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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE401	DCC	Electrical Machines I	3	1	2	5	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks

Course Educational Objectives (CEOs):

1. To prepare the students to have a basic and practical knowledge of transformers.
2. To prepare the students to have a basic knowledge of induction motors.
3. To introduce students with the concept of Single phase induction machine.

Course Outcomes (COs):

Upon completion of this course students will be able to:

1. Demonstrate various parts of a electrical machine.
2. Conduct Different test on transformer.
3. Choose suitable Induction machine for specific applications.
4. Demonstrate constructional details, principle of operation of Special Machines.

Syllabus

UNIT I **9 Hrs.**

Single Phase Transformer: Working principle, Construction, types, EMF equation, Transformer on no load and on load, exact and approximate equivalent circuit, O.C & S.C. test on transformer, regulation of transformer, losses & efficiency, condition for maximum efficiency, All day efficiency, Efficiency curve, Sumpner's test, Parallel operation, Conditions, Parallel with equal and unequal voltage ratio.

UNIT II **8 Hrs.**

Auto Transformer: comparison with ordinary transformer, equivalent circuit and phasor diagram, saving of conductor material. PU system of calculation.

UNIT III **9 Hrs.**

Polyphase Transformer: Construction, Various connections and groups, choice of connections, open delta connection, Scott connection, three phase to two phase conversion and vice-versa, Applications.

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BTEE401	DCC	Electrical Machines I	3	1	2	5	60	20	20	30	20

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UNIT IV **9 Hrs.**

Polyphase Induction Motor: Construction, types, rotating magnetic field, principle of operation, equivalent circuit, slip, frequency of rotor current, rotor emf, rotor current, expression for torque, conditions for maximum torque, torque slip characteristics, starting torque in squirrel cage and slip ring motors, relation between full load torque and maximum torque, Power stages in induction motor, speed control of 3 phase motor, starting methods for 3 phase induction motor.

UNIT V **8 Hrs.**

Single Phase Induction Motor: Introduction, construction, principal, double revolving field theory, equivalent circuit, performance calculations, starting methods, and their types, torque slip characteristics of various types.

Textbooks:

1. P.S. Bhimbra 2008. *Electrical Machinery*, Khanna Pub., Delhi
2. A. Husain & H. Ashfaq 2016, *Electric Machines*, Dhanpat Rai & Co. (P) Ltd. New Delhi.

References:

1. M.G. Say, Performance & design of AC machines, CBS publishers & distributors, Delhi, 3rd edition
2. A.E. Clayton & N.N. Nancock, The Performance & design of DC machines CBS publications & distributors, Delhi, 3rd edition
3. P.S. Bhimbra, Generalized theory of Electrical Machines, Khanna publishers, Delhi,
4. Ashfaq Husain, Electric Machines, Dhanpat Rai, New Delhi.
5. Syed A. Nasar, Electric Machines & Power Systems, Volume I , Tata McGraw Hill, New Delhi
6. E. Fitzerald, C. Kingsley & S.D. Umans , Electric Machinery Tata McGraw Hill ,New Delhi ,5 edition.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE401	**DCC**	**Electrical Machines I**	3	1	2	5	60	20	20	30	20

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List of Experiments:

Experiments can cover any of the above topics, following is a suggestive list:

1. Evaluation of turn's ratio and polarity test on 1-phase transformer.
2. Performance analysis of load test on a 1-phase transformer and plot its load characteristic
3. Performance analysis of OC and SC tests on a 3-phase transformer and determine its equivalent circuit. Also find its efficiency and regulation at different load and power factor.
4. Separation of No Load Losses in 1 Φ Transformer.
5. Performance analysis of Sumpner's test on two 1-phase transformer and determine its efficiency at various load.
6. Performance analysis of No-load and block rotor test on a 3-phase IM and determine its equivalent circuit.
7. Perform load test on a 3-phase IM and plot its performance characteristics.
8. Study various types of starters used for 3-IMs.
9. Perform No-load and block rotor test on a 1-phase IM and determine its equivalent circuit.
10. Realization of Scott connection.

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							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE403	DCC	Power System I	3	0	2	4	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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Course Educational Objectives (CEOs):

1. To introduce the concepts and phenomenon of different sources of Power Generation.
2. Give an idea about the fundamental concepts of electrical power distribution, both AC & DC
3. Impart the knowledge of different turbines used in the generating stations.

Course Outcomes (COs):

After the successful completion of this course students will be able to:

1. Understand mechanical design of transmission line.
2. Calculate line parameters (Resistance, inductance and capacitance)
3. Compare DC and AC distribution.
4. Explain the representation of different power system components and loading capability of a generator.
5. Describe underground cables.

Syllabus

UNIT I **8 Hrs**

Electrical Energy Generation: General background, structure and components of power network Steam/ Thermal Power Plant, Hydel Power Plant, Nuclear Power plant. Non-conventional & distributed generation, Effect of transmission voltage on power system economy. Isolated & interconnected power system. Power Plant Economics - Load curves, base load, peak load, load factor, demand factor, diversity factor, capacity factor, utilization factor, cost of electricity, capital cost, fuel and operation cost.

UNIT II **9 Hrs.**

Transmission Lines Inductance and capacitance of single-phase, three-phase single circuit and double circuit lines, concept of GMD, transposition of lines, effect of earth on capacitance of transmission lines. Characteristics and performance of transmission lines, transmission lines as four terminal networks, nominal-T, nominal-π, equivalent-T, and equivalent-π representation of transmission lines, A, B, C, D constants, distributed parameters of long lines, hyperbolic solutions, Ferrantii effect, surge impedance loadings.

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							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE403	DCC	Power System I	3	0	2	4	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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UNIT III **9 Hrs.**

Over head lines and cables Type of overhead conductors, solid conductors, stranded conductors, bundled conductors, skin effect, proximity effects, principle of corona Types of cables, insulation resistance of cables, capacitance of cables dielectric stress, capacitance grading of cables, use of inter sheaths

UNIT IV **8 Hrs.**

Main components of overhead lines, conductor materials, line supports, towers, insulators, types of insulators, potential distribution over suspension insulators, string efficiency, methods of improving string efficiency, sag in over head lines, sag and tension calculations, stringing of conductors, sag template, vibration and vibration dampers

UNIT V **9 Hrs.**

Voltage control & Distribution system Ac single phase, 3 phase, 3wire & 4 wire distribution, Kelvin's law for most economical size of conductor Substation layout showing substation equipment, bus bar single bus bar and sectionalized bus bar, main and transfer for bus bar system, sectionalized double bus bar system, ring mains.

Textbooks:

1. William Stevenson, Elements of Power System Analysis, McGraw Hill.
2. C.L. Wadhwa, Electrical Power System Analysis, New Age International.
3. D.P. Kothari, I.J. Nagrath, Modern Power System Analysis TMH, III Ed. Reprint 2008.

References:

1. John Grainger and William Stevenson, Power system Analysis, McGraw Hill.
2. Ashfaq Husain, Electrical Power Systems, Vikas Publishing House.
3. T. Wildi, Electrical Machines, Drives and Power Systems, Pearson Education.

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							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE403	**DCC**	**Power System I**	3	0	2	4	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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List of Experiments:

1. Study and Analysis of Thermal Power plant.
2. Study and Analysis of Hydro Power plant.
3. Study and Analysis of Nuclear Power plant.
4. Study of different types of insulator.
5. Analysis of Ferranti effect and voltage distribution in H.V. long transmission line using transmission line model.
6. Determine the ABCD, H, Z & Image parameters of short transmission line.
7. Determine the ABCD, H, Z & Image parameters of medium transmission line For T network.
8. Determine the ABCD, H, Z & Image parameters for long transmission line.
9. Measure the receiving end voltage of each line under no load or lightly load condition to understand Ferranti effect.
10. Understand the performance of transmission line under different loads with varies Resistive, Inductive, and Capacitive load in different steps.

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COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEE404	DCC	Electromagnetic Field Theory	60	20	20	0	0	3	1	0	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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Course Educational Objectives(CEOs):
The objective of this course is to-
1. Obtain an understanding of physical laws governing electromagnetic effects in the form of Maxwell's equations
2. Understand the concepts of static and time varying fields with an emphasis on wave propagation

Course Outcomes (COs):
After completion of this course students should be able to
1. Apply vector calculus to determine the electric and magnetic fields and energy stored due to specified charge and current distribution.
2. Apply Maxwell's equation in Differential and integral forms for the solution of appropriate problems involving static as well as time varying fields.
3. Discuss and analyze propagation of electromagnetic waves in free space, dielectric and conducting media

Syllabus

UNIT I **10 Hrs.**

ElectrostaticsI

Introduction to various Co-ordinate systems and Co-ordinate transformations, Vector calculus, Divergence and Stokes theorem, Laplacian of a scalar and vector, Coulomb's law, Electric field intensity, Electric fields due to: point, line, surface and volume charge distributions, Electric flux density, Gauss's law and its application, Electric potential, Potential gradient, Electric dipole: dipole moment, potential & electric field intensity due to dipole, Energy stored in electrostatic fields, Method of images.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEE404	DCC	Electromagnetic Field Theory	60	20	20	0	0	3	1	0	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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UNIT II **8 Hrs.**

Electrostatics II

Poisson's and Laplace's equations, Solution of Laplace's equation, Uniqueness theorem, Capacitor and capacitance, Electric boundary conditions, Different electric currents and current densities , Behavior of different electrical materials in electric field, Equation of continuity and relaxation time, Ohms law in point form.

UNIT III **8 Hrs.**

Magnetostatics I

Magnetic field intensity, Magnetic flux, Magnetic flux density, Biot-Savart Law, Magnetic field due to: straight conductors, circular loop, infinite sheet of current, Ampere's circuital law and its application, Magnetic scalar and vector potential, Force on a moving charge and current elements, Force and torque on closed circuit, Magnetic dipole, Magnetic polarization, Self and mutual inductance, Energy stored in magnetic fields, Magnetic boundary conditions.

UNIT IV **9 Hrs.**

Magnetostatics II

Faraday's Law, Induced EMF for time varying fields, Displacement current, Maxwell's equation in point form, Maxwell's equation in integral form, Concept of retarded potential, Poynting vector theorem, Complex poynting vector.

UNIT V **9 Hrs.**

Electromagnetic Waves

Solution of wave equation, Propagation of plane EM wave in: perfect dielectric, lossy medium and good conductor, Media-attenuation, Phase velocity, Group velocity, Skin depth. Reflection and refraction of plane electromagnetic waves at boundaries for normal & oblique incidence, Snell's law of refraction, Brewster angle, Polarization of electromagnetic wave: linear, circular and elliptical polarization.Transmission Line parameters and equations.

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BTEE404	**DCC**	**Electromagnetic Field Theory**	60	20	20	0	0	3	1	0	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Textbooks:

1. Matthew. N.O. Sadiku, "Elements of Electromagnetics", Oxford University Press, First Indian Edition, 2010.
2. Shankar Prasad Ghosh, Lipika Datta, "Electromagnetic Field Theory", McGraw Hill,1st edition, 2012
3. Gangadhar.K.A, "Field theory", Khanna Publishers, New Delhi, 15thedition, 2004.
4. Umesh Sinha , "Transmission Lines and Networks", Satya Prakashan, 2003.

References:

1. William Hayt, "Engineering Electromagnetics", McGraw Hill, 7th edition, 2011.
2. David K Cheng, "Field and Wave Electromagnetics",Pearson Education, 2ndedition, 2004.
3. John D. Kraus, "Electromagnetics" McGraw Hill, 5th edition, 1999.
4. Narayana Rao N, "Elements of Engineering Electro Magnetics", Prentice Hall of India, 6th edition, 2008.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;
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Course Educational Objectives (CEOs):

1. To gain knowledge of basics of Microprocessor & Microcontroller & Learn development of assembly language programs.
2. To learn the programming skills of 8086 Microprocessor & 8051 Microcontroller.
3. To learn the interfacing of external devices (LED, LCD, ADC, DAC) with the microcontroller 8051.

Course Outcomes (COs):

The students will be able to:

1. Apply the concept of buses, Microprocessor & Microcontroller architecture and interrupts.
2. Interface memory and I/O devices with 8051 Microcontroller
3. Program assembly language / C programming of 8051 & 8086.
4. Design Microcontroller based small system
5. Interface 8051 with LED, LCD, ADC, DAC etc.

Syllabus

UNIT I **8Hrs.**

Introduction to 8086 Microprocessor

Overview of 8086 microprocessor. Architecture of 8086, Signals and pins of 8086 microprocessor, Concept of Memory Segmentation in 8086. Maximum Mode , Minimum Mode, Timing diagram, Comparative study of Salient features of 8086, 80286 & 80386.

UNIT II **10Hrs.**

Microprocessor 8086 programming

8086 Instructions set . Addressing mode of 8086, Assembly directives. Stack , Interupts of 8086, Assembly language programs of 8086.

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

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Input-Output interfacing: Peripherals I/O. PPI 8255 Architecture and modes of operation, Interfacing to 16-bit microprocessor and programming, DMA controller (8257) Architecture, Programmable interval timer 8254, USART 8251.

UNIT III **8 Hrs.**

Introduction to 8051 Microcontroller

Introduction, Difference between Microprocessors and Microcontrollers. Overview of 8051 Microcontroller family, Architecture of 8051 Microcontroller, The program counter and ROM space in the 8051, registers, 8051 register banks.

UNIT IV **10Hrs.**

8051 Assembly Language Programming

Introduction to 8051 assembly programming, Structure of Assembly language, Assembling and running an 8051 program, 8051 data types and directives, interrupts

8051 Addressing Modes & Instruction set

Addressing modes, Accessing memory using various Addressing modes, Bit addresses for I/O and RAM, Arithmetic instructions, Signed number concepts and arithmetic operations, Logic and compare instructions, Rotate instruction, Jump, Loop, And Call Instructions, Call instructions time delay for various 8051 chips.

UNIT V **10 Hrs.**

8051 Programming in C

Data types and time delay in 8051 C, I/O programming in 8051 C, Logic operations in8051 C, Data conversion programs in 8051 C, Accessing code ROM space in 8051 C, Interfacing with LEDs, LCDs ADCs, DACs.

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BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Text Books:

1. 1.A.K. Ray & K.M. Bhurchandi, "Advanced Microprocessors and peripheral-Architecture, Programming and Interfacing", Tata McGraw –Hill, 2012.
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems Using Assembly and C, 2/e", Second Edition, Pearson Education 2008.
3. Kenneth J. Ayala, Dhananjay V. Gadre ,"The 8051 Microcontroller & Embedded Systems using Assembly and C",Cengage Learning , India Edition, 2008.

References:

1. Douglas V. Hall ,"Microprocessor and interfacing", Revised second edition, Macmillan, McGraw Hill 2006.
2. Han Way Huang,"Using the MCS-51 Microcontrollers" , Oxford Uni Press,2000.
3. Rajkamal ,"Microcontrollers Architecture, programming, interfacing and system design" Pearson education,2009.

List of Experiments:

1. Introduction to 8086 & 8051 kit, hardware features & modes of operationand Technique of programming & basic commands of kit.
2. Design programs for Arithmetic Operations.
3. Develop a program to find 1's complement and then 2's complement of a 16-bit numbers.
4. Develop a program to find larger of two numbers.
5. Write a program to shift an 8-bit number left by 2-bits.
6. Write a program to generate a square wave of 2 KHz Frequency on input pin.
7. Introduction to IDE and Assembler directives.
8. Develop 8051 Assembly language programs using Arithmetic/ Logical instructions.
9. 8051 Assembly language programming for block data transfer between internal and external memory including overlapping blocks.

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COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEI401	DCC	Microprocessor and Microcontroller	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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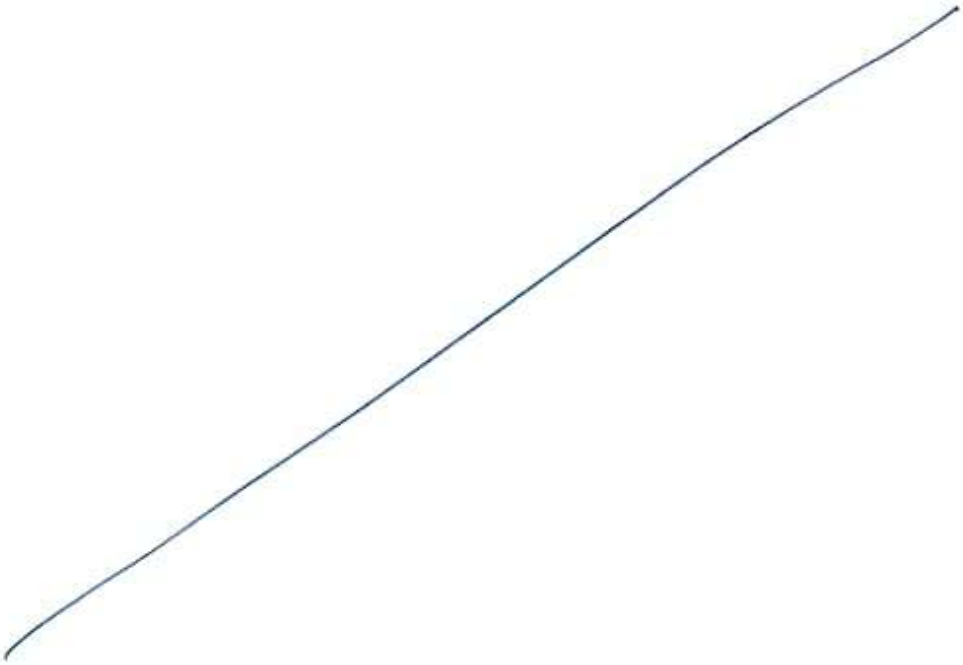
10. 8051 Assembly language programming for
    a. code conversions
    b. Timers in different modes.
    c. I/O port programming in embedded C.
    d. Programming of LCD in embedded C.



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Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEE105	SEC	Basics of MATLAB	0	0	0	30	20	0	0	2	1

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Course Educational Objectives (CEOs):
The main objectives are:

1. Understanding the MATLAB environment.
2. Being able to do simple calculations using MATLAB.
3. Being able to carry out simple numerical computations and analyses using MATLAB

Course Outcomes (COs):
Upon completion of the subject, students will be able to:

1. Understand the main features of the MATLAB and basic programming.
2. Design simple algorithms to solve problems.
3. Write simple programs in MATLAB to solve scientific and mathematical problems.
4. Understand the need for simulation/implementation for the verification of mathematical functions.
5. Interpret and visualize simple mathematical functions and operations thereon using plots/display.

Syllabus

UNIT I **9 Hrs.**

MATLAB: An Overview, Brief history of MATLAB, About MATLAB, Installation of MATLAB, help browser, Arranging the desktop, Basic functions of MATLAB, mostly used symbols in MATLAB, debugging in MATLAB; Building MATLAB expressions: MATLAB datatype, command handling, MATLAB basics.

UNIT II **9 Hrs.**

MATLAB Vector and Matrix: Scalar and vector, elementary features in a vector array, matrices, eigen values and eigen vectors, matrix operations, matrix operators, creating matrix arrangement, indexing array value, other operations, mathematical operations on array, array types

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UNIT III **6 Hrs.**

Graphics in MATLAB: 2D plots, parametric plots, contour lines and implicit plots, field plots, multiple graphics display function, 3D plots

UNIT IV **8 Hrs.**

MATLAB Programming: Reading and writing data, file handling - Personalized functions - Toolbox structure - MATLAB graphic functions

UNIT V **8 Hrs.**

Introduction to Simulink: Numerical simulations – Simple Models.

Textbooks:

1. Rudra Pratap, Getting Started With MATLAB 7. Oxford University Press, 2006.
2. MATLAB & Its Applications in Engineering By: Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma.

References:

1. A Guide to MATLAB: For Beginners & Experienced Users By: Kevin R. Coombes, John E. Osborn, Garrett J. Stuck.
2. S. Swapna Kumar, S V B Lenina: MATLAB – Esay way of learning, PHI Learning, 2016.
3. Amos Gilat ," An Introduction with Applications ,4ed " , wiley India

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