INTRODUCTION TO COMPUTERS AND PROGRAMMING IN C

Course Code: ITE2104
Credit Units: 03

Course Objective:
The objective of this course module is to acquaint the students with the basics of computers system, its components, data representation inside computer and to get them familiar with various important features of procedure oriented programming language i.e. C.

Course Contents:

Module I: Introduction
Introduction to computer, history, von-Neumann architecture, memory system (hierarchy, characteristics and types), H/W concepts (I/O Devices), S/W concepts (System S/W & Application S/W, utilities). Data Representation: Number systems, character representation codes, Binary, octal, hexadecimal and their interconversions. Binary arithmetic, floating point arithmetic, signed and unsigned numbers, Memory storage unit.

Module II: Programming in C

Module III: Fundamental Features in C
C Statements, conditional executing using if, else, nesting of if, switch and break Concepts of loops, example of loops in C using for, while and do-while, continue and break. Storage types (automatic, register etc.), predefined processor, Command Line Argument.

Module IV: Arrays and Functions
One dimensional arrays and example of iterative programs using arrays, 2-D arrays Use in matrix computations. Concept of Sub-programming, functions Example of user defined functions. Function prototype, Return values and their types, calling function, function argument, function with variable number of argument, recursion.

Module V: Advanced features in C

Examination Scheme:

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CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:
- “ANSI C” by E Balagurusamy

References:
**PROGRAMMING IN C LAB**

**Course Code:** ITE2106  
**Credit Units:** 01

**Software Required:** Turbo C

**Course Contents:**
- C program involving problems like finding the nth value of cosine series, Fibonacci series. Etc.
- C programs including user defined function calls
- C programs involving pointers, and solving various problems with the help of those.
- File handling

**Examination Scheme:**

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Note: IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.
OBJECT ORIENTED PROGRAMMING USING C++

Course Code:ITE2204 Credit Units: 03

Course Objective:
The objective of this module is to introduce object oriented programming. To explore and implement the various features of OOP such as inheritance, polymorphism, Exceptional handling using programming language C++. After completing this course student can easily identify the basic difference between the programming approaches like procedural and object oriented.

Course Contents:

Module I: Introduction

Module II: Classes and Objects
Abstract data types, Object & classes, attributes, methods, C++ class declaration, Local Class and Global Class, State identity and behaviour of an object, Local Object and Global Object, Scope resolution operator, Friend Functions, Inline functions, Constructors and destructors, instantiation of objects, Types of Constructors, Static Class Data, Array of Objects, Constant member functions and Objects, Memory management Operators.

Module III: Inheritance
Inheritance, Types of Inheritance, access modes – public, private & protected, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hierarchies, Overriding inheritance methods, Constructors in derived classes, Nesting of Classes.

Module IV: Polymorphism
Polymorphism, Type of Polymorphism – Compile time and runtime, Function Overloading, Operator Overloading (Unary and Binary) Polymorphism by parameter, Pointer to objects, this pointer, Virtual Functions, pure virtual functions.

Module V: Strings, Files and Exception Handling

Examination Scheme:

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Text & References:

Text:
- “Object Oriented Programming with C++” By E. Balagurusamy.

References:
OBJECT ORIENTED PROGRAMMING USING C++ LAB

Course Code: ITE2208
Credit Units: 01

Software Required: Turbo C++

Course Contents:
- Creation of objects in programs and solving problems through them.
- Different use of private, public member variables and functions and friend functions.
- Use of constructors and destructors.
- Operator overloading
- Use of inheritance in and accessing objects of different derived classes.
- Polymorphism and virtual functions (using pointers).
- File handling.

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Course Objective:
The objective is to acquaint the students with the basics of data communication and networking. A structured approach to explain how networks work from the inside out is being covered. The physical layer of networking, computer hardware and transmission systems have been explained. In-depth application coverage includes email, the domain name system; the World Wide Web (both client- and server-side); and multimedia (including voice over IP).

Course Contents:
Module I: Introduction
Introduction to computer networks, evolution of computer networks and its uses, reference models, example networks
The physical layer: Theoretical basis for data communication, transmission media, wireless transmission, telecom infrastructure, PSTN, communication satellites, mobile telephone system

Module II: The data link layer
Data link layer design issues, error detection and correction, data link protocols, sliding window protocols, example of data link protocols- HDLC, PPP Access

Module III: Medium access layer

Module IV: The network layer
Network layer concepts, design issues, static and dynamic routing algorithms, shortest path routing, flooding, distance vector routing, link state routing, distance vector routing, multicast routing, congestion control and quality of service, internetworking, Ipv4

Module V: The transport layer
The transport services, elements of transport protocols, TCP and UDP
The application layer: Brief introduction to presentation and session layer, DNS, E-mail, WWW

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Text & References:
Text:
- Computer networks: Tanenbaum, Andrew S, Prentice Hall
- Data communication & networking: Forouzan, B. A.

References:
- Computer network protocol standard and interface: Uyless, Black
- Data and Computer Communications, Seventh Edition (7th.) William Stallings Publisher: Prentice Hall
DATABASE MANAGEMENT SYSTEMS

Course Code: ITE2302 Credit Units: 04

Course Objective:
The objective of this course is to get students familiar with Databases and their use. They can identify different types of available database model, concurrency techniques and new applications of the DBMS.

Course Contents:
Module I: Introduction
Concept and goals of DBMS, DBMS Architecture, Database Languages, Database Users, Database Abstraction.
Basic Concepts of ER Model: Entity Type, Entity Set, Relationship type, Relationship sets, Constraints: Cardinality Ratio and Participation Constraint, Keys, Mapping, Design of ER Model

Module II: Hierarchical model & Network Model
Concepts, Data definition, Data manipulation and implementation.
Network Data Model, DBTG Set Constructs, and Implementation

Module III: Relational Model
Relational database, Relational Algebra, Relational Calculus, Tuple Calculus.

Module IV: Relational Database Design and Query Language
SQL, QUEL, QBE, Normalization using Functional Dependency, 1NF, 2NF, 3NF, BCNF, Multi valued dependency and Join dependency.

Module V: Concurrency Control and New Applications

Examination Scheme:

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Text & References:

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References:
OPERATING SYSTEMS

Course Code: ITE2303 Credit Units: 03

Course Objective:
Operating Systems serve as one of the most important courses for undergraduate students, since it provides the students with a new sight to envision every computerized systems especially general purpose computers. Therefore, the students are supposed to study, practice and discuss on the major fields discussed in the course to ensure the success of the education process. The outcome of this course implicitly and explicitly affects the abilities the students to understand, analyze and overcome the challenges they face with in the other courses and the real world.

Course Contents:

Module I: Introduction to operating system
Operating system and function, Evolution of operating system, Batch, Interactive, multiprogramming, Time Sharing and Real Time System, multiprocessor system, Distributed system, System protection. Operating System structure, Operating System Services, System Program and calls.

Module II: Process Management
Process concept, State model, process scheduling, job and process synchronization, structure of process management, Threads
Interprocess Communication and Synchronization:
CPU Scheduling:
Deadlock:
System Deadlock Model, Deadlock Characterization, Methods for handling deadlock, Prevention strategies, Avoidance and Detection, Recovery from deadlock combined approach.

Module III: Memory Management

Module IV: Device management
Principles of I/O hardware, Device controller, Device Drivers, Memory mapped I/O, Direct Access Memory, Interrupts, Interrupt Handlers, Application I/O interface, I/O Scheduling, Buffering, Caching, Spooling,
Disk organization, Disk space management, Disk allocation Method, Disk Scheduling, Disk storage.

Module V: File System and Protection and security
Policy Mechanism, Authentication, Internal excess Authorization.

Examination Scheme:

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Text & References:

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References:
- Dietel, “An introduction to operating system”, Addision Wesley
- Tannenbaum, “Operating system design and implementation”, PHI
- Willam Stalling “ Operating system” Pearson Education
- Sumitabha Das “ Your UNIX The ultimate guide” Tata Mcgraw Hill
- “Design of UNIX Operating System “ The Bach Prentice – Hall of India
DATA STRUCTURES USING C

Course Code: ITE2304  Credit Units: 04

Course Objective:
Data structure deals with organizing large amount of data in order to reduce space complexity and time requirement. This course gives knowledge of algorithms, different types of data structures and the estimation space and time complexity.

Course Contents:
Module I: Introduction to Data structures
Data structures: Definition, Types. Algorithm design, Complexity, Time-Space Trade offs. Use of pointers in data structures.
Array Definition and Analysis, Representation of Linear Arrays in Memory, Traversing of Linear Arrays, Insertion And Deletion, Single Dimensional Arrays, Two Dimensional Arrays, Multidimensional Arrays, Function Associated with Arrays, Character String in C, Character String Operations, Arrays as parameters, Implementing One Dimensional Array, Sparse matrix.

Module II: Introduction to Stacks and queue
Stack: Definition, Array representation of stacks, Operations Associated with Stacks- Push & Pop, Polish expressions, Conversion of infix to postfix, infix to prefix (and vice versa), Application of stacks recursion, polish expression and their compilation, conversion of infix expression to prefix and postfix expression, Tower of Hanoi problem.
Queue: Definition, Representation of Queues, Operations of queues- QInsert, QDelete, Priority Queues, Circular Queue, Deque.

Module III: Dynamic Data Structure
Linked list: Introduction to Singly linked lists: Representation of linked lists in memory, Traversing, Searching, Insertion into, Deletion from linked list, doubly linked list, circular linked list, generalized list. Applications of Linked List-Polynomial representation using linked list and basic operation. Stack and queue implementation using linked list.

Module IV: Trees and Graphs
Trees: Basic Terminology, Binary Trees and their representation, expression evaluation, Complete Binary trees, extended binary trees, Traversing binary trees, Searching, Insertion and Deletion in binary search trees, General trees, AVL trees, Threaded trees, B trees.

Module V: Sorting and Searching and file structures
Sorting: Insertion Sort, Bubble sort, Selection sort, Quick sort, two-way Merge sort, Heap sort, Partition exchange sort, Shell sort, Sorting on different keys, External sorting.
Searching: Linear search, Binary search
File structures: Physical storage media, File Organization, Linked organization of file, Inverted file, Organization records into blocks, Sequential blocks, Hash function, Indexing & Hashing, Multilevel indexing, Tree Index, Random file, Primary Indices, Secondary Indices, B tree index files.

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Text & References:

Text:
- Horowitz and Sahani, “Fundamentals of Data structures”, Galgotia publications
- Tannenbaum, “Data Structures”, PHI
- R.L. Kruse, B.P. Leary, C.L. Tondo, “Data structure and program design in C” PHI
- “Data structures and algorithms” – Schaum Series.
DATA STRUCTURES USING C LAB

Course Code: ITE2305                        Credit Units: 01

Software Required: Turbo C++

Assignment will be provided for following:
- Practical application of sorting and searching algorithm.
- Practical application of various data structure like linked list, queue, stack, tree

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DATA COMMUNICATION AND COMPUTER NETWORKS LAB

Course Code: ITE2306  Credit Units: 01

Equipments Required:
Switch Network Cables, Patch Chord- Fiber optical and twisted pair cable, LAN cards, RJ-45 connectors etc.
Platforms required: Linux Server

Course Contents:
- Introduction and Installation of Linux
- Administrating Linux
- Setting up a Local Area Network
- Connecting to the Internet
- Setting up Print Server
- Setting up File Server
- Setting up Mail Server
- Setting up FTP Server
- Setting up Web Server
- Setting up MySQL Database Server

Examination Scheme:

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DATABASE MANAGEMENT SYSTEMS LAB

Course Code: ITE2307
Credit Units: 01

Software Required: Oracle 9i

Topics covered in lab will include:
- Database Design
- Data Definition (SQL)
- Data Retrieval (SQL)
- Data Modification (SQL)
- Views
- Triggers and Procedures
- PL/SQL

Examination Scheme:

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UNIX PROGRAMMING LAB

Course Code: ITE2308 Credit Units: 01

Software Required: UNIX SCO

Assignments will be provided for the following
- Introduction to UNIX Commands
- Introduction to vi editor
- Programming in shell script
- Introduction to programming in C Shell

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Note: IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

Text & References:
- “Unix Programming Environment” The Kernighan and Pike Prentice – Hall of India
- “Unix –Shell Programming” Kochar
- “Unix Concepts and application” Das Sumitabha Tata Mcgraw Hill
INTRODUCTION TO CLOUD COMPUTING

Course Code: ITE2309 Credit Units: 03

Course Objective:
The course presents a top-down view of cloud computing, from applications and administration to programming and infrastructure. The topic introduces students with various concepts like cloud systems, parallel processing in the cloud, distributed storage systems, virtualization, security in the cloud, and multicore operating systems. Students will study state-of-the-art solutions for cloud computing developed by Google, Amazon, Microsoft etc.

Course Contents:

Module I: Introduction to Cloud Computing

Module II: Infrastructure as a Service (IaaS)
IaaS definition, Introduction to virtualization, Different approaches to virtualization, Resource Virtualization- Server, Storage, Network, Hypervisors, Machine Image, Virtual Machine(VM), Data storage in cloud computing(storage as a service), Examples like Amazon EC2-Renting, EC2 Compute Unit, Platform and Storage, pricing, customers.

Module III: Platform as a Service (PaaS)
What is PaaS, Service Oriented Architecture (SOA), Cloud Platform and Management, Examples like Google App Engine.

Module IV: Software as a Service (SaaS)
Introduction to SaaS, Web services, Web 2.0

Module V:

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Text & References:

Text:
- Michael Miller, Cloud Computing, 2008
**Course Objective:**
This course examines the evolution of enterprise resource planning (ERP) systems - from internally focused client/server systems to externally focused e-business. This class studies the types of issues that managers will need to consider in implementing cross-functional integrated ERP systems. The objective of this course is to make students aware of the potential and limitations of ERP systems. This objective will be reached through hands-on experience, case studies, lectures, guest speakers and a group project. The course would equip students with the basics of E-Commerce, technologies involved with it and various issues associated with it.

**Course Contents:**

**Module I: Introduction and Concepts**
*Networks and commercial transactions* - Internet and other novelties; Networks and electronic transactions today, Model for commercial transactions; Internet environment - internet advantage, world wide web and other internet sales venues; Online commerce solutions.

**Security Technologies:** Why is internet insecure? A brief introduction to Cryptography; Public key solution. Digital payment systems; First virtual internet payment system; cyber cash model Operational process of Digicash, Ecash Trail; Using Ecash; Smart cards; Electronic Data Interchange: Its basics; EDI versus Internet and EDI over Internet.

**Module II: Introduction ERP**
An Overview, Enterprise- An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, On-line Analytical Processing (OLAP), Supply Chain Management, Management Information systems (MIS), Decision support system (DSS), Executive Information systems (EIS). ERP – A Manufacturing Perspective Materials Requirement Planning (MRP), Bill of Material (Bom), Distribution Requirements Planning (DRP), JIT & Kanban, CAD/CAM, Product Data Management (PDM), Benefits of PDM, MTO, MTS, ATO, ETO, CTO.

**Module III: ERP Implementation**
To be or not to be, ERP Implementation Lifecycle, Implementation Methodology, Not all Packages are Created Equal!, ERP Implementation- The Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring, After ERP Implementation.

**Module IV: The Business Modules**
Business Modules in an ERP Package, Finance, Manufacturing (Production), Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution

**Module V: The ERP Market**
ERP Market Place, SAP AG, PeopleSoft, Baan Company, JD Edwards World Solutions Company, Oracle Corporation, QAD, System Software Associates, Inc. (SSA)

**ERP-Present and Future**
Turbo Charge the ERP System, Enterprise Integration Applications (EIA), ERP and E-Commerce, ERP and Internet, Future Directions in ERP, Appendices’’

**Module VI: Benefits of ERP**
Time Reduction, Resource Utilization, Performance, Customer Satisfaction, Flexibility, Quality, Accuracy.

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ELECTRONIC DEVICES AND CIRCUITS

Course Code: ITE2311  Credit Units: 02

Course Objective:
This course builds from basic knowledge of Semiconductor Physics to an understanding of basic devices and their models. This course builds a foundation for courses on VLSI design and analog CMOS IC Design.

Course Contents:

Module I: Semiconductor physics: Mobility & conductivity, Charge densities in a semiconductor, Fermi dirac distribution, carrier concentration and Fermi levels in semiconductor, generation and recombination of charges, diffuse and continuity equations, Hall effect.

Module II: Semiconductor Diode and Diode Circuits
Junction diode, Diode as circuit element, Different types of diodes: Zener, Schottky, LED. Zener as voltage regulator, Diffusion capacitance, Drift capacitance, the load line concept, half wave, full wave rectifiers, clipping and clamping circuits.

Module III: Bipolar Junction Transistor
Bipolar junction transistor: Introduction, Transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations. Bias stabilization: Need for stabilization, fixed Bias, emitter bias, self bias, bias stability with respect to variations in $I_{ce}$, $V_{BE}$ & $\beta$, Stabilization factors, thermal stability.

Module IV: Small signal Analysis of transistor and Multistage Amplifier
Hybrid model for transistors at low frequencies, Analysis of transistor amplifier using h parameters, emitter follower, Miller’s theorem, THE CE amplifier with an emitter resistance, Hybrid $\pi$ model, Hybrid $\pi$ Conducatnces and Capacitances, CE short circuit current gain, CE short circuit current gain with $R_L$. Multistage amplifier: Cascading of Amplifiers, Coupling schemes (RC coupling and Transformer coupling)

Module V: Field Effect Transistors
Field effect transistor (JFET, MOSFET): volt-ampere characteristics, small signal model –common drain, common source, common gate, operating point, MOSFET, enhancement and -depletion mode, Common source amplifier, Source follower

Module VI: Feedback Amplifiers
Feedback concept, Classification of Feedback amplifiers, Properties of negative Feedback amplifiers, Impedance considerations in different Configurations, Examples of analysis of feedback Amplifiers.

Module VII: Power Amplifiers
Power dissipation in transistors, difference with voltage amplifiers, Amplifier classification (Class A, Class B, Class C, ClassAB) class AB push pull amplifier, collector efficiency of each, cross over distortion.

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Text & References:
- Millman and Halkias: Electronic Devices and circuits, Tata McGraw.
- Boylestad: Electronic Devices and Circuits, Pearson Education.
ELECTRONIC DEVICES AND CIRCUITS LAB

Course Code: ITE2312
Credit Units: 01

1. To study and plot the characteristics of a junction diode.
2. To study Zener diode as a voltage regulator.
3. To study diode based clipping and clamping circuits.
4. To study half wave, full wave and bridge rectifier with filters.
5. To study the input and output characteristics of a transistor in its various configurations.
6. To study and plot the characteristics of a JFET in its various configurations.
7. To study and plot the characteristics of a MOSFET in its various configurations.
8. To study various types of Bias Stabilization for a transistor.
9. To study the gain and plot the frequency response of a single stage transistor amplifier.
10. To measure gain and plot the frequency response of double stage RC coupled amplifier.

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Note: IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.
THEORY OF AUTOMATA AND COMPUTATION

Course Code: ITE2401  Credit Units: 04

Course Objective:
The course begins with the basic mathematical preliminaries and goes on to discuss the general theory of automata, properties of regular sets and regular expressions, and the basics of formal languages. Besides, sufficient attention is devoted to such topics as pushdown automata and it’s relation with context free languages, Turing machines and linear bounded automata, the basic concepts of computability such as primitive recursive functions and partial recursive functions.

Course Contents:
Module I: Introduction to Languages and Automata

Module II: Context Free Grammars and Pushdown Automata
CFG: Formal Definition, Derivation and Syntax trees, E-removal, Ambiguous Grammar, Properties of CFL, Normal Forms (CNF and GNF)
Pushdown Automata:Definitions, Relationship between PDA and context free language, Decision Algorithms

Module III: Turing Machine
The Turing Machine Model, Language acceptability of Turing Machine, Design of TM, Universal TM, Church’s Machine.
Recursive and recursively enumerable language, unrestricted grammars, Context Sensitive Language, Linear Bounded Automata (LBA).

Module IV: Undecidability
Turing machine halting Problem, undecidable problems for recursive enumerable language, Post correspondence problems (PCP) and Modified Post correspondence problems, Undecidable problems for CFL.

Module V: Computability
Partial and Total Functions, Primitive Recursive functions, Recursive functions.

Examination Scheme:

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CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

Text:
- Hopcroft and Ullman, “Introduction to Automata Theory, languages and computation”, Addision Wesley.
- “An introduction to formal languages and Automata (2nd ed)” by Peter Linz, D. C. Health and Company.

References:
- “Introduction to theory of computation (2nd Ed)” by Michael sipser.
- Mishra &Chandrashekharan, “Theory of Computer Sciences”, PHI.
- ZaviKohavi, “Switching and finite Automata Theory “
- Kohan, “Theory of Computer Sciences”.
- Korral, “Theory of Computer Sciences”.

Syllabus - Fourth Semester
DIGITAL ELECTRONICS

Course Code: ITE2402  Credit Units: 02

Course Objective:
This course is an introduction to the basic principles of digital electronics. At the conclusion of this course, the student will be able to quantitatively identify the fundamentals of computers, including number systems, logic gates, logic and arithmetic subsystems, and integrated circuits. They will gain the practical skills necessary to work with digital circuits through problem solving and hands on laboratory experience with logic gates, encoders, flip-flops, counters, shift registers, adders, etc. The student will be able to analyze and design simple logic circuits using tools such as Boolean Algebra and Karnaugh Mapping, and will be able to draw logic diagrams.

Course Contents:
Module I: Boolean Functions
Analog & digital signals, AND, OR, NOT, NAND, NOR & XOR gates, Boolean algebra, Standard representation of logical functions, K-map representation and simplification of logical function, don’t care conditions, XOR & XNOR simplifications of K-maps, Tabulation method.

Module II: Combinational Circuits
Adders, Subtractors, Multiplexer, de-multiplexer, decoder & encoder, code converters, Comparators, decoder / driver for display devices, Implementation of logic functions using multiplexer / de-multiplexer,.

Module III: Sequential Circuits

Module IV: Logic families
Logic families: RTL, DTL, TTL, ECL

Module V: Data Converters
Data converters: ADC – successive approximation, linear ramp, dual slope; DAC – Binary Weighted, R-2R ladder type

Examination Scheme:

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Text & References:
- Moris Mano: Digital Circuits Systems
- R. P. Jain: Digital Logic& Circuits
- Thomas L. Floyd: Digital Fundamentals
- Malvino and Leech: Digital Principles & Applications
DISCRETE MATHEMATICS

Course Code: ITE2403  Credit Units: 04

Course Objective:
This subject provides students with an in-depth education in the conceptual foundations of computer science and in engineering complex software and hardware systems. It allows them to explore the connections between computer science and a variety of other disciplines in engineering and outside. Combined with a strong education in mathematics, sciences, and the liberal arts it prepares students to be leaders in computer science practice, applications to other disciplines, and research.

Course Contents:
Module I: Formal Logic
Statement, Symbolic Representation and Tautologies, Quantifiers, Predicator and validity, Normal form. Propositional Logic, Predicate Logic, First Order Logic.

Module II: Proof & Relation

Module III: Sets and Combinations
Sets, Subtracts, power sets, binary and unary operations on a set, set operations/set identities, fundamental country principles, principle of inclusion, exclusion and pigeonhole principle, permutation and combination, Pascal’s triangles, Comparing rates of growth: big theta, little oh, big oh and big omega.

Module IV: Relation/Function and matrices
Relation/function and matrices: Relation, properties of binary relation, operation on binary relation, closures, partial ordering, equivalence relation, Function, properties of function, composition of function, inverse, binary and n-ary operations, characteristic function, Permutation function, composition of cycles, Boolean matrices, Boolean matrices multiplication.

Module V: Lattices & Boolean Algebra
Lattices: definition, sub lattices, direct product, homomorphism Boolean algebra: definition, properties, isomorphic structures (in particulars, structures with binary operations) sub algebra, direct product and homo-morphism, Boolean function, Boolean expression, representation & minimization of Boolean function.

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Text & References:
Text:
- Kolman, Busby & Ross “Discrete Mathematical Structures”, PHI.

References:
INTRODUCTION TO IOT

Course Code: ITE2404  Credit Units: 03

Course Objective:
The Internet is evolving to connect people to physical things and also physical things to other physical things all in real time. It’s becoming the Internet of Things (IoT). The course enables student to understand the basics of Internet of things and protocols. It introduces some of the application areas where Internet of Things can be applied. Students will learn about the middleware for Internet of Things. To understand the concepts of Web of Things

Course Contents:


Module III: IOT ARCHITECTURE - IoT Open source architecture (OIC)- OIC Architecture & Design principles- IoT Devices and deployment models- IoTivity : An Open source IoT stack - Overview- IoTivity stack architecture- Resource model and Abstraction.


Module V: IOT APPLICATIONS - IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications. Study of existing IoT platforms /middleware, IoT- A, Hydra etc.

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Text & References:

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References:
DIGITAL ELECTRONICS LAB

Course Code: ITE2405 Credit Units: 01

List of Experiments:
1. To verify the truth tables of OR, AND, NOR, NAND, EX-OR, EX-NOR gates.
2. To obtain half adder, full adder and subtractor using gates and verify their truth tables.
3. To verify the truth tables of RS, JK and D flip-flops.
4. To design and study a binary counter.
5. To design and study synchronous counter.
6. To design and study ripple counter.
7. To convert BCD number into excess 3 form
8. To design and study a decade counter.
9. To design and study a sequence detector.
10. To implement control circuit using multiplexer.

Examination Scheme:

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COMMUNICATION SYSTEMS

Course Code: ITE2406

Credit Units: 02

Course Objective:
The purpose of this course is to provide a thorough introduction to analog and digital communications with an in depth study of various modulation techniques, Random processes are discussed, and information theory is introduced.

Course Contents:

Module I: Introduction
Communication Process, Source of Information, Communication channels, base-band and pass-band signals, Review of Fourier transforms, Random variables, different types of PDF, need of modulation process, primary communication resources, analog versus digital communications

Module II: Amplitude modulation
Amplitude modulation with full carrier, suppressed carrier systems, single side band transmission, switching modulators, synchronous detection, envelope detection, effect of frequency and phase errors in synchronous detection, comparison of various AM systems, vestigial side band transmission.

Module III: Angle Modulation
Narrow and wide band FM, BW calculations using Carlson rule, Direct & Indirect FM generations, phase modulation, Demodulation of FM signals, noise reduction using pre & de-emphasis.

Module IV: Pulse Modulation
Pulse amplitude, width & position modulation, generation & detection of PAM, PWM & PPM, Comparison of frequency division and time division multiplexed systems, Basics of digital communications: ASK, PSK, FSK, QPSK basics & waveform with brief mathematical introduction

Module V: Noise
Different types of noise, noise calculations, equivalent noise band width, noise figures, effective noise temperature, noise figure.

Module VI: Introduction to Information Theory
Measurement of Information, mutual, Shannon’s theorem, Source coding, channel coding and channel capacity theorem, Huffman code

Examination Scheme:

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Text & References:

Text:
- B. P. Lathi: “Modern analog & digital communication”, OXFORD Publications

References:
- Taub and schilling, “Principles of Communication Systems” TMH
COMMUNICATION SYSTEMS LAB

Course Code: ITE2407  Credit Units: 01

List of Experiments:

1. To study the sampling and reconstruction of a given signal.
2. To study amplitude modulation and demodulation.
3. To study frequency modulation and demodulation.
4. To study time division multiplexing.
5. To study pulse amplitude modulation.
6. To study delta and adaptive delta modulation and demodulation.
7. To study carrier modulation techniques using amplitude shift keying and Frequency shift keying.
8. To study carrier modulation techniques using binary phase shift keying and differential shift keying.
9. To study pulse code modulation & differential pulse code modulation as well as relevant demodulations.
10. To study quadrature phase shift keying & quadrature amplitude modulation.

Examination Scheme:

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COMPUTER GRAPHICS

Course Code: ITE2408  Credit Units: 03

Course Objective:
The objective of the course is to provide the understanding of the fundamental graphical operations and the implementation on computer, the mathematics behind computer graphics, including the use of spline curves and surfaces. It gives the glimpse of recent advances in computer graphics, user interface issues that make the computer easy, for the novice to use.

Course Contents:
Module I: Introduction to Graphics and Graphics Hardware System
Application of computer graphics, Video Display Devices, Raster Scan Display, Random Scan Display, Input Devices, Graphic Software and graphics standards, Numerical based on Raster and Random Scan display, Frame buffer, Display processor.

Module II: Output Primitives and Clipping operations
Algorithms for drawing 2D Primitives lines (DDA and Bresenham's line algorithm), circles (Bresenham's and midpoint circle algorithm), Antialiasing and filtering techniques. Line clipping (cohen-sutherland algorithm), Curve clipping algorithm, and polygon clipping with Sutherland Hodgeman algorithm, Area fill algorithms for various graphics primitives: Scanline fill algorithm, boundary fill algorithm, flood fill algorithm, Polygon representation, various method of Polygon Inside test: Even-Odd method, winding number method, Character generation techniques.

Module III: 2D Geometric transformation
2D Transformation: Basic transformation, Translation, Rotation, Rotation relative to an arbitrary point, scaling, Matrix Representations and Homogeneous coordinates, window to viewport transformation.

Module IV: 3D Geometric transformation
3D Concepts: Parallel projection and Perspective projection, 3D Transformations, composite 3D transformation, co-ordinate transformation, Inverse transformation

Module V: Object modeling and Visible Surface detection
fractal geometry methods, fractal dimensions, Geometric construction of deterministic self-similar fractals, Iterated function system to generate fractals, Bezier curves and Bezier surfaces, Bspline curves and surfaces, Visible surface detection method: Basic illumination, diffuse reflection, specular reflection, shadows. Ray tracing method, Depth-buffer method, A-buffer method, Depth-sorting method (painter's algorithm), Binary search partition method, Scan line method,

Module VI: Introduction to multimedia
Design of animation sequences, Computer Animation languages, Elementary filtering techniques and elementary Image Processing techniques, graphics library functions used in animation design

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Text & References:

Text:
References:

- Alan Watt and Mark Watt, “Advanced Animation and Rendering Techniques”, Addison-Wesley, 1992
ARTIFICIAL NEURAL NETWORK

Course Code: ITE2409  Credit Units: 02

Course Objective:
Aim of this course is to introduce the students fundamentals concepts of Nural network and its various application in computer science.

Course Contents:
Module I:-
Artificial Neural Networks (ANN) and biological neural networks, supervised and unsupervised learning rules, neural network applications.

Module II:-
Unsupervised learning:- Hebbian learning and competitive learning. Supervised learning:- Back propagation algorithms,
Learning rule:-
Delta learning rule, Widrow-Hoff learning rule, Winner-Take-All learning rule.

Module III:-
Feed forward neural network, feed backward neural network, Perceptron and its learning law, single-layer perceptron, multi-layer perceptron.

Module IV:-

Module V:-
Associative memory, auto-associative memory, bi-directional associative memory.

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Text Book:

- Kenji Suzuki (ed.) - InTech, 2013
- Todd Troyer - University of Texas at San Antonio, 2005
ARTIFICIAL NEURAL NETWORK LAB

Course Code: ITE2410
Credit Units: 01

Course Objective
The aim of this lab is to gain the practical knowledge of basic neuron models and learning algorithms.

Lab Assignment
To study some basic neuron models and learning algorithms by using Matlab’s neural network toolbox.

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Course Objective:
This course deals with the systematic study of the Architecture and programming issues of 8085-microprocessor family. The aim of this course is to give the students basic knowledge of the above microprocessor needed to develop the systems using it.

Course Contents:
Module I: Introduction to Microcomputer Systems
Introduction to Microprocessors and microcomputers, Study of 8 bit Microprocessor, 8085 pin configuration, Internal Architecture and operations, interrupts, Stacks and subroutines, various data transfer schemes.

Module II: ALP and timing diagrams
Introduction to 8085 instruction set, advance 8085 programming, Addressing modes, Counters and time Delays, Instruction cycle, machine cycle, T-states, timing diagram for 8085 instruction.

Module III: Memory System Design & I/O Interfacing
Interfacing with 8085. Interfacing with input/output devices (memory mapped, peripheral I/O), Cache memory system. Study of following peripheral devices 8255, 8253, 8257, 8255, 8251.

Module IV: Architecture of 16-Bit Microprocessor
Difference between 8085 and 8086, Block diagram and architecture of 8086 family, pin configuration of 8086, Minimum mode & Maximum mode Operation. Internal architecture of 8086, Bus Interface Unit, Register Organization, Instruction Pointer, Stack & Stack pointer, merits of memory segmentation, Execution Unit, Register Organization.

Module IV: Pentium Processors
Internal architecture of 8087, Operational overview of 8087, Introduction to 80186, 80286, 80386 & 80486 processors, Pentium processor.

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Text & References:

Text:
- Douglas V Hall.

References:
- Gosh,” 0000 to 8085” PHI.
INTRODUCTION TO OPEN SOURCE TECHNOLOGIES
(PHP, MySql)

Course Code:ITE2502 Credit Units: 03

Course Objective:
This course is aimed to provide a fundamental understanding of dynamic web site creation. PHP is the
language used for development of most common web sites. Syllabus includes basic and advanced
features of PHP which includes detailed introduction of PHP and MYSQL, Arrays, Loops and
variables etc. It also gives an overview open source framework like JOOMLA, ZEND etc.

Course Contents:

Module I: Introduction to Open Source and PHP programming
Introduction to Open Sources Technologies, Introduction to PHP, installation and configuration,
Advantages and Disadvantages of PHP, Client Side Scripting, Server Side Scripting, Variables, data
types, various types of function, creating your own function, Strings in PHP, String Functions.

Module II: Operator, Loops, Array, Exception and Error Handling
Operators, Conditions, Loops, Using for each, Creating and Using Arrays, Multidimensional Array,
Associative array.
Error Handling in PHP, Errors and Exceptions, Exception class, try/catch block, throwing an
exception, defining your own Exception subclass.

Module III: Classes, File system, Passing Information between pages
Object orientedprogrammingwithPhp, Working with Datetime, code re-use, require (), include(), and
the include_path; Understanding PHP file permissions, File reading and writing functions, File system
functions, File uploads, Sending mail & use of email server.
HTTP, GET arguments, POST arguments, Using Session in PHP, cookies, The setcookie() function,
Deleting Cookies and Reading Cookies.

Module IV: Workingwithdatabase
HTML Tables and Database tables, Databasemanipulation(Select, Insert, Update, Delete), validating
User Input usingJavascript.
MYSQL, Introducing MySQL; database design concepts; the Structured Query, Language (SQL);
communicating with a MySQL backend via the PHP, MySQL APIBuilding Database Applications,

Module V: WorkingwithFrameworks
Working with Mambo, Working with Joomla, Working with framework.Use of Joomla in rapid
development of website.Developing of simple website using joomla.

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Text & References:

Text:
  • Beginning PHP, Apache, MySQL Web Development
  • Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason
  Gerner

References:
  • PHP Manual.
  • The Complete Reference PHP, by Steven Holzner, TAYA McGraw-Hill Publication
  • Beginning PHP and MYSQL, by W. Jason Gilmore, Apress Publication
DESIGN AND ANALYSIS OF ALGORITHM

Course Code: ITE2503  Credit Units: 03

Course Objective:
The designing of algorithm is an important component of computer science. The objective of this course is to make students aware of various techniques used to evaluate the efficiency of a particular algorithm. Students eventually should learn to design efficient algorithm for a particular program.

Course Contents:

Module I: Introduction
Algorithm Design paradigms - motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations. Recurrences- substitution method, recursion tree method, master method

Module II: Divide and conquer
Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Merge sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations.

Greedy Method
Overview of the greedy paradigm examples of exact optimization solution (minimum cost spanning tree), Approximate solution (Knapsack problem), Single source shortest paths, traveling salesman

Module III: Dynamic programming
Overview, difference between dynamic programming and divide and conquer, Applications: Shortest path in graph, chain Matrix multiplication, Traveling salesman Problem, longest Common sequence, knapsack problem

Module IV: Graph searching and Traversal
Overview, Representation of graphs, strongly connected components, Traversal methods (depth first and breadth first search)

Back tracking
Overview, 8-queen problem, and Knapsack problem

Branch and bound
LC searching Bounding, FIFO branch and bound, LC branch and bound application: 0/1 Knapsack problem, Traveling Salesman Problem

Module V: Computational Complexity
Complexity measures, Polynomial Vs non-polynomial time complexity; NP-hard and NP-complete classes, examples.

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Text & References:

Text:

References:
- J.E Hopcroft, J.D Ullman, “Design and analysis of algorithms”
- D. E. Knuth, “The art of Computer Program
JAVA PROGRAMMING

Course Code: ITE2504             Credit Units: 03

Course Objective:
The objective is to impart programming skills used in this object oriented language java.
The course explores all the basic concepts of core java programming. The students are expected to
learn it enough so that they can develop the web solutions like creating applets etc.

Course Contents:

Module I: Java Basics
Concepts of OOP, Features of Java, How Java is different from C++, Environmental setup, Basic
syntax, Objects and classes, Basic Data Types, Variable Types, Modifier Types, Basic operators,
Loop Control, Decision Making, Strings and Arrays, Methods, I/O.

Module II: Java Object Oriented
Inheritance, Overriding, Polymorphism, Abstraction, Encapsulation, Interfaces, Packages, Exploring
java.util package.

Module III: Exception Handling and Threading
Exception Hierarchy, Exception Methods, Catching Exceptions, Multiple catch Clauses, Uncaught
Exceptions Java’s Built-in Exception.
Creating, Implementing and Extending thread, thread priorities, synchronization suspending,
resuming and stopping Threads, Multi-threading.

Module IV: Event Handling And AWT
Event handling Mechanism, Event Model, Event Classes, Sources of Events, Event Listener
Interfaces
AWT: Working with Windows, AWT Controls, Layout Managers

Module V: Java Advanced
AppletClass, Architecture, Skeleton, Display Methods.
Swings: Japplet, Icons, labels, Text Fields, Buttons, Combo Boxes.
Socket Programming: Socket methods, Server Socket methods, Socket Client and Socket Server
examples.

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CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination;
Att: Attendance

Text & References:
Text:
- JAVA The Complete Reference by Patrick Naughton & Herbert Schild, TMH
- Introduction to JAVA Programming a primar, Balaguruswamy.

References:
- “Introduction to JAVA Programming” Daniel/Young PHI
MICROPROCESSOR LAB

Course Code:ITE2505
Credit Units: 01

Course Contents:
1. To load the numbers 49H and 53H in the memory location 9510 and 9511 respectively and add the contents of memory location 9601.
2. To write assembly language programming for 8 bit addition with and without carry.
3. To write assembly language programming for 8 bit subtraction with and without borrow.
4. To write assembly language programming for 8 bit multiplication and division.
5. To write assembly language programming for sorting an array of numbers in ascending and descending order.
6. To write assembly language programming with additional instructions.
7. To write and execute a program using stacks.
8. To study and program the programmable peripheral interface (8255) board.
9. To study and program the programmable interval timer (8253) board.
10. To study and program the programmable DMA controller (8257) board.
11. To study and program the programmable interrupt controller (8259) board.
12. To write and execute a program using stacks.

Examination Scheme:

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Note: IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.
INTRODUCTION TO OPEN SOURCE TECHNOLOGIES LAB
(PHP, MySql)

Course Code:ITE2506 Credit Units: 01

Course Contents:

1. Write the process of installation of web server.
2. Write programs to print all details of your php server. Use phpinfo().
3. Write a program to give demo of ECHO and PRINT command.
4. Write a program to implement the string functions.
5. Write a program to print Fibonacci series upto given number.
6. Write a menu driven program to implement a calculator which performs only addition, subtraction, multiplication and division. The operation should happen based on user choice.
7. Write a program sort ten number by using array.
8. Write a program to demonstrate the concept of associative array.
9. Write a program to demonstrate the concept of multidimensional array.
10. Write a program to demonstrate the concept of Classes & objects.
11. Create a login form with two text fields called “login” and “password”. When user enters “Amity” as a user name and “university” as a password it should be redirected to a Welcome.HTML page or toSorry.HTML in case of wrong username/password.
12. Create a database in MySql and connect that database from PHP.
13. Write a program to Update, insert and delete the values of table in database.
14. Create a form with a text box asking to enter your favorite city with a submit button when the user enters the city and clicks the submit button another php page should be opened displaying “Welcometo the city”.
15. Write a program to design login form in which find the greatest number amongst three numbers.
16. WAP for Marksheet generation.

Examination Scheme:

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DESIGN AND ANALYSIS OF ALGORITHM LAB

Course Code: ITE2507
Credit Units: 01

Lab assignment will be based on the following:

Programs for binary search and Quick sort by using divide and conquer techniques.
Programs on algorithm based on greedy method.
Programs on algorithm based on Dynamic programming.
Programs on Depth First and Breadth Search traversals of graphs.
Programs on algorithm based on backtracking.
Programs on algorithm based on Branch and Bound.

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JAVA PROGRAMMING LAB

Course Code: ITE2508                      Credit Units: 01

Software Required: JDK1.3

Assignments will be provided for the following:

- Java programs using classes & objects and various control constructs such as loops etc, and data structures such as arrays, structures and functions
- Java programs for creating Applets for display of images and texts.
- Programs related to Interfaces & Packages.
- Input/Output and random files programs in Java.
- Java programs using Event driven concept.
- Programs related to network programming.

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SUMMER INTERNSHIP EVALUATION-I

Course Code: ITE2535  Credit Units: 03

Course Objective:
The objective of this course is to provide practical training on some live projects that will increase capability to work on actual problem in industry. This training may undergo in an industrial environment or may be an in house training on some latest software which is in high demand in market. This training will be designed such that it will useful for their future employment in industry.

Examination Scheme:

- Feedback from industry/work place: 20
- Training Report: 40
- Viva: 15
- Presentation: 25
- Total: 100
FUZZY LOGIC & GENETIC ALGORITHM

Course Code: ITE2509  Credit Units: 03

Course Objective:
This course introduces the student to intelligent control theory, introduce Machine Intelligence and to understand Fuzzy Logic Theory and Neural Network Theory. It will help students design Intelligent Controllers using Fuzzy and Neural Systems.

Course Contents:

Module I: Introduction
Crisp sets: Overview, Fuzzy sets: Basic types and concepts, Characteristics and significance of paradigm shift, Fuzzy sets vs Crisp sets, Representation of fuzzy sets

Module II: Fuzzy operations and Fuzzy arithmetic
Types of operations, Fuzzy complements, Fuzzy intersection: t-norms, Fuzzy union: t-conorms, Combination of operations, Aggregation operation, Fuzzy numbers, Linguistic variables, Arithmetical operations on intervals, Arithmetical operations on Fuzzy numbers, Lattice of Fuzzy numbers, Fuzzy equation.

Module III: Fuzzy systems
General discussion, Fuzzy controller: Overview and example, Fuzzy systems and neural networks, Fuzzy neural network, Fuzzy automata.

Module IV: Applications
Pattern recognition in fuzzy logic, Database and information retrieval in fuzzy logic, Decision making in fuzzy logic, Engineering applications and fuzzy logic, Fuzzy logic in Medicine and Economics.

Examination Scheme:

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Text & References:

Text:
- Fuzzy sets and fuzzy logic theory and application by George. j. klir, Bo Yuan

References:
- A First Course in Fuzzy and Neural Control by Nguyen, Prasad, Walker, and Walker. CRC 2003
- Artificial Intelligence by Negnevisky. Addison-Wesley
- Automatic Control Systems by Colnaraghi and Kuo. 9th edition. Wiley Publisher. 2010
WIRELESS SENSOR NETWORKS

Course Code: ITE2510 Credit Units: 03

Course Objective:
Wide range of applications such as disaster management, military and security have fueled the interest in sensor networks during the past few years. This course provides a broad coverage of challenges and latest research results related to the design and management of wireless sensor networks. Covered topics include network architectures, node discovery and localization, deployment strategies, node coverage, routing protocols, medium access arbitration, fault-tolerance, and network security.

Course Contents:

Module I

Module II

Module III
Data Storage and Manipulation: Data centric and content based routing, storage and retrieval in network. Applications: Detecting unauthorized activity using a sensor network. Commercially available sensor nodes – Imote, IRIS, Mica Mote, EYES nodes etc,

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Text & References:

Text:

Reference Books:
DISTRIBUTED OPERATING SYSTEM

Course Code:ITE2511 Credit Units: 03

Course Objective:
This Subject provides students with an in-depth knowledge about the operating system. The former treats the standard principles of single processor system, including processes, synchronization, I/O, deadlocks, mutual exclusion, fault tolerance, Memory Management, File Management systems, security and so on. This subject covers distributed operating system in detail, including communication process, file system and memory management synchronization and so on but this time in the context of distributed systems

Course Contents:
Module I: Introduction

Module II: Distributed Mutual Exclusion
Lamppost’s Algorithm, The Critical Section Problem, Other Synchronization Problems, Language Mechanisms for Synchronization, Axiomatic Verification of Parallel Programs, Inter process communication (Linux IPC Mechanism), Remote Procedure calls, RPC exception handling, security issues, RPC in Heterogeneous Environment, Case studies.

Module III: Synchronization in Distributed System
Deadlocks in Distributed Systems, Centralized Deadlock- Detection Algorithms, Distributed Deadlock Detection Algorithm’ Path Pushing Algorithm, Edge Chasing Algorithm, Diffusion Computation Based Algorithm.
Clock Synchronization: Logical clocks, Physical clocks, Vector Clock, clock synchronization algorithms, Mutual Exclusion, Non-Token Based Algorithms – Lamport’s Algorithm, Token-Based Algorithms, Suzuki-Kasami’s Broadcast Algorithm, Election Algorithms,

Module IV: Distributed Shared Memory

Module V: Concurrency Control Algorithms

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Text & References:
Syllabus - Sixth Semester

ARTIFICIAL INTELLIGENCE

Course Code: ITE2601
Credit Units: 03

Course Objective:
To develop semantic-based and context-aware systems to acquire, organize process, share and use the knowledge embedded in multimedia content. Research will aim to maximize automation of the complete knowledge lifecycle and achieve semantic interoperability between Web resources and services. The field of Robotics is a multi disciplinary as robots are amazingly complex system comprising mechanical, electrical, electronic H/W and S/W and issues germane to all these.

Course Contents:

Module I: Problem solving and Scope of AI
Introduction to Artificial Intelligence. Applications - Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems. AI techniques - search knowledge, abstraction.

Problem Solving

Module II: Knowledge Representation
Knowledge Representation issues, first order predicate calculus, Horn Clauses, Resolution, Semantic Nets, Frames, Partitioned Nets, Procedural Vs Declarative knowledge, Forward Vs Backward Reasoning.

Module III: Understanding Natural Languages

Module IV
Expert System: Need and justification for expert systems, knowledge acquisition, Case studies: MYCIN,R1
Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets. Programming Language: Introduction to programming Language, LISP and PROLOG.
Handling Uncertainties: Non-monotonic reasoning, Probabilistic reasoning, use of certainty factors, Fuzzy logic.

Module V: Introduction to Robotics
Fundamentals of Robotics, Robot Kinematics: Position Analysis, Dynamic Analysis and Forces, Robot Programming languages & systems: Introduction, the three levels of robot programming, requirements of a robot programming language, problems peculiar to robot programming languages.

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Text & References:

Text:
- John J. Craig, “Introduction to Robotics”, Addison Wesley publication
- Tsuneo Yoshikawa, “Foundations of Robotics”, PHI Publication

References:
MICROCONTROLLER

Course Code:ITE2602 Credit Units: 03

Course Objective:
The aim of this course is to provide the student with a detailed understanding of Microcontrollers. The course covers fundamentals, The 8051 Architecture, Assembly Language Programming, Instruction set, Serial Communication and Interfacing techniques of 8051 Microcontroller.

Course Contents:
Module I:
Introduction to Microcontrollers – Microcontrollers survey-four bit, eight bit, sixteen bit, thirty two bit Microcontrollers --Comparing Microprocessors and Microcontrollers, Introduction to Embedded Processors -Overview of the 8051 family, pin diagram explanation, internal diagram 8051.

Module II:
The 8051 Architecture- Hardware- Oscillator and clock-program counter Instruction Set:Addressing mode, data transfer instruction, logical, arithmetic instruction,bit instruction, branching instruction.

Module III:

Module IV:
Interfacing of memory, intelligent LCD, 8255, ADC, DAC, LED display, Pulse Measurement - D / A and A/D conversion- Stepper Motor.

Module V:
Basic concept of PIC microcontroller

Examination Scheme:

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Text & References:
- Micro controllers & its applications by B.S. Chhabra, Dhanpat Rai Pub. Co., India
- 8051mC, Scott Mackenizie, PHI, Englewood Cliffs, New Jersey.
- The 8051 Microcontrollers and Embedded Systems : Muhammed Ali Mazidi
- The 8051 Microcontrollers Architecture, Programming & Applications Kenneth J. Ayala

Reference Books:
- Design with PIC Microcontroller: John Petman
ADVANCED JAVA PROGRAMMING

Course Code: ITE2603  Credit Units: 03

Course Objective:
The objective is to equip the students with the advanced feature of contemporary java which would enable them to handle complex programs relating to managing data and processes over the network. The major objective of this course is to provide a sound foundation to the students on the concepts, precepts and practices, in a field that is of immense concern to the industry and business.

Course Contents:
Module I: Distributed Computing

Module II: Database Connectivity
ODBC and JDBC Drivers, Connecting to Database with the java.sql Package, Using JDBC Terminology, JDBC with mysql, postgresql.

Module III: Servlet Programming
Introduction to Servlets, Servlet Life Cycle, Servlet based Applications, Servlet and HTML.Filters, jdbc with servelets, session Management techniques in detail.

Module IV: JSP Programming
JSP: Introduction to JSP, JSP implicit objects, JSP based Applications, Java. Net. Login & Logout Example, jdbc with jsp.

Module V: JEE Web Application
The Model-View-Controller Architecture What is Struts, Struts Tags, Creating Beans, Other Bean Tags, Bean Output, Creating HTML Forms, The Action Form class The Action class, Simple Struts: a simple Struts application; Introduction to EJB.

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Text & References:

Text:
- Java 2 Unleashed (Techmedia – SAMS), Jamie Jaworski
- Professional Java Server Programming (a Press). Allamaraju
- Developing Java Servlets (Techmedia – SAMS), James Goodwill sing Java 1.2 Special Edition (PHI), Webber

References:
- JaisonHunder & William Crawford, Java Servlet Programming, O'REILLY, 2002
- Dietal and Deital, “JAVA 2” PEARSON publication
ARTIFICIAL INTELLIGENCE LAB

Course Code: ITE2604 Credit Units: 01

Course Contents:

Assignments will be provided for the following:
- Programming in Prolog
- Programming for Robotics

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MICROCONTROLLER LAB

Course Code: ITE2605              Credit Units: 01

1. Write a program to add two 8-bit numbers using microcontroller 8051.
2. Write a program to multiply two 8-bit numbers using microcontroller 8051.
3. Write a program to divide two 8-bit numbers using microcontroller 8051.
4. Write a program to subtract two 8-bit numbers using microcontroller 8051.
5. Write a program to generate a geometric progression using microcontroller 8051.
6. Write a program to generate a square wave using microcontroller 8051.
7. Write a program to generate a delay of 5 ms using microcontroller 8051.
8. Study and implement serial communication by interfacing microcontroller with a computer.
9. Study and implement parallel data communication by interfacing microcontroller with a LCD.
10. Interface a ADC and a temperature sensor to measure temperature
11. Interface a DAC & Generate a stair case wave form – with step duration and no. of steps as variables
12. Flash a LED connected at a specified output port terminal

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ADVANCED JAVA PROGRAMMING LAB

Course Code:ITE2606 Credit Units: 01

Programming Language: Java
1. WAP to display label on a frame with the help of JFrame
2. WAP to display six buttons on a panel using JFrame.
3. WAP. To display an image and a string in a label on the JFrame.
4. WAP that implement a JApplet that display a simple label
5. WAP that implement a JApplet and display the following frame
   a. Customer name
   b. Customer number
   c. Age
   d. Address
6. WAP to access a table Product Master from MS-Access using Java code.
7. WAP that implement a simple servlet program.
8. WAP for authentication, which validate the login-id and password by the servlet code.
9. WAP to connecting a database using user-id and password.
10. WAP to insert data into the database using the prepared statement.
11. WAP to read data from the database using the ResultSet.
12. WAP to read data send by the client (HTML page) using servlet.
13. WAP to include a HTML page into a JSP page.
14. WAP to handle the JSPException.
15. WAP to read data send by a client (HTML page) using JSP.

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CRYPTOGRAPHY AND NETWORK SECURITY

Course Code: ITE2607  Credit Units: 03

Course Objective:
The objective here is to acquaint the students with the application of networking. Detail description of the various TCP/IP protocols and the working of ATM and its performance, Network security and authentication, and various algorithms related to it has been dealt, to get a practical approach.

Course Contents:
Module I: Advanced TCP/IP
TCP Services, TCP format and connection management, Encapsulation in IP, UDP Services, Format and Encapsulation in IP, IP Services, Header format and addressing, Fragmentation and reassembly, Migration to IPv6, Protocols: BOOTP, DHCP, ICMP, IGMP; Internet Routing Protocols: OSPF, RIP, EIGRP, BGP.

Module II: High Speed Networks
Packet Switching Networks; Frame Relay Networks; Asynchronous Transfer Mode (ATM); ATM protocol Architecture; ATM logical connections; ATM cells; ATM Service categories; ATM Adaptation Layer; QoS in ATM and Frame Relay

Module III: High Speed LANs
LAN Ethernet, fast Ethernet, gigabit Ethernet, FDDI, DSL, ADSL

Module IV: Wireless communication
Wireless networks, wireless channels, channel access, network architecture, IEEE 802.11, Bluetooth, Satellite Networks.

Module V: Network Security and Management
Principles of cryptography, Authentication, integrity, key distribution and certification, Access control and Firewalls, attacks and counter measures, security in many layers. Infrastructure for network management, The internet standard management framework, SMI, MIB, SNMP, Security and administration.

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Text & References:

Text:
- William Stallings, “High-Speed Networks and Internets, Performance and Quality of Service”, Pearson Education.
- Cryptography & Networks Security Stallings, William 3rd edition

References:
- Computer networks: Tanenbaum, Andrew S, Prentice Hall
- Data communication & networking: Forouzan, B. A.
- Computer network protocol standard and interface Uyless, Black
BIG DATA ANALYTICS

Course Code: ITE2608  Credit Units: 03

Course Objective:
Students will gain knowledge on analyzing Big Data. It serves as an introductory course for graduate students who are expecting to face Big Data storage, processing, analysis, visualization, and application issues on both workplaces and research environments.

Course Contents:
Module I: INTRODUCTION TO BIG DATA
Introduction— distributed file system–Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce
Big Data – Apache Hadoop & Hadoop EcoSystem, MovingData in and out of Hadoop – Understanding inputs and outputs ofMapReduce -, Data Serialization.

Module II: HDFS, HIVE AND HIVEQL, HBASE
HDFS-Overview, Installation and Shell, Java API; Hive Architecture, Comparison with Traditional Database, HiveQLQuerying Data, Sorting And Aggregating, Map Reduce Scripts, Joins& Sub queries, HBase concepts, Advanced Usage, Schema Design,Advance Indexing, PIG, Zookeeper , how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper.

Module III: SPARK
Introduction to Data Analysis with Spark, Downloading Spark and Getting Started, Programming with RDDs

Module IV: NoSQL
What is it?, Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL

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Text & References:
- Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, by Chris Eaton, Paul Zikopoulos
- Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends, By Michael Minelli, Michele Chambers, Ambiga Dhiraj
- BIG Data and Analytics , Sima Acharya, Subhashini Chhellappan, Wiley
MOBILE COMPUTING

Course Code:ITE2609  Credit Units: 03

Course Objective:
The objective of this consortium is to shape and expand a full-scale and sound mobile computing system market. To achieve this, cooperation is required of interests related to communication (network), computer hardware/software, system integrators (including service providers), and the media.

Course Contents:
Module I: Introduction to Personal Communications Services (PCS)
PCS Architecture, Mobility management, Networks signaling.
Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signaling.

Module II: General Packet Radio Services (GPRS) & Wireless Application Protocol (WAP)
GPRS Architecture, GPRS Network Nodes.
Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.
Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML).

Module III: Third Generation (3G) Mobile Services
Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G.
Wireless Local Loop (WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

Module IV: Global Mobile Satellite Systems
Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.

Module V: Enterprise Networks
Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols. Advanced techniques in mobile computing.

Examination Scheme:

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CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

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MOBILE APPLICATION DEVELOPMENT

Course Code: ITE2701  Credit Units: 04

Course Objective:
To introduce students with mobile operating system and mobile development IDE’s. The course will explain the core concepts related to mobile application development.

Course Contents:
Module I: Introduction: Mobile operating system, Operating system structure, Constraints and Restrictions, Hardware configuration with mobile operating system, Features: Multitasking Scheduling, Memory Allocation, File System Interface, Keypad Interface, I/O Interface, Protection and Security, Multimedia features.

Module II: Introduction to Mobile development IDE’s, Introduction to Worklight basics, Optimization, pages and fragments , Writing a basic program- in Worklight Studio, Client technologies, Client side debugging, Creating adapters, Invoking adapters from Worklight Client application, Common Controls, Using Java in adapters, Programming exercise with Skins, Understanding Apache Cordova, Offline access, Encrypted cache deprecated, Using JSONStore

Module III: Module IV: Android: Introduction to Android, Architecture, memory management, communication protocols, application development methods, deployment. Case Study: Design and development of Application using mobile application development platforms e.g. WorkLight

Module IV: iOS
Introduction to iOS, Architecture, memory management, communication protocols, application development methods, deployment. Case Study: Design and development of Application using mobile application development platforms e.g. WorkLight, Kendo, Appcon, Xcode, Xpages

Examination Scheme:

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Text & References:

Text:
- Anubhav Pradhan, Anil V Deshpande, “Mobile Apps Development” Edition: I
- Teach Yourself Android Application Development In 24 Hours, Edition: I, Publication: SAMS
- Worklight resources

References:
- Neal Goldstein, Tony Bove, “iPhone Application Development All-In-One For Dummies”, John Wiley & Sons
INTRODUCTION TO RASPBERRY PI AND ARDUINO

Course Code: ITE2703
Credit Units: 03

Course Objective:
This program aims to train students to be equipped with a solid theoretical foundation, systematic professional knowledge and strong practical skills in the Raspberry Pi and Arduino. The course focuses on higher-level operating systems, advanced networking, user interfaces, multimedia and uses more computing intensive IoT applications as examples using Raspberry Pi running Linux as the platform of choice, while also exposing the student to other comparable platforms like Arduino. After doing this course, students should be able to design and deploy multiple IoT devices that could connect to the gateway.

Course Contents:

Module I: Getting Started with Raspberry Pi
Basic functionality of Raspberry Pi B+ board, setting up the board, configuration and use, implications of an operating system on the behavior of the Raspberry Pi as an IoT device, booting Raspberry Pi 3, Downloading an Operating System, format an SD card and booting the OS. Basics of Linux and its use, main features including navigating the file system and managing processes, text-based user interface through the shell, overview of the graphic user interface for Raspbian Linux distribution.

Module II

Module III
Communication with devices through the pins of the Raspberry Pi, RPi.GPIO library, Python Functions, setting up the pins, General purpose IO Pins, Protocol Pins, GPIO Access, applying digital voltages, and generating Pulse Width Modulated signals, Tkinter Python library, accessing pins through a graphic user interface.

Module IV: The Arduino Environment

Module V:
Basics of C programming, composition of an Arduino programs, Arduino tool chain, Arduino IDE, basic structure of a sketch, including the use of the setup() and loop() functions. Accessing the pins from a sketch for input and output, introduction on debugging embedded software on an Arduino, UART communication protocol, Synchronization, parity and stop, the use of the Serial library to communicate with the Arduino through the serial monitor.

Examination Scheme:

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MOBILE APPLICATION DEVELOPMENT LAB

Course Code: ITE2704
Credit Units: 01

Course Objective:
The student should be made to know the components and structure of mobile application development frameworks for Android and windows OS based mobiles, understand how to work with various mobile application development frameworks, learn the basic and important design concepts and issues of development of mobile applications and understand the capabilities and limitations of mobile devices.

LIST OF EQUIPMENT
Standalone desktops with Windows or Android or iOS or Equivalent Mobile Application Development Tools with appropriate emulators and debuggers.

Course Contents:

LIST OF EXPERIMENTS:

1. Develop an application that uses GUI components, Font and Colours
2. Develop an application that uses Layout Managers and event listeners.
3. Develop a native calculator application.
4. Write an application that draws basic graphical primitives on the screen.
5. Develop an application that makes use of database.
6. Develop an application that makes use of RSS Feed.
7. Implement an application that implements Multi threading
8. Develop a native application that uses GPS location information.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.
11. Write a mobile application that creates alarm clock.

Examination Scheme:

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Note: IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.
INTRODUCTION TO RASPBERRY PI AND ARDUINO LAB

Course Code: ITE2705  Credit Units: 01

Programming Language: Python

List of Programs:

1. Getting started with Raspberry Pi, Install Raspian on your SD card
2. Linux basic commands.
3. Coding simple programs in Python.
4. How to use Python-based IDE (integrated development environments) for the Raspberry Pi and how to trace and debug Python code on the device
5. How to have your Raspberry Pi interact with online services through the use of public APIs and SDKs.
6. Arduino basic setup, how to install it and use it, shields to extend the functionality of an Arduino-based system.

Examination Scheme:

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INDEPENDENT STUDY

Course Code: ITE2709  Credit Units: 02

This is an elective, self-directed course to investigate emerging areas of IT and Computer Science like Mobile Operating System, Cloud Computing, or from Current Research Areas etc. The primary goal of the course is to provide students with research exploration of a specific topic of interest to the individual student under the advisement of an instructor who will monitor and critique the student’s progress.

Independent study provides students with the opportunity to work one-on-one with a Faculty on a particular topic. The student and faculty should discuss the aims and content of the study and present the proposal to Head of Department. The independent study proposal should include the study’s title, theme, readings, work to be submitted, and syllabus. Faculty and student should meet for a minimum number of 2 hours per week. Student will give a seminar after completion of study.
TERM PAPER

Course Code: ITE2731 Credit Units: 02

A term (or research) paper is primarily a record of intelligent reading in several sources on a particular subject. The students will choose the topic at the beginning of the session in consultation with the faculty assigned. The progress of the paper will be monitored regularly by the faculty. At the end of the semester the detailed paper on the topic will be submitted to the faculty assigned. The evaluation will be done by Board of examiners comprising of the faculties.

GUIDELINES FOR TERM PAPER

The procedure for writing a term paper may consist of the following steps:
1. Choosing a subject
2. Finding sources of materials
3. Collecting the notes
4. Outlining the paper
5. Writing the first draft
6. Editing & preparing the final paper

1. Choosing a Subject
   The subject chosen should not be too general.

2. Finding Sources of Materials
   a) The material sources should be not more than 10 years old unless the nature of the paper is such that it involves examining older writings from a historical point of view.
   b) Begin by making a list of subject-headings under which you might expect the subject to be listed.
   c) The sources could be books and magazine articles, news stories, periodicals, scientific journals etc.

3. Collecting the Notes
   Skim through sources, locating the useful material, then make good notes of it, including quotes and information for footnotes.
   a) Get facts, not just opinions. Compare the facts with author's conclusion.
   b) In research studies, notice the methods and procedures, results & conclusions.
   c) Check cross references.

4. Outlining the paper
   a) Review notes to find main subdivisions of the subject.
   b) Sort the collected material again under each main division to find sub-sections for outline so that it begins to look more coherent and takes on a definite structure. If it does not, try going back and sorting again for main divisions, to see if another general pattern is possible.

5. Writing the first draft
   Write the paper around the outline, being sure that you indicate in the first part of the paper what its purpose is. You may follow the following:
   a) statement of purpose
   b) main body of the paper
   c) statement of summary and conclusion
   Avoid short, bumpy sentences and long straggling sentences with more than one main idea.

6. Editing & Preparing the final Paper
   a) Before writing a term paper, you should ensure you have a question which you attempt to answer in your paper. This question should be kept in mind throughout the paper. Include only information/ details/ analyses of relevance to the question at hand. Sometimes, the relevance of a particular section may be clear to you but not to your readers. To avoid this, ensure you briefly explain the relevance of every section.
   b) Read the paper to ensure that the language is not awkward, and that it "flows" properly.
   c) Check for proper spelling, phrasing and sentence construction.
   d) Check for proper form on footnotes, quotes, and punctuation.
   e) Check to see that quotations serve one of the following purposes:
      (i) Show evidence of what an author has said.
      (ii) Avoid misrepresentation through restatement.
Save unnecessary writing when ideas have been well expressed by the original author.

f) Check for proper form on tables and graphs. Be certain that any table or graph is self-explanatory.

Term papers should be composed of the following sections:
1) Title page
2) Table of contents
3) Introduction
4) Review
5) Discussion & Conclusion
6) References
7) Appendix

Generally, the introduction, discussion, conclusion and bibliography part should account for a third of the paper and the review part should be two thirds of the paper.

Discussion
The discussion section either follows the results or may alternatively be integrated in the results section. The section should consist of a discussion of the results of the study focusing on the question posed in the research paper.

Conclusion
The conclusion is often thought of as the easiest part of the paper but should by no means be disregarded. There are a number of key components which should not be omitted. These include:
   a) summary of question posed
   b) summary of findings
   c) summary of main limitations of the study at hand
   d) details of possibilities for related future research

Reference
From the very beginning of a research project, you should be careful to note all details of articles gathered.

The bibliography should contain ALL references included in the paper. References not included in the text in any form should NOT be included in the bibliography.
The key to a good bibliography is consistency. Choose a particular convention and stick to this.

Conventions
Monographs

Edited volumes
[ (eds.) is used when there is more than one editor; and (ed.) where there is only one editor. In German the abbreviation used is (Hrsg.) for Herausgeber].

Edited articles

Journal articles

Electronic book

Electronic journal articles
Watts, S. (2000) Teaching talk: Should students learn 'real German'? [HTML document]. German as a

Other websites

Unpublished papers

Unpublished theses/dissertations

Appendix
The appendix should be used for data collected (e.g. questionnaires, transcripts, ...) and for tables and graphs not included in the main text due to their subsidiary nature or to space constraints in the main text.

Assessment Scheme:
Continuous Evaluation: 40%
(Based on abstract writing, interim draft, general approach, research orientation, readings undertaken etc.)

Final Evaluation: 60%
(Based on the organization of the paper, objectives/problem profile/issue outlining, comprehensiveness of the research, flow of the idea/ideas, relevance of material used/presented, outcomes vs. objectives, presentation/viva etc.)
PROJECT (WITH PRESENTATION AND EVALUATION)

Course Code:ITE2732 Credit Units: 02

Course Objective:
The objective of this course is to provide practical training on some live/demo projects that will increase capability to work on actual problem in industry. It will be an in house training on some latest software which is in high demand in market. This training will be designed such that it will useful for their future employment in industry.

STUDENT ASSESSMENT RECORD (SAR)
Record to be maintained by project guide.
1. Project Tools (Hardware/ Software) used fot implementation.
2. Project Evaluation & Execution.

Examination Scheme:

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V – Viva, S – Synopsis, FP – Final Presentation, R - Report
SUMMER INTERNSHIP EVALUATION-II

Course Code: ITE2735  Credit Units: 03

Guidelines:
There are certain phases of every Intern’s professional development that cannot be effectively taught in the academic environment. These facets can only be learned through direct, on-the-job experience working with successful professionals and experts in the field. The internship program can best be described as an attempt to institutionalize efforts to bridge the gap between the professional world and the academic institutions. Entire effort in internship is in terms of extending the program of education and evaluation beyond the classroom of a university or institution. The educational process in the internship course seeks out and focuses attention on many latent attributes, which do not surface in the normal classroom situations. These attributes are intellectual ability, professional judgment and decision-making ability, inter-disciplinary approach, skills for data handling, ability in written and oral presentation, sense of responsibility etc.

In order to achieve these objectives, each student will maintain a file (Internship File). The Internship File aims to encourage students to keep a personal record of their learning and achievement throughout the Programme. It can be used as the basis for lifelong learning and for job applications. Items can be drawn from activities completed in the course modules and from the workplace to demonstrate learning and personal development.

The File will assess the student’s analytical skills and ability to present supportive evidence, whilst demonstrating understanding of their organization, its needs and their own personal contribution to the organization.

The layout guidelines for the Project & Seminar Report:
1. File should be in the following specification:
   - A4 size paper
   - Font: Arial (10 points) or Times New Roman (12 points)
   - Line spacing: 1.5
   - Top & bottom margins: 1 inch/ 2.5 cm
   - Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components:
   - Front Page
   - Table of Content
   - Acknowledgement
   - Student Certificate
   - Company Profile (optional)
   - Introduction
   - Main Body
   - References / Bibliography

The File will include five sections in the order described below. The content and comprehensiveness of the main body and appendices of the report should include the following:
1. The Title Page--Title - An Internship Experience Report For (Your Name), name of internship organization, name of the Supervisor/Guide and his/her designation, date started and completed, and number of credits for which the report is submitted.
2. Table of Content--an outline of the contents by topics and subtopics with the page number and location of each section.
3. Introduction--short, but should include how and why you obtained the internship experience position and the relationship it has to your professional and career goals.
4. Main Body--should include but not be limited to daily tasks performed. Major projects contributed to, dates, hours on task, observations and feelings, meetings attended and their purposes, listing of tools and materials and their suppliers, and photographs if possible of projects, buildings and co-workers.
5. References / Bibliography--This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.
ASSESSMENT OF THE INTERNSHIP FILE
The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Internship File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student’s own work. It will also ensure regularity and meeting the delaines.

STUDENT ASSESSMENT RECORD (SAR)
1. Range of Research Methods used to obtain information
2. Execution of Research
3. Data Analysis
   - Analyse Quantitative/ Qualitative information
   - Control Quality
4. Draw Conclusions

Examination Scheme:

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V – Viva, S – Synopsis, FP – Final Presentation, R - Report
SOFTWARE ENGINEERING

Course Code: ITE2706  Credit Units: 03

Course Objective:
The basic objective of Software Engineering is to develop methods and procedures for software
development that can scale up for large systems and that can be used to consistently produce high-
quality software at low cost and with a small cycle time. Software Engineering is the systematic
approach to the development, operation, maintenance, and retirement of software.
The course provides a thorough introduction to the fundamentals principles of software engineering.
The organization broadly be based on the classical analysis-design-implementation framework.

Course Contents:
Module I: Introduction
Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of
Quality Standards like ISO 9001, SEI-CMM

Module II: Software Metrics and Project Planning
Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics,
Information Flow Metrics. Cost estimation, static, Single and multivariate models, COCOMO model,
Putnam Resource Allocation Model, Risk management.

Module III: Software Requirement Analysis, Design and Coding
Problem Analysis, Software Requirement and Specifications, Behavioural and non-behavioural
requirements, Software Prototyping Cohesion & Coupling, Classification of Cohesiveness &
Coupling, Function Oriented Design, Object Oriented Design, User Interface Design Top-down and
bottom-up Structured programming, Information hiding,

Module IV: Software Reliability, Testing and Maintenance
Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Software process,
Functional testing: Boundary value analysis, Equivalence class testing, Structural testing: path testing,
Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing
Tools, & Standards. Management of maintenance, Maintenance Process, Maintenance Models, Reverse
Engineering, Software RE-engineering

Module V: UML
Introduction to UML, Use Case Diagrams, Class Diagram: State Diagram in UML, Activity Diagram
in UML, Sequence, Diagram in UML, Collaboration Diagram in UML, Domain, Component Diagram
and Deployment Diagram

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Att: Attendance

Text & References:

Text:

References:
ROBOTICS AND MECHATRONICS

Course Code: ITE2707  Credit Units: 03

Course Objective:
The course aims to introduce the working of robots, their geometric interpretations and planning of trajectories. This course also provides knowledge on mechatronics.

Course Contents:

Module I: Robot Arm Kinematics
Introduction. The Direct Kinematics Problem. Rotation Matrices, Composite Rotation Matrix, Rotation Matrix about an Arbitrary Axis, Rotation Matrices with Euler Angles Representation, Geometric Interpretation of Rotation Matrices, Homogeneous Coordinates and transformation Matrix,

Module II
II & III Links, Joints and Their Parameters, The David-Hartenberg Representation, ½ Kinematics Equation for Manipulators, Other specifications of the Location of the End-Effector, Classification of manipulators, The Inverse Kinematics Problem, Inverse Transform Technique for Euler Angles Solution.

Module III: Planning of Manipulator Trajectories
Introduction, General considerations on Trajectory planning, joint- Interpolated Trajectories, Calculation of a 4-3-4 joint Trajectory, Cubic Spline Trajectory (five Cubics).

Module IV: Mechatronics

Module V: Actuators
Pneumatic and Hydraulic Actuation systems; Actuation systems, Pneumatic and Hydraulic systems, Directional control valves, Pressure control valves, Cylinders, Process Control Valves, Rotary Actuators.
Mechanical Actuation Systems: Mechanical systems, Types of motion, Kinematic chains, Cams, Gear trains, Ratchet and pawl, EEE2t and chain drives, Bearings, Mechanical aspects of motor selection.
Electrical Actuation Systems: Electrical systems, Mechanical switches, Solid state switches, Solenoids, D.C. Motors, A.C. Motors, Stepper Motors.
Programmable Logic Controllers: Introduction, Basic Structure, Input Output Processing, Programming, Mnemonics, Timers, Internal Relays and Counters, Shift Registers, Master and jump controls, Data handling, Analogue input/output, Selection of a PLC.

Examination Scheme:

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Text & References:

Text:
- Robotics, Control, Sensing, Vision and Intelligence, K S FU,
References:

- Introduction to Robotic Mechanics and Control, JOHN J. CRAIG, Pearson Education Ltd. 2003
- Introduction to Robotics, SYED V NIKU, PHI, Pearson, 2003
- Robotics and Control, R K Mittal, I J Nagrath, TMH, 2003
- Introduction to Mechatronics and Measurement systems – David G.Alciator and Michael B. Histand TMH 2005
GRID COMPUTING

Course Code: ITE2708 Credit Units: 03

Course Objective:
Grid computing (or the use of a computational grid) is applying the resources of many computers in a network to a single problem at the same time - usually to a scientific or technical problem that requires a great number of computer processing cycles or access to large amounts of data. The major objective of this course is to provide a sound foundation to the students on the concepts, percepts and practices in a field that is of immense concern to the industry and business.

Course Contents:
Module I: Introduction - Cluster to grid computing
Cluster computing models, Grid models, Mobile grid models, Applications.
Parset: System independent parallel programming on distributed systems: Motivation and introduction, Semantics of the parset construct, Expressing parallelism through parsets, Implementing parsets on a loosely coupled distributed system.
Anonymous remote computing model: Introduction, Issues in parallel computing on interconnected workstations, Existing distributed programming approaches, The arc model of computation, The two tired arc language constructs, Implementation

Module II: Integrating task parallelism with data parallelism
Introduction and motivation, A model for integrating task parallelism into data parallel programming platforms, Integration of the model into ARC, Design and implementation applications, performance analysis, guidelines for composing user programs, related work
Anonymous remote computing and communication model: Introduction, Location in dependent inter task communication with DP, DP model of iterative grid computations, Design and implementation of distributed pipes, Case study, and Performance analysis.

Module III: Parallel programming model on CORBA
Introduction, Existing works, notion of concurrency, system support implementation performance, suitability of CORBA: introspection.
Grid computing model: Introduction, a parallel computing model over grids, Design and implementation of the model, Performance studies, Related work.

Module IV: Introducing mobility into anonymous remote computing and communication model
Introduction, issues in mobile clusters and parallel computing on mobile clusters, moset overview, moset computation model, implementation, performance.

Module V: Parallel Simulated Annealing algorithms
Introduction, Simulated annealing (SA) Technique, Clustering algorithm for simulated annealing (SA), Combination of genetic algorithm and simulated annealing (SA) algorithm

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Text & References:
Text:
- “Grid Computing a Research Monograph” by D. Janakiram, Tata McGraw hill publications, 2005

References:
- “Grid Computing” Joshy Joseph & Craig Fellenstein, Pearson Education
IOT PLATFORMS AND SYSTEM DESIGN

Course Code:ITE2702  Credit Units: 03

Course Objective:
This program aims to train students to be equipped with a solid theoretical foundation, systematic professional knowledge and strong practical skills in the IoT Platform and System Design. The course focuses on understanding the vision of IoT from a global perspective, understand its applications, determine its market perspective, using gateways, devices and data management, building a state of art architecture in IoT and its applications in commercial building automation and real world design constraints.

Course Content:

Module I: IoT Networking Core
Technologies involved in IoT development, Internet web and Networking technologies, Infrastructure, Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards, Wireless networking equipment and configurations, accessing hardware and device file interactions.

Module II: M2M to IoT
Role of M2M in IoT, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT. The international driven global value chain and global information monopolies. Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.

Module III: IoT Architecture -State of the Art
IoT reference Model and Architecture- Functional View, Information View, Deployment and Operational View, Other Relevant architectural views, Middleware Introduction-FiWare etc., Remote monitoring and sensing, remote controlling and performance analysis, layering concepts, communication pattern, 6LoWPAN, Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

Module IV: IoT Application Development
Application protocols: MQTT, REST/HTTP, CoAP, MySQL, Back-end Application Designing Apache for handling HTTP Requests, MongoDB Object type Database, HTML, CSS & jQuery for UI Designing, JSON lib for data processing, Security & Privacy during development

Module V: IoT Security and case studies

Examination Scheme:

<table>
<thead>
<tr>
<th>Components</th>
<th>A</th>
<th>CT</th>
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</tbody>
</table>

CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Texts & References:

Texts:
References:
- Dr. OvidiuVermesan, Dr. Peter Friess “Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems”, River Publishers
GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student. Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage. The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

A short account of the activities that were undertaken as part of the project;
A statement about the extent to which the project has achieved its stated goals.
A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components:

Title or Cover Page

The title page should contain the following information: Project Title; Student’s Name; Course; Year; Supervisor’s Name.

Acknowledgements (optional)

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

Abstract

A good “Abstract” should be straight to the point; not too descriptive but fully informative. First paragraph should state what was accomplished with regard to the objectives. The abstract does not have to be an entire summary of the project, but rather a concise summary of the scope and results of the project.

Table of Contents

Titles and subtitles are to correspond exactly with those in the text.

Introduction

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

Materials and Methods

This section should aim at experimental designs, materials used. Methodology should be mentioned in details including modifications if any.

Results and Discussion

Present results, discuss and compare these with those from other workers, etc. In writing these section, emphasis should be given on what has been performed and achieved in the course of the work, rather than discuss in detail what is readily available in text books. Avoid abrupt changes in
contents from section to section and maintain a lucid flow throughout the thesis. An opening and closing paragraph in every chapter could be included to aid in smooth flow.

Note that in writing the various sections, all figures and tables should as far as possible be next to the associated text, in the same orientation as the main text, numbered, and given appropriate titles or captions. All major equations should also be numbered and unless it is really necessary never write in “point” form.

➢ Conclusion
A conclusion should be the final section in which the outcome of the work is mentioned briefly.

➢ Future prospects

➢ Appendices
The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

➢ References / Bibliography
This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

Examples

For research article

For book

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution.

Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The File should fulfill the following assessment objectives:

Range of Research Methods used to obtain information

 Execution of Research
 Data Analysis
 Analyse Quantitative/ Qualitative information
 Control Quality

Draw Conclusions

Examination Scheme:

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Course Objective:
Processing color and grayscale images or other two-dimensional signals has become an important tool for research and investigation in many areas of science and engineering. Digital Image Processing is designed to give professionals and students a powerful collection of fundamental and advanced image processing tools on the desktop. Digital Image Processing takes full advantage of the computational technology of Mathematica.

Course Contents:
Module I: Introduction and Digital Image Fundamentals

Module II: Image Enhancement in the Spatial Domain
Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

Module III: Image Enhancement in the Frequency Domain:
Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.


Module IV: Image Compression

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Threshold, Region Oriented Segmentation, Motion based segmentation.

Module V: Representation and Description
Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition
Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

Examination Scheme:

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Text & References:

Text:

References:
- RosefieldKak, “Digital Picture Processing”,

74
DIGITAL IMAGE PROCESSING LAB

Course Code: ITE2802

Credit Units: 01

Software Required: Java

List of Assignments:

Experiments will be based on Image Representation, Image transformation, Image Enhancements, Edge Detection, Morphological Image processing and Segmentation.

Examination Scheme:

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Note: IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.
Course Objective:
To create web based applications using ASP.NET.

Course Contents:

Module I: Introduction to .NET technologies
Features of .NET, .NET Framework, CLR, What is ASP.NET? Difference between ASP and ASP.NET.
Design View, HTML View, Default Files used in ASP.NET. Concept of Master pages, Intrinsic Objects of ASP.Net, Structure of ASP.NET page, Cascading Style Sheet: Embedded, Inline, External.

Module II: Controls in ASP.NET

Module III: Overview of ADO.NET and XML
What is ADO.NET, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets, using Command & Data Reader, binding data to data bind Controls, displaying data in data grid, XML basics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in ADO.NET, The XML Data Document, Data Binding and its types.

Module IV: ASP.NET Applications
Creating, tracking, caching, error handling, Securing ASP.NET applications- form based applications, window based application.

Module V: Web services
Introduction, State management- View state, Session state, Application state, Building ASP.NET web services, working with ASP.NET applications, creating custom controls, Invoking COM/COM+, Activ X Components

Examination Scheme:

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Text & References:

Text:
- ASP.NET Unleashed by Stephen Walther, SAMS publications

References:
- ASP.NET, Wrox Publications
- ASP.NET and VB.NET, Wrox Publication
- ASP.NET and C#.NET, Wrox publication.
DOT NET PROGRAMMING LAB

Course Code: ITE2804 Credit Units: 01

Course Contents:
- Use of Controls in creating web pages
- Creating sessions
- Creating Custom controls
- Implementing security

Examination Scheme:

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Course Objective:
The goal is to introduce students to basic simulation methods and tools for modelling and simulation of continuous, discrete and combined systems. The objective is to impart knowledge of simulation principles. The ability to create simulation models of various types.

Course Contents:

Module I: Linear Programming
Linear Programming: Formulation, Graphical solution, standard and matrix form of linear programming problems, Simplex method and its Algorithm, Two-phase Simplex method.

Module II: Integer Programming
Integer Programming: Importance, Need and importance of Integer Programming, Gomory’s All Integer Programming Problem technique and its algorithm.

Module III: Modeling & Simulation Concepts and Random Numbers

Module IV: Simulation Experiments and Design of Application Simulators
Simulation Experiments: Run length of Static and Dynamic Stochastic Simulation Experiments, Minimizing variability in simulators without increasing Number of simulation Runs.

Module V: Design of Application Simulators
Design of Application Simulators – for Multi-server Queuing System, PERT, Optimizing Inventory Policy and Cost in Business environment.

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Text & References:
SIMULATION AND MODELLING LAB

Course Code: ITE2806
Credit Units: 01

2. Exploring the Car Wash Model. (Single queue single server)
3. The Car Wash Model (Single Queue two Servers)
4. Implementation of Buffered Queue Model
5. To Design Airport Model. (One queue multiple servers)
6. To Design a superstore model (Two queue and two servers)
7. To Design a Billing System (Two queues one Server)

Examination Scheme:

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