SCHOOL OF ENGINEERING

SRI SATYA SAI UNIVERSITY OF TECHNOLOGY AND MEDICAL SCIENCES

Outcome based Curriculum for

Undergraduate Degree Courses in Engineering & Technology

Department of Information Technology

ITC-501

MICROPROCESSOR & INTERFACING

ITA-501	**MICROPROCESSOR & INTERFACING**	**2L:1T:2P**	**4 credits**	**5Hrs/Week**

Objectives :-

The objective of this course is to become familiar with the architecture and the instruction set of an Intel microprocessor

- Assembly language programming will be studied as well as the design of various types of digital and analog interfaces
- Understand the architecture of 8085 and 8051

Learning Outcomes:

At the end of this course students should:

1. Design and implement programs on 8086, ARM, PIC.
2. Design I/O circuits.
3. The program prepares students to successfully compete for employment in Electronics, Manufacturing and Embedded fields.
4. Design Memory Interfacing circuits.
5. Design and implement 8051 microcontroller based systems.
6. Describe the architecture and instruction set of ARM microcontroller

UNIT-I **(8 Hr.)**

Introduction to microprocessors, Microprocessor architecture and its operations, memory, inputs-outputs (I/Os), data transfer schemes interfacing devices, architecture, advancements of microprocessors.

UNIT-II **(7 Hr.)**

Architecture of 8085 microprocessor, Instruction set and Addressing modes of 8085 microprocessor, Assembly language programs of 8085 microprocessor, Stack, Subroutines, Time-Delay loops, Modular programming, Macro.

UNIT-III **(8 Hr.)**

8086 Microprocessor: Architecture, Register, Memory Segmentation, 8086 Memory Addressing Memory Read and Write Bus Cycle of 8086, Demultiplexing of the system Bus in 8086 and 8088 microprocessors, Instruction set and Addressing modes of 8086 microprocessor, Assembly language programs of 8086 microprocessor.

UNIT-IV **(9 Hr.)**

I/O and Memory Interfacing Using 8085/8086, Interrupts of 8085/8086 Microprocessors, 8259A Programmable Interrupt Controller, Programmable peripheral Interface, 8253 Programmable Counter/Interval Timer, Communication and Bus Interfacing with 8085/8086 Microprocessor, Serial Communication Interface, DMA Controller 8257, 8279-Programmable Keyboard and Display I/O Interface, Bus Interface,8089 I/O processor.

UNIT-V **(8 Hr.)**

8051 Microcontroller: Architecture of 8051 microcontroller, Memory organization, Timers/Counters, Interrupts, Addressing modes, 8051 Instruction set, Assembly language Programs, Applications of microcontrollers.

REFERENCES:

1. Douglas V Hall, "Microprocessors and interfacing – Programming & Hardware" TMH.

2. Gaonkar, "Microprocessor Architecture, Programming & Applications with 8085", TMH Grading System 2013 – 14.

3. Rafiquzzaman, "Microprocessors-Theory & Applications", PHI.

4. Savaliya, "8086 Programming & Advance Processor Architecture", Wiley India.

5. Ray, Bhurchandi, "Advanced Microprocessor and peripherals" TMH Pub.

6. Soumitra Kumar Mandal, "Microprocessors and Microcontroller" TMH Pub.

LIST OF EXPERIMENTS:

1. To study 8085 based microprocessor system.

2. To study 8086 based microprocessor system.

3. To develop and run a program for finding out the largest/smallest number from a given set of numbers. 4. To develop and run a program for arranging in ascending/descending order of a set of numbers.

5. To perform multiplication/division of given numbers.

6. To perform conversion of temperature from 0F to 0C and vice-versa.

7. To perform computation of square root of a given number.

8. To perform floating point mathematical operations (Addition, Subtraction, Multiplication and Division). 9. To obtain interfacing of RAM chip to 8085/8086 based system.

10. To obtain interfacing of keyboard controller.

ITA-502
Computer Graphics

ITA-502	Computer Graphics	2L:1T:2P	4 credits	5Hrs/Week

Objectives :-

This course will introduce students to all aspects of computer graphics including hardware, software and applications. Students will gain experience using a graphics application programming interface (OpenGL) by completing several programming projects.

Learning Outcomes:

At the end of this course students should:

Have a basic understanding of the core concepts of computer graphics.
Be capable of using OpenGL to create interactive computer graphics.
Understand a typical graphics pipeline.
Have made pictures with their computer

UNIT–I **(9 Hr.)**

Introduction and Overview of Graphics Systems:- Introduction to Computer Graphics, Application area of Computer Graphics, Introduction to Raster scan & Random scan displays, refreshing, flickering, interlacing, colour monitors, display processors resolution, working principle of dot matrix, inkjet laser printers, working principles of keyboard, mouse scanner, digitizing camera, track ball, tablets and joysticks, graphical input techniques etc.

UNIT–II **(7 Hr.)**

Scan conversion techniques, image representation, line drawing, simple DDA, Bresenham's Algorithm, Circle drawing, general method, symmetric DDA, Bresenham's Algorithm, curves, parametric function, Beizier Method, B-spline Method.

UNIT–III **(9 Hr.)**

2-D Transformation: - Translation, Rotation, Scaling, Shearing, Reflection, Inverse Transformation, Homogenous coordinate system, Matrices Transformation, Composite Transformation. Windowing & Clipping:- World Coordinate System, Screen Coordinate System, Viewing Transformation, Line Clipping & Polygon Clipping Algorithms

UNIT–IV **(7 Hr.)**

3-D Transformations: - Translation, Rotation and Scaling, Parallel & Perspective Projection:- Types of Parallel & Perspective Projection, Hidden Surface elimination:- Depth comparison, Back face detection algorithm, Painter's Algorithm, Z-Buffer Algorithm, Curve generation, Bezier and Bspline methods. Basic Illumination Model:- Diffuse reflection, Specular reflection, Phong Shading, Gouraud shading, Ray Tracing, Color models like RGB, YIQ, CMY, HSV.

UNIT–V **(8 Hr.)**

Multimedia :- Characteristics of a multimedia presentation, Uses of Multimedia, Text:– Types, Unicode Standard, text Compression, Text file formats, Audio Components of an audio system, Digital Audio, Digital Audio processing, Sound cards, Audio file formats, Audio Processing software, Video: -Video color spaces, Digital Video, Digital Video processing, Video file formats. Animation:- Uses of Animation, Principles of Animation, Computer based animation, 3D Animation, Animation file formats, Animation software's.

REFERENCES:-

1. Rogers, "Procedural Elements of Computer Graphics", Tata McGraw Hill

2. Donald Hearn and M.Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003

ITA-503
Java Programming

ITA-503	**Java Programming**	**2L:1T:2P**	**4 credits**	**5Hrs/Week**

OBJECTIVE:-

This course explores concepts underlying the definition, implementation, and use of programming languages. The goal is to provide you with an understanding of (and a vocabulary for) common language features, including how they are implemented, how other language-design choices affect them, and how they can be used effectively in program development.

OUTCOME:-

1. When given a moderate-sized Scheme program and relevant input, calculate the result of that program.
2. Describe, compare, and contrast various language features.
3. Implement an interpreter for a simple language incorporating lexical or dynamic scope, side effects and state, environments, closures, and recursion

UNIT-I **(8 Hr.)**

Basic Java Features - C++ Vs JAVA, JAVA virtual machine, Constant & Variables, Data Types, Class, Methods,Objects, Strings and Arrays, Type Casting, Operators, Precedence relations, Control Statements, Exception Handling, File and Streams, Visibility, Constructors, Operator and Methods Overloading, Static Members, Inheritance: Polymorphism, Abstract methods and Classes

UNIT-II

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9 Hr.)

Java Collective Frame Work - Data Structures: Introduction, Type-Wrapper Classes for Primitive Types, Dynamic Memory Allocation, Linked List, Stack, Queues, Trees, Generics: Introduction, Overloading Generic Methods, Generic Classes, Collections: Interface Collection and Class Collections, Lists, Array List and Iterator, Linked List, Vector. Collections Algorithms: Algorithm sorts, Algorithm shuffle, Algorithms reverse, fill, copy, max and min Algorithm binary Search, Algorithms add All, Stack Class of Package java. Util, Class Priority Queue and Interface Queue, Maps, Properties Class, Un- modifiable Collections.

UNIT-III **(7 Hr.)**

Advance Java Features - Multithreading: Thread States, Priorities and Thread Scheduling, Life Cycle of a Thread, Thread Synchronization, Creating and Executing Threads, Multithreading with GUI,Monitors and Monitor Locks. Networking: Manipulating URLs, Reading a file on a Web Server, Socket programming, Security and the Network, RMI, Networking, Accessing Databases with JDBC: Relational Database, SQL, MySQL, Oracle

UNIT-IV **(9 Hr.)**

Advance Java Technologies - Servlets: Overview and Architecture, Setting Up the Apache Tomcat Server, Handling HTTP get Requests, Deploying a web Application, Multitier Applications, Using JDBC from a Servlet, Java Server Pages (JSP): Overview, First JSP Example, Implicit Objects, Scripting, Standard Actions,

Directives, Multimedia: Applets and Application: Loading, Displaying and Scaling Images, Animating a Series of Images, Loading and playing Audio clips

UNIT-V **(7 Hr.)**

Advance Web/Internet Programming (Overview): J2ME, J2EE, EJB, XML.

References:

1. E. Balaguruswamy, "Programming In Java"; TMH Publications
2. The Complete Reference: Herbert Schildt, TMH
3. Deitel & Deitel, "JAVA, How to Program"; PHI, Pearson.
4. Cay Horstmann, Big JAVA, Wiley India.
5. Merlin Hughes, et al; Java Network Programming, Manning Publications/Prentice H

List of Experiment:

1. Installation of J2SDK
2. Write a program to show Scope of Variables
3. Write a program to show Concept of CLASS in JAVA
4. Write a program to show Type Casting in JAVA
5. Write a program to show How Exception Handling is in JAVA
6. Write a Program to show Inheritance
7. Write a program to show Polymorphism
8. Write a program to show Access Specifiers (Public, Private, Protected) in JAVA
9. Write a program to show use and Advantages of CONTRUCTOR
10. Write a program to show Interfacing between two classes

ITA- 504(A) Software Engineering

ITA- 504(A)	**Software Engineering**	**3L:1T:0P**	**4 credits**	**3 Hrs/Week**

OBJECTIVE:-

1. Knowledge of basic SW engineering methods and practices, and their appropriate application.
2. Describe software engineering layered technology and Process frame work.
3. A general understanding of software process models such as the waterfall and evolutionary models.

OUTCOME:-

1. Basic knowledge and understanding of the analysis and design of complex systems.
2. Ability to apply software engineering principles and techniques.
3. Ability to develop, maintain and evaluate large-scale software systems

UNIT –I **(8 Hr.)**

The Software Product and Software Process Software Product and Process Characteristics, Software Process Models: LinearSequential Model, Prototyping Model, RAD Model, Evolutionary Process Models likeIncremental Model, Spiral Model, Component Assembly Model, RUP and Agileprocesses. Software Process customization and improvement, CMM, Product andProcess Metrics**.**

UNIT II **(7 Hr.)**

Requirement Elicitation, Analysis, and Specification Functional and Non-functional requirements, Requirement Sources and Elicitation Techniques, Analysis Modeling for Function-oriented and Object-oriented software development, Use case Modeling, System and Software Requirement Specifications, Requirement Validation, Traceability

UNIT III **(7 Hr.)**

Software Design The Software Design Process, Design Concepts and Principles, Software Modeling andUML, Architectural Design, Architectural Views and Styles, User Interface Design, Function- oriented Design, SA/SD Component Based Design, Design Metrics.

UNIT IV **(9 Hr.)**

Software Analysis and Testing Software Static and Dynamic analysis, Code inspections, Software Testing, Fundamentals, Software Test Process, Testing Levels, Test Criteria, Test Case Design, TestOracles, Test Techniques, Black-Box Testing, White-Box Unit Testing and Unit, Testing Frameworks, Integration Testing, System Testing and other Specialized, Testing, Test Plan, Test Metrics, Testing Tools. , Introduction to Object-oriented analysis, design and comparison with structured Software Engg.

UNIT V **(9 Hr.)**

Software Maintenance & Software Project Measurement Need and Types of Maintenance, Software Configuration Management (SCM), Software Change Management, Version Control, Change control and Reporting, Program Comprehension Techniques, Re-engineering, Reverse Engineering, Tool Support. Project Management Concepts, Feasibility Analysis, Project and Process Planning, Resources Allocations, Software efforts, Schedule, and Cost estimations, Project Scheduling and Tracking, Risk Assessment and Mitigation, Software Quality Assurance(SQA). Project Plan, Project Metrics.

ITA- 504(B)
Simulation & Modeling

ITA- 504(B)	Simulation & Modeling	3L:1T:0P	4 credits	4Hrs/Week

Objectives: -

The aim of this course is to introduce various system modelling and simulation techniques, and highlight their applications in different areas. It includes modelling, design, simulation, planning, verification and validation. After learning the simulation techniques, the students are expected to be able to solve real world problems which cannot be solved strictly by mathematical approaches. This course begins by demonstrating the usefulness of simulation as a tool for problem solving in business, industry, government, and society.

Learning Outcomes:

• Knowledge and understanding

Understand different methods for random number generation
Have a clear understanding of the need for the development process to initiate the real problem.
Have a clear understanding of principle and techniques of simulation methods informed by research direction.

• Cognitive skills (thinking and analysis)

(a) Be able to describe the components of continuous and discrete systems and simulate them.

(b) Be able to model any system from different fields

(c) Be able to implement numerical algorithm to meet simple requirements, expressed in English.

(d) Be able to discuss the simulation methods and select the suitable technique on the problems.

UNIT-I **(9 Hr.)**

Introduction to Modelling and Simulation: Nature of Simulation Systems, Models and Simulation, Continuous and Discrete Systems, system modelling, concept of simulation, Components of a simulation study, Principles used in modelling, Static and Dynamic physical models, Static and Dynamic Mathematical models, Introduction to Static and Dynamic System simulation, Advantages, Disadvantages and pitfalls of Simulation.

UNIT-II **(8 Hr.)**

System Simulation and Continuous System Simulation: Types of System Simulation, Monte Carlo Method, Comparison of analytical and Simulation methods, Numerical Computation techniques for Continuous and Discrete Models, Distributed Lag Models, Cobweb Model, Continuous System models, Analog and Hybrid computers, Digital-Analog Simulators, Continuous system simulation languages, Hybrid simulation, Real Time simulations.

UNIT –III **(8 Hr.)**

System Dynamics & Probability concepts in Simulation: Exponential growth and decay models, logistic curves, Generalization of growth models, System dynamics diagrams, Multi segment models, Representation of Time

Delays. Discrete and Continuous probability functions, Continuous Uniformly Distributed Random Numbers, Generation of a Random numbers, Generating Discrete distributions, Non-Uniform Continuously Distributed Random Numbers, Rejection Method.

UNIT-IV **(8 Hr.)**

Simulation of Queueing Systems and Discrete System Simulation: Poisson arrival patterns, Exponential distribution, Service times, Normal Distribution Queuing Disciplines, Simulation of single and two server queue, Application of queuing theory in computer system, Discrete Events, Generation of arrival patterns, Simulation programming tasks, Gathering statistics, Measuring occupancy and Utilization , Recording Distributions and Transit times.

UNIT-V **(7 Hr.)**

Introduction to Simulation languages and Analysis of Simulation output GPSS: Action times, Succession of events, Choice of paths, Conditional transfers, program control statements, SIMSCRIPT: Organization of SIMSCRIPT Program, Names & Labels, SIMSCRIPT statements, Estimation methods, Relication of Runs, Batch Means, Regenerative techniques, Time Series Analysis, Spectral Analysis and Autoregressive Processes.

REFERENCES:

1. Gorden G., System simulation, Prentice Hall.

2. Seila, Simulation Modeling, Cengage Learning.

3. Law .,Simulation Modeling And Analysis, McGraw Hill.

4. Deo, System Simulation with Digital Computer, PHI.

5. Harrington, Simulation Modeling methods, McGraw Hill.

6. Severance, " System Modeling & Simulation, Willey Pub.

ITA- 505(A)
E-Commerce & Governance

ITA 505(A)	E-COMMERCE & GOVERNANCE	**3L:1T:0P**	**4 credits**	**4Hrs/Week**

Objectives: -
The main objective of this course are to :-

Examine the different definitions of e-commerce and e-governance
Describe major players in e-commerce
Explain the key drivers of e-commerce
Attempt a classification of e-commerce
Mention the role played by governments in the development of e-commerce
Examine the prerequisites for e-governance
Identify the skills needed for the successful functioning of e-governance
Describe the different models of e-governance

Learning Outcomes:
On completing this module, you should know clearly the meaning of the terms E-commerce and E-governance. You should also be aware of the various e- governance initiatives in India. You also need to have an idea of the role libraries, especially public libraries, can play in such initiatives.

UNIT-I **(8 Hr.)**
Introduction to e-commerce: History of e-commerce, e-business models B2B, B2C, C2C, C2B, legal, environment of e-commerce, ethical issues, electronic data interchange, value chain and supply chain, advantages and disadvantages of e-commerce.

UNIT-II **(8 Hr.)**
Electronic Payment Systems: Credit cards, debit cards, smart cards, e-credit accounts, e-money, Marketing on the web, marketing strategies, advertising on the web, customer service and support, introduction to m-commerce, case study: e-commerce in passenger air transport.

UNIT-III **(8 Hr.)**
E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of egovernance, e-governance models broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

UNIT-IV **(8 Hr.)**
E-readiness, e-government readiness, E- Framework, step & issues, application of data warehousing and data mining in e-government, Case studies: NICNET-role of nationwide networking in egovernance, e-seva.

UNIT-V **(8 Hr.)**
E-Government systems security: Challenges and approach to e-government security, security concern in e-commerce, security for server computers, communication channel security, security for client computers.

REFERENCES:

1. Gary P. Schneider, "E-commerce", Cengage Learning India.
2. C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.
3. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited.
4. David Whiteley, "E-commerce study, technology and applications", TMH.

ITA-505(B) Information Theory & Coding

ITA-505(B)	**Information Theory & Coding**	**3L:0T:0P**	**3 credits**	**3Hrs/Week**

Objective:

The objectives of this course are to understand the fundamentals of Cryptography, to acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity, to understand the various key distribution and management schemes, to understand how to deploy encryption techniques to secure data in transit across data networks, to design security applications in the field of Information technology.

Outcome:

The students at the end of the course will be able to:

- Understand and explain the basic concepts of information theory, source coding, channel and channel capacity, channel coding and relation among them.
- Describe the real life applications based on the fundamental theory.
- Calculate entropy, channel capacity, bit error rate, code rate, steady-state probability and so on.
- Implement the encoder and decoder of one block code or convolutional code using any program language

UNIT-I **(9 Hr.)**

Uncertainty, Information and Entropy Information Measures, Characteristics on information measure, Shannon's concept of information, Shannon's measure of information, Model for source coding theorem, Communication system, Source coding and line/channel coding, channel mutual information capacity (Bandwidth).

UNIT-II **(8Hr.)**

Channel coding, Theorem for discrete memory less channel, Information capacity theorem: Error detecting and error correcting codes, Types of codes, Block codes, Tree codes, Hamming Codes, Description of linear block codes by matrices, Description of linear tree code by matrices, Parity check codes, Parity check polynomials.

UNIT-III **(9 Hr.)**

Compression: Lossless and lossy, Huffman codes, Binary Image compression schemes, Run length Encoding, CCITT group-3 1D compression, CCITT group-3 2D compression, CCITT group-4 2D compression.

UNIT-IV **(7 Hr.)**

Video Image Compression: Requirement of full motion video compression, CCITT H 261 video coding algorithm, MPEG compression methodology, MPEG-2 compression, Audio (Speech)compression.

UNIT-V **(7Hr.)**

Cryptography: Encryption, Decryption, Cryptogram (cipher text), Concept of cipher, Cryptanalysis, Keys: Single key (Secret key), Cryptography, two-key (Public key) cryptography, Single key cryptography, Ciphers, Block Cipher code, Stream ciphers, Requirements for secrecy, The data Encryption Standard, Public Key Cryptography, Diffie- Hellmann public key distribution, The Rivest- Shamin Adelman(R-S-A) system for public key cryptography, Digital Signature.

REFERENCES:

1. Rajan Bose "Information Theory, Coding and Cryptography", TMH, 2002.
2. G A Jones J M Jones, "Information and Coding Theory", Springer Verlag, 2004.
3. Cole, "Network Security", Bible, Wiley INDIA, Second Addition.
4. K Sayood, "Introduction to Data Compression" 3/e, Elsevier 200