D. No 686
24. 10. 2020

BOARD OF STUDIES (BoS) PROCEEDING
IN
COMPUTER SCIENCE & ENGINEERING
AND
INFORMATION TECHNOLOGY
(Meeting Dated – 30th May, 2020)

	Outcomes (COs) from various stakeholders (students, alumni, faculty members, etc.) was presented and discussed. The house noticed and appreciated that most of the suggested courses (on emerging areas) / activities (from alumni) are in practice (at present) in the department. Moreover, it is discussed that the department will take necessary initiatives, wherever required.
ITEM CSEIT-11:	Any other matters:

(a) To discuss and propose new Scheme/Curriculum for M.Tech (CSE/IT/Cyber Security) Programmes

The newly proposed scheme and curriculum for M.Tech (CSE/IT/Cyber Security) programmes were presented before the house. The provisions made therein related to SWAYAM/NPTEL/MOOC based courses, Electives (in offline mode and through SWAYAM/NPTEL) and Open Category courses (in offline mode and through SWAYAM/NPTEL) were discussed. The scheme / curriculum are Annexed as Annexure-III.

(b) To discuss and propose new Scheme / curriculum for Two Years MCA Programme

The newly proposed scheme and curriculum for two years MCA programme was presented before the house. The provisions made therein related to SWAYAM/NPTEL/MOOC based courses, Electives (offline mode / through SWAYAM/NPTEL/MOOC), Open Category (OC) course (offline mode / through SWAYAM/NPTEL/MOOC) were discussed and finalized with minor adjustments (as per the suggestions). The scheme / curriculum is Annexed as Annexure-IV.

(c) To induct a new course in the Third Semester of current scheme of MCA programme

Considering the recent development and industrial requirements (pertaining to programming practices), it was proposed to induct a new course "Programming in Python" in the existing scheme of Third Semester MCA (3 Years) programme (for 2018-19 & 2019-20 admitted batch). This course will be offered in place of the course "Computer Oriented Optimization". The proposal (along with the syllabi) was discussed and recommended by the house. The Syllabi of newly proposed course "Programming in Python", is Annexed as Annexure-V.

(d) To discuss about the induction of InfyTQ certification courses (under the Infosys Campus Connect MoU) as Industry Elective courses / otherwise. as per the requirement raised by Infosys Ltd. (for B.Tech III Year Students)

To induct the InfyTQ certification courses based on emerging areas (as offered by Infosys) under InfyTQ certification initiatives (as part of Infosys Campus Connect program), it is desired to include / offer these courses, as listed below, as part of Electives / or the department may offer the same by creating Batches (separately) (by following all the requirements for the same). This is in the benefit of students, as these are based on emerging areas / current industrial practices. Therefore, the

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Scheme and Syllabi
for
Two Year M.C.A. Programme
[ITEM 11(b)]

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Guidelines / Abbreviations for Two Years MCA Programme (Effective from July 2020)

Abbreviations used

L	Lecture
T	Tutorial
P	Practical
BSC	Basic Science Courses
DC	Departmental Core
DE	Departmental Elective
BM	Business Management
OC	Open Category
DLC	Departmental Laboratory Courses
MOOC	Massive Open Online Courses

Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
2 Hours Practical(Lab)/week	2 credit

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Master of Computer Applications (MCA) (2 Year Programme) (Semester – 1) Recommended W.E.F JULY 2020

Scheme of Examination

S. No.	Course Category	Subject Code	Subject Name	Theory Slot			Practical Slot		MOOCs		Total Marks	Contact Periods per week			Total Credits
				End sem	Mid sem	Quiz/ Assignment	End Sem	Lab work/ sessional	Assignment	Exam		L	T	P	
1.	BSC	680111	Mathematical Foundations	70	20	10	-	-	-	-	100	3	-	-	3
2.	DC	680112	Data Structures and Algorithms	70	20	10	-	-	-	-	100	3	1	-	4
3.	DC	680113	Database Management Systems	70	20	10	-	-	-	-	100	3	1	-	4
4.	DC	680114	Operating Systems	70	20	10	-	-	-	-	100	3	1	-	4
5.	BM	680115	Management Functions and Oral & Written Communication	70	20	10	-	-	-	-	100	3	-	-	3
6.	DLC	680116	Lab-I (Object Oriented Programming Lab)	-	-	-	90	60	-	-	150	-	-	6	6
7.	DLC	680117	Lab-II (DBMS Lab)	-	-	-	60	40	-	-	100	-	-	2	2
			Total	350	100	50	150	100	-	-	750	15	3	8	26

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

Master of Computer Applications (MCA) (2 Year Programme) (Semester-II) **Recommended W.E.F JULY 2020**
Scheme of Examination

S. No.	Course Category	Subject Code	Subject Name	Theory Slot			Practical Slot		MOOCs		Total Marks	Contact Periods per week			Total Credits
				End sem	Mid sem	Quiz/ Assignment	End Sem	Lab work/ sessional	Assignment	Exam		L	T	P	
1.	DC	680211	Software Engineering	70	20	10	-	-	-	-	100	3	1	-	4
2.	DC	680212	Internet of Things (IoT)	70	20	10	-	-	-	-	100	3	1	-	4
3.	DC	680213	Computer Networks	70	20	10	-	-	-	-	100	3	1	-	4
4.	DE	DE	Departmental Elective-I	70	20	10	-	-	-	-	100	3	-	-	3
5.	BM	DE (BM)	Departmental Elective-II (BM)	70	20	10	-	-	-	-	100	3	-	-	3
6.	DLC	680223	Lab-III (Java Programming Lab)	-	-	-	90	60	-	-	150	-	-	6	6
7.	DLC	680224	Lab-IV (Business Programming Laboratory)	-	-	-	60	40	-	-	100			2	2
			Total	350	100	50	150	100	-	-	750	15	3	8	26

Elective-I course will run through Department List of Electives, as decided by respective BoS / Department. Moreover, this may also be run through SWAYAM/NPTEL/MOOC based Learning Platform (with credit transfer facility) (if required) to address the technological advancements and diverse application orientation. The need is to be assessed by the department/BoS.

**Elective-II course will run through Department List of Electives (for Business Management), as decided by BoS / Department.

List of Electives will remain dynamic and may be kept updated, considering the industrial demand / current practices.

DE-1 (Tentative)		DE-2 (BM)	
Subject Code	Subject Name	Subject Code	Subject Name
680214	Computer Architecture and Organization	680218	Managerial Economics
680215	Computer Graphics and Multimedia	680219	Corporate Planning
680216	Web Technology	680220	MIS Framework and Implementation
680217	Machine Learning with Python	680221	Management of Software Projects
		680222	Organizational Behavior

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Master of Computer Applications (MCA) (2 Year Programme) (Semester-IV) Recommended W.E.F JULY 2020

Scheme of Examination

S.No.	Course Category	Subject Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot						
				End sem. Exam.	Mid sem.	Quiz/ Assignment	End Sem. /Practical Viva	Sessional Work/ Practical Record/ Assignment/ Quiz/ Presentation		L	T	P	
1.	SEMINAR/S ELF STUDY	680405	Self Learning / Presentation/ Seminar [SS]	-	-	-	-	100	100	-	-	2	2
2.	DLC	680406	System Development Project Internship	-	-	-	300	200	500	-	-	20	20
			Total	-	-	-	300	300	600	-	-	22	22

[SS] Self learning / presentation through SWAYAM / NPTEL (Registration in a course will be compulsory for students but assessment will be based on internal seminar presentation)

DEAN (ACADEMICS)
M.I.T.S
GWALIOR

Syllabi
of
M.C.A. I Semester

Mathematical Foundations
680111 (BSC)

Objective:

- To understand the basic discrete mathematical structures
- To develop understanding of boolean mathematics.
- To understand recurrence relations and its usage in computer science.

UNIT-I

Sets Relations and Functions: Sets, Subsets, Power-Sets, Complement, Union and intersection. Demorgan's law Cartesian, products, Relations: relational Matrices, properties of relations, equivalence relation Functions: Injection, Surjection, Bijection, Composition of Functions. Permutations. Cardinality, the characteristic functions and Mathematical induction.

UNIT-II

Lattices :Partial order set, Hasse diagrams, upper bounds, lower bounds, Maximal and minimal element, first and last element ,Lattices, sub lattices , Isotonicity, distributive inequality lattice homomorphism, lattice isomorphism, complete lattice, complemented lattice distribution lattice.

UNIT-III

Groups and Fields: Groups: Group axioms-permutation groups; Subgroups, Co-sets, Normal Subgroups, semi groups; Lagrange theorem, fields, minimal polynomials, reducible polynomials, primitive polynomial roots, applications.

UNIT-IV

Graphs: Finite graphs; incidence and degree, isomorphism, subgraphs and union of graphs; Connectedness; Walks paths and circuits Eulerian graphs. Trees properties of trees; pendant vertices in a tree, Center of tree Spanning trees and Cutvertices; Binary tree Matrix representation of graph, Incidence, Adjacency matrices and their properties. Applications of graphs in Computer Science.

UNIT-V

Discrete Numeric function and Recurrence relation: Introduction to discrete numeric functions and generating functions introduction to recurrence relations and recursive algorithms. Linear recurrence relations with constant coefficients, homogeneous solutions, particular solutions and total solutions.

Books:

1. J.P.Trembley & R.P.Manohar. "Discrete Mathematical Structure with applications to Computer Science
2. Nersingh Deo: Graph Theory. :: C.L. Liu Discrete Mathematics.
3. C.L. Liu: Discrete Mathematics
4. D.K. Jain: Discrete Structures

Course outcomes:

Student would be able to

CO1: understand the basic concept of set theory, lattices, graph theory, discrete numeric function and algebraic structure.

CO2: describe basic knowledge of course content and distinguish between them in terms

of their applications.

CO3: implement the course content to related engineering applications and problems faced in real life.

CO4: apply the concepts of mathematics to the suitable technique for relevant industries and contribution to the society

CO5: analyze the set theory, lattices, graph theory, discrete numeric function and algebraic structure to examine the real world problem.

CO6: design analytical skills and interpret applications of engineering beneficial in real time troubleshooting.

Data Structures and Algorithms
680112 (DC-1)

Objective:

- To understand the abstract data types stack, queue, deque, trees, lists etc.
- To be able to design efficient algorithms using various data structures.
- To understand design techniques the time complexity of algorithms.

UNIT-I

Prerequisites: Array, Structure, pointers, pointer to structure, functions, parameter passing, recursion.

Stack and Queue: contiguous implementations of stack, various operations on stack, various polish notations-infix, prefix, postfix, conversion from one to another-using stack; evaluation of post and prefix expressions. Contiguous implementation of queue: Linear queue, its drawback; circular queue; various operations on queue; linked implementation of stack and queue- operations

UNIT-II

General List: list and it's contiguous implementation, it's drawback; singly linked list-operations on it; doubly linked list-operations on it; circular linked list; linked list using arrays.

Trees: definitions-height, depth, order, degree, parent and children relationship etc; Binary Trees- various theorems, complete binary tree, almost complete binary tree; Tree traversals-preorder, inorder and post order traversals, their recursive and non recursive implementations; expression tree- evaluation; linked representation of binary tree-operations. Threaded binary trees; forests, conversion of forest into tree. Heap-definition.

UNIT-III

Searching, Hashing and Sorting: requirements of a search algorithm; sequential search, binary search, indexed sequential search, interpolation search; hashing-basics, methods, collision, resolution of collision, chaning; Internal sorting- Bubble sort, selection sort, insertion sort, quick sort, merge sort on linked and contiguous list, shell sort, heap sort, tree sort.

Graphs: related definitions: graph representations- adjacency matrix, adjacency lists, adjacency multilist; traversal schemes- depth first search, breadth first search; Minimum spanning tree; shortest path algorithm; kruskal & dijkstra algorithm.

Trees: Miscellaneous features Basic idea of AVL tree- definition, insertion & deletion operations; basic idea of B-tree- definition, order, degree, insertion & deletion operations;

B-tree- definitions, comparison with B-tree; basic idea of string processing.

UNIT-IV

Time Complexity: models of computation, algorithm analysis, order architecture, time space complexities, computing the average and worst case analysis

UNIT-V

Divide and conquer: Structure of divide-and-conquer algorithms: examples; Binary search, quick sort, Strassen Multiplication; Analysis of divide and conquer run time recurrence relations. **Graph searching and Traversal:** Overview, Traversal methods (depth first and breadth first search).

Books:

1. Kruse R.L. Data Structures and Program Design in C: PHI
2. TennenBaum A.M. & others: Data Structures using C & C++: PHI
3. Horowitz & Sawhaney: Fundamentals of Data Structures, Galgotia Publishers.
4. Ullman "Analysis and Design of Algorithm" TMH
5. Goodman "Introduction to the Design & Analysis of Algorithms, TMH-2002.
6. Sara Basse, A. V. Gelder, " Computer Algorithms." Addison Wesley
7. T. H. Cormen, Leiserson , Rivest and Stein. "Introduction of Computer algorithm." PHI

Course Outcomes:

Student would be able to

CO1: describe the stack, queue, link list.

CO2: analyze worst-case running times of algorithms using asymptotic analysis.

CO3: synthesize familiar with advanced data structures such as balanced search trees. hash tables, priority queues, tree traversal techniques.

CO4: describe several sorting algorithms including quick sort, merge sort and heap sort.

CO5: organize some graph algorithms such as shortest path and minimum spanning tree.

CO6: evaluate different data structures techniques and pick an appropriate data structure for a design situation.

Database Management Systems
680113 (DC-2)

Objectives:

- To describe key concepts, issues, and operational terminology
- To understand the relationships of key components behind concepts such as hardware, networks, data storage, operating systems, and software programs.
- To normalize any problem using $1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}$ normal form

UNIT-I

Introduction: Advantage of DBMS approach, various view of data, data independence, schema and sub-schema, primary concepts of data models, Database languages, transaction management, Database administrator and users, data dictionary, overall system architecture.

ER model: basic concepts, design issues, mapping constraint, keys, ER diagram, weak and strong entity sets, specialization and generalization, aggregation, inheritance, design of ER schema, reduction of ER schema to tables.

UNIT-II

Domains, Relations and Keys: domains, relations, kind of relations, relational database, various types of keys, candidate, primary, alternate and foreign keys.

Relational Algebra & SQL: The structure, relational algebra with extended with extended operations, modifications of Database, idea of relational calculus, basic structure of SQL, set operations, aggregate functions, null values, nested sub queries, derived relations, views, modification of Database, join relations, DDL in SQL.

UNIT-III

Functional Dependencies and Normalization: basic definitions, trivial and non trivial dependencies, closure set of dependencies and of attributes, irreducible set of dependencies, introduction to normalization, non loss decomposition, FD diagram, first, second, third Normal forms, dependency preservation, BCNF, multivalued dependencies and fourth normal form, Join dependency and fifth normal form.

UNIT-IV

Transaction, concurrency and Recovery: basic concepts, ACID properties, Transaction states, implementation of atomicity and durability, concurrent executions, basic idea of serializability, basic idea of concurrency control, basic idea of deadlock, failure classification, storage structure types, stable storage implementation, data access, recovery and atomicity- log based recovery, deferred Database modification, immediate Database modification, checkpoints.

UNIT-V

Distributed Database: basic idea, distributed data storage, data replication, data fragmentation- horizontal vertical and mixed fragmentation

Emerging Fields in DBMS: object oriented Databases-basic idea and the model, object structure, object class, inheritance, multiple inheritance, object identity, data warehousing- terminology, definitions, characteristics, data mining and it's overview, Database on www, multimedia Databases-difference with conventional DBMS, issues, similarity based retrieval, continuous media data, multimedia data formats, video servers.

Storage structure and file organizations: overview of physical storage media, magnetic disks-performance and optimizations, basic idea of RAID, file organizations, organization of records in files, basic concepts of indexing, ordered indices, basic idea

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of B-tree and B+-tree organization.

Books:

1. Database System Concepts – A Silberschatz, H.F Korth, Sudersan, MGH Publication.
2. An introduction to Database Systems – C.J Date 6th ed.
3. Fundamentals of Database systems – L elmasri & Navathe III ed.
4. An introduction to Database systems – B.C. Desai.

Course Outcomes:

Student would be able to

CO1: differentiate database systems from file systems by enumerating the features provided by database systems and execute various SQL queries

CO2: define the terminology, features, classifications, and characteristics embodied in database systems.

CO3: design principles for logical design of databases, including the E-R method and improve the database design by normalization.

CO4: evaluate the principles of storage structure and recovery management.

CO5: identify the issues of transaction processing and concurrency control.

CO6: analyze an information storage problem and derive an information model expressed in the form of an entity relation diagram and other optional analysis forms, such as a data dictionary, file and page organizations, indexing methods including B tree, and hashing.

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3. Peterson, Silberschatz. "Operating System Concepts". Addison Wesely Publishing Company, 1989.
4. Tanenbaum A.S. "Modern Operating System" Prentice Hall of India Pvt Ltd 1995.

Course Outcomes:

Student would be able to

CO1: evaluate different structures for operating systems.

CO2: analyze theory and implementation of: processes, resource control (concurrency etc.)

CO3: distinguish system calls for managing processes. memory and the file system.

CO4: demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system.

CO5: apply the various resource management techniques for distributed systems.

CO6: discover the different features of real time and mobile operating systems.

Management Functions and Oral & Written Communication
680115 (BM-1)

UNIT-I

Definition - Management - Role of managers - Evolution of Management thought - Organization and the environmental factors – Trends and Challenges of Management in Global Scenario.

PLANNING : Nature and purpose of planning - Planning process - Types of plans – Objectives - - Managing by objective (MBO) Strategies - Types of strategies - Policies - Decision Making - Types of decision - Decision Making Process - Rational Decision Making

ORGANIZING : Nature and purpose of organizing - Organization structure - Formal and informal groups organization - Line and Staff authority - Departmentation - Span of control - Centralization and Decentralization - Delegation of authority - Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - - Performance Appraisal.

UNIT-II

DIRECTING : Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective communication - Organization Culture - Elements and types of culture - Managing cultural diversity.

CONTROLLING : Process of controlling - Types of control - Budgetary and non-budgetary control Q techniques - Managing Productivity - Cost Control - Purchase Control – Maintenance Control - Quality Control - Planning operations.

UNIT-III

Communication: Meaning, Nature, Process, Medium and Media, and Elements of Communication. Importance of Effective Communication, Communication Situation, Barriers to Communication, Communication Window, Objectives of Communication. Types of Communication: Verbal and Non-Verbal, Oral and Written, merits and demerits of Oral and written Communication, Horizontal and Vertical Communication, Formal and informal communication, Grapevine Communication. Negotiation: Utility and Styles, Creativity.

UNIT-IV

Communication Skills: Listen, Speak Read and Write, improving Communication Skills. Speaking: Presentation: Conducting, Use of Aids – Visual and Audio-visual. Group Discussion, Meetings. Interview, Telephonic Conversations, Seminar, Debates, Speech, Body Language.

UNIT-V

Writing: Mechanics of Writing. Paragraph Writing. Letters: Essentials of Writing Letters, Types of Official Letters, Letters of complaints enquiry, order, and Informative. Applications: Job Applications, Drafting Bio Data. Précis writing.
Writing Reports: Mechanics of Report Writing, Types of Report, Technical Report, Organising a report Precise Writing, Advertisement and Comprehension

Books:

1. Stoner, Freeman & Gilbert Jr - Management (Prentice Hall of India, 6th Edition)

2. Koontz Harold & Weihrich Heinz - Essentials of management (Tata Mc Graw Hill, 5th Edition 2008)
3. Robbins & Coulter - Management (Prentice Hall of India, 9th Edition)
4. Robbins S. P. and Decenzo David A. - Fundamentals of Management Essential Concepts and Applications (Pearson Education, 6th Edition)
5. Communication Skills for Engineers – Pearson Education.
6. Technical Communication – Oxford University Press
7. Effective Business communication – Tata McGraw Hill
8. Business Communication – OUP, Tata McGraw.
9. Practical English Grammar by Thomson Martinet – Oxford University Press.
10. Study Listening, Speaking Reading, Writing a series by Cambridge University Press.
11. Communication Skills for Technical Students Farhathullah, T.M Orient Longman
12. English for Engineers & Technologists (Combined Vol.1 and Vol.2) Orient Longman

Course outcomes:

Student would be able to:

CO1: demonstrate the roles, skills and functions of management.

CO2: analyze the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

CO3: demonstrate knowledge and comprehension of major text and traditions in language as well as its social, cultural, and historical context.

CO4: read a variety of text critically and analytically so as to demonstrate in written and/or speech the interpretation of those texts.

CO5: evaluate and interpret text written in English assessing the results in written and oral arguments using appropriate material for support.

CO6: develop professional work habits including those necessary for effective collaboration and cooperation with others.

Object Oriented Programming Lab
680116 (DLC-1)

Data Types; Constant & Variable; Operators & expressions. Priority & associatively of operators.

Control Constructs- if-else, for while, do-while; Case statement; Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Special constructs-Break, continue, exit (), goto & labels;

Functions; Arguments; Return Value; Parameter passing- call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variable, static variable; Calling a function; Recursion – basics, comparison with iteration, tail recursion, when to avoid recursion, examples.

Overview of object oriented programming, evolution, features. comparison with procedural languages. applications, advantages. C++ basics, data types. Operators, loops and decisions, structures and functions. references.

Object model, OOD, OOA, abstraction, encapsulation, modularity, hierarchy , state, behavior and relationship among objects. Object oriented design. identifying classes and objects, object diagrams.

Course outcomes:

Student would be able to
CO1: Adhere to object oriented programming constructs.

CO2: Implement inheritance, polymorphism. encapsulation, abstraction.

CO3: Modify existing codes and classes as per the requirement of software development.

CO4: Construct programming solutions to a broad range of query problems

CO5: Develops object oriented application system as part of a team in industry.

CO6: Design the classes and constructs for real time software as per societal needs.

Database Management Laboratory
680117 (DLC-2)

Basic structure of SQL, set operations, aggregate functions, null values, nested sub queries, derived relations, views, modification of Database, join relations. DDL in SQL. Creation of a database and writing SQL queries to retrieve information from the database. Performing insertion, deletion, modifying, altering, updating and viewing records based on conditions. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Creation of Views, Creating an Employee database to set various constraints. Creating relationships between the databases. Case Study using real life database applications.

Course outcomes:
Student would be able to

CO1: **Design** database application system as part of a team.

CO2: **Solve** queries using SQL

CO3: **Design** an information model expressed in the form of an entity relation diagram

CO4: **Adapt** normalization theory for a database.

CO5: **Implement** data definition language for the schema using a DBMS

CO6: **Construct** database application system solutions to a broad range of query problems.

Syllabi
of
Departmental Core (DC) Courses
M.C.A. II Semester

Software Engineering
680211 (DC-4)

COURSE OBJECTIVES

- To understand the basic concepts of software engineering logical process modeling and operational terminology
- To understand the software process models
- To draw DFDs using specific rules and components to depict logical process models

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UNIT - I Introduction to Software Engineering:
Definition, Software Characteristics and Elements of system. The System Development Life Cycle, The Role of System Analyst. Types of Requirement- Functional and Non-functional Requirements, User and System Requirements, Requirement Elicitation Methods, Requirement Analysis Methods. Requirement Documentation (SRS), Requirement Validation, Requirement Management.

UNIT - II Software Process Models:
Software, Software Myths, Software Engineering - A Layered Technology, Software Process Models, The Linear Sequential Model. The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Fourth Generation Techniques

UNIT - III Design Concept, Principle and Methods:
Design Fundamentals. Design Principles. Effective Modular Design. Design Representations, Real Time Design. Object Oriented Design, Coupling and Cohesion. Risk analysis.

UNIT - IV Software Metrics, Project Management and Estimation:
Metrics in Process and Project domains. Software Measurement. Software Quality Metrics, **Project Management-** Basics-People, Product, Process, Project, **Estimation-** Software Project Estimation, Decomposition Techniques- Function Point Estimation, Line of Code (LOC) based estimation, Empirical Estimation, COCOMO Model, Project Scheduling Techniques

UNIT - V Software Quality Assurance and Testing:
Definitions, Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Testing Life Cycle (STLC), Test Case Design, Strategic Approach to Software Testing- Verification & Validation, Strategic issues, Criteria for completion of Testing, Unit Testing, Integration Testing, Validation Testing, System Testing, Black Box Testing Techniques, White Box Testing Techniques, Acceptance Testing

BOOKS
- Software Engineering by Sommerville, Pearson
- Software Engineering. A Practitioner's Approach. by Roger S. Pressman. McGrawHill
- Software Engineering by K.K. Agrawal & Yogesh Singh, New Publication
- Software Engineering by Rajib Mall

Course Outcomes:
After completion of this course, the students would be able to:

CO1: design and mapping of different real world problems using software engineering concepts

CO2: evaluate software models with respect to their accuracy and needs of the customer requirement.

CO3: design test cases and SQA of a software system.

CO4: identify and how to use various cost estimation techniques used in software engineering.

CO5: design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

CO6: evaluate as an effective member or leader of software engineering teams and manage time, processes and resources effectively by prioritizing competing demands to achieve personal and team goals

Internet of Things
680212 (DC-5)

Unit I

Introduction & Concepts: Introduction to Internet of Things, Architecture, Physical Design of IOT, Logical Design of IOT, Four Pillars of IoT, Applications, IOT Enabling Technologies, IOT components, Basics of Networking.

Unit II

Sensors, actuators, types of sensors. IOT service oriented Architecture, IOT associated technologies, IOT Communication Protocols: IEEE 802.15.4, Zigbee, 6LoWPAN, Wireless Hart, AMQP, MQTT, COAP, NFC, XMPP, SOAP, REST, HTTP Routing protocols.

Unit III

Developing Internet of Things & Logical Design using Python: Introduction, IOT Design Methodology, Installing Python, Python Data Types & Data Structures, Control Flow, Functions, Modules, Packages, File Handling, Date/ Time Operations, Classes, Introduction to Raspberry Pi, Introduction to Arduino Programming, Integration of Sensors and Actuators with Arduino, Raspberry Pi & arduino devices.

Unit IV

Sensor Networks, Ubiquitous Computing, data storage in IOT, IOT Cloud Based Services, Interoperability in IoT, cloud Computing, Fog Computing, Edge computing, Data Analytics overview.

Unit V

Security and privacy in the internet of things: concepts, IoT security overview, security framework for IoT, Privacy in IOT networks, IoT Robustness and reliability, governing internet of things: issues, Approaches and new paradigms. . IOT Case studies. : Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.

Books:

1. Rajkamal,"Internet of Things", Tata McGraw Hill publication

2. Vijay Madisetti and Arshdeep Bahga, "Internet of things(A-Hand-on-Approach)" 1st Edition ,Universal Press

3. Hakima Chaouchi "The Internet of Things: Connecting Objects", Wiley publication.

4. Charless Bell "MySQL for the Internet of things", Apress publications.

5. Francis dacosta "Rethinking the Internet of things:A scalable Approach to connecting everything", 1st edition, Apress publications 2013.

6. Donald Norris"The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and BeagleBone Black", McGraw Hill publication.

Course Outcomes:

CO1: Define fundamentals of IoT, Enabling Technologies, Networking and Communication Protocols.

CO2: Illustrate the functions, applications of various IOT Protocols and architectures.

CO3: Make use of networking knowledge in Domain Specific IOTs for societal benefits

CO4: Discover technologies and theories involved in Sensor Networks. Machine-to-Machine Communications & Arduino Programming.

CO5: Evaluate the role of Security and privacy in the internet of things to provide solutions related to reliability and privacy for real world problems.

CO6: Develop IoT design methodologies using Python constructs and Raspberry Pi.

Computer Networks
680213 (DC-6)

Objectives:

- To introduces students to computer networks and concentrates on building a firm foundation for understanding Data Communications and Computer Networks.
- To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
- To acquire Familiarity with the basic protocols of computer networks and how they can be used to assist in network design and implementation.

UNIT-I

Introduction: Layered Networks Architecture. Review of ISO-OSI model, Data Communication techniques pulse code modulation (PCM) Differential Pulse Code Modulation (DPCM). Delta Modulation (DM). transmission media wires cables. radio links, satellite links, fiber-optic links. error detection. parity check codes, cyclic redundancy codes. & Hamming code.

UNIT-II

Multiplexing and DLC Preliminaries: Multiplexing techniques Frequency division, time division, statistical time division multiplexing, multiplexing hierarchies. **DLC Preliminaries:** Stop and wait protocols: Noise free and noisy channels, performance and efficiency, sliding window protocols: Go back and selective repeat.

UNIT III

Data Link Protocols:
HDLC data link protocol. Integrated services digital networks: interfaces. Devices. Channel structure, Asynchronous transfer node (ATM) cells. header and cell formats. Layers in ATM. Class 1,2,3,4 traffic.
FDDI, token bus, token ring: Reservation, polling, Multiple access protocols: Concept of random access Pure ALOHA, Slotted ALOHA, CSMA. CSMA/CD, FDMA, TDMA, CDMA.

UNIT-IV

Network Layer Protocols: Design Issues : Virtual Circuits and Datagram, Internetworking & devices: Repeaters. Hubs. Bridges, Switches, Router, Gateway: Addressing : Internet address, classful address, subnetting: Routing : techniques, static vs. dynamic routing , routing table for classful address:Routing algorithms: Optimality principle, Shortest path routing – Dijkstra, bellman-ford and floyd warshall algorithms, flooding and broadcasting, distance vector routing, link state routing, flow based routing, multicasting, routing.

UNIT-V

Transport Layer Protocols and Congesting Control: General principles of congestion control, window flow control, packet discarding, Isarithmic control, traffic shaping, choke packets Leaky bucket algorithm. Token bucket algorithm, choke packets; Connection Management, Addressing, Connection Establishment and releases, flow control and buffering, multiplexing, crash recovery in TCP.
Presentation and Application Layer Protocols: Presentation concepts, Cryptography: Substitution and transposition, ciphers, data encryption standard (DES), DES chaining,

breaking DAS, public key cryptography, RSA , authentication protocols.

Books:

1. A.S. Tanenbaum, "Computer Networks", Second Ed., Prentice Hall India(tan).
2. J.F.Hayes, "Modeling and Analysis of Computer Communication Networks", Plenum press.
3. D.Bertsekas and R. Gallager, "Data Networks", Second Ed. Prentice Hall, India.
4. D.E. Comer, "Internetworking with TCP/IP", vol. 1, prentice Hall India.
5. G.E. Keiser, "Local Area Networks", McGraw Hill, international Ed.
6. W. Stalling, "Data & Computer Communications", Maxwell Macmillan international Ed.

Course Outcomes:

Student would be able to

CO1: describe various data communication techniques, OSI reference model, the TCP/IP reference model and other basics in data communication and networking. (Understanding)

CO2: discuss some medium access protocols (like. Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD etc), some Modern topics (like ISDN services, ATM) (Understanding)

CO3: examine various multiplexing techniques, error detection & correction methods, flow control methods and other concepts of computer networks to achieve required networking results as per standards. (Analyzing)

CO4: illustrate different types of network devices and their functions within a network, Internetworking devices, Routing concepts, techniques and protocols and other concepts of computer networks (Applying)

CO5: evaluate various congestion prevention, avoidance and control mechanisms and other concepts of computer networks (Evaluation)

CO6: justify the use of cryptography, security and networking techniques and other concepts of computer networks for providing better network/applications in society. (Evaluation)

Syllabi
of
Departmental Elective (DE-I) Courses
M.C.A. II Semester

Computer Architecture and Organization
680214 (DE-I)

Objectives:
- To introduce basic concepts of computer organization.
- To understand the architecture of modern computer.
- To understand different instruction types.
- To illustrate the computer organization concepts by Assembly Language programming.
- To teach Assembly language programming.
- To understand how a computer performs arithmetic operation of positive and negative numbers.
- To understand how computer stores floating point numbers in IEEE 754 standard.
- To understand how cache mapping occurs in computer.

UNIT-I

Representation of Information: Number. integer and floating-point representation, character codes (ASCII, EBCDIC), Error detection and correction codes. Basic Building Blocks: Boolean Algebra, combinational blocks: gates, multiplexers, decoders etc, Sequential building blocks: flip-flops,. registers, counters, ALU, Random access memory etc.

UNIT-II

Register Transfer Language and Micro-operations: concept of bus, data movement among registers, language to represent conditional data transfer, data movement from/to memory, arithmetic and logical operations along with register transfer, timing in register transfer.

UNIT-III

Architecture of a simple processor: A simple computer organization and instruction set, instruction formats, addressing modes, instruction execution in terms of microinstructions, concepts of interrupt and simple I/O organization. implementation of processor using the building blocks.

UNIT-IV

Assembly Language programming: detailed study of 8086/8088 assembly language instruction set, loops and comparisons, conditions and procedures, arithmetic operations in assembly language, illustrations using typical programs like: table search, subroutines, symbolic and numerical manipulations and I/O.

UNIT-V

Memory organization: basic cell of static and dynamic RAM, Building large memories using chips, associative memory, cache memory organization, virtual memory organization.

Books:
1. M. Morris Mano, "Computer System Architecture",PHI,3rd edition, 1993
2. Liu and Gibson, "8086/8088 Microprocessor Assembly Language".
3. Bartee, "Digital Computer Fundamentals".
4. Malvino, "Digital Computer Electronics".

Course Outcomes:

Student would be able to

CO1: Analyze computer hardware at abstract level.

CO2: Design the Instruction execution stages.

CO3: Differentiate between High level languages and machine language.

CO4: Depict storage of positive and negative number at hardware level.

CO5: Design Assembly language programs.

CO6: Solve various problems related to secondary storage organization and utilization of cache memory.

Computer Graphics and Multimedia
680215 (DE-I)

Objectives:

- To identify and explain the core concepts of computer graphics.
- To apply graphics programming techniques to design, and create computer graphics scenes.
- To understand the basics of multimedia data, video data and audio data

UNIT-I
Introduction: Basics of computer graphics, Graphics hardware and software, DDA and Bresenhan's line drawing algorithm, antialiasion, circle generation: Midpoint algorithms, ellipse, other curves, character generation, area filling scan line algorithm, boundary fill flood fill algorithm, attributes of output primitives line attributes, area fill attributes, character attributes.

UNIT-II
Two-dimensional Transformations: Translation scaling rotation reflection sheer, matrix representation and homogeneous coordinate's composite transformation commands. Viewing coordinates window, view port, clipping, window to view transformation line clipping Cohan Sutherland algorithm polygon clipping: Sutherland-hodgeman algorithm.

Unit-III
Three-dimensional concepts: Three dimensional viewing, three dimensional object presentation : polygons, cured line & surfaces quadrate (sphere, ellipsoid), surfaces, design of curves & surfaces, bezier's methods, Bspling methods: three dimensional transformation: Translation, scaling composite transformation, rotation, about arbitrary axis, projection: parallel, perspective.

UNIT-IV
Introduction to multimedia: Introduction to multimedia, multimedia and hypermedia, Multimedia hardware, analog media devices, digital media devices, MIDI, RAID, CD-ROM standards, Multimedia software: Multimedia operating systems, multimedia databases, multimedia software tools.

UNIT-V
Video Data: Video representation and operations on video data type, YUV, YIQ and YCbCr Color models, analog to digital video conversion, Basic video compression schemes, H.261 Video, H.263, MPEG-1 and MPEG-2 Video compression standards.
Sound and Audio: Digitization of sound, Signal-to-Noise Ration(SNR), Linear and non linear quantization, audio filtering. MIDI: Hardware aspects, structure of MIDI, MIDI to wav conversion, Quantization and transformation of audio: Pulse code modulation, differential coding, DPCM, DM and ADPCM, audio formats.

Books:
1. D.Hearn and M.P. Baker Computer Graphics (2nd ed), PHI.
2. S.Harrington–Computer Graphics–a Programming approach (2nd ed) McGrawhill.
3. New Mann & Sprout – Principles of interactive computer graphics (2nd ed) McGrawhill.
4. Multimedia Computing, communications and applications: Ralf Steinmetz and Klara Nahrstedt, Pearson Education.
5. Multimedia Systems Design: Prabhat K. Andleigh and Kiran Thakrar, PHI.

6. Multimedia Systems: John F.K. Buford, Pearson Education.

Course Outcomes:
Student would be able to
  CO1: analyze the structure of an interactive computer graphics system.
  CO2: apply geometrical transformations, interaction techniques and 2D viewing.
  CO3: demonstrate use of modern 3D computer graphics techniques, models, and
      algorithms to solve graphics problems.
  CO4: incorporate and operate various multimedia object and technology.
  CO5: analyze various compression schemes.
  CO6: analyze various audio formats.

Web Technology
680216 (DE-I)

Objectives:

- understand best technologies for solving web client/server problems
- analyze and design real time web applications
- use Java script for dynamic effects and to validate form input entry
- Analyze to Use appropriate client-side or Server-side applications

UNIT I

History of the internet, internetworking concepts, architecture, and protocol: Switch router etc., internet address and domains. Introduction World Wide Web (WWW), Hyper Text Transfer Protocol (HttP), feature of HTTP protocol HTTP request-response model, Hyper Text Transfer Protocol Secure (HTTPS).Security on the web, proxy server, Firewall.

UNIT II

Introduction to Hyper Text Markup Language (HTML), HTML elements, XHTML syntax and Semantics, extensible Markup Language (XML), element, attributes, entity declarations. DTD files and basics of Cascading Style Sheet (CSS),Document object Model (DOM) history and levels, Document tree.

UNIT III

Introduction to Java Script, Basic concepts, variables and data types, functions, conditional statements, Loops, Operators, Arrays. Introduction to Web Services: UDDI, SOAP, WSDL.

UNIT IV

PHP : Introduction and basic syntax of PHP, decision and looping with examples. PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP

UNIT V

PHP and MySQL : Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs

Books :

1. Web Technolgies, Uttam Roy, OXFORD University press
2. Web programming with HTML, XHTML and CSS, 2e, Jon Duckett, Wiley India
3. Web programming Bai, Michael Ekedahl, CENAGE Learning , India edition.
4 An Introduction to Web Design + Programming, Paul S.Wang, India Edition

Course Outcomes:

Student would be able to

CO1: evaluate web application architecture, technologies and frameworks.
CO2: integrate java and server side scripting languages to develop web applications.
CO3: debug, test and deploy web applications in different web servers.
CO4: apply the knowledge of web technology in developing web applications.
CO5: implement small to large scale project to provide live solution in web application development fields.
CO6: evaluate different solutions in field of web application development.

Machine Learning with Python
680217 (DE-I)

Objectives:

- To learn the basic construct of python programming for implementing various Machine Learning algorithms.
- To understand the basic concepts of Machine Learning.
- To use Machine Learning concepts and algorithms for real-world problem solving.

Unit – I

Introduction to Python Programming: Setting up Programming Environment, Running Python Programs from a Terminal, Variables and Simple Data Types: Numeric, String, List, Tuple, Dictionary, Set, Boolean, Conditional Statements and Loops, Lambda Functions; Various inbuilt Functions; Read Write Operations in Files; using Python Packages and Modules.

Unit – II

Data Processing and Visualization: Introduction to Pandas, Installation, Reading CSV Files and Performing Various Operations: Slicing, Merging, Concatenation on Various Datasets. Introduction to Numpy, Vector Representation, Basic Operations on N-Dimensional Matrices using Numpy. Data Visualization using Matplotlib, Plotting Various Types of Graphs: Line, Bar, Scatter, Histogram and Pie-Charts.

Unit – III

Introduction to Machine Learning: Basic Principles, Applications, Challenges; Supervised, Unsupervised and Reinforcement Learning Approaches; Basic Steps of Machine Learning: Data Collection, Data Preparation, Choosing a Learning Model, Training a Model, Evaluation of Model, Parameter Tuning and Prediction.

Unit – IV

Supervised Learning: Linear Regression, Gradient Descent, Features, Overfitting, Regularization and Complexity, Training, Validation, Testing Data, Performance Matrices: Mean Squared Error(MSE), Root-Mean-Squared-Error(RMSE), Mean-Absolute-Error(MAE), R^2 or Coefficient of Determination; Multivariate Regression; Applications of Regression. **Classification:** Binary, Multi-Class and Multi-Label Classification; Applications; Logistic Regression, K-Nearest Neighbour, **Decision Trees,** Random Forests, **Support Vector Machines and Neural Networks; Comparison Matrix.**

Unit – V

Unsupervised Learning: Clustering and Association Problems; Applications; K-Means, DBSCAN, Principal Component Analysis, Apriori Algorithm for Association Rule Learning Problems. Machine Learning Model Building on Various Datasets

available on Kaggle and UCI Repositories using Python Machine Learning Library: Scikit-Learn.

Books:

- John Hunt, A Beginners Guide to Python 3 Programming. Springer. 1ˢᵗ Edition. 2019.
- Learn Python the Hard Way: 3rd Edition.
- Python Crash Course: A Hands-On, Project-Based Introduction to Programming. By Eric Matthes.
- Andreas C. Müller, Sarah Guido. Introduction to Machine Learning with Python. O'Reilly Media, Inc, 2016.
- Aurélien Géron, Hands-On Machine Learning with Scikit-Learn and TensorFlow. O'Reilly Media, Inc. 2017.

Course Outcomes:

After completion of this course, the students would be able to:

CO1. define basic concepts of machine learning.

CO2. summarize various concepts of python programming, data processing and visualization.

CO3. apply machine learning algorithms to solve real world problems using python programming.

CO4. compare machine learning algorithms for applicability and performance analysis.

CO5. assess various open source datasets and estimate the most suitable machine learning model for prediction process.

CO6. build machine learning models on open source datasets using python machine learning library.

Syllabi
of
Departmental Elective (DE-II) Courses
M.C.A. II Semester

Managerial Economics
6802018 (DE-II (BM))

UNIT-I

Meaning, nature and scope of managerial economics, difference and similarities between micro-economics and macro-economics, objectives of firm, Profit maximization theory alternative theories and behavioral theories of the firm.

UNIT-II

Economic Principles, concepts of opportunity cost, marginal cost, incremental, time perspective, principles of discounting and equi-margin.

UNIT-III

Consumer behaviour-demand analysis purpose and concepts of demand, docrine of diminishing utility, elasticity of demand, price elasticity, income elasticity and cross elasticity, demand forecasting.

UNIT-IV

Product and cost analysis: short run and long run average cost curves. Law of supply, economies and diseconomies of scale, law of variable proportions. Production functions: single output isoquants.

UNIT-V

Pricing: prescriptive approach, price determination under perfect competition, monopoly, oligopoly and monopolistic competition, methods of pricing, pricing strategies.Profits: nature and measurement policy, break even analysis, case study.

Books

1. Dean J. Managerial Economics PHI, New Delhi
2. Mote V.L. et al Management Economics Concepts and Cases TMH, New Delhi

Course outcomes:

Student would be able to

CO1: Develop an understanding of management and its uses in day to day life.

CO2: The aware students about each and functions of management and to understand the ability to understand how management serves as a guideline to sustain in professional life.

CO3: Develop an understanding of professional and ethical responsibilities so as to analyze and solve contemporary issue

CO4: Relate the subjects of arts and management in engineering and allied fields

CO5: Understanding as to how management helps a student to understand, adjust and adapt to the world around us.

CO6: Enhance the understanding of economics and its impact on organization.

Corporate Planning
680219 (DE-II (BM))

Unit 1: Introduction to Strategies: Introduction, Fundamentals of Strategy, Conceptual Evolution of Strategy, Scope and Importance of Strategies, Purpose of Business, Difference between Goals and Objectives of Business, Strategic Intent through Vision and Mission Statements, Core Competencies of Business
Strategic Management: Introduction, Strategic Management, Need, scope, key features and importance of strategic management, Role of Strategists in Decision Making, strategists at various management levels, Types of Strategies, Limitations of Strategic Management

Unit 2: Strategy Analysis: Introduction, Strategy Analysis and its Importance, Environmental Appraisal and Scanning Techniques, Organisational Position and Strategic Advantage Profile, Strategic Management Model
Strategy Formulation and Implementation: Introduction, Strategy Formulation, Process in Strategy Formulation, Strategy Implementation and its Stages, Reasons for Strategy Failure and Methods to Overcome, Strategy Leadership and Strategy Implementation, Strategic Business Units (SBUs)

Unit 3: Strategic Control and Evaluation: Introduction, Strategy Evaluation, Strategic Control, Difference Between Strategic Control and Operational Control, Concept of Synergy and its Meaning, Key Stakeholder's Expectations
Business Policies: Introduction, Overview of Business Policies, Importance of Business Policies, Definitions of Policy, Procedures, Process and Programmes, Types of Policies, Business Policy Statements, Corporate Culture

Unit 4: Strategies for Multinational Corporations: Introduction, Multinational Corporations (MNCs), Benefits of MNCs, Limitations of MNCs, Business Strategies of MNCs, Techniques Employed by MNCs to Manage Markets, MNC, TNC and Global Companies
Strategic Alliances: Introduction, Strategic Alliances, Types of Strategic Alliances and Business Decisions, Problems Involved in Strategic Alliances

Unit 5: Role of Creativity and Innovation in Business: Introduction, Creativity, Innovation, Creating and Building Creative and Innovative Business Culture, Business Practices Adopted to Promote Creativity and Innovation, Importance of Creativity and Innovation in Business, Challenges Involved in Creativity and Innovation
Business Ethics and Corporate Social Responsibility : Introduction, Ethics and Values, Ethical Conduct and Unethical Conduct, Impact of Ethical Conduct, Corporate Social Responsibilities (CSR), Business obligations, Social Audit and Corporate Governance

Books:
1. Business Policy - Azhar Kazmi- S. Chand & Co. New Delhi
2. Strategic Management: Concepts & Cases - Upendra Kachru, Excel Bppks.
3. Strategic Planning: Formulation of Corporate strategy - V.S. Ramaswamy, S. Namakumari - Macmillan Publishing House Ltd.
4. Management Policy & Strategic Management - R. M. Shivastava, Himalaya Publishing House, Mumbai.
5. Creating Excellence - Craig R. Hickman & Michael A. Silva - London Univeral Book Stall, New Delhi.

Course Outcomes:

CO1. Describe major theories, background work, concepts and research output in the field of strategic management.

CO2. Demonstrate a clear understanding of the concepts, tools & techniques used by executives in developing and executing strategies and will appreciate its integrative and interdisciplinary nature.

CO3. Demonstrate effective application of concepts, tools & techniques to practical situations for diagnosing and solving organisational problems.

CO4. Demonstrate capability of making their own decisions in a dynamic business landscape

CO5. Develop their capacity to think and execute strategically.

CO6. Select and apply current technologies to support an organization's integrative trade initiatives.

MIS Framework and Implementation
680220 (DE-II (BM))

Course Objective:

- Understand the role of the information systems (IS) function in an organization
- Develop an insight as to how information systems influence business strategy
- Develop the ability to contribute meaningfully towards information system selection

Unit I

An overview MIS definition of MIS, MIS as an evolving concept, MIS and other academic disciplines subsystems of an MIS, operating elements of an information system MIS support for decision making.

Unit II

Management information system structure based on management activity, hierarchy of Management activity, information systems for operation control, information system for management operation control, information system for strategic planning.

Unit III

Based on organizational function: sales and marketing subsystem, production subsystem logistics subsystem, personnel subsystem, financial and accounting subsystem, information processing subsystem, top management subsystem, synthesis of MIS structure, some issues in MIS.

Unit IV

Development of long range plans of the MIS, Ascertaining the class of information, Determining the information requirement, Development and implementation of the MIS, Management of information quality in the MIS, Organization for development of MIS, MIS development process model.

Unit V

Planning fundamentals (real world cases), Organizational planning, planning for competitive advantage,(SWOTAnalysis), Business models and planning. Business/IT planning, identifying business/IT strategies. Implementation Challenges, Change management., Developing business systems, (real world case), SDLC, prototyping. System development process, implementing business system.

Books :

1. Gordan B. Davis and Margrethe H. Olson, Management Information Systems - Conceptual Foundation, Structure and Development, McGraw Hill.
2. D. P. Goyal, Management Information Systems, McMillan E. M. Awad, system
3. System Analysis and Design, E. M. Awad

Course Outcomes:

CO1:define fundamental concepts of MIS framework, elements, challenges encountered in implementation and role of MIS in decision making.

CO2: summarize the organizational functions of various subsystems and issues involved in MIS.

CO3: identify the need of MIS structure, hierarchy of Management activity and

information system for strategic planning to provide benefits to business organizations.

CO4: analyze various business/IT strategies and Business models to improve business systems using MIS.

CO5: evaluate the role of management of information quality in the MIS. implementation Challenges and System development process.

CO6: develop business plans, strategies and models using MIS framework to find solutions for real world cases.

Management of Software Projects
680221 (DE-II (BM))

Unit 1 – Overview of Project Management: Project Management – Definitions; Factors Influencing Project Management – Project Manager, Project Management Activities, Stakeholders; Project Communication; Project Development Phases, Project Charter, Statement of Work (SoW); Project Management Associations.

Unit 2- Planning a Software Project: Project Plan, guidelines for Software planning, Tasks in Project Planning; Work Breakdown Structures (WBS), Planning Methods; Development Life Cycle Models; Estimation and Budgeting of Projects; Software Cost Estimation; COCOMO Model; Budgeting.

UNIT 3- Project Scheduling: Scheduling Techniques – Program Evaluation and Review Technique (PERT), Gantt Chart, Critical Path Method (CPM), Automated Tools. **Project Monitoring and Controlling**: Project Status Reporting; Project Metrics; Earned Value Analysis (EVA); Project Communication Plan & Techniques; Steps for Process Improvement.

UNIT 4- Risk Management: Concepts of Risks and Risk Management; Risk Management Activities; Effective Risk Management; Risk Categories; Aids for Risk Identification; Potential Risk Treatments; Risk Components and Drivers; Risk Prioritization.

UNIT 5-Software Maintenance: Fundamental of software maintenance, types of software maintenance, strategies, and maintenance of object oriented system design.
CASE tools and Environment: Concept, scope of CASE, classification of CASE tools, categories of CASE environment.
Communication & Business technical reports: Role of communication in s/w project management & its type's .Various Types of Reports according to different phases of SDLC.

Books :

1. Software Engineering: A Practitioner's Approach, Pressman Roger, Tata Mcgraw hill.

2. An Integrated Approach to Software Engineering, Pankaj Jalote, Narosa Pub.

3. Bob Hughes and Mike Cotterell "Software Project Management", Third Edition, Tata Mcgraw- Hill

4. Project Management -"Harold Kerznes"

5. Basics of software Project Management, Niit, Prentice-Hall India, 2004

6. Jalote Pankaj, Software Project Management In Practice, Pearson Education

Course Outcome

CO1: define fundamental concepts of software project management and related factors, activities, maintenance etc.

CO2: demonstrate the role and need of risk management in software project management

CO3   apply the fundamental knowledge of Project Management to improve overall performance of software projects

CO4   analyze techniques of Project Scheduling and Project Monitoring & Controlling

CO5   evaluate the role of Communication & Business technical reports and case tools in project management

CO6   develop project plan for software project by using guidelines of Software planning, structures, Planning Methods and Budgeting principles.

Organizational Behaviour
680222 (DE-II (BM))

COURSE OBJECTIVES
- To help the students to develop cognizance of the importance of human behaviour.
- To enable students to describe how people behave under different conditions and understand why people behave as they do.
- To provide the students to analyse specific strategic human resources demands for future action.
- To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.

UNIT – I
Organizational Behavior Today: What is Organizational Behavior, shifting paradigms of organizational behavior, organizational behavior and diversity. Learning about Organizational Behavior: Organizational Behavior and learning imperative scientific Foundations of organizational behavior.

UNIT – II
Challenge and Opportunities for organizational behavior: Towards improving quality & productivity, improving people skills from management control to empowerment, from sterility of flexibility, Improving ethical behavior, organizational social responsibility work and quality of life.

UNIT- III
A Micro Perspective of Organizational Behavior: The perception process, personality and attitudes, motivation: motivating performance through job design and goal setting, learning: processes rewards systems and behavior management.

UNIT – IV
Micro and Macro Dynamics of Organizational Behavior: Graph dynamics and teams, interactive conflict and negotiation skills, stress: cause effects and coping strategies, leadership styles, activities and skills. A Macro Perspective of Organizational Behavior: Communications, decision-making, Organizational Theory & Design, Organizational Culture.

UNIT – V
Horizons for Organizational Behavior: International Organizational Behavior (IOB), the impact of culture on IOB, Communication in IOB, motivation across culture, managerial leadership across cultures Organizational Change & Development: Learning objectives, the changes facing organizations, managing change and organizational development, future of organizational Behavior.

Books:
1. Fred Luthans "Organizational Behavior", McGraw Hills international Edition, Management & Organization series.
2. Schermerhorn, Hunt & Osborn "Organizational Behavior" (7th Edition), John Wiley & Sours Inc.
3. Stephen P. Robbins "Organizational Behavior: Concepts controversies applications", PHI publications.
4. A.J.Robertson Lvan T. and Cooper, Cary.L. "Work Psychology Understanding Human Behavior in the workplace" Macmillan India Ltd. Delhi 1996.
5. M.N. Mishra "Organizational Behavior", Vikas Pub. Co. Note: Paper is to be set unit

wise with internal choice.

Course Outcomes:

CO1: to be familiarized with various aspects of organizational behavior, personality and attitude, perception, motivation etc

CO2: describe and assess the basic design elements of organizational structure and evaluate their impact on employees.

CO3: demonstrate the applicability of the concept of organizational behavior to understand the behavior of people in the organization.

CO4: demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.

CO5: analyze the complexities associated with management of the group behavior in the organization.

CO6: demonstrate how the organizational behavior can integrate in understanding the motivation (why) behind behavior of people in the organization.

Java Programming Lab
680223 (DLC-3)

Basics: Data types; Operators- precedence and associativity; Type conversion; decision making – if, if else, switch; loops – for, while, do…while; special statements–return, break, continue, labeled break, labeled continue; Modular programming methods; arrays; memory allocation and garbage collection in java keywords.

Class; Packages; scope and lifetime; Access specifies; Constructors; Copy constructor; this reference; finalize () method; arrays; Memory allocation and garbage collection in java keywords; variable argument list; command line arguments; super keyword.

Basic idea of multithreaded programming; The lifecycle of a thread; Creating thread with the thread class and runnable interface; Thread synchronization; Thread scheduling; Producer-consumer relationship; Daemon thread, Selfish threads; Basic idea of exception handling; The try, catch and throw; throws Constructor and finalizers in exception handling; Exception Handling.

Applet security restrictions; the class hierarchy for applets; Life cycle of applet; HTML Tags for applet.

Course outcomes:

Student would be able to

CO1: apply the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements.

CO2: implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.

CO3: demonstrate the ability to use simple data structures like arrays in a Java program.

CO4: make use of members of classes found in the Java API (such as the Math class).

CO5: demonstrate the ability to employ various types of selection constructs in a Java program.

CO6: employ a hierarchy of Java classes to provide a solution to a given set of requirements.

Business Programming Laboratory
680224 (DLC-4)

This course is an introduction to basic concepts of business modelling and underlying technologies for implementing the business practices. In this emphasis is on developing business and commercial applications in stand- alone mode or as android based applications. Student may be exposed the process of app development for business applications. Emphasis is placed on the implementation of programs with procedural structures, along with graphical user interfaces and event-driven code. Upon completion, students should be able to design, code, test, and debug programs based on business requirements using a selected programming language.

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MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
(A Govt. Aided UGC Autonomous Institute Affiliated to R.G.P.V. Bhopal, M.P.)

ANNEXURE V

Syllabus of Newly Proposed Course
in the Existing Scheme of III Semester
(M.C.A. Programme)
[ITEM 11(C)]

Programming in Python
(6803011)

- **Unit 1 - Introduction to Python:** Data Types, Variables, Basic Input-Output Operations, Basic Operators Boolean Values, Conditional Execution, Loops, Lists and List Processing, Logical and Bitwise Operations. Python literals; Operators - data manipulation tools; Variables - data-shaped boxes; How to talk to computer?; Making decisions in Python; Python's loops; Logic and bit operations in Python; Lists - collections of data; Sorting simple lists - the bubble sort algorithm; Lists - some more details; Lists in advanced applications

- **Unit 2 - Functions, Tuples, Dictionaries, and Data Processing Modules, Packages, String and List Methods, and Exceptions:** Writing functions in Python; How functions communicate with their environment?; Returning a result from a function; Scopes in Python; Let's make some fun... sorry, functions; Tuples and dictionaries; Using modules; Some useful modules; What is package?; Errors - the programmer's daily bread; The anatomy of exception; Some of the most useful exceptions; Characters and strings vs. computers; Python's nature of strings; String methods; Strings in action; Four simple programs

- **Unit 3- The Object-Oriented Approach:** Classes, Methods, Objects, and the Standard Objective Features; Exception Handling, and Working with Files; Basic concepts of object programming; A short journey from procedural to object approach; Properties; Methods; Inheritance - one of object programming foundations; Exceptions once again; Generators and closures; Processing files; Working with real files

- **Unit 4: Regular expressions, CGI, Multithreading:** Match function; Search function; Matching VS Searching; Modifiers; Patterns; Introduction; Architecture; CGI environment variable; GET and POST methods; Cookies; File upload; Thread Starting a thread; Threading module; Synchronizing threads; Multithreaded Priority Queue.

- **Unit 5: Database connectivity & Network Programming through Python:** Introduction; Connections; Executing queries; Transactions; Handling error; Socket; Socket; Module; Methods; Client and server; Internet modules.

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