

DEVI AHILYA VISHWAVIDYALAYA, INDORE



FACULTY OF ENGINEERING

**SCHEME OF EXAMINATION (CBCS)
&
COURSE OF CONTENTS**

**BE I Year Programme
(Common to All Branches)
Batch 2022– 2023 and onwards**

INSTITUTE OF ENGINEERING & TECHNOLOGY

(www.iet.dauniv.ac.in)

DEVI AHILYA VISHWAVIDYALAYA, INDORE INSTITUTE OF ENGINEERING & TECHNOLOGY

CBCS SCHEMES OF EXAMINATION FOR BE I YEAR PROGRAMME

Batch 2022– 2023 and onwards

(Subject to Revision)

B. E. I YEAR

(Computer Engineering, Information Technology and Civil Engineering)

SEM - 1				
S.NO	Sub Code	Sub Name	Number of Credit L-T-P	Sub Type
1.	1AMRC1	Applied Mathematics-I	3-1-0	PC1
2.	1ACRC2	Applied Chemistry and Environmental Sciences	3-1-1	PC2
3.	1MERC3	Elements of Mechanical Engineering	3-1-1	PC3
4.	1ETRC4	Basic Electronics	3-1-1	PC4
5.	1MERC5	Workshop Practice	0-1-2	PC5
6.	1SSRS1	Technical English	3-1-0	SS1
7.	1BERV1	Comprehensive Viva I	0-0-4	Viva1
Total Credit for SEM I			26 actual + 4 Virtual credits	

SEM - 2				
S.NO	Sub Code	Sub Name	Number of Credit L-T-P	Sub Type
1.	2AMRC1	Applied Mathematics-II	3-1-0	PC1
2.	2APRC2	Applied Physics	3-1-1	PC2
3.	2MERC3	Engineering Drawing	2-1-2	PC3
4.	2EIRC4	Electrical Engineering	3-1-1	PC4
5.	2CORC5	Introduction to Computer Programming	3-1-1	PC5
6.	2SSRS2	Humanities	2-0-0	SS2
7.	2BERV2	Comprehensive Viva II	0-0-4	Viva2
Total Credit for SEM II			26 actual + 4 Virtual credits	

**DEVI AHILYA VISHWAVIDYALAYA, INDORE
INSTITUTE OF ENGINEERING & TECHNOLOGY**

**CBCS SCHEMES OF EXAMINATION FOR BE I YEAR PROGRAMME
Batch 2022– 2023 and onwards
(Subject to Revision)**

B. E. I YEAR (Common to all branches)

**(Mechanical Engineering, Electronics & Telecommunication Engineering and
Electronics & Instrumentation Engineering*)**

SEM - 1				
S.NO	Sub Code	Sub Name	Number of Credit L-T-P	Sub Type
1.	2AMRC1	Applied Mathematics-II	3-1-0	PC1
2.	2APRC2	Applied Physics	3-1-1	PC2
3.	2MERC3	Engineering Drawing	2-1-2	PC3
4.	2EIRC4	Electrical Engineering	3-1-1	PC4
5.	2CORC5	Introduction to Computer Programming	3-1-1	PC5
6.	2SSRS2	Humanities	2-0-0	SS2
7.	2BERV2	Comprehensive Viva II	0-0-4	Viva2
Total Credit for SEM 1			26 actual + 4 Virtual credits	

SEM - 2				
S.NO	Sub Code	Sub Name	Number of Credit L-T-P	Sub Type
1.	1AMRC1	Applied Mathematics-I	3-1-0	PC1
2.	1ACRC2	Applied Chemistry and Environmental Sciences	3-1-1	PC2
3.	1MERC3	Elements of Mechanical Engineering	3-1-1	PC3
4.	1ETRC4	Basic Electronics	3-1-1	PC4
5.	1MERC5	Workshop Practice	0-1-2	PC5
6.	1SSRS1	Technical English	3-1-0	SS1
7.	1BERV1	Comprehensive Viva I	0-0-4	Viva1
Total Credit for SEM 2			26 actual + 4 Virtual credits	

* Semester 1 for three branches and Semester 2 for other three branches for the teaching load balancing.

Semester 1

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE-I Year (Common to all branches) Semester- 1			
Subject Code & Name	Instructions Hours per Week			Credits			
	L	T	P	L	T	P	Total
1AMRC1: Applied Mathematics-I	3	1	-	3	1	-	4
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- To develop the concepts of calculus, useful to create mathematical models in order to arrive into an optimal solution in various disciplines like physics, engineering, economics, and statistics.
- Provide the fundamentals of formal techniques like differentiation to find the slope of a curve, find approximation to the original function by Taylor's series, determine the stationary points of functions in order to sketch their graphs, optimization of functions and so on; Integration to find areas, volumes, central points and many useful things; Vector fields to represent many physical quantities like velocities, forces (useful in fluid mechanics), particle displacements (useful in solid mechanics), and electric and magnetic fields (electromagnetism).

Prerequisites: Knowledge of basics of functions, limits, derivatives, and integrals.

COURSE OF CONTENTS**UNIT-I**

Differential Calculus: Review of Successive differentiation, Leibnitz theorem and problems; Expansion of functions by Taylor's and Maclaurin's Theorem; Asymptotes; Curvature in Cartesian and Polar Coordinates; Envelopes; Evolutes and Involutives.

UNIT-II

Advanced Differential Calculus: Function of Several Variables; Partial Differentiation; Approximations and errors; Jacobians; Taylor's Series of Two Variables; Maxima and Minima of Function of Two and More Variables; Lagrange's Method of Undetermined Multipliers.

UNIT-III

Integral Calculus: Beta and Gamma functions; detailed study of tracing of curves- Cartesian, polar and parametric curves; Area; Length of Curve; Volume; Surface of Revolution; Theorems of Pappus and Guldin and problems.

UNIT-IV

Advanced Integral Calculus: Multiple integrals: Double and Triple Integration; Change of Order of Integration; Area; Volume; Centre of Gravity; Moment of Inertia.

UNIT-V

Vector Calculus: Differentiation of a Vector; Gradient; Divergence; Curl; Integration of a Vector Function; Gauss's, Green's and Stoke's Theorems.

Learning Outcomes:

Upon completing the course, students will be able to:

- Apply the concept of function derivatives to study the behaviour and rate of how different quantities change, how the graph of a function can actually be computed, analysed, and predicted and use integrals to find the summation of infinitely many small factors to determine whole.
- Learn the applicability of calculus in various fields like, in physics, it is used in the study of motion, electricity, heat, light, harmonics, acoustics, astronomy, dynamics and advanced physics concepts including electromagnetism and Einstein's theory of relativity use calculus. In the field of chemistry, calculus can be used to predict functions such as reaction rates and radioactive decay. In addition, it is used to check answers for different mathematical disciplines such as statistics, analytical geometry, and algebra.
- Find a way to construct relatively simple quantitative models of change, and deduce their consequences.

BOOKS RECOMMENDED

- [1] B.S.Grewal, "*Engineering Mathematics*", 39/e, Khanna Publishers, 2006.
- [2] Erwin. Kreyszig, "*Advanced Engineering Mathematics*", 8th edition, John Willy and sons Publications, 1999.
- [3] Ramana B V, "*Higher Engineering Mathematics*", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.
- [4] C.Ray Wylie & Louis C. Barretle, "*Advanced Engineering Mathematics*", Tata McGraw Hill Publishing Co. Ltd., 6/e, 2003.
- [5] H.K.Das, "*Higher Engineering Mathematics*", S.Chand New Delhi.
- [6] E Mendelson, G J Hademenos, F Ayres, "*Schaum's Easy Outline: Calculus*", McGraw-Hill, 2000.
- [7] R C Wrede, M Spiegel, "*Schaum's Outline of Advanced Calculus*", 2/e, McGraw-Hill, 2002.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE -I Year (Common to all branches) Semester- 1 or 2			
Subject Code & Name	Instructions Hours per Week			Credits			
1ACRC2: Applied Chemistry & Environmental Science	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	2	3	1	1	5

Learning Objectives:

- To learn chemistry of various engineering materials and processes, their importance, properties, testing, structure-property-uses relationship, tailoring, and their applications in various technologies.
- To understand and aware with various environmental issues and pollution and control studies in modern society for sustainable development.

Prerequisite: Nil**COURSE OF CONTENTS****UNIT-I WATER AND ITS APPLICATIONS**

Sources, impurities, applications, Hardness- its expression and determination; Boiler troubles and their causes; Industrial water requirement, Treatment of water for industrial and domestic purpose; Water softening, De-ionization of water; Analysis of water; Water quality parameters, Numerical problems on water analysis and water treatment processes.

UNIT-II ENGINEERING MATERIALS AND TESTING

Introduction, classification and requirement of engineering materials. Material testing.

Polymers: Chemistry of polymer materials and their diversification; Types of polymerization and their brief account; Examples of polymers.

Cement, Glass and Refractories: Different types, composition, properties and uses.

UNIT-III LUBRICANTS

Introduction, Principle and functions of lubrication, Types of lubricants, Mechanism of lubrication, Properties, tests and applications of solid, semi-solid and liquid lubricants; Synthetic lubricants and lubricating emulsions; Cutting fluids: Numerical problems on Lubricants.

UNIT-IV INSTRUMENTAL TECHNIQUES IN MATERIAL CHARACTERIZATION

Classification, Lamberts and Beers Law; Spectroscopy, Introduction, Principle and applications of Colorimetry, IR, UV-Vis, NMR and Mass spectroscopy; Chromatographic Techniques and applications, Numerical Problems on spectroscopic techniques.

UNIT-V ENVIRONMENTAL SCIENCE

Components of Environment and their interactions, Natural resources, Energy, Ecosystem, Impacts of development of environment, Environment protection act, EIA, Sustainable development.

Pollution and its types, Description, effects and control measures of Air, Water, Land and Noise pollution, Chemical toxicology, Global warming, Depletion of ozone layer, Acid rains, Eutrophication, Rain water harvesting, Pollution case studies.

Learning Outcomes:

Upon completing the course, students will be able to:

- Apply applications of various engineering materials in different technologies.
- Relate structure-property-uses relationship of engineering materials and tailoring of materials for technology development.
- Use of material testing and material characterization required in different engineering applications.
- Understand the components of Environment and their interactions with modern world. Also to analyse factors affecting, causes of Environmental Pollution and to apply possible control measures for Sustainable development.

BOOKS RECOMMENDED:

- [1] Jain & Jain, Engineering Chemistry, Dhanpat Rai Publications, 2007.
- [2] S. S. Dara, A Text Book of Engineering Chemistry, S. Chand & Company, 2007.
- [3] B. Joseph, Environmental Studies, Tata McGraw Hill.
- [4] A.K. De, Environmental Chemistry, New Age International, 1996.
- [5] Shashi Chawala, A Text Book of Engineering Chemistry, Dhanpat Rai Publications, 2006.

List of Experiments

1. Determination of Total Hardness of water sample by EDTA titration method.
2. Study of Steam Emulsification Number (SEN) of oil sample.
3. Determination of CO_3^{2-} , HCO_3^- and total Alkalinity of water sample.
4. Study of Flash point and fire point of oils.
5. Determination of % Purity of NaOH-NaCl mixture by Titration method.
6. Determination of Aniline Point of lubricating/fuel oil.
7. Determination of Total Dissolved Solid (TDS) in Water sample.
8. Determination of pH of given solution using Digital pH meter.
9. Determination of concentration of KMnO_4 solution and to verify Beers- Lamberts law by Colorimeter.
10. Determination of Redwood Viscosity of lubricating oil.
11. Study and interpretation of UV-Visible, IR and NMR spectra of unknown compounds.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE-I Year (Common to all branches) Semester- 1			
Subject Code & Name	Instructions Hours per Week			Credits			
1MERC3: Elements of Mechanical Engineering	L	T	P	L	T	P	Total
	3	1	2	3	1	1	5
Duration of Theory Paper: 3 Hours							

Learning Objectives:

- To understand the basic fundamentals of Mechanical Engineering in light of thermal engineering and production engineering.
- To provide an insight about the basic thermal and production processes, materials, components and applications.

Prerequisites: Nil.**COURSE OF CONTENTS****UNIT I**

Thermodynamics and energy, Temperature and Zeroth law of thermodynamics, Systems and control volume, Properties of a system, Energy transfer by heat and work, First law of thermodynamics, Energy analysis of closed systems, Internal energy and enthalpy of ideal gases, Energy analysis of steady flow systems, Analysis of some steady flow engineering devices, Relevant review problems.

UNIT II

Properties of pure substance, p-v and T-s diagram for a pure substance, Mollier diagram for a pure substance, Quality or dryness fraction, Steam tables, Methods for measurement of steam quality, Relevant review problems.

UNIT III

Basic considerations in the analysis of power cycles, Air standard assumptions, Overview of reciprocating engines, Thermodynamic analysis of Otto cycle: Ideal cycle for spark ignition engines, Thermodynamic analysis of Diesel cycle: Ideal cycle for compression ignition engines, Comparison of Otto and Diesel cycles, Effect of Specific Heat and Dissociation on the performance of the cycles, Relevant review problems.

UNIT IV

Metal Casting: Classification and overview of metal casting processes: sand casting, expandable mould casting and permanent mould casting; Patterns, cores and moulding; Elements of gating systems; Heating, pouring and solidification; Casting quality: cleaning, finishing and defects.

UNIT V

Welding and Machining: Fundamentals of welding and overview of welding processes: Oxy-Acetylene gas welding, Arc welding: TIG, MIG, SAW etc., Resistance welding; Soldering & Brazing; weld quality and defects; Fundamentals of metal machining and introduction to turning and related operations; Constructional features of lathe, Geometry of single point cutting tool and cutting tool materials.

Learning Outcomes:

- Upon Completing the Course, Student will able to:
- Understand basics of thermodynamics and components of steam.
- Identify engineering materials, their properties, manufacturing methods encountered in

engineering practice.

- Understand basics of internal combustion engines.
- Understand functions and operations of welding, casting and machine tools including milling, shaping, grinding and lathe machines.

BOOKS RECOMMENDED:

1. Nag P K, Engineering Thermodynamics, The McGraw-Hill Companies, Fourth Edition.
2. P N Rao, Manufacturing Technology, Vol. I and Vol.2 Tata McGraw-Hill, 4th Edition, 2014.
3. Hajra & Chaudhary, Work Shop Technology, Vol. 1 & 2, 12th Edition, Media Promoters & Pub, 2007.
4. Cengel Y A, Boles M A, Thermodynamics-An Engineering Approach, The McGraw-Hill Companies, Fifth Edition.
5. Mikell P. Groover, Fundamentals of Modern manufacturing, 3rd Edition, John Wiley and Sons.

List of Experiments:

1. Study of Simple Vertical Boiler.
2. Study of Cochran Boiler.
3. Study of Lancashire Boiler.
4. Study of Babcock & Wilcox Boiler.
5. Study of Boiler Mountings and Accessories.
6. Study of Two Stroke Petrol Engine.
7. Study of Two Stroke Diesel Engine.
8. Study of Four Stroke Petrol Engine.
9. Study of Four Stroke Diesel Engine.

Devi Ahilya University, Indore, India				BE-I Year (Common to all branches)			
Institute of Engineering & Technology				Semester- 1			
Subject Code & Name	Instructions Hours per Week			Credits			
1ETRC4: Basic Electronics	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	2	3	1	1	5

Learning Objectives:

- To introduce the basic concepts of electronics along with the understanding of working fundamental circuit devices such as diode, transistors and op-amp.
- To apply the basics of diode to describe the working of rectifier circuits such as Full and half wave rectifiers and zener diode as a voltage regulator in line and load regulation.
- Describe the application of transistors for Current and voltage amplification, the characteristics of different configurations of the transistor, DC load line and bias point. List, explain, and design and analyse the different biasing circuits, to give basic knowledge of working of op-amp, its characteristics and applications.

Prerequisites:

Nil

COURSE CONTENTS**UNIT-I**

Intrinsic, Extrinsic semiconductors, PN Junction, PN Junction under Zero, Forward and reverse Bias, Minority and Majority carrier distribution, Space charge width and electric field in forward and reverse bias, PN junction diode current equation, diode equivalent circuit, Junction breakdown phenomena.

UNIT-II

P-N diode applications: Clipper circuits, Clamper circuits, DC power supply: Half wave rectifier, full wave rectifier (center tapped and bridge) with and without filter.

UNIT-III

Types of diodes: Zener diode and its application for regulated power supply, Light emitting diode, 7-segment LED, Photo diode, PIN diode, Tunnel Diode, Varactor diode

UNIT-IV

Bipolar Junction Transistor: Bipolar principle of operation, Different modes of operation- Common Base, Common Emitter, Common Collector configuration, Concept of Q point, Biasing methods (Common emitter)- fixed biasing, self-biasing, feedback biasing and stability. BJT applications- as amplifier, and as switch.

UNIT-V

OP-AMP block diagram, ideal OP-AMP characteristics, transfer curve, open loop and close loop configuration. Feedback: positive feedback, negative feedback, concept of stability, Application of OP-AMP: Inverting, non-inverting op-amp, summer, subtractor, integrator, differentiator, comparator.

Learning Outcomes:

Upon completing the course, students will be able to:

- Students will be able to get the knowledge of Q point and can calculate it using different biasing circuits. They will easily compare different biasing circuits on the basis of stability factor.
- Students will be able to solve clipper and clamper circuits. They get the knowledge of op-amp and its various applications as integrator, differentiator and as an oscillator.

BOOKS RECOMMENDED:

- [1] Adel S. Sedra and Kenneth C. Smith “Microelectronics Circuits Theory and Applications”, Oxford, 6e.
- [2] R.L.Boylestad, L. Nashelsky, Electronic devices, and circuit theory, Prentice Hall, 2002.
- [3] Millman, Grabel, Microelectronics, Mc-Graw-Hill.
- [4] Hayt, Kammerly and Durbin, Engineering Circuit Analysis, Tata McGraw Hill, sixth edition.
- [5] R.A. Gayakwad, OP-amps and linear integrated circuits, Prentice Hall of India

List of Experiments:

- [1]. To study, characterization, and calibration of Multimeter, Function Generator, Oscilloscope and basic electronics components (Resistor, capacitor, inductor).
- [2]. To obtain V-I characteristics of PN junction diode (Si, Ge) and light emitting diode
- [3]. To obtain V-I characteristics of Zener and application of Zener diode as Line and Load regulation.
- [4]. To observe waveforms at the output of following circuit:
 - a) clipper circuit.
 - b) clamper circuits.
- [5]. To observe waveform at the output of half wave rectifier with and without filter capacitor. To measure DC voltage, DC current, ripple factor with and without filter capacitor.
- [6]. To observe waveform at the output of full wave center tapped rectifier with and without filter capacitor. To measure DC voltage, DC current, ripple factor with and without filter capacitor.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE-I Year (Common to all branches) Semester- I & II			
Subject Code & Name	Instructions Hours per Week			Credits			
	L	T	P	L	T	P	Total
1MERC5: Workshop Practice	0	1	2	0	1	2	3
Duration of Theory Paper: Only practical examination.							

Learning Objectives:

- To develop the basic working skills with engineering tools and machines
- To develop the practical understanding of engineering materials, processes and manufacturing.

Prerequisite(s): nil**COURSE OF CONTENTS**

Introduction of and practice work on the following trade shops, processes, tools, material and their application in manufacturing:

1. Smithy
2. Fitting
3. Carpentry
4. Welding
5. Foundry
6. Machine shop
7. Plumbing Shop

Learning Outcomes:

Upon Completing the Course, Student will able to:

- To prepare simple wooden joints using wood working tools
- To Produce Fitting jobs as per specified dimensions
- To prepare simple lap, butt, T-, joint and Corner joints using arc welding equipment.
- To create gating elements in foundry shop.
- Learn to the essential parts of lathe machine as well perform the basic operation on lathe machine.
- To create threading operation in plumbing shop.

BOOKS RECOMMENDED:

- [1] W. A. J. Chapman, Workshop Technology, Vol-I/II, Elsevier Butterworth Heineman, 5/e.
[2] S.K. Hajra Choudhury, Elements of Workshop Technology, Media Promoters of Publishers.

Devi Ahilya University, Indore, India Institute of Engineering & Technology			BE-I Year (Common to all branches) Semester- 1				
Subject Code & Name	Instructions Hours per Week			Credits			
1SSRS1: Technical English	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	-	3	1	-	4

Learning Objectives:

- To develop the English communication skills in terms of reading, writing and understanding of Engineering terms.
- To develop the technical ideas in English and to be able to express the technical ideas.

Pre requisites: Basic knowledge of English and communication skills

COURSE OF CONTENTS

UNIT I

Basic of technical communication: Meaning of technical communication; process of communication; Forms of communication: Verbal and Non-verbal; technology-enabled communication; Barriers to communication; Essentials of effective communication; Types of communication; Defining audiences for technical communication; Aspects of communication: Global, Ethical and Legal.

UNIT II

Professional correspondence: Qualities of professional correspondence: Goodwill techniques; Types of correspondence: Letters, Memos, E-mails; Business Letters: Elements of a Letters, Basic Letter Formats; Types of Business Letters: Positive Letters, Negative Letters, Inquiry Letters, Sales Letters, Complain and Adjustment Letters. Memos: Meaning and Format of Memos. Writing job application letters & Designing Resumes; Meeting and Minutes.

UNIT III

Technical Writing: Meaning & Concept of Technical Writing: Process of Technical Writing: Forms of Technical Writing: Technical Description, Summaries, Instructions & User Manuals: Technical Reports: Meaning and Essentials of Good Report Writing: Classification of Reports; Report Formats: Formal and Informal; Common Informal Technical Reports: Progress Reports, Lab Reports, Feasibility reports, Problem Solving Reports.

UNIT IV

Reading Comprehension; Precis Writing; Expansion of an idea; Dialogue Writing; Paragraph Writing (Related to Technical Communication).

UNIT V

Foreign Words & Phrases; Antonyms and Synonyms; Transitional Words and Phrases; Articles, Use of Prepositions, Modal Verbs, Connectives, Relative Clauses, Noun/Nominal Compounds: Correction of Sentences and Homophones; Punctuation, Abbreviations, Capitalization and Number Usage; Use of Technical Words and Jargons.

Learning Outcomes:

Upon completing the course, students will be able to:

- Apply various technical terms and terminologies practically
- The course aims at developing the fundamentals of Technical English and mastery in the

professional writing like Business letters, Business correspondence .designing Business Memorandum, Resume and E-mail writing.

- Will be able to write formal and informal reports in work place.
- Will have complete knowledge of comprehending different passages and Precis writing.
- Apply various grammatical skills practically.

BOOKS RECOMMENDED:

- [1] A. Esenberg, A Beginner's Guide to Technical Communication, McGraw-Hills.
- [2] A. J. Rutherford, Basic Communication Skills for Technology, Pearson Education Asia.
- [3] C. L. Bovee, J. V. Thill & B Schatzman, Business Communication Today, 7/e, Pearson Education, 2002.
- [4] R. V. Lesikar, J. D. Perrit, Jr., & ME Flatley, Lesikar's Basic Business Communication.
- [5] R. C. Sharma and K. Mohan, Business Correspondence and Report Writing, Tata McGraw-Hill, 2002.

Semester 2

Devi Ahilya University, Indore, India Institute of Engineering & Technology			BE I Year (Common to all branches) Semester- 2				
Subject Code & Name	Instructions Hours per Week			Credits			
2AMRC1: Applied Mathematics-II	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	-	3	1	-	4

Learning Objectives:

- To introduce the mathematical concepts of Matrix Algebra, Differential Equation Probability and Statistics and Fuzzy sets for solving engineering problems that shall be used in various branches of engineering.
- Provide the basics of Matrix mathematics useful in providing a more compact way to deal with groups of equations in linear algebra; Differential equations, a mathematical equation that relates some function (usually represent physical quantities) with its derivatives (represent their rates of change), and the equation defines a relationship between the two; Probability distributions describe the dispersion of the values of a random variable; Curve fitting and regression analysis, to find the "best fit" line or curve for a series of data points; Theory of equations, which tells when an algebraic equation has an algebraic solution; Fuzzy sets generalize classical sets (Crisp sets), as the characteristic functions of classical sets are special cases of the membership functions of fuzzy sets.

Prerequisites: Knowledge of basics of determinants, matrices, derivatives, integrals, sets, probability and statistics.

COURSE OF CONTENTS**UNIT-I**

Matrix Algebra: Review of Matrices; Elementary Operations on Rows and Columns; Normal Form; Linear Dependence; Rank; Application of Rank Theory in Solving System of Linear Equations; Linear Transformation; Orthogonal, Unitary and Hermitian Matrices; Characteristic Equation; Eigen- Values and Eigen-Vectors; Caley-Hamilton Theorem; Quadratic and Linear forms.

UNIT-II

First Order Ordinary Differential Equation: Exact Differential Equation; Equations Solvable for x, y and p; Clairaut's Form; Application to Simple Problems.

Higher Order Ordinary Differential Equation: Linear Differential Equations with Constant & Variable Coefficients; Method of Variation of Parameters, Simultaneous Differential Equations; Application to Simple Problems.

UNIT-III

First Order Partial Differential Equations: Formation of Partial Differential Equations; Partial Differential Equations of First Order and First Degree i.e. $Pp + Qq = R$.

Higher Order Partial Differential Equations: Linear Homogenous Partial Differential equations of n^{th} order with constant coefficients; method of Separation of variables; their Simple applications.

UNIT-IV

Probability and Statistics: Conditional Probability, Baye's Theorem; Binomial, Poisson and Normal distributions and their Mean and Variance, Methods of least squares and curve fitting, Correlation and Regression Analysis.

UNIT-V

Theory of Equations: Polynomial equations, relation between root and coefficients, symmetric functions of roots, cube roots of unity, Cardon's method for solution of cubic equations.

Fuzzy sets: Membership function, definition, Operations on Fuzzy sets, Properties of Fuzzy sets.

Learning Outcomes:

Upon completing the course, students will be able to:

- Express a linear map between finite-dimensional vector spaces with a matrix, calculate the electrical properties of a circuit, with voltage, amperage, resistance, etc. with matrix arithmetic, use them in 3D geometry (e.g. computer graphics), can try to improve linear solvers efficiency. Matrices can also represent quadratic forms (for example, in analysis to study hessian matrices, which help us to study the behavior of critical points) and also computers run Markov simulations based on stochastic matrices in order to model events ranging from gambling through weather forecasting to quantum mechanics.
- Use differential equations to model natural phenomena, engineering systems and many other situations like exponential growth and decay, the population growth of species or the change in investment return over time, describing the movement of electricity, in modelling chemical reactions, in finding optimum investment strategies, describing the motion of waves, pendulums or chaotic systems.
- Handle probability distributions, to indicate the likelihood of an event or outcome, which are used for making forecasts and risk assessments. Pdf's are quite important and widely used in insurance, engineering, physics, evolutionary biology, computer science and even social sciences such as psychiatry, economics and even medical trials.
- Use fitted curves as an aid for data visualization, to infer values of a function where no data are available, and to summarize the relationships among two or more variables.
- Apply Fuzzy sets and logic to reason like a human in terms of linguistic variables, design Traffic monitoring systems, AC and heating ventilation, Gene Expression data analysis, Facial pattern recognition, Weather forecasting systems and many more.

BOOKS RECOMMENDED:

- [1] B.S. Grewal, "*Engineering Mathematics*", 39/e, Khanna Publishers, 2006.
- [2] Erwin. Kreyszig, "*Advanced Engineering Mathematics*", 8th edition, John Willy and sons Publications, 1999.
- [3] BV Ramana, "*Higher Engineering Mathematics*", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.
- [4] C. Ray Wylie & Louis C. Barretle, "*Advanced Engineering Mathematics*", Tata McGraw Hill Publishing Co.Ltd., 6/e, 2003.
- [5] H.K. Das, "*Higher Engineering Mathematics*", S.Chand New Delhi, 2014.
- [6] Zafar Ahsan, "*Differential Equation and their Applications*", Prentice Hall of India Pvt. Ltd., New Delhi, 2004.
- [7] S.C. Gupta and V.K. Kapoor, "*Fundamentals of Mathematical statistics*", Sultan Chand & Sons., 2000.
- [8] Freund John E, "*Mathematical Statistics*", PHI, N.D., 7th Ed., 2010.

- [9] G. J. Klir and Bo Yuan, “*Fuzzy Sets and Fuzzy Logic: Theory and Applications*”, PHI, New Delhi, 2005.
- [10] H. J. Zimmerman, “*Fuzzy Set Theory and its Applications*”, Allied Publishers, 1996.
- [11] Timothy J. Ross, “*Fuzzy Logic with Engineering Applications*”, 3rd Edition, John Wiley & Sons, Inc., 2010.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE - I Year (Common to all branches) Semester- 2			
Subject Code & Name	Instructions Hours per Week			Credits			
	L	T	P	L	T	P	Total
2APRC2: Applied Physics	3	1	2	3	1	1	5
Duration of Theory Paper: 3 Hours							

Learning Objectives:

To introduce the fundamental concepts of physics that are useful in solving problems of engineering especially for semiconductors, optics, electromagnetism and quantum mechanics.

COURSE OF CONTENTS

Unit-I Optics-I: Interference of Light Waves: Thin film, Newton's Ring experiment, Michelson interferometer; Diffraction of Light Waves: Fresnel's & Fraunhofer diffraction, Zone plate, Single slit experiment, diffraction by double slit, Diffraction at Circular aperture, Plane transmission Grating.

Unit-II Optics-II: Polarization of Light Waves, Double refraction, Nicol Prism, Half Wave & Quarter Wave plates, Circularly & elliptically polarized light, Polarimeter; LASER: Stimulated & spontaneous emission, Population Inversion, Optical Resonator, Einstein's coefficients, He-Ne Laser, CO₂ Laser, Semiconductor Laser; Optical Fiber: types of Fibers (material, refractive index, mode), Acceptance angle, Numerical aperture, V-Number, Propagation of Light through Fibers, Applications.

Unit-III Crystal Structure and Semiconductors: Symmetry & properties of Simple crystal structure, Miller's Indices, Interplanar spacing, production and properties of x-ray, Bragg's law; Semiconductors: Band theory of Semiconductors, Intrinsic & extrinsic semiconductors, Fermi level, pn junction diode, LED, Zener diode, npn & pnp Transistors.

Unit-IV Electromagnetism: Continuity equation for Charge & Current, Inconsistency of Ampere's law for time varying field, Concept of Displacement current, Maxwell's equations; Wave equations for E & H, Propagation of one dimensional electromagnetic waves in dielectric medium, Energy density in electromagnetic field: Poynting Vector.

Unit-V Quantum Physics: Planck's law, Compton's effect, Concept of Matter Waves, Devison & Germer's experiment, Phase velocity & Group velocity, Heisenberg's Uncertainty Principle; Schrodinger 's Wave Equation, Interpretation of Wave function Ψ , Time dependent & Time Independent equations, Schrodinger's Wave equation for a free particle in a box.

Learning Outcomes:

Upon completing the course, students will be able to:

1. The student will demonstrate the ability to use concepts of Modern physics to their engineering applications.
2. The course aims at developing the fundamentals of wave optics, crystal structure, structure of atoms and their applicable to obtain quantitative solutions of problems in physics.

BOOKS RECOMMENDED:

- [1] R K Gaur & S L Gupta, Engineering Physics, Dhanpat Rai & Sons, 2006
- [2] H.K. Malik & A.K.Singh, Engineering Physics, Tata MCgRAW Hill, 2011
- [3] N. Gupta & S.K. Tiwary , *A Text Book of Engineering Physics*, Dhanpat Rai & Co. 2009
- [4] W. T. Silfast, *Laser Fundamentals* Cambr. Un. Press, 1996,
- [5] D Halliday and R Resnick, *Physics Vol-II*, Wiley Eastern, 1993
- [6] H White, *Modern Physics*: Van Nostrand; 15/e
- [7] D P Khandelwal, *Optics and Atomic Physics*.
- [8] R Feynman, *Feynman Lectures on Physics*, /e, Narosa Publication, 1998
- [9] S.O. Pillai, *Solid State Physics*, New Age International Publication, 2010
- [10] R.S. Sedha, *A Text Book of Applied Electronic*, S. Chand & company Lmt. 2005
- [11] R.P. Goyal, *Unified physics-II*, and III Shive Lal Agrawal & Co. ,1994

List of Practical Assignments:

During the learning of course, students need to carry out following assignments:

1. To Study the Characteristics of a Diode / Zener Diode.
2. To Study the Characteristics of a Transistor (PNP).
3. To Study the Charging & Discharging of a Capacitor.
4. To Study the Regulated Power Supply using Zener Diode.
5. To Study the Energy Band Gap of a semiconductor.
6. To determine the specific rotation of sugar solution with the help of polarimeter.
7. To determine the refractive index and dispersive power of material of prism with the help of spectrometer.
8. To determine "R" by the Newton's Ring Method.
9. To determine " λ " by the Plane Transmission Grating.
10. To verify Malus Law using He-Ne laser.
11. To determine Resolving Power of a Telescope.
12. To determine the value of Planck's constant with the help of LEDs.

Devi Ahilya University, Indore, India				BE (Common to all branches/ Branch)			
Institute of Engineering & Technology				Semester- A/B,B/A			
Subject Code & Name	Instructions Hours per Week			Credits			
2MERC3: Engineering Drawing	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	2	1	4	2	1	2	5

Learning Objectives:

- To understand the concepts of imagining, envisioning and visualizing the objects & machine parts and drawing them with the instruments & tools.

To introduce the students to the “universal language of Engineers” for effective communication through drafting exercises of geometrical solids.

Pre requisite(s): Nil

COURSE CONTENTS

Unit-I

Introduction, need & Classification of Engineering Drawings, Drawing Instruments and their uses, Indian Standards for Drawing, Drawing Sheet Layout, Various conventions used in drawing, Technical Lettering, Dimensioning, Basic Geometrical Constructions. Engineering Scales & Engineering Curves

Unit - II

Orthographic Projections, Isometric Projections, Oblique Projections, Perspective Projections & Missing Views.

Unit - III

Projection of Points, Straight Lines and Plane Surfaces.

Unit - IV

Projection of Solids, Section of Solids & Development of Surfaces.

Unit - V

Interpenetration of Solids / Intersection of Surfaces, Introduction to Computer Aided Drawings, Drawing of Machine elements like Riveted Joints, Screw fasteners and Welded Joints.

Learning Outcomes:

- Upon Completing the Course, Student will able to:
- Understand the importance of BIS and ISO Standards in Engineering Drafting.
- Graphically construct and understand the importance of mathematical curves in engineering applications.
- Visualize geometrical solids in 3D space through exercises in Orthographic Projections.
- Interpret Orthographic, Isometric and Perspective views of objects.
- Develop the surfaces of geometrical solids.

BOOKS RECOMMENDED:

[1]. 1.Bhatt N D, Engineering Drawing, Charoter Publishing House, Anand, Gujrat 2.Agrawal B, and Agrawal C M, Engineering Drawing, Tata McGraw-Hill Publishing Company Limited.

- [2].1.French T E, Vierck C J, Foster R J, Engineering. Drawing and Graphic Technology Mc Graw-Hill International, Singapore, Low Price Edition.
- [3].2.Luzadder W J, Duff J M, Fundamentals of Engineering Drawing, Prentice- Hall India, New Delhi.
- [4].3.Dhananjay A Jolhe, Engineering drawing, Tata McGraw Hill.
- [5].4.Shah M B and Rana B C , Engineering Drawing, Pearson Education, New Delhi.

Devi Ahilya University, Indore, India				BE - I Year (Common to all branches)			
Institute of Engineering & Technology				Semester- 2			
Subject Code & Name	Instructions Hours per Week			Credits			
2EIRC4: Electrical Engineering	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	3	1	2	3	1	1	5

Learning Objectives:

- To understand the concepts and practical ideas of AC/DC circuits along with basic 3 phase power management, Properties of different magnetic material used in Electromagnetic Circuits to create an idea among students that how different magnetic materials were choose for different practical machines.
- Practical concepts of Transformers and different Electric Machines to make students easy understanding of electrical machines surrounded by us and also they are basic to all the engineering streams.

Prerequisite(s): Basic circuital laws and their practical applications.

COURSE OF CONTENTS**UNIT-I**

AC circuits: Generation of EMF, Phasor Quantities, RMS, Average, Form Factor, Peak Factor etc., Phasor Diagrams; Single Phase AC Circuits: R, L, C And Combinations, Resonance, Q-Factor, Bandwidth; Three Phase AC Circuits: Generation, EMF, Phase Sequence, Analysis of Star and Delta Connections, and Power Measurement in Single Phase & Three Phase Circuit.

UNIT-II

Circuit analysis tools: Kirchhoff's laws, Analysis of DC circuits, Thevenin's theorem, Norton's theorem, Max power transfer theorem, Superposition theorem, and Source transformation.

UNIT-III

Faraday's law of electromagnetic induction, Fleming's left hand rule and right hand rule, statically and dynamically induced EMF's, self and mutual inductance, coefficient of coupling, energy stored in magnetic field. comparison between electrical and magnetic circuits.

Transformer: Single phase transformers: Construction, principle of working, e.m.f equations, voltage and current ratios, Analysis of transformer on no load and load conditions, Equivalent resistance and reactance, losses, definition of regulation and efficiency, Cooling methods, Auto transformer.

UNIT-IV

DC Generators: Construction, working principles, EMF equations of DC generators, Armature reaction and Commutation, DC Generator Characteristics.

DC Motors: Construction, working principles, Torque equations of DC Motors, Speed Regulation and Characteristics, Starting of DC motor, Speed Control of DC motor, Losses and Efficiency of DC Machines.

UNIT-V

AC Machines: General aspects of AC motors, Three Phase induction motor: working principle, construction, Single phase Induction Motor: working principle, construction and starting methods., Three phase Synchronous Motor: working principle, construction and starting methods.

Learning Outcomes:

Upon completing the course, students will be able:

- To solve circuit problems based on KVL, KCL laws and different network theorems which helps them to solve practical circuits for future industries exposure.
- The course also covers basic knowledge of alternating circuits and their practical applications, which helps students to understand their domestic home load in better way.
- Students were also able to understand uses of different magnetic materials available in market for constructing different electrical machines and they also able to solve their circuit parameters which helps in designing a electrical machine at initial level.
- After this course, students were able to understand different properties, characteristics and functioning of different parts of transformer and different rotating electrical machines at basic level.

BOOKS RECOMMENDED:

- [1] V Del Toro, Electrical Engineering Fundamentals, 2/e, PHI, 2000.
- [2] D P Kothari, I J Nagrath, Basic Electrical Engineering, 2/e, Tata McGraw Hill, 2002 (Fifth Reprint 2003).
- [3] A Sudhakar, Network Theory, 2/e, Tata McGraw Hill, 2004
- [4] P S Bimbhara, Electrical Machinery, 7/e, Khanna Publishers, New Delhi, 2006.

List of Practicals

1. Verification of Kirchhoff's laws.
2. Verification of Thevenin's Theorem.
3. Verification of Norton's Theorem.
4. Verification of Superposition Theorem.
5. Verification of Maximum Power Transfer Theorem
6. To determine the turns ratio of single phase transformer.
7. To measure power consumed by single phase circuit using single phase wattmeter.
8. To determine the efficiency of single phase transformer by direct loading.
9. To study the speed control of DC motor.
10. Study of DC generator.

Devi Ahilya University, Indore, India				BE I Year (Common to all branches)				
Institute of Engineering & Technology				Semester- 2				
Subject Code & Name		Instructions			Credits			
		Hours per Week						
2CORC5:		L	T	P	L	T	P	Total
Introduction to Computer Programming		3	1	2	3	1	1	5
Duration of Theory Paper: 3 Hours								

Learning Objectives:

- To learn basic and advanced problem solving through programming.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to implement classes with object-oriented programming.

Prerequisites: Basic knowledge of computer, algorithms, flowcharts, operators etc.

COURSE OF CONTENTS**UNIT-I**

Programming with C++: - C++ Data Types, Tokens, Keywords Variables and Constants, Operators, Precedence of Operators, Arithmetic and Logical Expressions, Assignment Statements and Type Casting. Control structures- Iteration statements, Jump Statements and Selective statements, Difference between C and C++.

UNIT-II

Functions: Introduction - Call by Value and Call by Reference, Default Arguments, Storage Access specifiers, Recursion programming, Function Overloading

Arrays: - Introduction to Arrays – Initialization and programming of 1 D Array and Multi dimensional Arrays, Passing arrays to functions, Strings, Programming of array string Standard Library String Functions.

Unit- III

Pointers: - Declaration and Initialization of Pointers, Pointers and Arrays: -Array of Pointers, Pointer to an array, Function returning a pointer, Reference variables and use of alias. Invoking functions by passing pointers/arrays.

Structures: - Structure elements, Nested Structures, Array of Structures, Array within structures and passing structures to functions.

Introduction to standard template library (STL) in C++: - Vector, Set, Map, Pair

UNIT-IV

Object Oriented Programming Paradigm - Basic Concepts of OOP - Benefits of OOP. Classes in C++, class declaration, declaring objects, Defining Member functions, Array of objects, Array within a class, Objects as function argument, Visibility modes of class, Static class members and member functions, Constructor characteristics and its types, Destructor, Friend function and friend class.

UNIT-V

Introduction to Operator Overloading - Rules for Operator overloading – Overloading of binary and unary operators

Inheritance – Derived class and base class: Defining a derived class, Accessing base class member, Inheritance Types: Multilevel, Multiple, Hierarchical, Hybrid

File Handling - File classes, Opening and Closing a file, File modes, Manipulation of file pointers, Functions for I/O operations, Random Access to Files.

Learning Outcomes: -

Upon completing the course, students will be able to:

- To develop C++ programs using basic and advanced constructs that will solve real life problems.
- The course aims to understand the features of basic and object-oriented programming in C++.
- Apply the major object-oriented concepts to implement object-oriented programs in C++ i.e., encapsulation, inheritance and polymorphism.

BOOKS RECOMMENDED:

- [1] Sumita Arora , Computer Science with C++ For Class XI and Class XII (Both) Dhanpat Rai.
- [2] Yashvant Kanetkar ,Let us C++ ,BPB publication .
- [3] E Balagurusamy, Object Oriented Programming with C++, McGraw Hill Education.
- [4] Ravichandran, Programming With C++, Tata McGraw Hill.
- [5] Herbert Schildt , C++:The Complete Reference McGraw-Hill Education
- [6] Bjarne Stroustrup ,The C++ programming Language Addison-Wesley Professional
- [7] Robert Lafore ,Object Oriented Programming in C++ Pearson

List of Practical Assignments:

During the learning of course, students need to carryout following assignments:

1. Programs of digits manipulation in a number (Armstrong, Palindrome, Prime, GCD)
2. Programs of series summation (Fibonacci, cos, tan, log) .
3. Programs of printing number pyramids and design patterns (Diamond, Sandbox, Triangle).
4. Programs of Parameter passing , Recursion programming and Function Overloading.
5. Programs of 2D arrays addition, multiplication and transpose.
6. Programs of string manipulations. (Palindrome, Reverse, Insertion, Deletion and Shifting of characters)
7. Programs showing demonstration of pointers, array of pointers, pointer to an array, Function returning a pointer, reference variables and use of alias and invoking functions by passing pointers/arrays.
8. Programs giving demonstration of structures, array of structures and array within structures
9. Programs for implementing STL library through Vector, Set, Map, Pair and using them in basic competitive programming programs
10. Programs for implementing basic object-oriented programming through visibility modes of a class, constructors, destructors, friend and static.
11. Programs for implementing unary and binary operator overloading.
12. Programs for implementing all types of inheritance
13. Program for reading, writing, counting, appending, searching data in file.

Devi Ahilya University, Indore, India				BE-I Year (Common to all branches)			
Institute of Engineering & Technology				Semester- 2			
Subject Code & Name	Instructions Hours per Week			Credits			
2SSRS2: Humanities	L	T	P	L	T	P	Total
Duration of Theory Paper: 3 Hours	2	-	-	2	-	-	2

Learning Objectives:

- To introduce students to understand and interpret the human experience from individual to entire culture.
- It also helps to understand how human beings across time and cultures understand happiness & suffering, understand good from bad, debate political questions.
- To understand that their actions have a Social, economic and environmental impact. To inspire ethical & moral course of thinking.

Prerequisite(s): Nil.

COURSE OF CONTENTS

UNIT-I

Man and society- Theories of man and society, Methodological individualism, structuralism, Society and its features- Social Institutions; Social Stratification and Change; Contemporary Indian Philosophy-its characteristics and Cross-cultural Issues.

UNIT-II

Human Behavior: Biological Bases of Behavior, Psychobiology of learning, memory, emotions and personality, Temperament and personality: trait structure and persistence, Extraversion/sociability, Aggression-hostility/agreeableness, Philosophy of Mind & Cognition. Concepts of good life – quality of life and subjective well-being; happiness, life satisfaction, and positive affect.

UNIT-III

Perspectives on Knowledge, Science and Technology, Technological Shaping of Society and Social Shaping of Technology and its Human roots, Role of Humanities in Engineering: Professionalism in Engineering; Professional Engineering Bodies.

UNIT-IV

Governance and Engineers: Political parties; Types & Forms of Governance; Utilitarianism; capitalism, socialism and communism; Marxist and neo-Marxist thoughts; democracy in public and private spheres.

UNIT-V

Engineering and Corporate Social responsibility- Ecology and Natural Resources, Role of corporations in the society, Morals, Values, Consciousness, Experience: Basic codes of Ethics; Engineering Ethics, Evolution of CSR, Strategic CSR, Role of stakeholders in CSR, Consumer awareness towards CSR, CSR as competitive advantage, the Global Competitiveness Index (GCI) & Sustainability, Issues in CSR- organizational, economic & social.

Learning Outcomes:

On successful completion of course we will have

- Aspire students to be world citizens of broad perspective who can make educated and ethical decisions.
- Students who articulate their own values & beliefs and can apply them in their personal & professional life.
- To become a model human being.

BOOKS RECOMMENDED:

[1] D J Kemper, Introduction to Engineering Profession, 2/e, Suanders Publication, 1998.

[2] A S Chauhan, A Text Book of Social Science Jain Brothers 9/e, 2008.

[3] R C Agrawal, Principle of Political Science.

[4] NPTEL

[5] W.B. Werther& D. Chandler, Strategic Corporate Social Responsibility, Thousand Oaks, 2011.

[6] Stephen P. Robbins, Organizational Behaviour, Pearson Edu., 10th Ed., 2003.