Sharad Institute of Technology College of Engineering

(An Autonomous Institute)

Yadrav (Ichalkaranji)-416121, Dist. – Kolhapur

(Approved by AICTE, New Delhi, Recognized by Government of Maharashtra &
Affiliated to BATU University, Lonere)

**NBA Accredited Programs, Accredited By NAAC 'A' Grade,
ISO 9001:2015 Certified**

Teaching and Evaluation Scheme for TY B. Tech.

Department of Electronics and ComputerEngineering

Semester: V

Department: Electronics & Computer Engineering

Class: T.Y. B. Tech

Rev: Course Structure/00/2021-22

Semester: V

Course Code	Type of Course	Course	Teaching Scheme				Evaluation Scheme					Credits
			L	T	P	Total Hrs	CA1	CA2	MSE	ESE	Total	
EC501	PCC	Digital Signal Processing	4	-	-	4	10	10	30	50	100	4
EC502	PCC	Microprocessor and Microcontroller	3	-	-	3	10	10	30	50	100	3
EC503	PCC	Java Programming	3	-	-	3	10	10	30	50	100	3
OEXXX	OEC	Open Elective-I	3	-	-	3	10	10	30	50	100	3
EC504	PEC	Elective-II	3	-	-	3	10	10	30	50	100	3
EC505	PCC	Digital Signal Processing Laboratory	-	-	2	2	15	15	-	20	50	1
EC506	PCC	Microprocessor and Microcontroller Laboratory	-	-	2	2	15	15	-	20	50	1
EC507	PCC	Java Programming Laboratory	-	-	2	2	15	15	-	20	50	1
EC508	PCC	Simulation Laboratory	-	-	2	2	15	15	-	20	50	1
PRJ04	PROJ	Mini Project-IV	-	-	2	2	25	25	-	-	50	1
HMS05	HSMC	Aptitude Skills-III	1	-	-	1	25	25	-	-	50	1
HMS06	HSMC	Language Skills-III	-	-	2	2	25	25	-	-	50	Audit
Total			**17**	**-**	**12**	**29**	**185**	**185**	**150**	**330**	**850**	**22**

Elective-II	
ETC504A	Artificial Intelligence
ETC504B	Control System
ETC504C	Wireless Communication

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Digital Signal Processing

EC501	PCC	Digital Signal Processing	4-0-0	4 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 4 Hrs/week	CA1:10Marks CA2:10Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Engineering Mathematics.

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

CO1	Distinguish various signals and systems.
CO2	Illustrate any arbitrary signal in time and frequency domain.
CO3	Apply DFT for analysis of Digital Signals.
CO4	Design Infinite Impulse Response Filters.
CO5	Design Finite Impulse Response Filters.
CO6	Construct the Structures of Digital Filters using realization methods.

Course Contents:

Unit No.1 **Classification Of Signals And Systems** Standard signals- Step, Ramp, Pulse, Impulse, Real and complex exponentials and Sinusoids. Classification of signals — Continuous time (CT) and Discrete Time (DT) signals, Periodic & Aperiodic signals, Deterministic & Random signals, Energy & Power signals — Classification of systems- CT systems and DT systems- — Linear & Nonlinear, Time-variant & Time-invariant, Causal & Non-causal, Stable & Unstable.	[6]
Unit No.2 **Fourier Series And Fourier Transforms:** **Fourier series** Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum. **Fourier Transforms:** Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform.	[6]
Unit No.3 **Discrete Fourier Transform** Sampling Theorem, concept of frequency in discrete-time signals, summary of analysis & synthesis equations for FT & DTFT, frequency domain sampling, Discrete Fourier transform (DFT) - deriving DFT from DTFT, properties of DFT - periodicity, symmetry, and circular convolution. Linear filtering using DFT. Filtering long data sequences - overlap save and overlap add method.	[6]

Unit No.4 **Infinite Impulse Response Filters** Characteristics of practical frequency selective filters. Characteristics of analog filters - Butterworth filters, Chebyshev filters. Design of IIR filters from analog filters (LPF, HPF, BPF, BRF) - Approximation of derivatives, Impulse invariance method, Bilinear transformation. Frequency transformation in the analog domain.	[6]
Unit No.5 **Finite Impulse Response Filters** Design of FIR filters - symmetric and Anti-symmetric FIR filters - design of linear phase FIR filters using Fourier series method - FIR filter design using windows (Rectangular, Hamming and Hanning window), Frequency sampling method.	[6]
Unit No.6 **Realization of Digital Filters:** Realization ofIIR filter - direct form I, direct form II, Cascade, parallel realizations. Realization of FIR filter - linear phase structure, direct form realizations	[6]

Text Books:
1. Signals and Systems – Simon Haykin and Van Veen, Wiley 2 Ed.,
2. Signals and Systems – A. Rama Krishna Rao, 2008, TMH
3. Proakis&Monalakis, "Digital signal processing – Principles Algorithms & Applications", 4thEdition,Pearson education, New Delhi, 2007. ISBN: 81-317-1000-9.

Reference Books:
1. Li Tan, Jean Jiang, "Digital Signal processing –Fundamentals and Applications", Academic Press, 2013,ISBN: 978-0-12-415893.
2. Discrete Time Signal Processing – A. V. Oppenheim and R.W. Schaffer, PHI, 2009
3. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis,
4. Digital Signal Processing – Fundamentals and Applications – Li Tan, Elsevier, 2008
5. Fundamentals of Digital Signal Processing using MATLAB – Robert J. Schilling, Sandra L. Harris, Thomson, 2007
6. Digital Signal Processing – S. Salivahanan, A. Vallavaraj and C. Gnanapriya, TMH, 2009
7. Digital Signal Processing - A Practical approach, Emmanuel C. Ifeachor and Barrie W. Jervis, 2nd, Edition, Pearson Education, 2009 Pearson Education / PHI, 2007.

Microprocessor & Microcontroller

EC502	PCC	Microprocessor & Microcontroller	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3Hrs/week	CA-1 : 10Marks CA 2 : 10Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: - Digital Electronics.

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

CO1	Explain architecture and pin functions of 8085 microprocessor.
CO2	Explain 8085 addressing modes &instruction set and build simple assembly language programs.
CO3	Make use of 8085 and 8255 to interface external peripherals.
CO4	Develop assembly language program for arithmetic & logical operations using 8051
CO5	Apply concepts of serial communication, timers & interrupts using I/O ports.
CO6	Make use of 8051 for interfacing External Peripherals.

Course Contents:

Unit No.1 **Introduction to 8085 Microprocessor** 8085 architecture, Registers, pin functions, De-multiplexing of Address/Data bus, Interrupt Structure & Interrupt Types.	[6]
Unit No. 2 **Programming with 8085** Addressing modes, Instruction set, Stack &Subroutine, Introduction to Timing diagram-T-state, Machine Cycle, Assembly language programming.	[6]
Unit No.3 **Interfacing with 8085** Memory Interfacing: RAM, ROM, Introduction to 8255, Block Diagram, Pin Diagram, Interfacing and Programming for LED, DC Motor	[6]
Unit No.4 **8051 Microcontroller Architecture And Instruction Set** Functional block diagram and pin diagram of 8051, Power supply, clock and reset circuit, Program Counter and ROM space in 8051, Program and Data Memory organization, addressing modes, Instruction Set: data transfer, arithmetic and logical, program branching instructions and Boolean variable manipulation	[6]
Unit No.5 **On-Chip Peripherals And Programming** Embedded C Programming: Data Types, Operators Embedded C Programming: Data Conversion, I/O Programming Timer/Counter: Operating Modes, Programming. UART: Operating Modes, Programming. Interrupt: 8051 Interrupt- External and Internal Interrupts.	[6]

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Unit No.6 **Off-Chip Peripheral Interfacing And Programming** Interfacing: LED, Switches and Matrix Keyboard, LCD, ADC 0808 with Analog Sensor, DAC.	[6]

Text Books:
1. Ramesh S. Gaonkar- Microprocessors Architecture, Programming and applications with 8085A
2. The 8051 Microcontroller & Embedded Systems By Muhammad Ali Mazidi & Janice Gillispie Mazidi Pearson Edition L. P .E.

Reference Books:
1. Kenneth L Short –'Microprocessors and Programmed logic'.
2. Douglas V Hall-'Microprocessors and Digital Systems".
3. The 8051 Microcontroller By Ayala 3- Edition.

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JavaProgramming

ET503	PCC	JavaProgramming	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3Hrs/week	CA-1 :10 Marks CA 2 :10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: -Basic programming skills (C/C++).

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

CO1	Developprogramsusingobject-orientedmethodologyinjava.
CO2	Applyconceptofinheritanceforcodereusability.
CO3	Developprogramusingmultithreading.
CO4	Implementexceptionhandling.
CO5	DevelopprogramsforhandlingI/Oandfilestreams.
CO6	Developprogramsusinggraphicsandapplets.

Course Contents:

Unit No.1 **Basic Syntactical Constructs In Java** Java features and java programming environment define class; create object and accessing members, java tokens, data types, constants. Variables dynamic initialization array string typecasting etc. Operators, expression Operator precedence, evaluation of expression, mathematical functions. Decision making and looping–If, If-Else, nested If-Else. Switch case Conditional operator, While loop, do-while loop, for loop, Continue, return keywords, nesting loops	[6]
Unit No.2 **Derived Syntactical Construct In Java** Constructors and Methods, Types of constructors, Nesting of Methods, This keyword, command line argument. garbage collection, finalize() method, object Class .Visibility control –private, public and protected. Friendly private protected access, default, Examples of visibility control, Arrays and Strings – types of arrays, String classes and string buffers. Vectors, Wrapper classes and enumerated types.	[6]
Unit No.3 **Inheritance, Interface And Package** Inheritance and its types, Types of inheritance Operator over loading and operator over riding Dynamic method dispatch. Final variable and method Using super abstract methods and classes, static members Interfaces –define, implement and access.	[6]
Unit No.4 **Exception Handling and Multithreading** Errors and Exception, types of errors Try, catch, nested try catch Throws, finally statement, build-in exception , creating own exception Examples of exception handling, Multithreaded	[6]

programming–Creating threads–using ex tending thread class and runnable interface, Thread lifecycle–wait(), notify(), sleep(), suspend() ,stop().	
Unit No.5 **Managing Input Output Files In Java** Introduction and concept of stream, stream classes, By the stream classes, input stream classes, output stream classes Examples of file handling using stream classes Character stream classes Using File IO Class: IO exceptions, creation of files, reading and writing files Handling primitive data types Examples of handling primitive data types	[6]
Unit No.6 **GraphicsinJava** Introduction to applet-Applet, Applet Life Cycle. Example of Applet life cycle, html parameters and embedding Applet Graphics Programming– Classes, Line, Examples of graphic programming using Rectangles, circles, Examples of graphic programming using, arcs, polygons.	[6]

Text Books:
1. The complete Reference Java , Herbert Scheildt TMH.
2. Computer Programming in JAVA Junaid Khateel &Dr. G. T. Thampi Dream Tech Press.
3. Core JAVA for Beginners Sharnam Shah & Vaishali Shah SPD.

Reference Books:
1. Programming in JAVA a primer E Balagurusamy TMH.
2. ProgramminginJAVASachinMalhotra,SaurabhChaudharyOxfordUniversityPress.

Elective II
A. Artificial Intelligence

EC504A	PEC	Artificial Intelligence	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3 Hrs/week	CA1:10Marks CA2:10Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: Basic mathematic concepts to implement in software or systems.

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

CO1	Explain history, foundations of artificial intelligence (AI) and intelligent agents
CO2	Understand informed and uninformed search strategies for solving Problems.
CO3	Apply search for solving Constraint Satisfaction Problems.
CO4	Understand concept of logical agents
CO5	Understand first-order predicate logic to prove theorems and Inference in First-Order Logic
CO6	Develop general understanding of approaches in planning.

Course Contents:

Unit No. 1 **Introduction** What Is AI? The Foundations of Artificial Intelligence, The History of Artificial Intelligence, State of the art, Types of AI. Intelligent Agents: Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.	[6]
Unit No. 2 **Solving Problems by Searching** Uninformed Search Strategies- DFS, BFS, Uniform cost search, Depth limited search, Iterative deepening Informed (Heuristic) Search Strategies, Heuristic Functions.	[6]
Unit No. 3 **Constraint Satisfaction Problems** Defining Constraint Satisfaction Problems: Map coloring, N queens; Constraint Propagation: Inference in CSPs, Backtracking Search for CSPs, Local Search for CSPs	[6]
Unit No. 4 **Logical Agents** Knowledge-Based Agents, The Wumpus World, Logic, Propositional Logic: A Very Simple Logic, Propositional Theorem Proving, Effective Propositional Model Checking, Agents Based on Propositional Logic.	[6]
Unit No. 5 **First-OrderLogic** Representation Revisited Syntax and Semantics of First-Order Logic, Using First-Order Logic,Knowledge Engineering in First-Order Logic, Inference in First-Order Logic-	[6]

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Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining.	
Unit No. 6 **Planning** Introduction to planning, classical planning, planning with state space search, Hierarchical planning.	[6]

Text Books:
1. Eugene, Charniak, Drew Mcdermott, "Introduction to artificial intelligence", Addison Wesley, 1985.
2. Eiaine Rich and Kerin Knight, "Artificial Intelligence", McGraw-Hill, Second Edition.
3. Anindita Das Bhattacharjee, Artificial Intelligence and Soft Computing for Beginners, 2nd Edition, SPD Publication.

Reference Books:
1. Stuart Russell, Peter Norvig, Artificial Intelligence: A Modern Approach, Third Edition.
2. Herbert A. Simon, "The Sciences of the Artificial ", MIT Press, 3rd Edition (2nd Printing), 1995.
3. Tim Jones, "Artificial Intelligence Application Programming", Dreamtech Publication.
4. George F. Luger, "Artificial Intelligence-Structures and Strategies For Complex Problem Solving", Pearson Education / PHI, 2002.
5. Prolog Programming for A.I. by Bratko, TMH.

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B. Control System

EC504B	PEC	Control System	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3Hrs/week	CA-1 :10 Marks CA 2 :10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: - electronic instrumentation and measurement

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

CO1	Explain the necessity of feedback and types of feedback control systems
CO2	Obtain transfer function of systems through block diagram manipulation and reduction
CO3	Discuss transient and steady state time response of a simple controlsystem
CO4	Discuss stability analysis using Bodeplots
CO5	Analyze stability of a control system using Nyquist plot.

Course Contents:

Unit no.1 **Basics of control system** Introduction to control systems: Introduction, classification of control systems. Mathematical models of physical systems: Modeling of mechanical system elements, electrical systems, Analogous systems, Transfer function, Single input single output systems, Procedure for deriving transfer functions, servomotors, synchronous, gear trains.	[6]
Unit no.2 Block diagram and signal flow graph Block diagram of a closed loop system, procedure for drawing block diagram and block diagram reduction to find transfer function. Signal flow graphs: Construction of signal flow graphs, basic properties of signal flow graph, signal flow graph algebra, construction of signal flow graph for control systems.	[6]
Unit no. 3 **Time Domain Analysis** Standard test signals, time response of first order systems, time response of second order systems, steady state errors and error constants, types of control systems. Routh Stability criterion: BIBO stability, Necessary conditions for stability, Routh stability criterion, difficulties in formulation of Routh table, application of Routh stability criterion to linear feedback systems, relative stability analysis.	[6]
Unit no. 4 **Root locus technique** Introduction, root locus concepts, construction of root loci, rules for the construction of root locus. Frequency Response analysis: Co-relation between time and frequency response – 2nd order systems only. Bode plots: Basic factors G(iw)/H(jw), General procedure for constructing bode plots, computation of gain margin and phase margin.	[6]

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Unit no. 5 **Nyquist plot** Principle of argument, Nyquist stability criterion, assessment of relative stability using Nyquist criterion. Design of Control System: Introduction, design with the PD controller, design with the PI controller, design with the PID controller.	[6]

Text Books:
1. Control Systems Anand Kumar PHI 2ndEdition,2014.

Reference Books:
1. Automatic Control Systems FaridGolnaraghi, Benjamin C. Kuo Wiley 9 th Edition, 2010
2. Control Systems Engineering Norman S. Nise Wiley 4 th Edition, 2004
3. Modern Control Systems Richard C Dorf et al Pearson 11th Edition, 2008
4. Control Systems, Principles and Design M.GopalMcGaw Hill 4 th Edition, 2012
5. Control Systems Engineering S. Salivahananet al Pearson 1 st Edition, 2015

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C. Wireless Communication

EC504C	PEC	Wireless Communication	3-0-0	3 Credits

Teaching Scheme:	Examination Scheme:
Lecture: 3Hrs/week	CA-1 :10 Marks CA 2 :10 Marks Mid Semester Exam: 30 Marks End Semester Exam: 50 Marks

Pre-Requisites: - Computer Network

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

CO1	Describe the wireless communication system.
CO2	Explain the basic concepts of basic Cellular System.
CO3	Explain the basics of mobile propagation models with large scale path loss.
CO4	Explain the basics of mobile propagation models with small scale fading.
CO5	Summarize the various multiple access techniques used in wireless communication.
CO6	Explain the emerging trends in Wireless communication like WiFi, WiMAX, and related issues and challenges.

Course Contents:

Unit no.1 **Introduction to Wireless Communication System** Evolution of mobile communications, Mobile Radio System around the world, Examples of Wireless communication System, Comparison of Common wireless system, Second generation Cellular Networks, Third Generation (3G) Wireless Networks , Wireless Local Loop(WLL),Wireless Local Area network(WLAN).	[6]
Unit no.2 **Cellular Radio Systems** Basic cellular system, Components and Operation of cellular systems, Analog & Digital cellular systems, Concept of frequency reuse channels, Co-channel interference, Cell splitting.	[6]
Unit no.3 **Mobile Radio Propagation Model** Large scale path loss:-Free Space Propagation loss equation, Path-loss of LOS systems, Reflection, Diffraction, Scattering, Indoor and outdoor propagation models.	[6]
Unit no.4 **Mobile Radio Propagation Model, Small Scale Fading** Small scale multipath propagation, Impulse model for multipath channel, Delay spread, Types of small scale Fading, Rayleigh and Rician distribution.	[6]
Unit no.5 **Multiple Access Techniques** Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code division Multiple access (CDMA), Spread Spectrum Multiple Access, Space	[6]

Division Multiple Access (SDMA),GSM system architecture,GPRS system architecture.	
Unit no.6 **Recent Trends** Introduction to Wi-Fi, WiMAX, ZigBee Networks, Wireless Adhoc Network and Mobile Portability, Security issues and challenges in a Wireless network.	[6]

Text Books:
1. Jochen Schiller, Mobile Communications, Pearson, 2008.
2. Andreas F Molish , Wireless Communications, 2nd Edition , Wiley India Publications,2013.
3. Wireless Communication, Theodore S. Rappaport, Prentice hall.

Reference Books:
1. Wireless Communications and Networking,VijayGarg, Elsevier.
2. Wireless digital communication, Kamilo Feher, PHI.
3. Mobile and personal Communication system and services by Rajpandya, IEEE press (PHI).
4. William C Y Lee, Mobile Cellular Telecommunications, 2nd Edition, MGH, 2004.
5. Raj Pandya, —Mobile and Personal Communication systems and servicesǁ, Prentice Hall of India,2001.

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Digital Signal Processing Laboratory

EC505	PCC	Digital Signal Processing Laboratory	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical : 2Hrs/Week	CA1:15Marks CA2:15Marks End Semester Exam: 20 Marks

Pre-Requisites: Matlab.

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

CO1	Demonstrate elementary signals /waveforms and perform the mathematical operation on discrete signals.
CO2	Determine the magnitude and phase response of DFT, Inverse DFT
CO3	Model IIR and FIR filter using window techniques.

Experiment List: Minimum 8 experiments from this list.

1.	To construct a program to plot the following continuous time and discrete time Signals. i. Step Function ii. Impulse Function iii. Exponential Function iv. Ramp Function v. Sine Function
2.	To compose a program for some basic operations like addition, subtraction, shifting and folding on signal
3.	To construct a program to generate Fourier series of a Square Wave.
4.	To construct a program to Calculate and plot using MATLAB Fourier Transform of a given signal.
5.	To find the DFT/IDFT of a sequence without using the inbuilt functions.
6.	To identify Linear Convolution for given sequence.
7.	To design Low Pass IIR filter for given sequence.
8.	To design High Pass IIR filter for given sequence.
9.	To develop Low Pass FIR filter for given sequence.
10.	To develop of High Pass FIR filter for given sequence.

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Microprocessor & Microcontroller Laboratory

EC506	PCC	Microprocessor & Microcontroller Laboratory	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical: 2hrs/week	CA1:15Marks CA2:15Marks Practical and Oral Exam: 20Marks

Pre-Requisites: Digital Electronics.

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

CO1	Make use of 8085 instructions to build simple assembly language programs.
CO2	Apply features of 8255 to interface LEDs.
CO3	Develop assembly & Embedded C language programs to interface external devices to 8051.

Experiment List: Minimum 8 experiments from this list.

1.	Addition & Subtraction using 8085 Microprocessor.
2.	Multiplication & Division using 8085 Microprocessor.
3.	Block transfer & block exchange using 8085 Microprocessor.
4.	I/O Mode & BSR Mode of 8255.
5.	Waveform generation using DAC0808, 8255 & 8085 Microprocessor.
6.	Arithmetic and Logical operations using 8051 Microcontroller.
7.	LEDs Interfacing to 8051 Microcontroller with Timer Interrupt.
8.	LCD Interfacing to 8051 Microcontroller.
9.	Keyboard Interfacing to 8051 Microcontroller.
10.	Stepper Motor Interfacing to 8051 Microcontroller

JavaProgrammingLaboratory

EC507	PCC	JavaProgrammingLaboratory	0-0-2	1Credit

TeachingScheme:	ExaminationScheme:
Practical:2Hrs/week	CA1:15Marks CA2:15Marks PracticalandOralEx am:-20Marks

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

CO1	Understand the java programming environments
CO2	Develop a program to demonstrate use of decision making and Looping
CO3	Develop programs for handling I/O and file streams
CO4	Develop programs using graphics and applets.

Experiment List: Minimum 8 experiments from this list.

1	Develop program to demonstrate use of IF statement and its different forms.
2	Develop programs to demonstrate use of a) Switch Case statement b) Conditional If()
3	Develop programs to demonstrate use of looping statement _for'
4	Develop programs to demonstrate use of _while' , _do while'
5	a) Develop program for implementation of constructor. b) Develop program for implementation of multiple constructors in a class.
6	Develop program for an implementation of arrays in java.
7	Develop program for an implementation of vectors in java.
8	Develop program for an implementation of wrapper class.
9	Develop program which implements concept of overriding.
10	Develop program which implements single and multilevel inheritance.
11	Develop minimum two basic applets. Display output with applet viewers and graphics. a) Develop program on basic applet. b) Develop a program using control loops in applets
12	Write a program to create animated shape using graphics and applets.

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13	Develop a program to draw following shapes, graphics and applets
	  a) Cone
	  b) Cylinders
	  c) Cube
	  d) Square inside a circle
	  e) Circle inside a square	

14	Develop a program to implementation of I/O stream classes.	
15	Develop a program to implementation of File stream classes.	

Simulation Laboratory

EC508	PCC	Simulation Laboratory	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical:2Hrs/week	CA-1 : 25Marks CA 2 : 25Marks

Pre-Requisites:-Basics of Mathematics, Basics of C Programming

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

CO1	ExperimentwithvariousarithmeticoperatorsandfunctionsinMATLAB.
CO2	DevelopefficientprogrammingskillusingBranchingandControlstatements.
CO3	Makeuseofdifferent building anduserdefinedfunctionsinMATLAB
CO4	BuildDifferentGUIswindowusingMALTLAB
CO5	Construct differentProcessingModelUsingSimulinkToolboxinMATLAB

Course Contents:

Unit no.1
Introduction to Matlab Software, The Command Prompt, Workspace, Simple Mathematical Expressions.
Basic Mathematics Using MATLAB: MATLAB basics, variables, arrays, Multidimensional sub arrays, Special values, displaying output data, data files, scalar and array operations, Hierarchy of operations built-in Matlab functions. **Graph:-**Introduction to plotting, Debugging Matlab programs.

Unit no.2
Branching and Control Statements
Branching, Statements and logical data type, Branches, write if & for loop logical arrays and vectorization, programming User-defined & i/o functions.

Unit no. 3
Private functions, Nested functions, complex data , string functions , text readfunction, load and save commands, an introduction to Matlab file processing, file opening and closing, binary i/o functions, formatted i/o functions, comparing formatted and binary i/o function, file positioning and status functions.

Unit no.4
Handle graphics & GUI, the Matlab graphics system, Object handles, examining and changing object properties, Using set to list possible property values, user defined data, Finding objects, selecting objects with the mouse, creating and displaying a graphical user interface, object properties, graphical user interface components, dialogboxes , menus.

Unit no. 5
Simulink basics, simulink modeling, solvers, simulating model using variables from matlab, data Import/ export, state space modeling & simulation, creation of subsystems.

Text Books:
1. Getting Started with MATLAB by RrudraPratap
2. MATLAB and its Applications in Engineering by Raj Kumar Bansal

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Reference Books:
1.MATLAB for Beginners by Peter IssaKattan.
2.A Guide to MATLAB for Beginners and Experienced user by Brian RHunt.

Experiment List: Minimum 8 experiments from this list.

1.	To study Basic of MATLAB.
2.	Write program for Operation on matrix.
3.	Write program for Complex function handling.
4.	Write Program for branching & looping statement.
5.	To study 2D and 3D plotting.
6.	Write program for User defined function.
7.	Write Program for file handling.
8.	To study String Manipulation.
9.	Write program for GUI components.
10.	Write program for Simulink.
11.	Write program for Generation of Discrete & Continuous signal.
12.	Write program for Operation of signal & sequence.

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Mini Project-IV

PRJ04	PROJ	Mini Project-IV	0-0-2	1 Credit

Teaching Scheme:	Examination Scheme:
Practical:2Hrs/week	CA-1 : 25Marks CA 2 : 25Marks

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

CO1	Select the appropriate method for solving the problem
CO2	Make use of various engineering techniques and tools to give a solution
CO3	Justify the method/tools used to develop the solution.
CO4	Demonstrate tangible solutions to the problem
CO5	Describe the solution with the help of a project report and presentation.

About Hackathon

The project is a part of addressing societal and industrial needs. Hackathon is one of the platforms that students will use to solve real-world challenges. This course focuses on the selection of methods/engineering tools/analytical techniques for problem-solving. Through this course, students gain a thorough understanding of engineering basics and ideas, gain practical experience, have the opportunity to display their skills and learn about teamwork, financial management, communication skills, and responsibility.

Guidelines:

1.	Every student shall undertake the Hackathon activity for semester V.
2.	Minimum three and maximum of five students should work together in Hackathon
3.	The students have to work on different approaches and finalize the best methodology to solve the problem in consultation with the project guide.
4.	The students should use different tools /Techniques for the development of the solution to the problem.
5.	While developing solutions, the student can take care of effective use of resources, follow ethical practices, finance management,
6.	The solution should be optimal, affordable, user-friendly and environment friendly.
7.	Critically analysis and testing of the solution provided.
8.	By using IPR, students should reserve their rights of innovations as well as communicate new findings to society with the help of research papers.

The committee of senior faculty members and a project guide will be appointed to monitor the progress and continuous evaluation of each project. The assessment shall be done jointly by the guide and committee members.

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SHARAD INSTITUTE OF TECHNOLO:
COLLEGE OF ENGINEERING
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Aptitude Skill III

HSMC	HMS05	Aptitude Skill III	1-0-0	1 credit

Teaching Scheme:	Examination Scheme:
Practical:1Hr/week	CA-1 : 25Marks CA 2 : 25Marks

Pre-Requisites: Communication Skills, Aptitude Skills I, II

Group B

Aptitude (12Hrs) (Compulsory)

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

CO1	Solve the problems on system of equation.
CO2	Solve the problems on seating arrangement.
CO3	Solve the logical reasoning problems.
CO4	Solve the critical analysis problems.
CO5	Solve the problems of Data interpretation.
CO6	Solve the problems of permutations and Combinations

Course Contents:

Unit no.1 **System of equations** quadratic equations, Surds and indices, solution of equations, Ages.	[2]
Unit no.2 **Seating Arrangements** Linear seating Arrangement, Circular seating arrangement, Complex seating arrangement	[2]
Unit no.3 **Logical Reasoning** Numerical based on sense of direction, Blood relations, Odd man Out	[2]
Unit no.4 **Critical analysis** Clocks and Calendar based problems, Crypt arithmetic, heights and distances	[2]
Unit no.5 **Data Interpretation** Table form, Bar form, Line for Pi chart form.	[2]
Unit no.6 Numbers and Words Repetition allowed and Repetition not allowed.	[2]

Text Books:
1. RS Aggarwal "A Modern Approach to Verbal & Non-Verbal Reasoning ",S. Chand Publisher; 2016 edition.
2. RS Aggarwal, " Quantitative Aptitude for Competitive Examinations ", S. Chand Publisher; 2016 edition.
3. Raymond Murphy "Essential English Grammar with Answers", Murphy

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Language Skill -III

HSMC	HMS06	Language Skill -III	0-0-2	Audit

Teaching Scheme:	Examination Scheme:
Practical:2Hrs/week	CA-1 : 25Marks
	CA 2 : 25Marks

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

CO1	Develop a program to read input and return output.
CO2	Develop a program using data types, Strings and variables
CO3	Develop a program using Unary, Binary and Ternary operator
CO4	Develop a program using Conditional and Logical statements.

Course Contents:

Unit no.1 **Introduction** What is Python, what can python do, why python, how to use Python, Python indentation, python comments, basic syntax of program, first program of python	[6]
Unit no.2 **Variable and data types** Creating variable, casting, variable name, global variable, local variable, built in datatypes, string, constructor, function of datatype, type conversion	[6]
Unit no.3 **Operators in Python** Unary Operator, Binary operator -:(arithmetic operator, logical operator, assignment operator, membership operator, identity operator, bitwise operator), ternary operator	[6]
Unit no.4 Unit IV **Statements and loops** Input & Output Statements, Conditional Statements, Simple if Statement, If-else statement, Else-if Ladder, Nested if statement, while loop, for loop, break, continue, pass statements	[6]

Text Books:
1. Python Projects (Author: Laura Cassell, Alan Gauld) Wrox publication.
2. Murach's Python Programming. Aut.:Michael Urban, Joel Murach, murach's Publication.
3. Fundamentals of Python (First Program) Cengage MINDTAP Publication 2nd Edition. Author: K.A. Kambert

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