MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute Affiliated to RGPV, Bhopal)

NAAC Accredited with A++ Grade

Flexible Scheme & Syllabus

2021-2022

B.Tech.

in

Electrical Engineering

(I Semester)

Madhav Institute of Technology & Science
Gwalior-474005

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B.Tech I Semester (Electrical Engineering)

(for batch admitted in academic session 2021-2022)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching	Mode of Exam.	Duration of Exam.
				Theory Slot				Practical Slot				L	T	P				
				End Term Evaluation		Continuous Evaluation		End Sem. Exam	Continuous Evaluation									
				End Sem. Exam	$Proficiency in subject /course	Mid Sem. Exam.	Quiz/ Assignment		Lab Work & Sessional	Skill Based Mini Project								
1.	100011	BSC	Engineering Mathematics –I	50	10	20	20	-	-	-	100	3	1	-	4	Offline	PP	2 Hrs
2.	100023	ESC	Basic Computer Engineering	50	10	20	20	60	20	20	200	2	1	2	4	Blended	AO	2 Hrs
3.	100014	ESC	Engineering Graphics	50	10	20	20	-	-	-	100	1	2	-	3	Offline	AO	1.5 Hrs
4.	100015	HSMC	Energy, Environment, Ecology Society	50	10	20	20	-	-	-	100	3	-	-	3	Blended	MCQ	2 Hrs
5.	100016	HSMC	Technical Language	50	10	20	20	-	-	-	100	3	-	-	3	Blended	PP	2 Hrs
6	100017	HSMC	Language Lab	-	-	-	-	60	20	20	100	-	-	2	1	Offline	SO	-
7	130112	DC	Mini Project	-	-	-	-	60	40	-	100	-	-	2	1	Offline	SO	
	Total			250	50	100	100	180	80	40	800	12	04	06	19	-	-	-
Induction programme of three weeks (MC): Physical activity, Creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept./Branch & Innovations.																		

$**Proficiency in course/subject – includes the weightage towards ability/ skill/ competency /knowledge level /expertise attained etc. in that particular course/subject.**

Natural Sciences& Skills: Engineering Physics / Engineering Chemistry / Environmental Science/ Language. Credits of Natural Sciences & Skills will be added in the VI Semester.MCQ: Multiple Choice Question   **AO:** Assignment + Oral   **OB:** Open Book **PP:** Pen Paper   **SO:** Submission + Oral

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Engineering Mathematics –I :100011

Course Objectives:
- To understand the techniques of differential and integral calculus in engineering problems
- To expose to the concept of ordinary and partial differentiation
- To explore with matrix and its applications
- To understand Boolean algebra and graph theory

Unit 1:
Maclaurins's and Taylor's theorem, Partial differentiation, Euler's theorem, Jacobian, Maxima and Minima of one and two variables, Convergence of Sequence and series Test.

Unit 2:
Definite integral as limit of a sum, application in summation of series, Beta and Gamma function and its properties, transformation of Beta function, Gama functions, transformation of Gama function, relation between Beta and Gama function, Legendre's duplication formula, double & triple integral, Change of order of integration, Length of the curves, Volumes and surfaces.

Unit 3:
Ordinary differential equations of first and higher order, Linear higher order differential equation with constant coefficients, Homogeneous linear differential equation and Simultaneous differential equations.

Unit 4:
Matrix, Rank of Matrix, Echelon form, Normal form of matrix, Solution of simultaneous equation by elementary transformation, Consistency of equation, Eigen values and Eigenvectors, Normalized eigenvector, Cayley Hamilton theorem and its application to finding inverse of matrix.

Unit 5:
Introduction to Algebra of Logic, statement, Logical connector, Types of Conditional statement, Logical equivalence, CNF and DNF, Algebraic laws, De morgan's laws, Boolean algebra, Principle of duality basic theorems, Boolean expressions and function, DNF and CNF form and Switching circuit. Graph Theory, graph, Types of graphs, walk, path, circuit, Hamiltonian graph, Euler graph and its applications, Tree, Spanning tree and its properties.

Course Outcomes
After completing this course, student will be able to:

CO1   Apply differential calculus in solving basic engineering problems
CO2   Use integration techniques to determine the solution of various complex problems
CO3   Solve linear higher order differential equation with constant coefficients
CO4   Apply the concepts, terminology, methods and conventions of Matrix to solve the mathematical problems.
CO5   Concept of Boolean algebra and graph theory

.   **Recommended Books:**
1.   E. Kreyszig: Advance Engineering Mathematics, John Wiley & Sons, 10th Edition (2011).
2.   C.L Liu: Discrete Mathematics, 4th Edition 2012.
3.   R. K. Jain, S. R. K. Iyengar: Advance Engineering Mathematics, Narosa Publishing House Pvt.Ltd, 5th Edition (2016).
4.   F. B .Hildebrand: Advanced Calculus for application, Englewood Cliffs, N. J. Prentice- Hall, 2nd Edition (1980).
5.   B. S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Edition (2015).
6.   B.V. Ramanna: Higher Engineering Mathematics, McGraw Hill Education, 1st Edition (2017).

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Basic Computer Engineering :100023

Course Objectives:
- To develop the understanding of algorithms, programming approaches and program documentation techniques.
- To study the concepts of procedural and object oriented programming.
- To design and implement basic programming solutions using programming constructs.

Unit I

Introduction to Programming, types of computer programming languages, Program Execution and Translation Process, Problem solving using Algorithms and Flowcharts. Introduction to C++ Programming: Data Types, Constants, Keywords, variables, input/output, Operators & Expressions, Precedence of operators.

Unit II

Control Statements and Decision Making: goto statement, if statement, if-else statement, nesting of if statements, The switch statement, while loop, do...while loop, for loop, nesting of for loops, break and continue statement. Function Basics, Function Prototypes, Passing Parameter by value and by reference, Default Arguments, Recursion. Arrays: One-dimensional Arrays, Multidimensional Arrays, Passing Arrays to Functions.

Unit III

Strings, Pointers, Structures and File handling:, operations on Strings, Basics of Pointers & Addresses, reference variable, Pointer to Pointer, Pointer to Array, Array of Pointers, Pointer to Strings. Dynamic memory allocation using new and delete operators. Structures & Union, Pointer to Structure, Self-Referential Structures. File Concepts, Study of Various Files and Streams, operations on files.

Unit IV

Object Oriented Paradigm, Features of OOPS, Comparison of Procedural Oriented Programming with Object Oriented Programming, Abstract Data Types, Specification of Class, Visibility Modes, Defining Member Functions, Scope Resolution Operator, Constructors, its types, and Destructors, Creating of Objects, Static Data Member, Static Member Function, Array of Objects, Object as Arguments, Inline Function, Friend Function.

Unit V

Polymorphism: Introduction, Type of Polymorphism: Compile Time Polymorphism & Run Time Polymorphism, Function Overloading, Operator Overloading. Inheritance: Introduction, Visibility Modes, Types of Inheritance: Single Level, Multilevel, Multiple, Hybrid, Multipath.

Recommended Books:
- C++ How to Program, H M Deitel and P J Deitel, Prentice Hall.
- Programming with C++, D Ravichandran, T.M.H.
- Computing Concepts with C++ Essentials, Horstmann, John Wiley.
- The Complete Reference in C++, Herbert Schildt, TMH.
- Object-Oriented Programming in C++, E Balagurusamy.
- Fundamentals of Programming C++, Richard L. Halterman.

Course Outcomes:

After completing this, the students will be able to:

CO1: identify situations where computational methods and computers would be useful.

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Engineering Graphics:100014

Course Objectives:
- To inculcate the imagination and mental visualization capabilities for interpreting the geometrical details of common engineering objects.
- To impart knowledge about principles/methods related to projections of one, two, and three-dimensional objects.

Unit - 1
Introduction and scale: Basics of instruments, Lettering and dimensioning, Plane geometrical constructions. Plain and diagonal scale - Representative fraction, Unit conversion and Exercises based on linear, area, volume and speed. Scale of chord. Engineering curves: Cycloidal curves - cycloid, epicycloid and hypocycloid curve, tangent and normal. Spiral curves - Archimedean and logarithmic spiral curves. Tangent & normal on the curves. Involute curve.

Unit - 2
Projection of points: Introduction, types of projections, quadrant system, positions of points and Exercise.
Projection of straight line: Introduction, Orientation of a straight line, Traces of a line and Exercise.

Unit - 3
Projection of planes: Introduction, Types of planes, Traces of planes, Position of planes and Exercise.
Projection of solids: Introduction, Types of solids, Positions of solids and Exercise.

Unit - 4
Section of solids: introduction, Types of section planes and Anti-section and Exercise. Development of surfaces of right solids: Introduction, Methods of development & anti-development and exercise. Intersection of cylinders: Introduction, methods of developments, intersection of cylinder by another cylinder and exercise.

Unit - 5
Isometric projections: Introduction, isometric scale, isometric axis, isometric view and isometric projections from orthographic views, orthographic views from pictorial view and exercise.Computer Aided Drafting using Auto CAD: Introduction, software's basic commands, transformation and editing commands.

Course Outcomes:
After successful completion of this course students will be able to:
CO1.   **Visualize** the geometric details of engineering objects.
CO2.   **Translate** the geometric information of engineering objects into engineering drawings.
CO3.   **Draw** orthographic projections and sections.
CO4.   **Develop** knowledge to read, understand and explain drawing.
CO5.   I**mprove** their skills so that they can apply these skills in developing new products.
CO6.   **Prepare** simple layout of factory, machine and buildings.

Text books:
1. Engineering Drawing by N. D. Bhatt, Charotar Publication Pvt. Ltd.
2. Engineering Drawing by P.S. Gill, S. K. kataria& sons, Delhi
3. Engineering Drawing by BasantAgrawal& C. M. Agrawal, Tata McGraw Hill Education Pvt. Ltd.
4. Engineering Graphics by K. Venugopal, New Age International Publication, India

NPTEL Link for Engineering Graphics:
http://nptel.ac.in/courses/112103019/

Energy Environment, Ecology Society: 100015

Course Objectives:

To create awareness about various sources of energy and their applications.

To create awareness about various environmental issues and how to deal with those environmental issues.

To impart fundamental concepts in environmental engineering dealing with air, water and waste management.

To create awareness about sustainability concepts and need of sustainable development for development of society.

To create awareness about various environmental policies.

Unit 1: Energy: Various forms of Renewable and non-renewable energy and their applications, Solar Energy, Hydro, wind, biomass, geothermal, tidal and nuclear energy, green energy, clean energy, role of energy in economic and social development.

Unit 2: Water Environment: Ecosystems & its components, Water Cycle, Water availability & uses, Water resources problems and its solutions, Water pollution problems, Water quality characteristics & standards, Introduction to water treatment mechanisms.

Unit 3: Air Environment: Air pollution, causes, global effects, climate change and its impact, Introduction to air pollution control measures, Carbon credit, Carbon trading, Clean Development Mechanism (CDM).

Unit 4: Waste Management: Introduction to management of municipal solid waste, Ewaste and plastic waste, various initiatives in the management of waste.

Unit 5: Sustainability: Introduction to the concept of sustainability & sustainable development, Sustainable development goals, TBM, Challenges for sustainable development. Policies: Multi1atcral environmental agreements and Protocols – Kyoto Protocol, Montreal Protocol, Indian policies - Environment Protection Act 1986, Waste Management rules 2000.

Course Outcomes:

Upon completion of the course, the students will be able to:

CO 1. Explain the fundamental concepts of energy, ecosystems & environment.

CO 2. Recognize various environmental problems and their effects.

CO 3. Apply various air & water remediation methods.

CO 4. Apply waste management techniques.

CO 5. Apply the concepts of sustainability

Text Books:

K. Asthana, Meera Asthana, A Text Book of Environmental Studies, S Chand & Co., New Delhi.

P. Meenakshi, Elements of Environmental Science & Engineering, PHI, New Delhi

M.M. Sulphey, M.M. Safeer, Introduction to Environment Management, PHI, New Delhi

S K Dhameja, Environmental Engineering & Management, S K Kataria& Sons, New Delhi

Lab Work:

Basic Analysis of Water Quality Parameters: pH, Acidity, Alkalinity, Solids.

Skill Based Mini Project: Students have to deliver a presentation in class preferably on power point and submit a write up of the same on following topics (preferably group project wherein students divided into group of 4):

1. Identification of potential water related problems in the vicinity of their residence and propose solutions for these problems.

2. Identification of potential air pollution issues in the vicinity of their residence and propose solutions for these problems.

3. Identify waste related issues in the vicinity of their residence and propose solutions for these issues.

4. Study of Solar Energy Panel in the Institute.

5. Study of Wind Mill in the Institute.

Language Lab: 100017

Course Objectives:

- The course intends to build the required communication skills of the students so as to communicate effectively in real-life situations like starting a talk and be comfortable using English language.
- It aims at teaching students to appreciate English language through the study of scientific, creative, and academic text.
- The course is designed to acquaint students with structure of English language used in literature, functional varieties, figurative language, and verbal concomitance.
- The students are expected to enrich their knowledge of language, culture, and ethics through this course.

Unit I: Introduction to Language & Linguistics

An Introduction to English Language and its need. Learning English as a Second Language.

Unit II: Communication

Communication: Approaches, Elements, Verbal and Nonverbal Communication; Barriers to Communication; Johari Communication Window.

Unit III: Application of Linguistic Ability

1. Listening: Factors Affecting Listening and Improving Listening.
2. Public Speaking & Delivering Presentation.

Unit IV: Reading

Reading Passages & Comprehension: Steps and Methods.

Unit V: Writing

Writing: Essentials of good writing; Formal Writings (Application, Email, CV, Résumé

Language Laboratory:

The objective of the language lab is to expose students to a variety of listening and speaking drills. This would especially benefit students who are deficient in English and it also aims at confidence building for interviews and competitive examinations. The Lab is to cover following syllabus**.**

1. Communication lab exercises as specified in Lab Manual

2. Listening skills (using Marc Hancock, CUP).

3. Speaking skills

4. Oral presentation.

Laboratory Tasks:

1. Exercise on Listening (04 lectures)
2. Exercise on Reading (06 Lectures)
3. Power point Presentation/Oral/Group Discussion/Debate (12 Lectures)

Reference Books: -

4. Understanding Human Communication — By Ronald Alderman by OUP
5. Communication Skills for Engineers — Pearson Education.
6. Practical English Grammar by Thomson Martinet — Oxford University Press
7. A Handbook of Language laboratory by P Sreekumar — Cambridge University Press.

Course Outcomes:

After successful completion of the course the student will be able to:

CO1 Speak effectively in a public forum to a variety of audiences and purposes.
CO2 Prepare oral dialogues and arguments within the Engineering Profession effectively.
CO3 Comprehend of major text and traditions in language as well as its social, cultural, and historical context.
CO4 Demonstrate in writing and/or speech the interpretation of texts.
CO5 Interpret text written in English assessing the results in written and oral arguments using appropriate material for support.