Independent Sources), Kirchhoff's Voltage & Current laws, Nodal Analysis, Mesh Analysis, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum Power Transfer theorem, Star-Delta Transformation.	**14**
Module 2	**AC Circuits:**Introduction to AC circuits and Sinusoidal Signals, Phasor representation,Concept of Impedance.Instantaneous, Active, and Reactive Power, Concept of Power factor. Introduction to Three Phase circuits.	**7**
Module 3	**Transformers:**Introduction to Transformers and their working principle, Ideal& PracticalTransformers, Equivalent circuit, and Phasor diagram. Losses & Efficiency.	**7**
Module 4	**Machines:**Introduction to Electric Machines. ***DC Machines:*** Construction, Principle of Operation,EMF and Torque Equations, Characteristics of DC Generators and Motors. ***Induction Motors:*** Production of Rotating Magnetic Field, Principle ofOperation of 3-φ I.M., Torque-Speed Characteristics of 3-φ I.M.	**10**
Module 5	**Measuring Instruments:**Basic Terminology associated with Measurement. Measurement of Current, Voltage, Resistance & Power. Sensors & Transducers.	**4**
	Total	**42**

Books Recommended:

1. Vincent Del Toro, Electrical Engineering Fundamentals, 2nd Edition, PHI, 2003.
2. Edward Hughes, Electrical Technology, 10th Edition, ELBS, 2010.
3. V.N. Mittle, Basic Electrical Engineering, TMH, 2000.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (1st & 2nd Semester)	Computer Programming	ITT101	3-0-0-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Apply programming for problem-solving and use various library functions, data types, characters, keywords and operators of the 'C' language	3
CO2	Analyze and apply the concept of conditional and iterative statements in C language and use of functions.	4
CO3	Evaluate the data types offered by the C language including complex data types: arrays, structures, pointers, and unions.	5
CO4	Compare different memory allocation techniques and implement the file handling concept in C programming.	4

Detailed Syllabus:

Module 1	**Introduction to Problem-Solving:** Engineering problem-solving methodology, Flowcharts and Algorithms, Need for computer Languages, High-level languages, History of C, Memory Layout of a C Program, GCC compiler **Language of Bits:** Binary Representation of Data, 1's and 2's complement representation, Computer Arithmetic, Octal and HexaDecimal Representation. **Fundamentals of C**: Program structure, C character set, Library functions, Preprocessors Directives, Compilation Flow of a C program, I/O functions in C, Comments, Header Files, C character set, data types, identifiers and keywords, Declarations, Operators and expressions, Type Conversion, Precedence and Associativity.	**8**
Module 2	**Decision Control Structure in C:** Decision-making statements(if, if-else,if-else-if, switch), nesting of decision control structures. **Loop Control Structure in C:** Looping Statements(while, do-while, for), nested loop, use of jumping statements(break, continue, goto). **Functions:** Concept of library functions, user-defined functions, passing arguments, Function prototypes, Calling a function, Static functions, Recursion.	**13**
Module 3	**Arrays and String:** Declaration and initialization, Passing arrays to a function, matrices as 2D arrays, Multi-dimensional arrays, string handling library functions. **Pointers:** Declarations, Passing pointers to a function, Operations on pointers, Pointer Arithmetic, Pointers and arrays, Arrays of pointers, and function pointers. **Structures and Unions:** Defining and accessing structure, structure as function arguments, an array of structures, pointers to structures, defining and accessing union.	**13**
Module 4	**Dynamic Memory Allocation:** Introduction to dynamic memory allocation(malloc, calloc, realloc, free). **File Handling:** File operation such as storing, retrieving and updating a file.	**8**

Books Recommended:

1. Schaums Outline of Theory and Problems of programming with C: Gottfried
2. Programming with C , Byron Gottfried, Third Edition. (McGrawHill).
3. Mastering C by Venugopal, Prasad – TMH
4. Programming in ANSI C, Balaguruswamy
5. C How to Program, P. J. Deitel and H. Deitel

Other Books Recommended:

1. Complete reference with C Tata McGraw Hill
2. Engineering Problem Solving with ANSI C, Delores M. Etter, Prentice Hall
3. C Programming, Ivor Horton, Wrox Press Limited
4. The C programming language: Kerninghan and Ritchie

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1stYear (1st and 2ndSemester)	Engineering Chemistry	CHT-101	3-1-0-4
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Analyze the properties and use of polymeric and nanomaterials.	4
CO2	Estimate the various parameters of water quality.	5
CO3	Identify the fuels and their applications.	3
CO4	Make use of lubricants and solve the corrosion problem	3

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	**Engineering materials** **Polymers:** Introduction, classification, types of polymerization, mechanisms of polymerization (free radical, cationic, anionic), coordination polymerization and its mechanism, synthesis and applications of some important engineering polymers (Polyethylene, PVC, Teflon, Terylene, Nylon-6, Nylon-6,6), Conducting polymers; classifications, properties and applications in engineering field. **Nanomaterials:** Introduction, Classification of nanomaterials based on their size, Approaches for nanomaterials synthesis (Bottom-up approach: Sol-gel synthesis, Hydrothermal growth and chemical vapor deposition. Top-down approach: Ball Milling and Micro-fabrication), Applications of nanotechnology in various fields.	**12**
Module 2	**Water treatment** Introduction, Impurities in water, Hard water, Determination of hardness and alkalinity, Softening of hard water (Lime-Soda process, Zeolite process and Ion Exchange process), municipal treatment of water for drinking purposes; removal of suspended, dissolved and biological impurities-Sterilization by chlorination (Effective and break-point chlorination). Numerical problems based on hardness, alkalinity and LS process.	**10**
Module 3	**Fuels** Introduction, Classification, Calorific value (HCV and LCV), Determination of calorific value using Bomb calorimeter, Numerical problems based on Dulong's formula. Biofuels: Classification of biofuels; first, second, third and fourth generation biofuels. Properties and characteristics of liquid biofuels (bioethanol, biobutanol and biodiesel).	**10**
Module 4	**Lubricants and Corrosion** **Lubricants:** Introduction, mechanisms of lubrication, hydrodynamic, boundary and extreme pressure lubrication, classification of lubricants: liquid, semi solid and solid lubricants. Lubricating oils; fatty oils, mineral oils, blended oils, synthetic oils, properties of lubricating oils with special reference to flash point, aniline point, viscosity and viscosity index. **Corrosion:** Introduction, types of corrosion: Dry and wet corrosion (pitting	**10**

	corrosion, crevice corrosion, and stress corrosion), corrosion prevention and control by proper design and material selection, cathodic protection, anodic protection, protective coatings.	

Books Recommended:

1. Jain P.C., Jain M., Engineering Chemistry, Dhanpat Rai Publishing Company, 17th Edition, 2019.
2. Dara S.S., Umare S.S., A Text Book of Engineering Chemistry, S. Chand Publication, 1st Edition, 2004.
3. Viaram S., Engineering Chemistry, Wiley Publication, 1st Edition, 2017.
4. Rao M.S.R., Singh S., Nanoscience and Nanotechnology: Fundamentals to Frontiers, Wiley Publication, 1st edition, 2014.
5. Roussak O.V., Gesser H.D., Applied Chemistry: For Engineers and Technologist, 2nd Edition, 2013.
6. Gowariker V.R., Viswanathan N.V., Sreedhar J., Polymer Science, New Age International Publisher, 3rd Edition, 2019.
7. Agarwal C.V., Murthy C.P., Naidu A., Chemistry of Engineering Materials, B.S. Publication, 9th Edition, 2018.
8. Cademartiri L., Ozin G. A., Lehn J. M., Concepts of Nanochemistry, Wiley-VCH Publication, 1stEdition, 2009.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1stYear (1st and 2ndSemester)	Engineering Drawing	CVT-101	1-0-4-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Course Objective:

To inculcate the ability to translate geometric and topological information of common engineering objects (two/three dimensional) into engineering drawing using standard graphical techniques.

Course Outcomes:

CO NOs	Course Outcomes	Bloom'sTaxonomy Level
CO1	Apply the concepts of projection of points, lines and solids to develop real world objects	3
CO2	Analyze different sectional views of simple geometrical solids	4
CO3	Perceive the intersection and development of surfaces of simple solids	5
CO4	Imagine and construct orthographic, Isometric, and Perspective views of objects.	6

Syllabus

Unit	Course Contents	Contact Hours
Unit 1	**Introduction to Engineering Drawing:** Basic principles of Engineering Drawing, Stationary requirements, drawing instruments, lettering, dimensioning, layout **Scales:** Representation of scales, units of measurement, representative fraction, types of scales **Types of projections:** Concept of first angle and third angle projections, concepts of projection of points, lines, and planes	**20**
Unit 2	**Introduction to 3D objects:** Construction of different views of simple geometrical solids using first angle projection **Sections:** Types of sectional planes, true shapes of sections	**20**
Unit 3	**Intersection of surfaces:**simple case of intersection of two prisms, two cylinders, and cone and a cylinder. **Development of surfaces:**Development of surfaces ofsections of solids and simple intersecting solids.	**15**

Unit 4	**Isometric views:**Development isometric views of simple blocks using orthographic third angle projections	**15**

Text book:

1. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 50th Edition, 2010.

References:

1. Gopalakrishna K. R., "Engineering Drawing" (Vol. I&II combined), Subhas Stores, Bangalore, 2007.
2. Shah M. B., and Rana B. C., "Engineering Drawing", Pearson, 2nd Edition, 2009.
3. Luzzader, Warren. J. and Duff, J. M., "Fundamentals of Engineering Drawing with an Introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.
4. Venugopal K. and Prabhu R. V., "Engineering Graphics", New Age International (P) Limited, 2008.
5. Natrajan K.V., "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2009.
6. Basant A. and Agarwal C. M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. Gowri S., and Jeyapoovan T., "Engineering Graphics" Vikas Publishing House (P) Limited, 2011.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1stYear (1st and 2ndSemester)	Chemistry Laboratory	CHL 101	0-0-2-1
Evaluation Policy	**Continuous Assessment**		**End-Term**
	60 Marks		40 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Assess the different parameters of water quality.	5
CO2	Experiment with synthesis of polymeric materials.	3
CO3	Analyze fuels and lubricants.	4
CO4	Make use of instruments for chemical analysis.	3

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	1. To determine the total, permanent and temporary hardness of water by EDTA method. 2. To determine alkalinity of given water samples/alkali mixtures by warder's Method. 3. To estimate percentage of available chlorine (free chlorine) in bleaching powder/water.	**08**
Module 2	1. Synthesis of Urea formaldehyde resin. 2. Synthesis of Phenol formaldehyde resin. (Demonstration)	**04**
Module 3	1. Proximate analysis of coal. 2. To determine the acid value of given lubricating oil. 3. To determine the aniline point of given lubricating oil. 4. Estimation of viscosity of lubricating oil by viscometer.	**10**
Module 4	1. Estimation of strength of HCl by pH Meter. (Demonstration) 2. To verify Beer–Lambert law for coloured solution and to determine the concentration of a given unknown solution. (Demonstration).	**06**

Books Recommended:

9. Dara S.S., A Textbook on Experiments and Calculations in Engineering Chemistry, S Chand & Company Publication, 9th Edition, 2015
10. Mangla B., Sachdeva R., Sethi B., Engineering Practical Chemistry, Manakin Press, 1st Edition, 2018.
11. Rattan S., Theory and Practicals of Engineering Chemistry, S.K. Kataria and Sons publication, 1st Edition 2013.
12. Jaspal D., Malviya A., Engineering Chemistry Practical Book, Alpha science International Ltd., 1st Edition, 2015.
13. Thakur A., Practical Engineering Chemistry, Narosa Publication, 1st Edition, 2018.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (Ist and 2nd Semester)	Computer Programming Lab	ITL101	0-0-2-1
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
100 Marks			

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Apply programming for problem-solving and use various basic components of C program.	3
CO2	Evaluate the use of functions and different decision, and loop control structures.	5
CO3	Examine the use of cases in arrays and strings.	4
CO4	Compare different data structures like structures and unions; and implement dynamic memory allocation and file handling.	4

Lab Details:

1. **Introduction**
   a. Understanding compilation flow using gcc.
   b. Programs to understand how integers, characters, and strings are stored and represented in C.
   c. Programs to understand the ASCII character encoding.
2. **Operators and expressions**
   a. Programs to understand how to use different operators available in C.
   b. Programs to understand differences between logical and arithmetic operators.
   c. Programs to understand differences between logical and bitwise operators.
   d. Programs to evaluate algebraic expressions in C.
3. **Number System**
   a. Programs to obtain a full understanding of signed, unsigned, long and short numbers in C.
   b. Programs to understand exactly how numbers are represented in computers (octal, hexadecimal and binary numbers systems) .
4. **Input and output Functions**
   a. Programs to understand taking input from user using different input functions.
   b. Programs to understand printing of various data types using different output functions.
   c. Programs to exercise all flags in printf() and scanf() functions.
   d. Programs to understand printing of display patterns of numbers and asterisks.
5. **Decision Control Structures**
   a. Programs to understand the use of conditional statements like if-else.
   b. Programs to understand the use of nested control structures.
   c. Programs for implementing the Switch statements and its use cases.
6. **Loop Control Structures**
   a. Implementation of loops using C programs.

b. Programs for solving some mathematical problems using loops.
c. Programs for designing the patterns using loops.

7. Functions

a. Programs to understand modularize of code using functions.

b. Programs to implement function with/without arguments and with/without return types.

c. Programs to understand static data types and static functions.

8. Recursion

a. Programs to understand direct and indirect recursions using functions.

b. Programs to generate mathematical series using recursion.

9. Arrays and strings

a. Programs to understand how arrays work in C, how to use them, and how they are stored in memory.

b. Programs to understand searching in an array.

c. Programs to understand sorting techniques using arrays.

10. Pointers

a. Programs to understand pointers in C.

b. Programs to understand the relationship between array indexing and pointer arithmetic.

c. Programs to use pointer to pass the address of data.

11. Pointer usage in arrays

a. Programs to understand the relation between the name of the array and pointers.
b. Programs to analyze the effect of arithmetic operations on the name of the array.

12. Structures and Unions

a. Programs to understand creating, accessing and using structures.

b. Programs to understand use of arrays of structures.

c. Programs to understand pointers to structures and pointers as structures members.

d. Programs to understand creating, accessing and using unions.

13. Dynamic memory allocation

a. Programs to understand dynamic memory allocation especially with respect to1D and 2D arrays.

b. Programs to analyze the effect of dynamic memory allocation on memory management.

14. File Handling

a. Programs to understand creating, reading, writing a file.

b. Programs to understand taking input through arguments to the main() function.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1stYear (1st & 2ndSemester)	**Fundamental Knowledge of Accreditation**	NBA101	2-0-0-0
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Analyse the need of the outcome-based course and Accreditation.	4
CO2	Interpret the graduate attribute, program outcomes and Bloom Taxonomy levels.	5
CO3	Develop appropriate test items for all outcome based objectives for both summative and formative evaluation.	3
CO4	lan an outcome-based curriculum document to meet NBA and Washington Accord requirements.	3

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	Introduction to Outcome based Learning (OBL) & Outcome based Education (OBE) and its importance. Vision and Mission statements of the institute, Vision and Mission of the department,	**6**
Module 2	Program educational objectives (PEOs), Program outcomes(POs), Program specific outcomes(PSOs), Graduate attributes and introduction of accreditation.(Washington Accord, NBA etc.).	**6**
Module 3	Course Outcomes (COs), Bloom Taxonomy, Taxonomies levels, and Instructional Objectives. Assessment and Evaluation as per OBE, ICT for Assessment and Evaluation, Outcome-based Curriculum Design framework, Outcome-based Curriculum Design.	**8**
Module 4	Mapping of outcome-based curriculum with Program outcomes (POs), Program specific outcomes (PSOs), Outcome-based, learning style and learning approaches and life long learning.	**6**
Module 5	CO attainments, PO/PSO attainments. Benefits of accreditation to the students and the Institute.	**4**

Books Recommended:

1. NBA user manuals.
2. https://www.nbaind.org/Downloads/Documents
   https://onlinecourses.nptel.ac.in/noc23_ge46/preview

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (1st & 2nd Semester)	Elements of Mechanical Engineering	MET101	2-1-0-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Examine materials and manufacturing processes for industrial applications.	4
CO2	Evaluate the performance of energy conversion and conservation systems.	5
CO3	Apply the concepts of fluid engineering in practical and diverse fields.	3
CO4	Select the proper train drive for particular applications.	3

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	Units and measurements. Engineering Materials and Materials Response. Basics of manufacturing processes. Recent advances in mechanical engineering, Role of Computer-Aided Design, Simulation and 3D printing.	**10**
Module 2	System and Surroundings, Thermodynamic processes, First and Second law of thermodynamics, Concept of Entropy. Engine Cycles and Efficiency. Basic idea of internal combustion engines. Heat transfer through conduction, convection and radiation. Heat exchangers. Energy conservation and conversion.	**12**
Module 3	General properties of fluids, Fluid statics, Pressure measurement. Equation of fluid motion, Bernoulli's Equation. Viscous Effects: Viscosity, Laminar and Turbulent Flows. Introduction to hydraulic machines: turbines, pumps, their types and applications in energy conversion.	**12**
Module 4	Gears, Types, Design Criteria, Speed, torque and power in gear sets. Simple, compound and reverted gear trains, gear ratios, applications.	**8**

Books Recommended:

1. P.N. Rao. (2013). *Manufacturing technology: metal cutting and machine tools* (Vol. 2). Tata McGraw-Hill Education.
2. H S Shan(2017). *Manufacturing processes,* 2nd Edition. Tata McGraw-Hill Education.
3. P. K. Nag, K. Tripathi, C. B. Pawara. *Basic Mechanical Engineering.*
4. Rattan, S. S. (2014). *Theory of machines*. Tata McGraw-Hill Education.

Reference Books:

1. Cengel, Yunus, John Cimbala, and Robert Turner. *Fundamentals of Thermal-Fluid Sciences (SI units)*. McGraw Hill, 2012.
2. Shigley, Joseph. *Theory of Machine and Mechanisms*, McGraw Hill 2014.

Year (Semester)	Course Title	Course Code	L - T - P = Credits
1st Year (Ist & IInd Semester)	Engineering Physics	PHT-101	3 - 0 - 1 = 4
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
NEP	26 Marks	24 Marks	50 Marks

Pre-requisites: None

Course objectives of B.Tech. Eng Physics

1. The main objective of the course is show that Newtonian Mechanics cannot accurately describe the physical behavior of our universe
   Two regimes, were Newtonian mechanics fails to accurately predict the physical outcomes are
   (i) When the size of system is small
   (ii) When the bodies are moving with velocity comparable to velocity of light
   In this course we will see that in order to describe these two regimes accurately we need to use the ideas of Quantum mechanics and Special Theory of relativity besides materials at small scale and in low dimensions
   (iii) Basic ideas of electromagnetism, their applications in modern science and Technology and in day-to-day life

Course Outcomes

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Apply the laws of Electromagnetic waves in different engineering fields.	3
CO2	Analyze the concept of relativity to explore various natural phenomena.	4
CO3	Evaluate the concepts of quantum mechanics to understand the underlying mechanism of engineering problems	5
CO4	Determine the significance of new engineering materials and radioactive decay.	5

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	**Introduction to Electromagnetism:** **Lecture 1:** Concept of Electromagnetism, **Lecture 2-3:** Basic equations of electricity and magnetism, **Lecture 4:** Displacement Current, Examples, **Lecture 5:** Nebla operator and its Operations **Lecture 6:** Maxwell equations in different media and its solution in one dimension, **Lecture 7:** Characteristic of Electromagnetic waves and spectrum, **Lecture 8:** Electrostatic Energy density and Magnetostatic Energy density, Poynting **Lecture 9:** Theorem and Conservation of momentum of Electromagnetic wave, **Lecture 10:** Reflection of EM waves, Polarization of EM waves **Lecture** 11: Examples, Numerical problems and practical demonstrations	**11**
Module 2	**Special Theory of Relativity:** **Lecture 1:** Inertial and Non inertial Frames of Reference, Galilean Transformations, **Lecture 2:** Michelson Morley Experiment, **Lecture 3:** Postulates of Special Theory of Relativity **Lecture 4:** Lorentz Transformations, **Lecture 5-6:** Time Dilation, Doppler Effect in light and its application in Expanding of Universe,	**10**

	Lecture 7: Twin Paradox, Length Contraction, Simultaneity **Lecture 8:** Velocity addition rule **Lecture 9:** Relativistic Mass, Energy and Momentum, **Lecture 10:** Equivalence of Mass and Energy, Examples, Numerical problems	
Module 3	**Quantum Mechanics:** **Lecture 1:** Transition from Classical to Quantum mechanics: Black Body Radiation, **Lecture 2:** Photoelectric effect, Compton effect. **Lecture 3:** De-Broglie Waves, Concept of wave packets, Numerical problems and practical demonstrations **Lecture 4:** Heisenberg Uncertainty principle and its applications, **Lecture 5:** Linearity and Superposition of the wave function, **Lecture 6:** Operators, Expectation values, **Lecture 7:** Schrodinger's Equations: Time-dependent and Steady State Form, **Lecture 8:** Quantum Confinement Concept, **Lecture 9:** 1-D Particle in a box: Finite and Infinite Potential Well. **Lecture 10:** Quantum mechanical tunneling, **Lecture 11:** Harmonic Oscillator, Numerical problems	**11**
Module 4	**Fundamental Engineering Materials:** **Lecture 1-2:** Introduction and Classification of Materials, **Lecture 3:** Composites Fiber, Metallic, Glasses, ceramics, and semiconductors. **Lecture 4:** Biomaterials, Magnetic materials, Properties & Applications, **Lecture 5-6:** Superconducting materials: Meissner effect –Type I & Type II Superconductors **Lecture 7: Nuclear Materials,** Binding Energy, Liquid-Drop Model, **Lecture 8:** Nuclear Fission and Fusion, Radioactive Decay **Lecture 9-10:** Half Life, Alpha Decay (Qualitative analysis), Beta Decay (Fermi Theory) and Gamma Decay and Numerical Problems.	**10**

Books Recommended:

1. Griffith D. J., (1999) *Introduction to Electrodynamics,* USA: Prentice-Hall.
2. Resnick R. (2007) *Introduction to Special Relativity,* Singapore: John Wiley & Sons
3. Beiser A., Mahajan S., Choudhury S. R. (2009) *Concepts of Modern Physics, (6Th Edition),* India: McGraw Hill Education
4. Callister's (2009), *Materials Science and Engineering* (2nd edition), Wiley

Note: e books are available on our web page.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1stYear (1st and 2ndSemester)	Environmental Studies	CHT-102	2-1-0-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Assess the role of environmentand natural resources towards sustainability.	4
CO2	Identify an eco-system with the help of biogeochemical cycles.	3
CO3	Classify the environmental pollutions and their control measures.	4
CO4	Discuss the different social aspects related to the environment by field assignment.	6

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	**Environment and Natural Resources** Introduction, scope and importance of environmental studies, Types of natural resources, Natural resources and associate problems (1) Forest resources: deforestation, dams and their effects on forests and tribal people, (2) Water resources: surface and ground water, floods, drought, conflicts over water, benefits and problems associated with dams, (3) Mineral resources: classification and environmental effects of extracting the mineral resources, (4) Food resources: world food problems, effects of modern agriculture, problems with the use of fertilizers-pesticides and (5) Energy resources: growing energy needs, renewable and non- renewable energy sources and their applications.	11
Module 2	**Ecology and Eco-Systems** Introduction, basic concept and definitions, ecology, ecosystems, structure and function of an eco-system, Energy flow in the ecosystems (food chain, food web, ecological pyramids), Biogeochemical cycles (water cycle, nitrogen cycle, carbon cycle, oxygen cycle, phosphorous cycle, sulphur cycle), Ecological succession, Introduction, types, characteristic features, structure and function of forest and freshwater ecosystems (lake/river).	10
Module 3	**Environmental Pollution** Definition of pollution; pollutants; classification of pollutants; solubility of pollutants (hydrophilic and lipophilic pollutants),Definition, Causes, Effects and Control measures of (1) Air pollution (global warming, acid rain, ozone layer depletion) (2) Water pollution (COD, BOD, DO) (3) Soil pollution (4) Marine pollutionand (5) Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes.	11
Module 4	**Social issues and the Environment, Field Assignment** From unsustainable to sustainable development, urban problems related toenergy, water conservation, rain water harvesting,	10

	watershedmanagement,Environmental ethics: issues and possiblesolutions, climate change, global warming, acid rain, ozone layer depletion,nuclear accidents and holocaust.Environment protectionAct, Air (prevention and control of pollution)Act, Water (prevention and control of pollution)Act, Wildlife protectionAct, Forest conservationAct. Field Assignment: Assignment on local environment problems.	

Books Recommended:

1. Bharucha E., Textbook of Environmental Studies for Undergraduate Courses, Universities Press, 2nd edition, 2019.
2. Mishra D.D., Fundamental Concepts in Environmental Studies, S. Chand & Company Pvt. Ltd, 4th edition,2014.
3. Rajgopalan R., Environmental Studies: From Crisis to Cure, Oxford University Press, 3rd edition, 2015.
4. Kaushik A., Kaushik C. P., Perspectives in Environmental Studies, New Age International Pvt. Ltd., 7th edition, 2021.
5. Joseph B.,Environmental Studies, McGraw Hill Education, 3rd edition, 2017.
6. Chiras D.D., Environmental Science, Jones and Bartlett Publishers,10th edition, 2014.
7. Nazaroff W.W., Alvarez-CohenL., Environmental Engineering Science, Wiley India Pvt. Ltd., 1st edition, 2009.
8. Gregory K.J., Environmental Sciences: A Student's Companion, SLE Pound Publication,1st edition, 2008.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (1st and 2nd Semester)	Engineering Mechanics	CVT-102	2-1-0-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Course Objective:

Develop an understanding of the fundamental concepts, theories, and principles of Engineering Mechanics for their applications in Solving Engineering Problems.

Course Outcomes:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Utilize the fundamentals of Static Equilibrium and Stress-Strain Concepts to Solve Engineering Problems.	3
CO2	Analyze the Properties of Plane Surfaces and the Concept of Friction in Mechanical Problems.	4
CO3	Determine the Forces in Plane Trusses and Explain the Principle of Virtual Displacement.	5
CO4	Apply the Concept of Dynamics of Rigid Bodies and Energy Principles to Solve Engineering Problems.	3

Unit	Contents	Contact Hours
01.	**Introduction to Engineering Mechanics-** Statics:Fundamentalconceptsandlawsofmechanics.Equilibriumofbodies:Free-bodydiagrams,Statical determinacy. Force systems: Principle of Moments, Resultant of forces, Couple systems, Equilibrium of Rigid Bodies, Support reactions. Torque due to a force. **Concept of Stress and Strain:** Compatibility and Stress-Strain Relations. Stress-Strain diagrams, Hooke's law, Modulus of elasticity (E), Lateral strains, Poisson's ratio, Multi-axial stress system, Volumetric strain, Bulk modulus (K), Shear stress concept, Modulus of rigidity (G). Relation between E, G, and K.	18
02.	**Properties of plane surfaces:** Centroid and Center of Gravity, First moment of area, Second Moment of Area. **Friction**: General concept of Friction. Static and Dynamic Friction.	10
03.	**Plane Trusses:** Forces in members of a Truss by Method of Joints and Method of Sections. **Virtual Work:** Principle of Virtual Work, Calculation of Virtual Displacement and Virtual Work.	10
04.	**Dynamics of Rigid Bodies:** Newton's Laws, D'Alembert's Principle, Energy Principles.	4

Textbook:

1. Hibbeler, R.C., "Mechanics of Materials", 6th SI edition, Prentice Hall.
2. Hibbeler, R.C., Engineering Mechanics: Statics and Dynamics, Prentice Hall(2012).
3. Singer, F. L., Engineering Mechanics Statics & Dynamics, Prentice Hall.

References:

1. Beer,P.F.andJohnston(Jr.)E.R."MechanicsofMaterials",S.I.Version,TataMcGrawHill, India, 2001.
2. Beer,Johnston,ClausenandStaab,VectorMechanicsforEngineers,Dynamics,McGraw-Hill Higher Education (2003)
3. TimoshenkoandYoung,EngineeringMechanics,TataMcGrawHillEducationPrivateLimited (2000).
4. Shames, I.H. Engineering Mechanics: Dynamics, Pearson Education India(2002).
5. Popov, E.P., Engineering Mechanics of Solids, Prentice-Hall, 1999.
6. GereJ. M. and Good no, B. J., Strength of Materials, Cengage Learning.
7. Craig, R.R., "Mechanics of Materials", 2ndedition, John Wiley and Sons

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (1st and 2nd Semester)	English Language Lab	HSL101	0-0-2-1
Evaluation Policy	**Mid-Term**	**Continuous Assessment**	**End-Term**
		60 Marks	40 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Develop his/her vocabulary considerably and use elements of English grammar correctly.	3
CO2	Utilize effective listening and speaking skills.	3
CO3	Build effective reading and writing skills.	6
CO4	Adapt themselves to various professional settings verbally and non-verbally.	6

Detailed Syllabus:

Module/Week No.	Contents	Hours
Week 1	**Vocabulary-I** Selected Laboratory Modules (with Practice Exercises) Complementary Material: English with Ronnie (cuq.in/GXUO)	2
Week 2	**Listening I** Selected Laboratory Modules (with Practice Exercises) Complementary Material: Listening Time (cuq.in/IDkX)	2
Week 3	**Speaking I** Selected Laboratory Modules (with Practice Exercises) Complementary Material: English Speaking Success (cuq.in/P1bN)	2
Week 4	**Reading I** Selected Laboratory Modules (with Practice Exercises) Complementary Material: Oxford Online English (cuq.in/adxO)	2
Week 5	**Writing I** Selected Laboratory Modules (with Practice Exercises) Complementary Material: Purdue OWL (owl.purdue.edu/)	2
Week 6	**Grammar I** Selected Laboratory Modules (with Practice Exercises) Complementary Material: English with James (cuq.in/UruK)	2
Week 7	**Interpersonal Skills I** Selected Laboratory Modules (with Practice Exercises) Complementary Material: LetThemTalkTV (cuq.in/6gvC)	2
Week 8	**Vocabulary II** Selected Laboratory Modules (with Practice Exercises) Complementary Material: English with Katherine (cuq.in/wJEO)	2
Week 9	**Listening II** Selected Laboratory Modules (with Practice Exercises) Complementary Material: Aleena Rais Live (cuq.in/4Q72)	2
Week 10	**Speaking II** Selected Laboratory Modules (with Practice Exercises) Complementary Material: Speak English with Vanessa (cuq.in/9Rrz)	2
Week 11	**Reading II** Selected Laboratory Modules (with Practice Exercises)	2

	Complementary Material: Learn English with Cambridge (surl.li/ivyjd)	
Week 12	**Writing II** Selected Laboratory Modules (with Practice Exercises) Complementary Material: The Writing Center: University of North Carolina at Chapel Hill(writingcenter.unc.edu/)	2
Week 13	**Grammar II** Selected Laboratory Modules (with Practice Exercises) Complementary Material: English with Jennifer (cuq.in/uncc)	2
Week 14	**Interpersonal Skills II** Selected Laboratory Modules (with Practice Exercises) Complementary Material: Advanced English—For Professionals (cuq.in/7wJ7)	2

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1stYear (1st and 2ndSemester)	Engineering & Applied Physics Laboratory	PHL-101	0-0 -2-1
Evaluation Policy	**Continuous Assessment**		**End-Term**
	60 Marks		40 Marks

Pre-requisites: None

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Examine the interaction of radiation with matter.	4
CO2	Analyze the physical implications of Simple harmonic motion under the influence of gravity.	4
CO3	Evaluate the dynamics of electromagnetic fields.	5
CO4	Design the semiconductor based devices	6

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	1. To determine Planck's constant and work function using photoelectric effect. 2. To verify inverse square law of radiation using photoelectric effect. 3. Determination of absorption coefficient of a liquid or solution with the help of Photovoltaic cell.	06
Module 2	1. To determine value of acceleration due to gravity with Bar pendulum. 2. To determine value of acceleration due to gravity with Kater's pendulum. 3. To determine the young's modulus of the material of a given beam supported on two knife edges and loaded at the middle point. 4. To verify Stoke's law and determine the coefficient of viscosity of a highly viscous liquid.	08
Module 3	1. To determine the wavelength of sodium light by newton's rings method. 2. To find angle of prism, angle of minimum deviation and refractive index of prism. 3. To study variation of magnetic field along the axis of circular coil carrying current.	08
Module 4	1. To determine the Hall coefficient for given semiconductor and study its field dependence. 2. To plot the V-I Characteristics of the solar cell and hence determine the fill factor. 3. To plot the V-I Characteristics of the P-N Junction Diode. 4. To study the temperature dependence of resistivity of semiconductor and to determine band gap of experimental material (Ge).	06

Books Recommended:

5. Arora C. L. (2016) *Practical Physics*,India: S Chand.
6. Gupta S. L., Kumar V. (2010) *Practical Physics*India: PragatiPrakashan.
7. Das R., Robinson C. S., Kumar R. and Sahu P. R.(2016) *A Textbook ofEngineering PhysicsPractical*, India: University Science Press.

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1stYear (1st and 2ndSemester)	Workshop Practice	WSL101	0-0 -4-2
Evaluation Policy	**Continuous Assessment**		**End-Term**
	60 Marks		40 Marks

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Identify and apply relevant tools and techniques in various Machining Operations.	3
CO2	Explain various joints, tools, operations and techniques in Welding and Sheet-Metal Shop.	5
CO3	Apply basic principles and techniques of Forging and Foundry Shop.	3
CO4	Take part in basic operations using different types of tools and fixtures in Carpentry and Fitting Shop.	4

SYLLABUS

Machining Trade

(Machinist Trade & Turning Section) **(8 Hrs.)**

Theoretical Instructions:
Safety Precautions, Introduction of machine tools such as lathe, drilling machine & other related metal cutting tools. Parts of lathe & basic metal cutting operations. Introduction of various types of cutting tools and their material.

Practical Demonstrations:
Demonstration on Lathe & basic operations such as drilling, facing, turning, taper turning, step turning, knurling, chamfering etc. Demonstration of basic measuring instruments.

Job No. 1: TO PERFORM PLAIN AND STEP TURNING ON A JOB ON CENTRE LATHE AS PER GIVEN DRAWING.
Job No. 2: TO PERFORM TAPER TURNING AND KNURLING ON JOB NO. 1 AS PER THE DRAWING.
Job No. 3: TO PERFORM GROOVING OPERATION ON JOB NO. 2 AS PER THE DRAWING.

Sheet Metal & Spray-Painting Section **(8 Hrs.)**

Theoretical Instructions:
Safety precautions, brief introduction of sheet metal, various tools, joints & operations. Soldering, brazing, & shearing, Fluxes & their applications. Introduction of different machines and pattern development in detail. Brief description of paints & varnishes.

Practical Demonstrations:
Demonstration of all basic hand tools & equipment's. Fabrication of simple joints and jobs. Preparation & painting of surfaces for varnish & painting etc.

Job No. 1: TO DEVELOP A CYLINDRICAL JOB.

Job No. 2: TO DEVELOP A SQUARE ELBOW AS PER THE DRAWING.
Job No. 3: TO DEVELOP A RECTANGULAR TRAY AS PERDRAWING.

Fitting & Benchwork Section **(8 Hrs.)**

Theoretical Instructions:
Safety precautions, introduction to fitting & bench work. Demonstration of basic hand tools, holding devices and basic fitting operations such as measuring, marking, filing, sawing. drilling, tapping, buffing.
Practical Demonstrations:
Demonstration of all basic hand tools/ measuring tools & equipment's. Demonstration of simple operations such as marking, punching, filing, sawing, scrapping, drilling.

Job No. 1: TO FABRICATE A SQUARE PLATE OF MILD STEEL WORK PIECE 50X50X 5 mm.
Job No. 2: TO FABRICATE A SNAP FITTING OF MILD STEEL WORK PIECE 50 X 50 X 5 mm.
Job No. 1:TO FABRICATE A CROSS/SQUARE FITTING OF MILD STEEL WORK PIECE 50X50X 5 mm.

Welding Section **(8 Hrs.)**

Theoretical Instructions:
Safety Precautions, Introduction of welding processes like electric arc welding, Gas Welding, MIG Welding, TIG welding, Submerged arc welding & spot welding. Various Fluxes & electrodes used in welding. Introduction of ac & dc welding and its applications.
Practical Demonstrations:
Demonstration of all basic tools &personal protective equipment's. Demonstration of different types of joints by using arc welding & gas welding etc.

Job No.1: TO PERFORM A ROUGH WELDING USING SHIELDED METAL ARC WELDING MACHINE (SMAW)
Job No.2: TO MAKE A SINGLE-V BUTT JOINT OF MILD STEEL 80x50x8mm
Job No.3: TO MAKE A LAP JOINT OF MILD STEEL 85x35x6mm

Foundry and Casting Section **(8 Hrs.)**

Theoretical Instructions:
Safety Precautions, Introduction to foundry and casting processes, basic steps in casting processes types of patterns, brief description of common hand tools used in foundry work,

Introduction of risers, runners, gates moulding sand and its composition and its properties. Name of the common Metals for Casting.
Practical Demonstrations:
Demonstration and practice for preparation of moulding sand, use of hand tools to prepare the mould by using different types of patterns

Job No. 1: TO PREPARE A GREEN SAND MOULD BY USING STEP PULLEY BLOCK FOR CASTING
Job No. 2: TO PREPARE A GREEN SAND MOULD BY USING OPEN BEARING BLOCK FOR CASTING
Job No. 3: TO PREPARE A GREEN SAND MOULD BY USING SELF CORED PATTERN FOR CASTING

Smithy & Forging Section **(8 Hrs)**

Theoretical Instructions:
Safety precautions, introduction of forging tools. Materials & their heat treatments. Description of all forging operations such as hand forging, upsetting, drawing & punching. Introduction of various forging methods. Comparison of hot & coldworking.

Practical Demonstrations:
Demonstration & practice of different smithy operations like forging, cutting, punching, bending etc. Demonstration & practice of MS rod into forged MS ring & octagonal cross section.

Job No. 1: TO FORGE MS-SQUARE FROM MS-ROUND BAR BY USING DIFFERENT FORGING HAND TOOLS.
Job No. 2: TO FORGE A SQUARE HEADED BOLT FROM MS-ROUND (60x30mm).
Job NO. 3: TO FORGE AN MS-OCTAGON FROM A SQUARE MS-BAR (80X80 mm).

Carpentry & Pattern Making Section **(8 Hrs)**

Theoretical Instructions:
Safety Precautions, Introduction of carpentry & joinery, different tools used in carpentry. Seasoning of wood and defects of wood. Various types of joints. Brief description of wood working machines and patternmaking.

Practical Demonstrations:
Demonstration & practice of different carpentry operation like Planning, sawing & chiselling and joints. Demonstration of pattern making tools & materials.

Job No. 1: PLANNING, SAWING AND CHISELING OF A WOODEN PLANK AS PER DRAWING.
Job No. 2: TO PREPARE HALF LAP CROSS JOINT OF SPECIFIED DIMENSIONS.
Job No. 2: TO PREPARE A BRIDLE JOINT OF SPECIFIED DIMENSIONS.

List of recommended books: -

1) Workshop Technology by W. A. J. Chapman
2) Workshop Technology by Choudhury H S K
3) Workshop Practice by Swarn Singh
4) Workshop Technology by Virender narula

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1st Year (2nd Semester)	Advanced English and Communication Skills	HST1012	2-1-0-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: None.

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Improve his/ her vocabulary and utilize grammatical elements in English communication.	6
CO2	Analyze the selected texts using the critical reading strategies effectively.	4
CO3	Develop persuasive technical writing for academic and professional purposes.	3
CO4	Build impressive verbal and non-verbal interpersonal communication required for work place environment.	6

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	**Vocabulary and Grammar** Abbreviations and Acronyms [Textbook Pages 88-89] Words from Foreign Languages and Technical Fields [Textbook Pages 108-112 and 130-133] Noun-Pronoun Agreement, Subject-Verb Agreement [Textbook Pages 35-39 and 114-115] Tenses, Misplaced Modifiers [Textbook Pages 62-71 and 113-115]	(10 Hours)
Module 2	**Critical Reading** Techniques of Effective Reading [Textbook Pages 15-16] Intensive and Extensive Reading [Textbook Pages 96-97] Practicing Reading Comprehension [Textbook Pages 52-57, 85-88, 106-108, and 116-119] Reading Non-Prescribed Passages/Texts	(11 Hours)
Module 3	**Technical Writing** Formal Letters [Textbook Pages 43-48] and Email Writing Job Application and Résumé Writing [Textbook Pages 48-51] Précis Writing [Textbook Pages 102-105] Report Writing [Textbook Pages 120-126]	(10 Hours)
Module 4	**Interpersonal Skills** Non-Verbal Communication Listening and Its Types Debate and Group Discussion Job Interviews	(11 Hours)

Books Recommended:

1. N. P. Sudharshana and C. Savitha, *English for Engineers*, Cambridge, 2018.
2. learnenglish.britishcouncil.org/business-english/english-emails[For Unit3, Email Writing]
3. www.skillsyouneed.com/ [ForUnit4]

Year (Semester)	Course Title	Course Code	L-T-P-Credits
1stYear (1st & 2ndSemester)	Mathematics-II	MAT-102	2-1-0-3
Evaluation Policy	**Mid-Term**	**Internal Assessment**	**End-Term**
	26 Marks	24 Marks	50 Marks

Pre-requisites: A student should have basic knowledge of integral calculus and ordinary differential equations .

Course Outcomes: At the end of the course, the student will be able to:

CO No.	Course Outcomes	Bloom's Taxonomy Level
CO1	Determine the nature of series and Fourier Series of various functions.	5
CO2	Solve problems related to partial differential equations by various methods.	3
CO3	Apply partial differential equations for solution of wave equation and heat equation.	3
CO4	Evaluate problems related to double and triple integrals, Beta and Gamma functions.	5

Detailed Syllabus:

Module No.	Contents	Hours
Module 1	Sequence and series, Fourier series, Dirichlet's condition for a Fourier series, Fourier series for functions having points of discontinuity, Fourier series for functions having arbitrary period, Half range series.	**10**
Module 2	Formation of PDE, Lagrange's linear equations , Partial differential equations of first order, Standard forms, Partial differential equations of second and higher order, Homogeneous partial differential linear equations with constant coefficients, Non-homogeneous linear partial differential equations, Charpit's method.	**12**
Module 3	Classification of linear partial differential equation of second order, Vibration of a stretched flexible string, Heat flow equation, Wave equation, Solution by the methods of separation of variables.	**8**
Module 4	Beta & Gamma functions (definition & related problems), Differentiation under the integral sign (Leibnitz rule). Jacobians, Double & Triple integrals, Change of Variables in double integrals.	**12**

Books Recommended:

1. Jain, R.K and Iyengar, S.R.K.(2008) .*Advanced Engineering Mathematics*, Third Edition, Narosa Pub. House.
2. Kreyszig, E. (2006).*Advanced Engineering Mathematics*, 9th Edition, John Wiley Sons.
3. Piaggio, H.T.H. *Differential Equations*, CBS publishers.