Regulations and Syllabi

Of

Master of Computer Applications

(Self-Financing)

Offered from the academic year 2015-2016

MCA DEPARTMENT

ETHIRAJCOLLEGE FOR WOMEN

(AUTONOMOUS)

Re-Accredited with 'A' Grade Status by NAAC

College with Potential for Excellence by the UGC

(Effective from the academic year 2015-2016)

1. OBJECTIVES OF THE MASTER'S PROGRAMME

The Master's programme is designed to

- lay a strong foundation in Computer Applications and Information Technology.
- develop ingenuity in advanced programming languages.
- gain working knowledge with web technologies.
- provide hands on experience in IT applications.

2. ELIGIBILITY FOR ADMISSION

Candidates who have passed the under-mentioned degree examinations under 10+ 2 +3 or 11+1+3 or 11+2+2 pattern or under the Open University System, shall be eligible for admission to the M.C.A Degree Course.

(a) B.C.A / B.E.S / B.Sc. in Computer Science / Mathematics / Physics / Statistics / Applied Sciences.
(b) B.Com / Bachelor of Bank Management / B.B.A / B.L.M / B.A Corporate Secretary-ship / B.A Economics / any other Bachelor's Degree in any discipline with Business Mathematics and Statistics or Mathematics / Statistics in Main / Allied level.
(c) B.Sc Chemistry with Mathematics and Physics as allied subjects
(d) B.E / B.Tech / M.B.A
(e) A Bachelor's Degree in any discipline with Mathematics as one of the subjects at the Higher Secondary level (i.e in +2 level of the 10+2 pattern)

3. DURATION OF THE COURSE

The Course duration shall be three years consisting of six semesters. In order to be eligible for the award of the degree the candidate shall successfully complete the course in a maximum period of five years reckoned from the date of enrolment for the first semester of the course.

4. ELIGIBILITY FOR THE AWARD OF DEGREE

A candidate shall be eligible for the award of the Degree of Master of Computer Applications only if she has undergone the prescribed courses of study in the Ethiraj College for Women (Autonomous) affiliated to the University of Madras for a period of three academic years and passed the examinations of all the six semestersand fulfilled such conditions as have prescribed therefore.

5. PROVISION FOR LATERAL ENTRY

Students who have completed Bachelor's degree of minimum 3 years in B.C.A/B.Sc(Computer Science) with mathematics as a course at 10+2 level or at graduate level shall alone be eligible for admission to second year M.C.A course (Lateral Entry) up to a maximum of 20% of sanctioned intake which will be supernumerary of the approved intake.

6. PASSING MINIMUM

A minimum of 50% marks taken as an aggregate of CIA and EE of the course is prescribed for a **PASS**. A candidate who has not secured a minimum of 50% of the maximum marks**(aggregate of CIA: 40 and EE: 60)** in a course shall be deemed to have failed in that course. A candidate who successfully completes the course and passes the examinations of all the six semesters prescribed as per the syllabus earning a minimum of **142**credits shall be declared to have qualified for the degree, provided the whole course has been completed within a maximum period as prescribed and permissible by the College.

7. CLASSIFICATION AND RANKING OF SUCCESSFUL CANDIDATES

a. Successful candidates securing not less than 75 % in the aggregate of the marks prescribed for the course shall be declared to have qualified for the Degree in **First Class with Distinction** provided they pass all the examinations prescribed for the course as well as the project work in the First appearance.

b. Successful candidates securing not less than 60% in the aggregate of the marks prescribed for the course shall be declared to have qualified for the Degree in **First Class.**

c. All other successful candidates shall declare to have passed the examination in the **Second Class**.

d. Only those candidates who have passed all the papers including practical and project work in the first appearance shall be considered for the purpose of **RANKING**

e. The candidates admitted in the lateral entry system shall not be considered for Ranking. However, those candidates shall be considered for classification.

8. COMPONENTS OF THE MASTERS PROGRAMME

The Master's Programme has three components. They are Core Courses, Extra Disciplinary Elective, Elective Courses and Soft Skill Courses. Each course carries a credit depending upon the content. Students have to earn **142**credits comprising of Core, Elective, Extra Disciplinaryand Soft Skill Courses.

S.NO	Course	Credits
1	Core: Theory Practical	4 2
2	Elective and Extra Disciplinary	3
3	Summer Project Internship	2 2
4	Major Project and Viva-voce	15
5	Soft Skill	2

9. COURSE PROFILE

Course Code	Course Title	Hrs./ Week	Credits	CA	End Sem	Total
SEMESTER I						
MCA15/1C/DCF	Digital Computer Fundamentals	5	4	40	60	100
MCA15/1C/DSS	Data Structures	5	4	40	60	100
MCA15/1C/PCC	Programming in C & C++	5	4	40	60	100
MCA15/1C/MFC	Mathematical Foundations of Computer Science	5	4	40	60	100
MCA15/1P1/PCC	Computer Laboratory- I: Programming in C & C++	5	2	40	60	100
MCA15/1S1/BCNA MCA15/1S1/BCNB MCA15/1S1/BCNC	Business Communication - Vantage Business Communication - Preliminary Business Communication - Basic	3	2			100
MCA15/1S2/SPS	Spoken and Presentation Skills	2	2			100
SEMESTER II						
MCA15/2C/CON	Computer Organization	4	4	40	60	100
MCA15/2C/PIJ	Programming in Java	4	4	40	60	100
MCA15/2C/OSS	Operating Systems	4	4	40	60	100
MCA15/2C/SEG	Software Engineering	4	4	40	60	100
MCA15/2P2/PIJ	Computer Laboratory – II: Programming in Java	5	2	40	60	100
MCA15/2P3/LSP	Computer Laboratory -III: Linux and Shell Programming	5	2	40	60	100
MCA15/2P4/SPT	Computer Laboratory -IV: Summer Project	1	2	40	60	100
MCA15/2E1/NMS MCA15/2E1/IIT MCA15/2E1/WPE	**Elective I:** Numerical Methods Introduction to Information Technology Web Programming Essentials	3	3	40	60	100
MCA15/2S3/FFB	French For Beginners	2	2			100
SEMESTER III						
MCA15/3C/DAA	Design and Analysis of Algorithms	4	4	40	60	100
MCA15/3C/DMS	Database Management Systems	4	4	40	60	100
MCA15/3C/CNS	Computer Networks	4	4	40	60	100
MCA15/3E2/CGM MCA15/3E2/MCE MCA15/3E2/IOT	**Elective II:** Computer Graphics and Multimedia M-Commerce Internet of Things	3	3	40	60	100
MCA15/3ED1/RMT	Resource Management Techniques	3	3	40	60	100
MCA15/3P5/DMS	Computer Laboratory V: Database Management Systems	5	2	40	60	100
MCA15/3P6/DAA	Computer Laboratory VI: Design and Analysis of Algorithm	5	2	40	60	100
MCA15/3S4/QAE	Quantitative Aptitude	2	2			100

SEMESTER IV						
MCA15/4C/XWS	XML and Web Services	4	4	40	60	100
MCA15/4C/OSS	Open Source Systems	4	4	40	60	100
MCA15/4C/CNS	Cryptography and Network Security	4	4	40	60	100
MCA15/4E3/ADS MCA15/4E3/MCG MCA15/4E3/STQ	**Elective III:** Advanced Databases Mobile Computing Software Testing and Quality Assurance	3	3	40	60	100
MCA15/4ED2/AFM	Accounting and Financial Management	3	3	40	60	100
MCA15/4P7/XWS	Computer Laboratory VII: XML and Web Services	5	2	40	60	100
MCA15/4P8/OSS	Computer Laboratory VIII: Open Source Systems	5	2	40	60	100
MCA15/4S5/PET	Personality Enrichment	3	2			100
MCA15/4P9/INT	Computer Laboratory IX: Internship	1	2	40	60	100
SEMESTER V						
MCA15/5C/VNP	Visual.Net Programming	4	4	40	60	100
MCA15/5C/AJP	Advanced Java Programming	4	4	40	60	100
MCA15/5C/CCG	Cloud Computing	4	4	40	60	100
MCA15/5E4/DIP MCA15/5E4/DCG MCA15/5E4/DWM	**Elective IV:** Digital Image Processing Distributed Computing Data Warehousing and Mining	3	3	40	60	100
MCA15/5E5/BDA MCA15/5E5/ISY MCA15/5E5/MPG	**Elective V:** Big Data Analytics Information Security Mobile Programming	3	3	40	60	100
MCA15/5P10/VNP	Computer Laboratory X: Visual.Net Programming	5	3	40	60	100
MCA15/5P11/AJP	Computer Laboratory XI : Advanced Java Programming	5	3	40	60	100
MCA15/5P12/MPT	Computer Laboratory XII: Mini Project	3	2	40	60	100
MCA15/5S6/TSR	Technical Seminar & Report Writing	2	2			100
SEMESTER VI						
MCA15/6P13/MPV	Computer Laboratory XIII : Major Project and Viva Voce		15	80	120	200

(Summer Project and Internship were carried out during summer vacation for the period of 6 to 8 weeks and will be evaluated in the subsequent semesters)

ELECTIVE:

Elective I: Numerical Methods
Introduction to Information Technology
Web Programming Essentials

Elective II: Computer Graphics and Multimedia
M-Commerce
Internet of Things

Elective III: Advanced Databases
Mobile Computing
Software Testing and Quality Assurance

Elective IV: Digital Image Processing
Distributed Computing
Data Warehousing and Mining

Elective V: Big Data Analytics
Information Security
Mobile Programming

SOFT SKILL COURSES

1. Business Communication
2. Spoken and Presentation Skills
3. French For Beginners
4. Quantitative Aptitude
5. Personality Enrichment
6. Technical Seminar and Report Writing

10. EXAMINATION AND EVALUATION

10.1. Evaluation pattern of both Theory and Laboratory courses

Evaluation shall be done on a continuous basis. There shall be **twoTests fortwo hours**duration(Continuous Internal Assessment Test) and **oneExternal Examination for three hours** duration in each course during each semester. Continuous Assessment will be evaluated by one or more participatory tools such as Test, Assignment/Seminar, Participation Learning and Laboratory activities etc., whichever would be suitable to the course.

Distribution of marks in the Continuous Internal Assessment for Theory Courses.

Test	Duration	Max.Marks	CA Final Marks
I	2 Hours	40	10
II	2 Hours	40	10
Assignment/Seminar			10
Participatory Learning			10
		Total	40

Distribution of marks in the Continuous Internal Assessment for Practical

Test	Duration	Max.Marks	CA Final Marks
I	2 Hours	40	10
II	2 Hours	40	10
		Model Exam	10
		Record	5
		Lab Activities	5
		Total	40

DISTRIBUTION OF MARKS TO CIA AND EE

I.THEORY COURSES:

Maximum Marks (CIA + EE) : 100 Marks
Continuous Internal Assessment(CIA) : 40 Marks
External Evaluation (EE) : 60 marks

II. COMPUTER LABORATORY EXAMINATION

Duration : 3 Hrs
Maximum for Lab Course : 100 Marks
Continuous Internal Assessment(CIA) : 40 Marks
Passing Minimum in CIA : 20 Marks
External Examination : 60 Marks
Passing Minimum in EE : 30 Marks

III. MINI PROJECT, SUMMER PROJECT AND INTERNSHIP

Maximum Marks (CIA+EE) : 100 Marks
Continuous Internal Assessment(CIA) : 40 Marks
External Examination : 60 Marks

Final Marks: Internal + ExternalMarks : 100 Marks

IV. MAJOR PROJECT

Maximum Marks (CIA+EE) : 200 Marks
Continuous Internal Assessment(CIA) : 80 Marks
External Examination : 120 Marks

Final Marks: Internal + ExternalMarks : 200 Marks

10.2 Examiners for the conduct of Laboratory Examinations

For the conduct of Computer Laboratory Examinations, the Controller of Examinations of the College will appoint one external examiner, one internal examiner who shall normally be the Faculty-in-Charge of the Computer Laboratory Course. The examiners will conduct the examinations and award the marks on the same day and forward the Mark List to the Controller of Examinations of the College.

There will be one question with or without subsections to be asked for the practical examination. Every question should be chosen from the question bank prepared

by the examiner(s). Every fourth student should get a new question i.e. each question may be used for at most three students

10.3Distribution of Marks in the evaluation of Lab courses/Mini Project/Summer Project/ Internship/Major Project during External Examination

10.3.1 Distribution of Marks in the evaluation of Lab courses

Logical Thinking Skill (Flow chart / Algorithm)	: 12 Marks
Coding Skill (writing syntax error free codes)	: 12 Marks
Debugging Skill (Entering, Debugging errors and Compilation)	: 12 Marks
Neatness in Presentation of the Output	: 12 Marks
Record Note Book	: 12 Marks

TOTAL: 60 Marks

10.3.2 DISTRIBUTION OF MARKS IN THE EVALUATION OF MINI PROJECT

Dissertation	**Internal**	**External**
Problem for study	4 Marks	4 Marks
Knowledge in the System Requirement Specification	4 Marks	4 Marks
Development of Extra skill in the chosen software	4 Marks	4 Marks
Scientific writing capability	4 Marks	4 Marks
Implementation of the developed System	4 Marks	4 Marks
TOTAL	**20 Marks**	**20 Marks**

Viva-voce	**Internal**	**External**
Preparation of the Presentation (OHP/LCD etc)	10 Marks	20 Marks
Defense capability in oral examination	10 Marks	20 Marks
TOTAL	**20 Marks**	**40 Marks**

Total Internal Marks: 40; Total External Marks: 60;
Final Marks: Internal + External Marks

10.3.3 Distribution of Marks in the evaluation of Summer Project and Internship

DISSERTATION	INTERNAL	EXTERNAL
Problem for study	4 Marks	4 Marks
Knowledge in the System Requirement Specification	4 Marks	4 Marks
Development of Extra skill in the chosen software	4 Marks	4 Marks
Scientific writing capability	4 Marks	4 Marks
Implementation of the developed System	4 Marks	4 Marks
TOTAL	**20 Marks**	**20 Marks**

Viva-voce	Internal	External
Preparation of the Presentation (OHP/LCD etc)	10 Marks	20 Marks
Defense capability in oral examination	10 Marks	20 Marks
TOTAL	**20 Marks**	**40 Marks**

Total Internal Marks: 40; Total External Marks: 60;

Final Marks: Internal + External Marks

10.3.4 DISTRIBUTION OF MARKS IN THE EVALUATION OF MAJOR PROJECT AND VIVA VOCE

Dissertation	Internal	External
Problem for study	8 Marks	16 Marks
Knowledge in the System Requirement Specification	8 Marks	16 Marks
Development of Extra skill in the chosen software	8 Marks	16 Marks
Scientific writing capability	8 Marks	16 Marks
Implementation of the developed System	8 Marks	16 Marks
TOTAL	**40 Marks**	**80 Marks**

Viva-voce	Internal	External
Preparation of the Presentation (OHP/LCD etc)	20 Marks	20 Marks
Defense capability in oral examination	20 Marks	20 Marks
TOTAL	**40 Marks**	**40 Marks**

Total Internal Marks: 80; Total External Marks: 120;

Final Marks: Internal +External Marks.

10.3.5 DISTRIBUTION OF MARKS IN THE EVALUATION OF TECHNICAL SEMINAR AND REPORT WRITING

Every student should submit a final paper as per project specifications along withall short review reports (at least 5 internal reviews) and corresponding evaluation comments to the concerned staff members.

Choice of subject and Review of Literature	: 20 marks
Organization and Interpretation	: 20 marks
Report Writing	: 20 marks
Project Presentation	: 20 marks
Viva-Voce	: 20 marks
Total	**: 100 marks**

10.3.4 SOFT SKILL COURSES

Maximum Marks : 100 Marks

Written Examination for 3 Hours duration at the end of the semester and only internal valuation applicable.

11. QUESTION PAPER PATTERN

A. WRITTEN EXAMINATION: CORE, ELECTIVE AND EXTRA DISCIPLINARY COURSES

INTENDED LEARNING SKILLS	Maximum **: 100 Marks;** Passing Minimum **: 50 Marks;** Duration**: 3 Hrs.**
Memory Recall / Example/ Counter Example / Knowledge about the Concepts/ Understanding/Descriptions	**PART –A (5X 8 = 40 Marks)** Answer **ANY FIVE** questions out of **EIGHT** Questions **(**Each question carries 8 **Marks**) 1. 2. 3. 4. 5. 6. 7. 8.
Application / Analysis / Synthesis / Evaluation/	**PART-B (3 X 20 = 60 Marks)** Answer any **THREE** questions out of **FOUR** questions (Each question carries**20 Marks**) 9. a. b. 10. a. b. 11. a. b. 12. a. b. **(Q. No:9**isto be a **CASE STUDY/PROBLEM/PROGRAM (Whichever is applicable)** and must be answered **compulsorily.**
Questions should be uniformly distributed over all the units of the syllabus, Sub Sections in Questions is permitted. In case of subsections distribution of marks should be clearly mentioned	

Question papers should be setwith the maximum 100 marks and the answer scripts should be evaluated for 100 marks. The awarded marks should be converted to the maximum of 60 Marks.

B. WRITTEN EXAMINATION: SOFT SKILL COURSES

1. SPOKEN AND PRESENTATION SKILLS

Written Examination - 1.30 hours - 50 marks
Oral Examination - 1.30 hours - 50 marks

	Type of Question	Marks	Choice
PART A	Definition Multiple choice Match panel	20	No choice 20question x 1 mark = 20 marks
PART B	Understanding/Description	20	Internal Choice 4 questions x 5 marks = 20 marks
PART C	Application/Analysis Synthesis/Evaluation	10	One out of two Questions 1 question x 10 marks = 10 marks

2. FRENCH FOR BEGINNERS

	TYPE OF QUESTION	MARKS	CHOICE
PARTA	Grammar (Definition and practical application of rules)	20	No choice5 questions (one from each unit) **(5 x 4 marks = 20 marks)**
PART B	Culture and Civilization, and Vocabulary (understanding and description of matter studies)	30	No Choice –10 questions covering all cultural components presented in the units. **(10x2 marks = 20 marks)** 2 questions Vocabulary required from all units **(2 x 5 marks = 10 marks)** Total : 30 marks
PART C	Comprehensive and Expression (Synthesis and evaluation of matter studies)	30	Either-or type 5 questions from all units **(3 x 10 marks=30 marks)**
PART D	Oral Examination	20	Description about themselves Describe the object shown

3. QUANTITATIVE APTITUDE

50 Objective Type questions uniformly distributed among the entire syllabus and each question carries 2 marks

4. PERSONALITY ENRICHMENT

	Type of Question	Marks	Choice
PART A	Definition Multiple choice Match panel	40	**No choice** 20question x 2 mark = 40 marks
PART B	Self Awareness/ Motivation, Memory and study skills, positive thinking , General Knowledge	30	**Internal Choice** 5 questions x 6 marks = 30 marks
PART C	Application/Analysis Synthesis/Evaluation	30	**Two out of three Questions** 2 question x 15 marks = 30 marks

12. FORMAT FOR THE PREPARATION OF RECORD/PROJECT WORK

12.1 Record of Laboratory work in the case of Programming exercises

(a) Aim
(b) Flowchart and/or Algorithm
(c) Source Code
(d) Input/output specification
(e) Printout(s)
(f) Remarks /Scope / Limitations of the Experiment.

12.2 Format for the Project Work

(a) Title page
(b) Bonafide Certificate
(c) Acknowledgement
(d) Table of contents
(e) Summary of content
(f) Chapter-wise report
(g) References
(h) Appendices, if any.

12.3 Format of the Title Page

TITLE OF THE PROJECT

A project report
Submitted for

¼M□ªg`k!7gøÚú¬ ˆ»p¶L¦¥iÞìÐÆïÎ‹ù¹¥‰m
ª+————————————————üÕåuÓ“
□˜£éš©ŒÐÁ¸RÞ5É¶;Å“ • P14{2ÊáŒ
®ÍvüÆ • àC›å†f7¹ªÚ.>ñBxgµéµyð+ðARœ
i¥©□9Ì6ŒÈmÃfØ|÷□ò7ÿÿ+R¶oE
»p%
×5ýÝÂ¡‰ô:9•J¿Ëµåiså@ÓH¿,Å©qˆ˜¬ÌÃ
Ù¥^-
/©5É————————————————óÍ4Ó
¬□¡iO˜“ÊPè:Î†ºý□ïZ□Î

12.4 Format of the Certificate

For Dissertation	For Laboratory Records
CERTIFICATE This is to certify that the report entitled **“TITLE OF THE PROJECT”** being submitted to the Ethiraj College for Women,(Autonomous). affiliated to the University of Madras, Chennai by Candidate’s name for the partial fulfillment for the award of the Degree of **Master of Computer Applications** is a bona fide record of work carried out by her under my guidance and supervision Date: Signature Signature of the Place: of the Guide HOD Submitted for the viva-voce examination at…… ..…… on …….. Examiner-1: …… (Signature and Name of the Examiner) Examiner-2: …… (Signature and Name of the Examiner)	**CERTIFICATE** This is to certify that this is the bonafide record of work carried out under my supervision in the Computer Laboratory Course: **“TITLE OF THE LABORATORY COURSE”** submitted to the Ethiraj College for Women,(Autonomous). affiliated to the University of Madras, Chennai by Candidate’s name as a part of Course work leading to the award of the Degree of **Master of Computer Applications** Date: SignatureSignature of the Place: of the Faculty HOD Submitted for Laboratory Examination at…… ..…… on …….. Examiner-1: ……... (Signature and Name of the Examiner) Examiner-2: …… (Signature and Name of the Examiner)

13.REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

Candidates shall register their names for the First Semester Examinationafter the admission in the Master's Programme. Candidates shall be permitted to proceed from the First Semester upto Final Semester irrespective of their failure in any of the Semester examinations subject to the condition that the candidates should register for all the arrear courses of earlier semesters along with current (subsequent) semester courses. Candidates shall be eligible to go to subsequent semester, only if they earn sufficient attendance as prescribed therefore by the College from time to time**.**

"Provided in the case of candidate earning not less than 50% of attendance in any one of the semesters due to any extraordinary circumstance such as medical grounds, such candidates who shall produce Medical Certificate issuedby the Authorized Medical Attendant (AMA), duly certified by the Principal of the College, shall be permitted to proceed to the next semester and to complete the course of study. Such candidate shall have to repeat the missed semester by rejoining after completion of final semester of the course, after paying the fee for the break of study as prescribed by the College from time to time".

COMMENCEMENT OF THIS REGULATION

These regulations shall take effect from the academic year 2015, for students who are admitted to the first year of the course during the academic year 2015 and thereafter.

TRANSITORY PROVISION

Candidates who were admitted to the course of study in 2015 under this Master's Programme shall be permitted to appear for the examinations under those regulations for a period of three years i.e., up to and inclusive of the examination of March/April 2015. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

SEMESTER – I

DIGITAL COMPUTER FUNDAMENTALS

PAPER NO – I **COURSE CODE: MCA15/1C/DCF**
Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**
L T P : 3 1 0

OBJECTIVES:

- To identify various number systems and work with Boolean Algebra
- To understand various logic gates
- To simplify the Boolean expression using K -Map and Tabulation techniques
- To analyze various types of flip flops used for designing registers and Counters.

COURSE OUTLINE:

UNIT I : Number system: converting numbers from one base to another-complements- Binary Codes -Binary storage and registers- Binary Logic- Integrated Circuits Boolean Algebra- Boolean Functions-Canonical and standard forms- Other Logic operations-Digital Logic gates. 12 Hrs

UNIT II : Simplification of Boolean Functions:K-map method Simplification- Product of Sums- NAND NOR implementation- Don't Care Conditions- The Tabulation method. 12 Hrs

UNIT III : Combinational Logic: Introduction - Design Procedures - Adders-Sub tractors-Code Conversion- Multilevel NAND NOR circuits- XOR and Equivalence function- Binary Parallel Adder- Decimal Adder- Decoders- Multiplexers. 12 Hrs

UNIT IV : Sequential Logic: Flip flops- Triggering of Flip Flops- Clocked Sequential Circuits- Design of Counters- Registers- Shift Registers- Ripple Counters and Synchronous Counters. 12 Hrs

UNIT V : Register Transfer Logic : Introduction- Interregister Transfer- Shift Micro Operations- Conditional Control Statement- Fixed point binary Data- Overflow- Arithmetic Shifts- Decimal Data- Floating point Data- Non numeric Data- Instruction Codes- Design of Arithmetic and Logic Unit. 12 Hrs

BOOKS AND REFERENCES:

1. M. Morris Mano, Digital Logic and Computer Design, PHI, Fourth Edition .2008 .
2. M.M. Mano and C. R. Kime, Logic and Design Fundamentals, Pearson Education, Fifth Edition, 2015.

E-LEARNING RESOURCES:

https://learn.sparkfun.com/tutorials/digital-logic#boolean-logic-in-programming
http://scanlibs.com/logic-computer-design-fundamentals.

SEMESTER – I
DATA STRUCTURES

PAPER NO – II **COURSECODE: MCA15/1C/DSS**
Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**
L T P : 3 1 0

OBJECTIVES:

- This core course covers good principles of algorithm design, elementary analysis of algorithms, and fundamental data structures.
- The emphasis is on choosing appropriate data structures.
- Designing correct and efficient algorithms to operate on these data structures.

COURSE OUTLINE:

UNIT I : Introduction: Basic Terminology- Data Structures- Data Structure Operations- Preliminaries – Algorithmic Notation- Complexity of Algorithms 10 Hrs

UNIT II : Arrays- Records and Pointers – Introduction- Linear Arrays- Representation of Linear Arrays- Operations on Linear Arrays- Searching- Linear and Binary- Multidimensional Arrays- Pointer Arrays- Records- Representation of Records- Matrices and sparse Matrices. 12 Hrs

UNIT III : Linked List: Representation- Traversing- Searching- Memory Allocation- Insertion into and Deletion Stacks- Application of Stacks- Queues and Recursion- Towers of Hanoi. 14 Hrs

UNIT IV : Trees :Binary Trees- Representation of Binary Trees-Traversing- Binary Search Trees-Operations-AVL Tree- Splay Tree- B+ Tree. 13 Hrs

UNIT V : Graphs: Representation- Shortest paths- Operations and traversing of Graphs- Sorting and Searching – Insertion Sort- Selection Sort- Merge Sort 13 Hrs

BOOKS FOR REFERENCES:

1. Richard F. Gilberg&Behrouz A. Forouzan, Data Structures A Pseudocode Approach with C , Second Edition, CENTAGE Learning 2013.
2. SeyMourLipschutz - Theory and Problems of Data Structures -Schaum's Outline Series.
3. E. Horowitz, S.Sahni and Dinesh Mehta, Fundamentals of Data structures in C++, Galgotia, 1999.
4. E. Horowitz, S.Sahni and S. Rajasekaran, Computer Algorithms / C++, Galgotia, 1999.
5. Adam Drozdex, Data Structures and algorithms in C++, Second Edition, Thomson learning – vikas publishing house, 2001.
6. G. Brassard and P. Bratley, Algorithmics: Theory and Practice, Printice –Hall, 1988.

E-LEARNING RESOURCES:

www.cee.hw.ac.uk.
www.softpanorama.org/Algorithms

SEMESTER – I
PROGRAMMING IN C & C++

PAPER NO – III **COURSE CODE: MCA15/1C/ PCC**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVES:

- To understand the concepts of Programming language
- To learn the basics of C declarations, operators and expressions
- To learn on the manipulation of strings, functions and pointers
- To apply concepts and Oops techniques for implementation.
- To learn file classes and customizing I/O files.

COURSE OUTLINE:

UNIT I : Introduction: Overview of C – Constants, Variables and Data Types – Operators and Expressions – Managing Input/output Operations – Formatted I/O - Decision Making - Branching –- IF, Nested IF – Switch – Looping- While, do, for statements. 12Hrs

UNIT II : Arrays**:**Dynamic and Multi-dimensional arrays - Character arrays and Strings Functions – String handling Functions - User defined Functions – Categories of Functions – Recursion - Structures and Unions – Array of Structures 12 Hrs

UNIT III : Introduction toOOP : Overview of C++ -Oops Concepts– Classes and Objects – Friend Functions – Friend Classes – Inline functions – Constructors –Destructors – Static Members – Passing objectsto functions – Functions Returning objects. Arrays – Pointers – Dynamic Objects- this pointer – References – Dynamic Memory Allocation–Pointers tofunctions. 12Hrs

UNIT IV : OOPS concepts**:** Operator Overloading - Polymorphism - Operator and function Overloading - Overloading Constructors - Overloading some special operators like [], (), a and comma operator – Inheritance – Types of Inheritance — Virtual functions – Pure virtual functions.-Generic Programming with Templates – Function templates – Class Templates– Exception handling. 12Hrs

UNIT V : File Classes: Opening and Closing a File , Reading and Writing Text Files-get() Functions, getline()-Detecting EOF-The Ignore() Function- Peek() -Putback() , flush() , Random Access, I/O status, Customized I/O Files.12Hrs

BOOKS AND REFERENCES:

1. E.Balagurusamy, “Programming in ANSI C”, Tata McGraw Hill, 2015
2. K. R. Venugopal and Raj Kumar Buyya, “Mastering C++” Tata McGraw Hill, 2013.
3. VenuGopal and Prasad, “Mastering C”, Tata McGraw Hill, 2013.
4. Herbert Schildt ,C++ - The complete Reference, 5th Edition, TMH, 2012.

E-LEARNING RESOURCES:

www.programiz.com
www.cplusplus.com
www.developers.net

SEMESTER – I

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

PAPER NO – IV **COURSECODE:MCA15/1ED1/MFC**
Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**
L T P : 3 1 0

OBJECTIVES:

- To develop logical thinking.
- To introduce basics of statistics.
- To learn basics of set & graph theory.

COURSE OUTLINE:

UNIT I : Mathematical Logic**:** Introduction - Statements and Notation - Connectives - The theory of Inference for the Statement Calculus : Validity Using Truth tables –Rules of inference- The Predicate Calculus :Definition – StatementFunction, Variables and Quantifiers- Predicate Formulas. 12 Hrs

UNIT II : Set And Graph Theory**:** Basic Concepts of Set Theory – Operations on Sets – Venn Diagrams – Basic Set Identities – Basic Concepts of Graph Theory : Basic Definitions–Paths, Reachability and connectedness. 12 Hrs

UNIT III : Algebraic Structures**:** Algebraic Systems – Semigroups - Monoids, Homomorphism of Semigroups and Monoids-Groups - Subgroups - Homomorphism of Groups.(Definitionsand examples only) (Note:NoDerivation required.) 12 Hrs

UNIT IV : Fundamentals Of Statistics **:**Classification And Tabulation of Data: Types of Classification – Types of Tables – Diagrammatic and Graphic Presentation – Measures of Central Value – Arithmetic Mean, Median,Mode. 12 Hrs

UNIT V : Probability**:** Calculation of Probability – Theorems of Probability: Addition theorem –Multiplication theorem-Conditional Probability – Bayes' Theorem. (Statements only) (Note : No Derivation Required)12 Hrs

BOOKS AND REFERENCES:

1. J.P.Tremblay, R.Manohar, Discrete Mathematical Structures with applications to Computer Science, TM Hall Edition , 2008.
2. S.P.Gupta , Statistical Methods ,Sultan Chand & Sons, 2011.
3. D.C.Sancheti , V. K . Kapoor ,Statistics (Theory , Methods and Applications),Sultan Chand &Sons , 2011 .

E-LEARNING RESOURCES:

http://nptel.ac.in/courses/106106094/
http://nptel.ac.in/courses/111107058/
http://nptel.ac.in/courses/111101004/

SEMESTER – I

COMPUTER LABORATORY – I: PROGRAMMING IN C & C++

PAPER NO – V **COURSE CODE: MCA15/1P1/ PCC**
Lab Hours: 15 x 5 = 75Hrs **Credits : 2**
L T P : 0 0 5

LIST OF PROGRAMS IN C AND C++

1. ARRAYS IMPLEMENTATION
2. SORTING & SEARCHING
3. STRING MANIPULATION
4. FUNCTIONS & POINTERS
5. FILE MANIPULATION
6. COMMAND LINE ARGUMENT

1. IMPLEMENTATION OF STRUCTURE AND UNION
2. IMPLEMENTATION OF FRIEND AND INLINE FUNCTIONS
3. IMPLEMENTATION OF CONSTRUCTORS AND DESTRUCTORS
4. IMPLEMENTATION OF FUNCTIONS
   a. FUNCTION RETURNING OBJECTS
   b. CALL BY VALUE AND CALL BY REFERENCE
   c. PASSING OBJECT TO FUNCTIONS
5. IMPLEMENTATION OF ARRAYS
6. IMPLEMENTATION OF POINTERS
   a. THIS POINTER
   b. REFERENCE POINTER

7. IMPLEMENTATION OF OVERLOADING
    a. DYNAMIC BINDING
    b. STATIC BINDING
8. IMPLEMENTATION OF INHERITANCE TYPES
9. IMPLEMENTATION OF VIRTUAL AND PURE VIRTUAL
10. IMPLEMENTATION OF TEMPLATES
    a. FUNCTION
    b. CLASS
11. IMPLEMENTATION OF STRING MANIPULATION
12. IMPLEMENTATION OF FILE MANIPULATION

SEMESTER – II

COMPUTER ORGANIZATION

PAPER NO – VIII **COURSE CODE: MCA15/2C/CON**
Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**
L T P : 3 1 0

OBJECTIVES:

- To understanding of the basic structure and operation of a digital computer.
- To study the hierarchical memory system including cache memories and virtual memory.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

COURSE OUTLINE:

UNIT I : Computer Systems Organization: Processors – Primary Memory – Secondary Memory.The Micro Architecture Level: An example micro architecture – Design of Micro architecture level – Improving performance – Comparison of Pentium 4 and 8051 CPU. 12 Hrs

UNIT II : The Instruction Set Architecture Level: Overview of the ISA level – Data types – Instruction formats and addressing – Instruction types – Flow of Control. 12 Hrs

UNIT III : Operating System Machine Level: Virtual Memory – Virtual I/O instructions – Virtual Instructions for parallel processing – Example Operating systems. 12 Hrs

UNIT IV : The Assembly Language Level:Introduction to assembly language– Macros – The assembly Process – Linking and Loading. 12 Hrs

UNIT V : Parallel Computer Architectures:On-chip parallelism – Coprocessors – Shared Memory Multi-Processors – Message passing multi computers. Case study: Grid Computing. 12 Hrs

BOOKS AND REFERENCES:

1. Andrew S Tanenbaum, 6th Edition "Structured Computer Organization", Pearson-Prentice Hall, 2013.
2. William Stallings, "Computer Organization and Architecture – Designing for Performance", 6th Edition, Pearson Education, 2003.
3. David A.Patterson and John L.Hennessy, "Computer Organization and Design: The hardware / software interface", 2nd Edition, Morgan Kaufmann, 2002.

E-LEARNING RESOURCES:

www.nptel.iitm.ac.in

SEMESTER – II

PROGRAMMING IN JAVA

PAPER NO –IX **COURSE CODE : MCA15/2C/PIJ**
Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**
L T P : 3 1 0

OBJECTIVES:

- To demonstrate adeptness of object oriented programming in developing solution to problems demonstrating usage of data abstraction, encapsulation and inheritance
- To learn syntax and features of exception handling.
- To demonstrate the ability to implement solution to various I/O manipulation operations and the ability to create two-dimensional graphic components using applets.

COURSE OUTLINE:

UNIT I : Introduction to Java : Features of Java - Object Oriented Concepts - Lexical Issues - Data Types - Variables - Arrays - Operators - Control Statements. 10 Hrs

UNIT II : Classes: Objects - Constructors - Overloading method - Access Control - Static and fixed methods - Inner Classes - String Class - String Objects - String Buffer - Inheritance - Overriding methods - Using super- Abstract class. 10 Hrs

UNIT III : Packages: Importing Packages - Access Protection - Interfaces - Exception Handling - Thread - Synchronization - Runnable Interface - Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads – Multithreading. 15 Hrs

UNIT IV : Event Handling: Basics of Event Handling-Actions-Mouse Events-AWT Event hierarchy. User Interface components - Text Input-Choice component-Menus Swing and Model-view-controller Design Pattern-Introduction to Layout Management-Border – Flow – Grid – Frame . 15 Hrs

UNIT V : I/O Streams : File Streams - Applets - - Java Utilities - Networks basicsTCP/IP Sockets - Net Address - URL – Datagrams - Source and Destination Port Numbers - Socket Programming. 10 Hrs

BOOKS AND REFERENCES:

1. P. Radha Krishna, "Object Oriented Programming through Java", Universities Press 2014.
2. Xavier, "JAVA Programming – A Practical Approach", Tata McGraw Hill Edition, 2014.
3. K. RajKumar, "JAVA Programming", Pearson Education, 2014.
4. K. Arnold and J. Gosling - The Java Programming Language - Second Edition, Addison Wesley, 2014.

E-LEARNING RESOURCES:

http://www.javatpoint.com
http://java.sun.com/developer/onlineTraining
http://www.dickbaldwin.com/tocadv.htm

SEMESTER – II

OPERATING SYSTEMS

PAPER NO – X **COURSE CODE: MCA15/2C/OSS**
Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**
L T P : 3 1 0

OBJECTIVES:

- In this course students will learn the fundamental principles of modern operating systems.
- The principles that are used in practice by writing system software and complete components of an operating system, including the system call interface, user processes, virtual memory, and a file system.

COURSE OUTLINE:

UNIT I : Introduction**:** Definition of OS-Mainframe System-Desktop Systems-Multi processor System-Distributed-Clustered-Real time Systems-Handheld Systems-Operating System Structure-System Components-Services-System Calls-System Programs – System Design and Implementation 12 Hrs

UNIT II : Process Management**:** Concepts-Process Scheduling-Operations on Processes-Co-operating Processes-Inter Process Communication-CPU Scheduling-Scheduling Concepts-Criteria-Scheduling Algorithms-Multiprocessor Scheduling-Real time Scheduling. 12 Hrs

UNIT III : Process Synchronization**:** Critical Section-Synchronization Hardware- Semaphores-Problems of Synchronization-Critical Regions-Monitors-Deadlocks-Characterization -Handling Deadlocks - Deadlock Prevention- Avoidance- Detection-Recovery. 12 Hrs

UNIT IV : Memory Management**:** Storage Hierarchy-Storage Management Strategies-Contiguous-Non Contiguous Storage Allocation-Single User-Fixed Partition-Variable Partition-Swapping-Virtual Memory-Basic Concepts-Multilevel Organization-Block Mapping-Paging-Segmentation-Page Replacement Methods-Locality-Working Sets. 14 Hrs

UNIT V : I/O And File Systems**:** Disk Scheduling-File Concepts-File System Structure-Access Methods-Directory Structure-Protection-Directory Implementation-Allocation Methods-Free Space Management Case Study: Linux Operating System – Commands, Shell Programming, Report writing. 10 Hrs

BOOKS FOR REFERENCE:

1. Silberschatz and Galvin, Operating System Concepts, 9th Edition, John Wiley & Sons, Inc.,2014.
2. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India ,2010.
3. Achyut S. Godbole ,Operating Systems, Sixth Edition, TMH,2009.

E-LEARNING RESOURCES:

www.awl.com/cseng/books

www.ntpel.iitm.ac.in

SEMESTER – II

SOFTWARE ENGINEERING

PAPER NO –XI **COURSE CODE : MCA15/2C/SEG**
Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**
L T P : 3 1 0

OBJECTIVES:

- To provide information about wider engineering issues involved in the development of complex, evolving (software-intensive) systems.
- Familiarize the basic concepts of Software design and implementation.
- Perform software testing on various applications.
- Apply various software metrics on software quality products.

COURSE OUTLINE:

UNIT I : Introduction to Software Engineering:Software processes – process models - Waterfall Life cycle model – Incremental-Spiral Model – Prototype Model – Agile software development 12 Hrs

UNIT II : Requirements Engineering: System Modeling- Architectural Design-Design and Implementation-Software testing 12 Hrs

UNIT III : Software Reuse: Application frameworks-software product lines-cots product reuse-Component based software Engineering- Distributed software Engineering-Aspect oriented software Engineering 12 Hrs

UNIT IV : Project Management: Risk management-Managing people-Teamwork-Project Planning-software pricing-plan-driven development-project scheduling-Estimation Techniques- Configuration Management-change management-version management-system building-Release management 12 Hrs

UNIT V : Quality Management: software quality-software standards-Reviews and inspections-Software measurement and metrics–CMM process Model 12 Hrs

BOOKS FOR REFERENCES:

1. IanSommerville, “Software engineering”, Ninth Edition, Pearson Education Asia,2011.
2. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Seventh Edition, Tata McGraw-Hill International Edition, 2009.
3. Roger S. Pressman, “Software Engineering – A Practitioner’s Approach”, Seventh Edition, Tata McGraw-Hill International Edition, 2009.
4. K.K.Aggrwal&Yogesh Singh “Software Engineering”R.2009.
5. Richard Fairley, Software Engineering- A Programming Approach, 2008
6. PankajJalote“ An Integrated Approach to software Engineering” , Narosa Publications.2008.

E-LEARNING RESOURCES:

www.SoftwareEngineering-9.com.
www.comp.lancs.ac.uk.

SEMESTER – II
COMPUTER LABORATORY – II
PROGRAMMING IN JAVA

PAPER NO – XII **COURSE CODE: MCA15/2P2/ PIJ**
Lab Hours: 15 x 5 = 75Hrs **Credits : 2**
L T P : 0 0 5

LIST OF PROGRAMS

1. IMPLEMENTATION OF ARRAYS
2. IMPLEMENTATION OF CONTROL STRUCTURES
3. IMPLEMENTATION OF OVERLOADING AND OVERRIDING METHODS
4. IMPLEMENTATION OF INHERITANCE
5. IMPLEMENTATION OF INTERFACES
6. IMPLEMENTATION OF MULTITHREADING
7. IMPLEMENTATION OF EVENT HANDLING
8. IMPLEMENTATION OF MENUS
9. IMPLEMENTATION OF STRING OBJECTS
10. IMPLEMENTATION OF APPLETS

SEMESTER – II
COMPUTER LABORATORY – III
LINUX AND SHELL PROGRAMMING

PAPER NO – XIII **COURSE CODE: MCA15/2P3/LSP**
Lab Hours: 15 x 5 = 75Hrs **Credits : 2**
L T P :0 0 5

LIST OF PROGRAMS

1. Write a script that asks for the user's age. If it is equal to or higher than 18, print a message saying that this user is allowed to drive any vehicle. If the user's age is below 16, print a message telling the user how many years he or she has to wait before legally being allowed to drive.
2. Use an if/then/else construct that prints information about the current month. The script should print the number of days in this month, and give information about leap year if the current month is February.
3. Check whether the given number is Armstrong / prime / perfect or not.
4. Accepts any number of arguments and prints them in the reverse order.
5. Write a script that does the following:
   a. display the name of the script being executed.
   b. Display the first, third and tenth argument given to the script.
   c. Display the total number of arguments passed to the script.
   d. If there were more than three positional parameters, use shift to move all the values 3 places to the left.
   e. Print all the values of the remaining arguments.
   f. Print the number of arguments .
   Note: test with zero, one, three and over ten arguments.
6. Design a menu driven program for rename, remove and copy commands.
7. Check whether the given user has logged in or not.
8. To check file permissions (read/write/execute/exit) and file types (file / directory /size zero)
9. Write a program to get two user inputs (filename and whether to download or upload the file.
10. Write a program to get two user inputs – the file name and the column no(n). using cat command, list the nth column from mentioned file.
11. Simulate find command.
12. Remove duplicates words from list / file.
13. To process Electricity Billing system using awk command.
14. To prepare pay slip for an employee awk command.

SEMESTER – III
DESIGN AND ANALYSIS OF ALGORITHMS

PAPER NO – XVII **COURSE CODE: MCA15/3C/DAA**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVES:

- To learn the algorithmanalysis techniques.
- To become familiar with the different algorithm design techniques.
- To understand the limitations of Algorithmic analysis.

COURSE OUTLINE:

UNIT I : Introduction: Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving –Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Analysis Framework – Asymptotic Notations and its properties – Mathematical analysis for Recursive and Non-recursive algorithms. 12 Hrs

UNIT II : Brute Force And Divide-And-Conquer: Brute Force – Closest-Pair and Convex-Hull Problems-Exhaustive Search – Traveling Salesman Problem – Knapsack Problem – Assignment problem. Divide and conquer methodology – Merge sort – Quick sort – Binary search – Multiplication of Large Integers – Strassen's Matrix Multiplication-Closest-Pair and Convex-Hull Problems. 12 Hrs

UNIT III : Dynamic Programming And Greedy Technique: Computing a Binomial Coefficient – Warshall's and Floyd' algorithm – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique– Prim's algorithm- Kruskal's Algorithm- Dijkstra's Algorithm-Huffman Trees.AULibrary.com
12 Hrs

UNIT IV : Iterative Improvement: The Simplex Method-The Maximum-Flow Problem – Maximm Matching in Bipartite Graphs- The Stable marriage Problem. 12 Hrs

UNIT V : Coping With The Limitations Of Algorithm Power: Limitations of Algorithm Power-Lower-Bound Arguments-Decision Trees-P, NP and NP-Complete Problems–Coping with the Limitations – Backtracking – n-Queens problem – Hamiltonian Circuit Problem – Subset Sum Problem-Branch and Bound – Assignment problem – Knapsack Problem – Traveling Salesman Problem- Approximation Algorithms for NP – Hard Problems – Traveling Salesman problem – Knapsack problem. 12Hrs

BOOKS FOR REFERENCES:

1. AnanyLevitin, "Introduction to the Design and Analysis of Algorithms", Third Edition, Pearson Education, 2012.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", Third Edition, PHI Learning Private Limited, 2012.
3. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms",Pearson Education,ReprinT 2006.
4. Donald E. Knuth, "The Art of Computer Programming", Volumes 1& 3 Pearson Education, 2009. Steven S. Skiena,"The Algorithm Design Manual",Second Edition, Springer, 2008.

E-LEARNING RESOURCES:

http://nptel.ac.in/courses/106101059/

SEMESTER – III

DATABASE MANAGEMENT SYSTEMS

PAPER NO – XVIII **COURSE CODE: MCA15/3C/DMS**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVES:

- To understand the fundamentals of database and data models and ER Diagrams.
- To use SQL Queries and the fundamentals of relational database design
- To expose data storage techniques, Query processing and Query Optimization
- To impart knowledge in Transaction processing, Concurrency Control and Recovery system

COURSE OUTLINE:

UNIT I : Introduction: Relational Model – Introduction to SQL – Intermediate SQL – Advanced SQL 12 Hrs

UNIT II : Database Design and ER model: Overview – E-R Model , Constraints – Removing Redundant Attributes – E-R Diagrams – Extended ER Features – Relational Database Design 12 Hrs

UNIT III : Storage and File Structure : Physical Storage media – Magnetic Disk and Flash Storage – RAID-Tertiary Storage – File Organization of Records in Files – Data Dictionary Storage – Database Buffer - Indexing and Hashing 12 Hrs

UNIT IV : Query Processing: overview – Measures of Query Cost – Selection Operation – Sorting – Join operations – Query Optimization – Transformation of Relational Expressions – Estimating Statistics – Choice of evaluation Plans - Transactions – Concepts – Transaction Model-Storage Structure – Atomicity and Durability – Transaction Isolation – Serializability. 12 Hrs

UNIT V : Concurrency Control: Lock Based Protocols – Timestamp Based protocols-Validation Based Protocols – Recovery System – Failure Classification – storage – Recovery and Atomicity – Recovery Algorithm – Buffer Management - Case Study – Oracle – Microsoft SQL Server 12 Hrs

BOOKS FOR REFERENCES:

1. Abraham Silberschatz , Henry F. Korth , S. Sudarshan " Database System concepts, 6th EditionæW*uîºÜÅ;‰¬é¡éÑ£'QÃ"/XÛybO<¢I(Å•{cÍ‹¿˜ÊÜÆö¸îáK

Í«˜K‹‡çg†Š É_ÿ[!·r*f*ÑQ¢DÉ'HPÆz¡Ö31ø!¬äØD–
CØ‹ï³ÿ‡!'}>÷¼.+›;@B{Ô)×S¼aóyc¯6ìðv²oR`¤¿4‰–,p¸ì'¨C';päsœY

8:□¦à_JÏ*PþK¬c;~Û‹¸Üe&OD32‡rmbCÚú¿] ¶û#0G?ì^{hâ}çT¼ƒ1BÓ•,¯u@—
â‰óËFîèš/ýŸƒKU¢åÃ³**[a¨K]¸PVXÏD(¦é¹©œ**?:ØœâQ[z]‡o,u

SEMESTER – III
COMPUTER NETWORKS

PAPER NO – XIX **COURSE CODE: MCA15/3C/CNS**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVES:

- To understand fundamental underlying principles of computer networking
- To understand details and functionality of layered network architecture.
- To understand ethical, legal, security, and social issues related to computer Networking.
- To understand the technologies associated and corresponding potential impact ofnetworking.

COURSE OUTLINE:

UNIT I : Introduction: The uses of Computer Networks - Network Hardware - NetworkSoftware - Reference Models - Example of Networks- Network Standardization. The Physical Layer: Guided Transmission Media - Wireless Transmission - Digital Modulation and Multiplexing - Public Switched Telephone Network - Mobile telephone System. 12Hrs

UNIT II : The Data Link Layer: Data link layer design issues - Error detection and correction - Elementary Data Link Protocols - Sliding Window Protocols - Example of data Link Protocols- Ethernet – Wireless LAN - Bluetooth- Data Link Layer Switching.12Hrs

UNIT III : The Network Layer: Network Layer Design Issues - Routing Algorithms - Congestion Control Algorithms - Internetworking- Network layer in the Internet. 12Hrs

UNIT IV : The Transport Layer: Transport Layer Service–Elements of Transport Protocols - Internet Transport protocols: UDP, TCP. 12Hrs

UNIT V : The Application Layer: Domain Name System - Electronic mail - World wide web – Digital Audio and Video – Cryptography- Symmetric key algorithms – Public key Algorithms - Digital signature- Communication Security. 12Hrs

BOOKS FOR REFERENCES:

1. Andrew S. Tanenbaum and David J. Wetherall, “Computer Networks”, Fifth Edition, Pearson Education 2012.
2. Behrouz A. Forouzan and FirouzMosharraf, “Data Communications and Networking”, McGraw Hill, Special Indian Edition2012.
3. William Stallings, Data and Computer Communications, Sixth Edition, PHI, 2013.

E-LEARNING RESOURCES:

www.cse.iitk.ac.in
www.svecw.edu.in

SEMESTER – III
COMPUTER LABORATORY-V
DATABASE MANAGEMENT SYSTEMS

PAPER NO – XXII **COURSE CODE: MCA15/3P5/DMS**

Teaching Hours: 5 X**15=75 Hrs** **Credits : 2**

L T P : 0 0 5

Students have to undertakeindividual / Group Projects and submit the Project Report based ontheapplicationarea.

SEMESTER – III
COMPUTER LABORATORY-VI
DESIGN AND ANALYSIS OF ALGORITHMS

PAPER NO – XXIII **COURSE CODE: MCA15/3P6/DAA**

Teaching Hours: 5 X 15=75 Hrs **Credits : 2**

L T P : 0 0 5

List of Programs

1. Sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

2. Using Open, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random number generator.

3. a. Obtain the Topological ordering of vertices in a given digraph.
b. Compute the transitive closure of a given directed graph using Warshall's algorithm. 4. Implement 0/1 Knapsack problem using Dynamic Programming.
4. From a given vertex in a weighted connected graph, find shortest paths to other vertices usingDijikstra‟s algorithm.

5. Find Minimum Cost Spanning Tree of a given undirected graph using Kristal‟s algorithm.

6. a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
b. Check whether a given graph is connected or not using DFS method.

7. Find a subset of a given set S = {sl,s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S= {1, 2, 5, 6, 8} and d = 9 there are two solutions{1,2,6}and{1,8}.A suitable message is to be displayed if the given problem instance doesn't have a solution.

8. Implement any scheme to find the optimal solution for the Traveling Salesperson problem andthen solve the same problem instance using any approximation algorithm and determine theerror in the approximation.

9. Find Minimum Cost Spanning Tree of a given undirected graph using Prim‟s algorithm.

10. Implement All-Pairs Shortest Paths Problem using Floyd's algorithm. Parallelize this algorithm, implement it using Open and determine the speed-up achieved.

11. Implement N Queen's problem using Back Tracking.

SEMESTER – IV
XML AND WEB SERVICES

PAPER NO – XXV **COURSE CODE: MCA15/4C/XWS**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVES:

- Students will learn the role of XML,web services in commercial applications, the principles of web service provision,use of Java for implementing web services, use of BPEL (Business Process Execution Logic) and WSDL (Web Service Description Language) for implementing web services.
- To demonstrate the ability to apply theory and techniques to unseen problems without references to notes.
- To work independently, and to work under a time constraint.

COURSE OUTLINE:

UNIT I : Role of XML : XML and The Web - XML Language Basics - SOAP - Web Services - Revolutions Of XML –Components of XML. XML Grammarrules. 12 Hrs

UNIT II : XML: Name Spaces - Structuring With Schemas and DTD - Presentation Techniques - Transformation - XML Infrastructure. 12 Hrs

UNIT III : XML : Based protocols and SOAP – SOAP Encoding – SOAP Message exchange model – SOAP Communication – SOAP Messaging –Message Structure – Message elements – Processing model – SOAP Security - WSDL–Functional Characteristics of Services. 12 Hrs

UNIT IV : WSDL 1.2: UDDI – categorizing services – identifiers – Business Entity Relationships – UDDI's SOAP interfaces – UDDI's and SOAP / WSDL Relationship – Publishing WSDL Service Interfaces in UDDI – ebXML – architectural overview of ebXML. 12 Hrs

UNIT V : Security Overview: Canonicalization - XML Security Framework - XML Encryption XML Digital Signature - XKMS Structure - Guidelines For SigningXML Documents 12 Hrs

BOOKS FOR REFERENCES:

1. Frank P. Coyle XML, Web Services and the Data Revolution, Pearson Education, Edition, (Unit I, Unit II),2oo2
2. James McGovern, Sameer Tyagi , Java Web Services Architecture, Morgan Kaufmann Publishers. (Unit IV and Unit V) 2003
3. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing

Java Web Services", Wiley Publishing Inc., 2005.

E-LEARNING RESOURCES:

www.sfubusiness.ca/motmba/courses/bus756/shared/pages
www.kent.k12.wa.us/KSD/IT/TSC/prof_dev/tutorials.html

SEMESTER – IV
OPEN SOURCE SYSTEMS

PAPER NO – XXVI **COURSE CODE: MCA15/4C/OSS**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVES:

- To expose students to FOSS environment and introduce them to use open source packages
- Provide the knowledge to select appropriate licenses
- Capable of selecting which OSS applications to use
- Able to recognize and plan for risks that are unique to OSS applications
- Choose their own information technology infrastructure for development of applications.

COURSE OUTLINE:

UNIT I : Introduction :Introduction to Open sources – Need of Open Sources – Advantages of Open Sources – Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode – Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux. 12 Hrs

UNIT II : Open Source Database:MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time – Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web. 12 Hrs

UNIT III : Open Source Programming Languages:PHP: Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling – Security – Templates. 12 Hrs

UNIT IV : Python**:** Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment. 12 Hrs

UNIT V : Open Source Tools And Technologies**:** Web Server: Apache Web server – Working with Web Server – Configuring and Using apache web services MDA: Introduction to MDA – Genesis of MDA – Meta Object Facility – UML – UML Profiles – MDA Applications. 12 Hrs

BOOKS FOR REFERENCES:

1. Remy Card, Eric Dumas and Frank Mevel, "The Linux Kernel Book", Wiley Publications, 2003
2. Steve Suchring, "MySQL Bible", John Wiley, 2002
3. RasmusLerdorf and Levin Tatroe, "Programming PHP", O'Reilly, 2002
4. Wesley J. Chun, "Core Phython Programming", Prentice Hall, 2001
5. Peter Wainwright, "Professional Apache", Wrox Press, 2002
6. Stephen J. Mellor, Marc Balces, "Executable UMS: A foundation for MDA", AddisonWesley, 2002.

E-LEARNING RESOURCES:

http://www.w3.org
http://www.php.net
http://www.phpbuilder.com

SEMESTER – IV
CRYPTOGRAPHY AND NETWORK SECURITY

PAPER NO – XXVII **COURSE CODE: MCA15/4C/CNS**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVES:

- To know the methods of conventional encryption and to understand the concepts of public key encryption and Key exchange Algorithms.
- To understand authentication and to know the network security tools and applications and to understand the system level security used.

COURSE OUTLINE:

UNIT I : Introduction : Symmetric Ciphers: Classical Encryption Techniques, Block Ciphers and the Data Encryption Standard 12 Hrs

UNIT II : AES :Transformation Functions – Key Expansions - Block Cipher Operation – Multiple Encryption and Triple DES – ECB – CBC – CFM – OFM – Counter Mode. 12 Hrs

UNIT III : Public Key Encryption: Principles of Public Key Cryptosystems - RSA Algorithm - Diffie-Hellman Key Exchange. 12 Hrs

UNIT IV : MAC: Functions – Authentication codes – HMAC – Key Management and Distribution – Distribution of Public keys – X.509 Authentication Service – User Authentication – Kerberos – Federated Identity Management – Personal Identity Verification 12Hrs

UNIT V : Electronic Mail Security: PGP – S/MIME - IP Security – Overview – IP Security Policy – Encapsulating Security Payload. 12 Hrs

BOOKS FOR REFERENCES:

1. William Stallings, “Cryptography And Network Security – Principles and Practices”, Pearson, Sixth Edition, 2015.
2. AtulKahate, “Cryptography and Network Security”, Tata McGraw-Hill, 2013.
3. Bruce Schneier, “Applied Cryptography”, John Wiley & Sons Inc, 2011.
4. Charles B. Pfleeger, Shari Lawrence Pfleeger, “Security in Computing”, Third Edition, Pearson Education, 2013.

E-LEARNING RESOURCES:
www.nptel.iitm.ac.in

SEMESTER – IV
COMPUTER LABORATORY-VI
XML AND WEB SERVICES

PAPER NO – XXX **COURSE CODE: MCA15/4P7/XWS**
Teaching Hours: 75 Hrs **Credits : 2**
L T P : 0 0 5

1. Validate XML document using DTD
2. Usage of simple schema.
3. Usage of complex schema.
4. To format and display data using CSS.
5. To format and display data using XSL sorting
6. To format and display data using tabular format.
7. A web service program for temperature conversion.
8. A web service program for concurrency conversion.
9. Database connectivity using SQL server.

SEMESTER – IV
COMPUTER LABORATORY-VII
OPEN SOURCE SYSTEMS

PAPER NO – XXXI **COURSE CODE: MCA15/4P8/OSS**
Teaching Hours: 5x15=75 Hrs **Credits : 2**
L T P : 0 0 5

1.**KernelConfiguration,compilation and installation :** Download/access the latest kernel source code from kernel.org, compile the kernel and install it in the local system. Try to view the source code of the kernel

2.**Virtualisation Environment(**eg.xen,kqemu or lguest) to test an applications, new kernels and isolate applications. It could also be used to expose students to the alternate OS like *BSD.

3.**Compiling from source** : Learn about the various build systems used like the auto*family,cmake, antetc. instead of just running the commands. This could involve the full process like fetching from a cvs and also include autoconf,automake,etc.

4.**Introduction to package management system** : Given a set of RPM or DEB, how to build and maintain, serve packages over HTTP or FTP and also how do you configure client systems to access the package repository.

5. **Installing various software packages** :Either the package is yet to be installed or an older version is existing. The student can practice installing the latest version. This might need internet access. Install samba and share files to windows.

Write user space drivers using fuse- Easier to debug and less dangerous to the system.(writing full-fledged drivers is difficult at student level).

6.**GUI Programming** : A sample programme –Using gambas since the students have VB knowledge. However, one should try using GTK or QT

7.**Text Processing with Perl** : Simple programs ,connecting with database eg.MySQL

8.**Running PHP**: Simple applications like login forms after setting up a XAMP stack.

9.**Running Python** :Some simple exercise – eg. connecting with MYSQL database

10.**Setup the complete network interface**usingipconfig command like settinggateway, DNS,IPtables,etc.

SEMESTER – V
VISUAL .NET PROGRAMMING

PAPER NO – XXXIV **COURSE CODE: MCA15/5C/CNP**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVE:

- To make the students understand the foundations of CLR execution
- Learn the technologies of the .NET framework, Know the object oriented aspects of C#.
- To know the application development in .NET.
- Learn web based applications on .NET (ASP.NET).

COURSE OUTLINE:

UNIT I: Introduction To C# :Introducing C#- Understanding .NET- overview of C#- Literals- Variables- Data Types- Operators- checked and unchecked operators- Expressions- Branching- Looping- Methods- implicit and explicit casting- Constant- Arrays- Array Class- Array List- String- String Builder- Structure- Enumerations- boxing and unboxing. 12 Hrs

UNIT II: Object Oriented Aspects Of C#:Class- Objects- Constructors and its types- inheritance- properties- indexers- index overloading- polymorphism- sealed class and methods- interface- abstract class- abstract and interface- operator overloading- delegates- events- errors and exception- Threading. 12 Hrs

UNIT III: Application Development On .Net : Building windows application- Creating our own window forms with events and controls- menu creation- inheriting window forms, SDI and MDI application- Dialog Box (Modal and Modeless)- accessing data with ADO.NET- DataSe- typed dataset- Data Adapter- updating database using stored procedures- SQL Server with ADO.NET- handling exceptions- validating controls- windows application configuration. 12 Hrs

UNIT IV: Web Based Application Development On .Net**:** Programming web application with web forms- ASP.NET introduction- working with XML and .NET- Creating Virtual Directory and Web Application- session management techniques- web.config- web services- passing datasets- returning datasets from web services- handling transaction- handling exceptions- returning exceptions from SQL Server. 12 Hrs

UNIT V: CLR And .Net Framework : Assemblies- Versioning- Attributes- Reflection- Viewing meta data- type discovery- reflection on type- marshalling- remoting- security in .NET. 12 Hrs

BOOKS FOR REFERENCES:

1. Herbert Schildt, "The Complete Reference: C# 4.0", Tata McGraw Hill, 2012.
2. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012.
3. Andrew Troelsen , "Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010.
4. Ian Griffiths, Matthew Adams, Jesse Liberty, "Programming C# 4.0", Sixth Edition, O'Reilly, 2010.

E-LEARNING RESOURCES:

https://msdn.microsoft.com/en-us/library/aa288436(v=vs.71).aspx
www.csharp-station.com/Tutorial.aspx

SEMESTER – V
ADVANCED JAVA PROGRAMMING

PAPER NO – XXXV **COURSE CODE: MCA15/5C/AJP**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 4**

L T P : 3 1 0

OBJECTIVES:

- To learn J2EE , Beans and JMS Concepts.
- To Understand Advanced Java Networking concepts
- To learn Server Side Programming Concepts
- To know about the JDBC Principles

COURSE OUTLINE:

UNIT I : J2Enterprise Edition overview: The beginning of Java- Java Byte code- Advantages of Java-J2EE and J2SE- J2EE Multi-tier Architecture-J2EE Best Practices- J2EE Design Pattern- Concept. 10 Hrs

UNIT II : J2EE Database concepts**:** Data- Database- Database schema –JDBC objects: JDBC Driver types- JDBC Packages – Overview of JDBC Process-database connection- JDBC-ODBC Bridge- statement objects- Result Set- Transaction Processing- Meta data- Java and XML 12 Hrs

UNIT III : Java Servlets: Servlets and CGI- anatomy of servlet-Deployment Descriptor- Reading data from client- Reading HTTP Request Headers- Sending data to a client- working with cookies- Tracking sessions- JSP- Installation- JSP Tags- Tomcat- Request String- user Sessions- cookies- session Objects- RMI- Java RMI – Remote Interface- passing objects- RMI Process- server side- client side 14 Hrs

UNIT IV : Enterprise Java Beans: Deployment Descriptors- Session Bean- Entity Java Bean- Message Driven Bean- Java Mail- Protocols-exceptions- sending ,Retrieving ,Deleting and Reply to, Forwarding an Email Message- Receiving attachments- searching an Email Folder 12 Hrs

UNIT V : Java Message service: JMS fundamentals- Components of JMS Program messages- message selector- sending messages to a queue- receiving messages - compiling and running queue programs- creating a publisher- creating a subscriber compile and running the publisher and subscriber- JNDI- Naming and Directories JND Interface- Naming Operations 12 Hrs

BOOKS FOR REFERENCES:

1. Jim Keogh, "J2EE : The Complete Reference", Tata McGraw Hill Edition,2014
2. Kogent Learning solutions, " Java 6 and J2EE 1.5, Black Book" , Dream Tech 2010
3. H. M.Deitel, P. J. Deitel, S. E. Santry ,"Advanced Java 2 Platform HOW TO PROGRAM" , Prentice Hall,2001

E-LEARNING RESOURCES:

https://oracle.com
www.javalearner.com
www.edureka.com

SEMESTER – V
CLOUD COMPUTING

PAPER NO – XXXVI **COURSECODE: MCA15/5C/CCG**
Teaching Hours: 15 x 3 = 60Hrs **Credits : 4**
L T P : 2 1 0

OBJECTIVES:

- This course provides a comprehensive and in-depth knowledge of CloudComputing concepts, technologies, architecture and applications
- This Course Provides introduction and research to the state-of-the-art in Cloud Computing fundamental issues, Research technologies, applications and implementations.

COURSE OUTLINE:

UNIT I : Cloud Computing: Overview – Applications-Intranets and the Cloud – Companies in the Cloud Today- Cloud Computing Services- On Demand Computing – Discovering Cloud Services-Development Services and Tools. 12 Hrs

UNIT II : Cloud hardware and infrastructure: clients-security-network-services-Accessing the cloud -cloud storage-Cloud standards. 12 Hrs

UNIT III : Types of Cloud Services: Software as a Service - Platform as a Service - Infrastructure as a Service - Monitoring as a Service - Communication as a Services – Building Cloud Network – Virtualization. 12 Hrs

UNIT IV : Public cloud: Private Cloud – Hybrid cloud – Enterprise Cloud – Comparisons. 12 Hrs

UNIT V : Organizational Readiness and Change Management in Cloud: Data Security in Cloud – Legal issues in Cloud Computing – Production Readiness for cloud services 12 Hrs

BOOKS FOR REFERENCES:

1. Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, "Cloud Computing –A Practical Approach", Tata McGraw Hill Education Pvt. Ltd, 2013.
2. RajkumarBuyya, James Broberg, AndrzejGoscinski, " Cloud Computing – Principles and Paradigms" , Wiley Publications, 2014.
3. Michael Miller, " Cloud Computing – Web-Based Appplications that change the way you work and Collaborate Online" , Pearson Education, 2013.

4. John W. Rittinghouse, James F. Ransome , "Cloud Computing – Implementation , Management and Security", CRC Press, 2013.

E-LEARNING RESOURCES:

www.ntpel.iitm.ac.in

SEMESTER – V
COMPUTER LABORATORY-VIII
VISUAL .NET PROGRAMMING

PAPER NO – XXXIX **COURSE CODE: MCA15/5P10/VNP**

Teaching Hours: 75 Hrs **Credits : 2**

L T P : 0 0 5

1. Jagged Array
2. Implementation of Banking
3. Income Tax Calculation
4. EB Calculation
5. Method Overloading
6. Operator Overloading
7. Interfaces
8. Events
9. Exception Handling
10. Threads
    (a) Single Thread
    (b) Multi Thread
11. Web Page Creation : ADO.NET
    (a) Username and Password
    (b) Mail ID Creation (Using Validation Controls)
12. Web Services
    (a) Calculator
    (b) Temperature Conversion
    (c) Currency Conversion

13. Assemblies

14. Reflection

15. Attributes

SEMESTER – IV
COMPUTER LABORATORY-IX
ADVANCED JAVA PROGRAMMING

PAPER NO – XL **COURSE CODE: MCA15/5P11/AJP**

Teaching Hours: 5X15=75 Hrs **Credits : 2**

L T P : 0 0 5

PROGRAMS:

1. Program to prompt the user for a hostname and then looks up the IP address for the hostname and displays the results.
2. Program to read the webpage from a website and display the contents of the webpage.
3. Programs for TCP server and Client interaction as per given below.
   i. Program to create TCP server to send a message to client.
   ii.Program to create TCP client to receive the message sent by the server.
4. Programs for Datagram server and Client interaction as per given below.
   i.Program to create Datagram server to send a message to client.
   ii. Program to create Datagram client to receive the message sent by the server.
5. Program by using JDBC to execute a SQL query for a database and display the results.
6. Program by using JDBC to execute an update query by using Prepared Statement and display the results.
7. Program to execute a stored procedure in the database by using Callable Statement and display the results.
8. Program to display a greeting message in the browser by using HttpServlet.
9. Program to receive two numbers from a HTML form and display their sum in the browser by using HttpServlet.
10. Program to display a list of five websites in a HTML form and visit to the selected website by using Response redirection.
11. Program to store the user information into Cookies. Write another program to display the above stored information by retrieving from Cookies.
12. Program in Java Beans to add a Button to the Bean and display the number of times the button has been clicked.
13. Program for Java Bean with Simple property by using SimpleBeanInfo class.
14. Program for Java Bean with Indexed Property by using SimpleBeanInfo class.
15. Program to develop a Enterprise Java Bean of "Session Bean" type.
16. Program to develop a Enterprise Java Bean of "Entity Session Bean" type.
17. Program to develop a Enterprise Java Bean of "Message Driven Bean" type.
18. Program to develop an application using RMI.
19. Program to send a e-mail.

ELECTIVES

SEMESTER – II
NUMERICAL METHODS

PAPER NO – XV **COURSE CODE: MCA15/2E1/NMS**
Teaching Hours: 15 x 3 = 45 Hrs **Credits : 3**
L T P : 2 1 0

OBJECTIVES:

- The curriculum is designed to provide the student with the basic concepts in Numerical Methods for Analysis and Modeling in Computer Applications .

COURSE OUTLINE:

UNIT I : Correlation Analysis – Scatter Diagram – Karl Pearsons Coefficient of correlation– Rank Correlation –Regression Analysis–Regression Lineof X on Y and ,Y on X. 12 Hrs

UNIT II : Theoretical Distributions: Discrete Distributions – Binomial distribution [Mean,Median,Mode,Fitting of Distribution]–Poisson distribution [Mean, Median, Mode, Fitting of distribution]- Continuous distributions-Normal distribution[Mean ,Median,Mode,Fitting of distribution (Area Property only). 12 Hrs

UNIT III : The Solution of Algebraic and Transcendal Equations : Bisection Method – Iteration Method-False Position Method-Newton Raphson Method. 12 Hrs

UNIT IV : The Solution of Simultaneous Linear Algebraic Equations: Gauss Elimination Method – Gauss Jordan – Jacobi Iteration – Gauss Seidal . 12 Hrs

UNIT V : Numerical differentiation – Newtons forward and backward difference formula. Solution of differential equations – Taylor Series - Euler Methods . 12 Hrs

(* Note : No Derivation required for All Units.)

BOOKS FOR REFERENCES:

1. S.P.Gupta, V. K. Kapoor , Elements of Mathematical Statistics.
2P.Kandasamy, K. Thilagavathy , Calculus of Finite differences and Numerical Analysis.
3. P.Kandasamy,K. Thilagavathy, K. Gunavathy., Numerical Methods, S.Chand&Co.Ltd Reprint 2009.

4. D.C.Sancheti , V. K . Kapoor ,Statistics (Theory , Methods and Applications),Sultan Chand &Sons .
5. S.P.Gupta , Statistical Methods, 33rd edition , Sultan Chand & Co.,2004 .
6. S.P. Gupta , V.K. Kapoor , Fundamentals of Statistics .

E-LEARNING RESOURCES:

www.ntpel.iitm.ac.in

SEMESTER – II

INTRODUCTION TO INFORMATION TECHNOLOGY

PAPER NO – XV **COURSE CODE: MCA15/2E1/IIT**
Teaching Hours: 15 x 3 = 45 Hrs **Credits : 3**
L T P : 2 1 0

OBJECTIVES:

- This course presents the basics of data and information, acquiring graphical data, data Storage, Computer software,Computer networks, Data organization.
- GoalTo enable the students to learn the basic types of data, image compression fundamentals, memory cell, CPU.

COURSE OUTLINE:

UNIT I : Data and Information: Types of data, simple model of a computer – Desktop computer. Acquisition of numbers and textual data: Introduction – Input units – Internal representation of numeric data- representation of characters in computers – Error detecting codes. 9 Hrs

UNIT II : Acquiring graphical data: Introduction – Acquisition of textual data, pictures – Storage format for pictures – Image compression fundamentals – Image acquisition with digital camera. Acquiring audio data – Acquisition of video – Processing multimedia data – Processing and displaying textual data 9 Hrs

UNIT III : Data Storage : Introduction – Memory cell – RAM- ROM- Floppy Disk Drive- CD ROM- Archival Memory – Central Processing Unit - Output Devices. 9 Hrs

UNIT IV : Computer software – Computer networks – Data organization9 Hrs

UNIT V : Some Internet Applications – Email – WWW – Information Browsing Service – Information Retrieved from World Wide Web – Audio on Internet – Business Information System : Introduction – Types of information needed by organization – Why should we use computer in business – Design of operational information system – System life cycle – Computer systems for transaction processing. 9 Hrs

BOOKS FOR REFERENCES:

1. V. Rajaraman “Introduction to Information Technology”, Prentice Hall of India, 2003.
2. Ajoy Kumar Ray &TinkuAcharya, “Information Technology – Principles and Applications Prentice Hall of India, 2004.

3. Research and Development Wing, ITL Education, "IT Tools and Applications", Macmillan India Ltd., 2004.

E-LEARNING RESOURCES:

www.ntpel.iitm.ac.in

SEMESTER – II
WEB PROGRAMMING ESSENTIALS

PAPER NO – XV **COURSE CODE: MCA15/2E1/WPE**
Teaching Hours: 15 x 3 = 45 Hrs **Credits : 3**
L T P : 2 1 0

OBJECTIVES:

- To understand the concepts and architecture of the WorldWideWeb.
- To understand and practice markup languages
- To understand and practice embedded dynamic scripting on client side Internet Programming
- To understand and practice web development techniques on client-side

COURSE OUTLINE:

UNIT I : Introduction To WWW: Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response — Generation of dynamic web pages. 9 Hrs

UNIT II : Ui Design Markup Language (Html):Introduction to HTML and HTML5 - Formatting and Fonts –Commenting Code – Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms. Cascading Style Sheet(CSS):The need for CSS, Introduction to CSS – Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds – Manipulating text - Margins and Padding. 9 Hrs

UNIT III : Introduction To Javascript:Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements - Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling - Controlling Windows & Frames and Documents - Form handling and validations. 9 Hrs

UNIT IV : Advanced Javascript:Browser Management–Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes – *JSON* - jQuery and AJAX. 9 Hrs

UNIT V : PHP : Introduction - How web works - Setting up the environment (LAMP server) - Programming basics - Print/echo - Variables and constants – Strings and Arrays – Operators, Control structures and loopingstructures – Functions – Reading Data in Web Pages - Embedding PHP within HTML – Establishing connectivity with

MySQL database. 9 Hrs

BOOKS FOR REFERENCES:

1. Harvey & Paul Deitel& Associates, Harvey Deitel and Abbey Deitel, “Internet and World Wide Web - How To Program”, Fifth Edition, Pearson Education, 2011.
2. Achyut S Godbole and AtulKahate, “Web Technologies”, Second Edition, Tata McGraw Hill, 2012.
3. Thomas A Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition, Tata McGraw Hill, 2013.
4. David Flanagan, “JavaScript: The Definitive Guide, Sixth Edition”, O'Reilly Media, 2011
5. Steven Holzner, “The Complete Reference - PHP”, Tata McGraw Hill, 2008
6. Mike Mcgrath, “PHP & MySQL in easy Steps”, Tata McGraw Hill, 2012.

E-LEARNING RESOURCES:

http://php.net/manual/

SEMESTER – III
COMPUTER GRAPHICS AND MULTIMEDIA

PAPER NO – XX **COURSE CODE: MCA15/3E2/CGM**
Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**
L T P : 2 1 0

OBJECTIVES:

- To understand computational development of graphics and multimedia
- To provide in-depth knowledge of 2D and 3D animation.
- To understand basic concepts related to Multimedia including data facets, algorithms and software development.

COURSE OUTLINE:

UNIT I : Basic Concepts: 2D Transformations – Clipping – Window – View Port Mapping – Graphical User Interfaces and Interactive Input Methods – Picture Construction Techniques – Virtual Reality Environment. 12 Hrs

UNIT II : 3D Graphics: 3D Transformation – 3D Viewing – Visible Surface Detection – Back Face Detection – Depth Buffer Method – Scan Line Method. 11 Hrs

UNIT III : Multimedia Basics: Introduction to Multimedia – Components – Hypermedia – Authoring – Authoring tools – File formats – Color models – Digital Audio representation – Transmission – Audio signal processing – Digital music making – MIDI – Digital video – Video compression techniques – Video performance measurements – Multimedia Databases – Animation – Key frames and tweening techniques – Principles of animation – Virtual reality – Multimedia for portable devices. 13 Hrs

UNIT IV : Multimedia Communication: Stream characteristics for Continuous media – Object Stream Interactions - Media Synchronization – Models for Temporal Specifications – Streaming of Audio and Video – RTSP — Multimedia Communication Standards – RTP/RTCP - Real time streaming and On-demand streaming.12 Hrs

UNIT V : Multimedia Application Development: Design, Development and evaluation of multimedia a system - The development of user interface design - Design Process - Multimedia & the Internet - Multimedia conferencing - Multimedia file sharing – Multimedia broadcasting - Multimedia Development Issues - Multimedia project - Structured Multimedia development - Multimedia project timing - Sample project.

12 Hrs

BOOKS FOR REFERENCES:

1. Donald Hearn and M. Pauline Baker, "Computer Graphics in C Version", Third Edition, Pearson Education, 2013.
2. Tom McReynolds – David Blythe " Advanced Graphics Programming Using OpenGL" , Elsevier, 2010.
3. ParagHavaldar and Gerard Medioni, "Multimedia Systems-Algorithms, Standards and Industry Practices", Course Technology, Cengage Learning, 2010.
4. Ralf Steinmetz and Klara "Multimedia Computing, Communications andApplications", Pearson Education,2004.

E-LEARNING RESOURCES:

http://www.springer.com/computer/information+systems+and+applications/journal/530
http://www.cs.cf.ac.uk/Dave/Multimedia/node12.html
http://www.tutorialspoint.com/computer_graphics
http://www.graphics.cornell.edu/online/tutorial
http://www.explainthatstuff.com/computer-graphics.html

SEMESTER III
M-COMMERCE

PAPER NO – XX **COURSECODE: MCA15/3E2/MCE**
Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**
L T P : 2 1 0

OBJECTIVES:

- To understand the E – commerce strategies and value chains
- To understand the M-commerce services
- To understand M – commerce infrastructure and applications.
- To know the availability of latest technology and applications of M- commerce in various domains.
- To apply mobile commerce in business-to-business application.

COURSE OUTLINE:

UNIT I : Electronic Commerce**:**Introduction - The e-commerce environment - The E-commerce marketplace -Focus on portals,Location of trading in the Marketplace - Commercial arrangement for transactions - Focus on auctions - Business models for e-commerce - Revenue models - Focus on internet start-up companies.

9Hrs

UNIT II : Mobile Commerce**:** Introduction – Infrastructure of M– Commerce – Types of Mobile commerce services – Technologies of wireless business – benefits and limitations, support, mobile marketing & advertisement, Non–internet applications in M– Commerce –wireless/wired commerce comparisons.

9Hrs

UNIT III: Mobile Commerce: Technology**:** A Framework for the study of Mobile Commerce – NTT Docomo's I– Mode – Wireless Devices For Mobile Commerce – Towards aclassification framework for mobile location based services – Wireless Personal and Local Area Networks –The Impact of technology advances on Strategy Formulation in Mobile Communications Networks.9Hrs

UNIT IV: Mobile Commerce: Theory and aplications :The Wireless Application Protocol – Mobile Portal – Factors Influencing The Adoption of Mobile Gaming Services – Mobile Data Technologies and Small Business Adoption and Diffusion – M–Commerce in the Automotive Industry – Location– Based Services: Criteria For Adoption and solution deployment – The Role of Mobile advertising in building a brand– M– Commerce Business Models.

9Hrs

UNIT V: Business– To– Business Mobile E-Commerce **:** Enterprise Enablement – Email and Messaging – Field force automation (insurance, real estate, maintenance, healthcare) – Field sales support (Content access, Inventory) – Asset tracking and maintenance/management – remote IT support – Customer Retention (B2C Services, Financial, Special Deals) – WarehouseAutomationSecurity.9Hrs

BOOKS AND REFERENCES:

1. Dave Chaffey, "E-Business and E-Commerce Management", Third Edition, 2009, Pearson Education.
2. Brian E. Mennecke, Troy J. Strader, "Mobile Commerce: Technology, Theory and Applications", Idea Group Inc., IRM press, 2003.
3. P. J. Louis, " M-Commerce Crash Course", McGraw- Hill Companies February 2001.
4. Paul May, "Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business" Cambridge University Press March 2001.
5. Michael P. Papazoglou, Peter M.A. Ribbers, 'e-business organizational and Technical foundation ',Wiley India 2009.
6. Dr.Pandey ,SaurabhShukla E-commerce and Mobile commerce Technologies , Sultan chand ,2011.

E-LEARNING RESOURCES:

www.ntpel.iitm.ac.in
www.courseera.org

SEMESTER II
INTERNET OF THINGS

PAPER NO – XX **COURSECODE: MCA15/3E2/IOT**

Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**

L T P : 2 1 0

OBJECTIVES:

- To learn the basic issues, policy and challenges in the Internet
- To understand the components and the protocols in Internet
- To build a small low cost embedded system with the internet
- To understand the various modes of communications with internet
- To learn to manage the resources in the Internet
- To deploy the resources into business
- To understand the cloud and internet environment.

COURSE OUTLINE:

UNIT I : Introduction:Definition – phases – Foundations – Policy– Challenges and Issues - identification - security –privacy. Components in internet of things**:** Control Units – Sensors – Communication modules –Power Sources – Communication Technologies – RFID – Bluetooth – ZigBee – Wi-Fi – Rflinks – Mobile Internet – Wired Communication9 Hrs

UNIT II : Programming The Microcontroller For IOT: Basics of Sensors and actuators – examples and working principles of sensors and actuators –Cloud computing and IOT – Arduino/Equivalent Microcontroller platform – Setting up the board - Programming for IOT – Reading from Sensors Communication:Connecting microcontroller with mobile devices – communication through Bluetooth and USB – connection with the internet using Wi-Fi / Ethernet 9 Hrs

UNIT III : Resource Management In The Internet Of Things: Clustering - Software Agents - Data Synchronization - Clustering Principles in an Internet ofThings Architecture - The Role of Context - Design Guidelines -Software Agents for Object – Data Synchronization- Types of Network Architectures - Fundamental Concepts of Agility andAutonomy-Enabling Autonomy and Agility by the Internet of Things-Technical Requirements for satisfying the New Demands in Production - The Evolution from the RFID-based EPC Network to an Agent based Internet of Things- Agents for the Behaviour of Objects 9 Hrs

UNIT IV : Business Models For The Internet Of Things: The Meaning of DiY in the Network

Society- Sensor-actuator Technologies and Middleware as a Basis for a DiY Service Creation Framework - Device Integration - Middleware TechnologiesNeeded for a DiY Internet of Things Semantic Interoperability as a Requirement for DiY Creation -Ontology- Value Creation in the Internet of Things- Application of Ontology Engineering in the Internet of Things-Semantic Web- Ontology - The Internet of Things in Context of EURIDICE - Business Impact 9 Hrs

UNIT V : From The Internet Of Things To The Web Of Things: Resource-oriented Architecture and Best Practices- Designing RESTful Smart Things – Web enabling Constrained Devices - The Future Web of Things - Set up cloud environment – send data from microcontroller to cloud – Case studies – Open Source e-Health sensor platform – Be Close Elderly monitoring – Other recent projects.

BOOKS FOR REFERENCES:

1. CharalamposDoukas , Building Internet of Things with the Arduino, Create space, April 2002
2. Dieter Uckelmann et.al, "Architecting the Internet of Things", Springer, 2011
3. Luigi Atzor et.al, "The Internet of Things: A survey, ", Journal on Networks, Elsevier Publications, October, 2010
4. http://postscapes.com/
5. http://www.theinternetofthings.eu/what-is-the-internet-of-things

E-LEARNING RESOURCES:

www.ntpel.iitm.ac.in

SEMESTER – III
ADVANCED DATABASES

PAPER NO – XXVIII **COURSE CODE: MCA15/4E3/ADS**

Teaching Hours: 15 x 3= 45Hrs **Credits : 3**

L T P : 2 1 0

OBJECTIVES:

- To acquire knowledge on parallel and distributed databases and its applications.
- To study the usage and applications of Object Oriented database
- To understand the principles of intelligent databases.
- To understand the usage of advanced data models and an application development.
- To understand the real time transaction systems with case study.

COURSE OUTLINE:

UNIT I : Parallel Databases: Introduction- I/O Parallelism- Inter query Parallelism-Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Query Optimization. -Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, distributed query processing. 9 Hrs

UNIT II : Data Warehousing And Mining:Decision-Support Systems, Data Warehousing, Data Mining, Classification, Association Rules-other types of association-clustering-other forms of data mining-information retrieval- Relevance Ranking Using Terms, Relevance Using Hyperlinks, Synonyms, Homonyms, and Ontologies, Indexing of Documents, Measuring retrieval Effectiveness-crawling and indexing the web-information retrieval. 9 Hrs

UNIT III : Object-Based Databases**:** Complex Data Types, Structures Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R Features-persistent programming languages-object relational mapping-object- oriented vs. object –relational. 9 Hrs

UNIT IV : Advanced Application Development:Performance Tuning, Performance Benchmarks,

Other Issues in Application Development-standardization -spatial and temporal data and mobility-Motivation, Time in Databases, Spatial and Geographic Data, Multimedia Databases-mobility and personal databases. 9 Hrs

UNIT V : Advanced Transaction Processing:Transaction-Processing Monitors, Transactional Workflows, E-Commerce, Main-Memory Databases, Real-Time Transaction Systems-long duration transactions- case study:ORACLE. 9Hrs

BOOKS FOR REFERENCES:

1. Henry FKorth, Abraham Silberschatz, S. Sudharshan, "Database System Concepts" Sixth edition, Tata McGraw Hill Ltd, 2013.
2. R.Elmasri,S.B.Navathe,"FundamentalsofDatabaseSystems",FifthEdition, Pearson Education/AddisonWesley,2007.
3. ThomasCannollyandCarolynBegg,"DatabaseSystems,APracticalApproach to Design,ImplementationandManagement",ThirdEdition,PearsonEducation, 2007.
4. Raghu Ramakrishnan, Johannes Gehrke,"Database management Systems", Tata McGraw Hill Limited, 2014.
5. C.J.Date, A.Kannan and S.Swamynathan,"An Introduction to Database Systems", Eighth Edition, Pearson Education,2006.
6. V. S. Subramanian,"Principles of Multimedia Database Systems",HarcourtIndiaPvtLtd.,2001.
7. VijayaKumar,"MobileDatabaseSystems",JohnWiley&Sons,2006.

E-LEARNING RESOURCES:

www.nptel.ac.in

SEMESTER – IV
MOBILE COMPUTING

PAPER NO – XXVIII **COURSECODE: MCA15/4E3/MCG**

Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**

L T P : 2 1 0

OBJECTIVES:

- The utilization of wireless communication technologies and the explosion of portable computing devices have made possible mobile computing era in which users, on the move, can seamlessly access network services and resources from any-where at any-time.
- To present the challenges faced to efficiently enable such access.

COURSE OUTLINE:

UNIT I : Introduction: Wireless transmission–Frequencies for radiotransmission–Signals–Antennas–SignalPropagation–Multiplexing–Modulations–Spreadspectrum–MAC–SDMA–FDMA–TDMA–CDMA–Comparative Study. 9Hrs

UNIT II : Telecommunication Systems: GSM– System Architecture – Protocols – Localization and Calling –Hand over – Security – New Data Services - Case Study: DECTand TETRA. 9Hrs

UNIT III : Satellite Systems : Applications – GEO-LEO-MEO- Wireless LAN–IEEE802.11 – System Architecture–HIPERLAN–WATM - BRAN–BlueTooth – Architecture-Security 9Hrs

UNIT IV : Mobile Network Layer: Mobile IP–Dynamic HostConfigurationProtocol–MANET –Routing – Wireless Local loop – WifiVs 3G. 9 Hrs

UNIT V : Mobile Transport Layer and Mobility Support : Traditional TCP–Indirect TCP–Snooping TCP–MobileTCP–Fast Retransmit / FastRecovery- Transmission/TimeoutFreezing - Selective Retransmission–Transaction Oriented TCP– WAP – WAPArchitecture—WML–WMLScript–WTA– MMS – GPRS Applications. 9Hrs

.

BOOKS FOR REFERENCES:

1. JochenSchiller,"MobileCommunications", Pearson Education, 2014.

2. William Stallings,"WirelessCommunications&Networks", Pearson Education, 2014.

3. AsokeTalukder, Hasa Ahmed and Roopa R Yavagal, "Mobile Computing", Tata McGraw

Hill Edition, 2013.

4. KavehPahlavan,PrasanthKrishnamoorthy,"PrinciplesofWirelessNetworks", second Edition, 2003,PearsonEducation.

E-LEARNING RESOURCES:
www.en.wikipedia.org

SEMESTER – IV
SOFTWARE TESTING AND QUALITY ASSURANCE

PAPER NO – XXVIII **COURSECODE: MCA15/4E3/STQ**

Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**

L T P : 2 1 0

COURSE OBJECTIVES:

- To learn the functionality of automated testing tools
- To understand standard principles to check the occurrence of defects and its removal.
- To understand the models of software reliability.

UNIT I : Testing Environment And Test Processes: World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing – Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis. 9 Hrs

UNIT II : Testing Techniques And Levels Oftesting: Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing – Unit Testing - Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing techniques. 9 Hrs

UNIT III : Incorporating Specialized Testing Responsibilities: Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software – Testing a Data Warehouse - Case Study for Web Application Testing. 9 Hrs

UNIT IV : Test Automation : Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool. 9 Hrs

UNIT V : Software Testing And Quality Metrics : Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics. Test the software by applying testing techniques to deliver a product free from bugs. 9 Hrs

BOOKS FOR REFERENCES:

1. William Perry, "Effective Methods of Software Testing", Third Edition, Wiley Publishing 2007
2. SrinivasanDesikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2007.
3. NareshChauhan , "Software Testing Principles and Practices " Oxford University Press , New Delhi , 2010.
4. Dale H. Besterfiled et al., "Total Quality Management", Pearson Education Asia, Third Edition, Indian Reprint (2006).
5. Stephen Kan, "Metrics and Models in Software Quality", Addison – Wesley, Second Edition, 2004.

E-LEARNING RESOURCES:

www.ntpel.iitm.ac.in

SEMESTER V
DIGITAL IMAGE PROCESSING

PAPER NO – XXXVII **COURSECODE: MCA15/5E4/DIP**

Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**

L T P : 2 1 0

OBJECTIVE:

- To introduce basic concepts in acquiring, storage and Process of images
- To introduce for enhancing the quality of images.
- To introduce techniques for extraction and processing of region of interest

COURSE OUTLINE:

UNIT I: Introduction To Image Processing**:** Digital image processing – fundamental steps in digital image processing-components of an image processing system-elements of visual perception-light and the electromagnetic spectrum-image sensing and acquisition-image sampling and quantization-some basic relationships between pixels. 9 Hrs

UNIT II: Intensity Transformations And Spatial Filtering: Intensity Transformation functions – Histogram processing – Fundamentals of Spatial filtering-smoothing spatial filters. 9 Hrs

UNIT III: Geometric Transformations And Image Registration: Transforming points-Affine transformations-projective transformations-applying geometric transformations to images-image coordinate systems in MATLAB-image interpolation-image registration. 9 Hrs

UNIT IV: Wavelets And Multiresolution Processing: Background-multi resolution expansions-wavelet transforms in one dimension-The fast wavelet transform-wavelet transforms in two dimensions-image compression-fundamentals- some basic compression methods. 9 Hrs

UNIT V: Image Segmentation: Fundamentals-Point, Line and Edge Detection-Thresholding –Region-Based segmentation-segmentation using morphological watersheds. 9 Hrs

BOOKS FOR REFERENCES:

1. Rafael C. Gonzalez ,Richard E. Woods, Digital Image Processing , Pearson Prentice Hall,Third Edition,2013.
2. Rafael C.Gonzalez, Richard E.Woods, Steven L.Eddins, Digital Image Processing Using MATLAB, McGraw Hill Education (India) Private Limited., 2014.
3.Chanda.B., DuttaMajumder .D.,Digital Image Processing and Analysis, Prentice Hall of India, New Delhi, 2007.
4. Scott E.Umbaug, Computer Vision and Image Processing, Prentice Hall International, New Delhi, 1998.
5. Milan Sonka, Vaclav Hlavac and Roger Boyle, "Image Processing, Analysis and Machine Vision", Second Edition, Thomson Learning, 2001

E-LEARNING RESOURCES:

http://nptel.ac.in/courses/106105032/

SEMESTER – V
DISTRIBUTED COMPUTING

PAPER NO – XXXVII **COURSECODE: MCA15/5E4/DCG**

Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**

L T P : 2 1 0

OBJECTIVES:

- The course studies appropriate models of distributed computing architectures, as well as major techniques for the design and analysis of distributed systems.
- provides theoretical foundations of current distributed implementations

COURSE OUTLINE:

UNIT I : Introduction – Examples of Distributed Systems – Resource Sharing and the Web –Challenges- System Models - Introduction – Architectural Models – Functional Models-Characterization of Distributed Systems – Client-Server Communication – DistributedObjects and Remote Invocation – Communication Between Distributed Objects – Remote Procedure Call – Events and notifications. 10 Hrs

UNIT II : Distributed Operating Systems - Introduction – Issues – Communication Primitives –Inherent Limitations - Lamport's Logical Clock; Vector Clock; Causal Ordering; GlobalState; Cuts; Termination Detection. Distributed Mutual Exclusion – Non-Token BasedAlgorithms – Lamport's Algorithm - Token-Based Algorithms – Suzuki-Kasami's Broadcast Algorithm – Distributed Deadlock Detection – Issues – Centralized Deadlock – Detection Algorithms - Distributed Deadlock-Detection Algorithms. Agreement Protocols – Classification - Solutions –Applications. 12 Hrs

UNIT III : Distributed Resource Management - Distributed File systems – Architecture – Mechanisms –Design Issues – Distributed Shared Memory – Architecture – Algorithm – Protocols – Design Issues. Distributed Scheduling – Issues – Components – Algorithms 14 Hrs

UNIT IV : Introduction to Distributed Algorithms, Kinds of Distributed Algorithm, Timing

Models. Synchronous Network Algorithms: Synchronous Network Model, Leader Election in a synchronous Ring, Algorithms in a General Synchronous Networks, Distributed Consensus with Link Failures, Distributed Consensus with Process failures, More Consensus problems. 13 Hrs

UNIT V : Resource Security and Protection - Introduction – The Access Matrix Model – Implementation of Access Matrix Model – Safety in the Access Matrix Model – Advanced Models of protection – Data Security. 13 Hrs

BOOKS FOR REFERENCES:

1.GeorgeCoulouris, Jean Dellimore and Tim KIndberg, "Distributed Systems Concepts and Design", Pearson Education, 4th Edition, 2005 [Unit-I]
2. MukeshSinghal and N. G. Shivaratri, "Advanced Concepts in Operating Systems",
3. McGraw-Hill, 2001 [Units II - IV]
4. Joshy Joseph and Craig Fellenstein, "Grid Computing", IBM Press, 2004. [Unit –V]
5. Ajay D. Kshemkalyani and MukeshSinghal, " Distributed Computing – Principles,
6. Algorithms and Systems", Cambridge University Press, 2008.
7. Pradeep K. Sinha, Distributed Operating Systems, PHI, 2005.
8. Nancy A. Lynch, Distributed Algorithms, Morgan Kaufmann Publishers, 2000.

E-LEARING RESOURCES:

1. cs-www.cs.yale.edu/homes/aspnes/classes/465/notes.pdf
2. www.cs.nyu.edu/courses/fall07/G22.2631-001/distcomp.ppt
3. web.eecs.umich.edu

SEMESTER – V
DATA WAREHOUSING AND MINING

PAPER NO – XXXVII **COURSE CODE:MCA15/5E4/ DWM**
Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**

OBJECTIVES:

- To introduce the concept of data mining which covers the basic tasks, metrics, issues and implication. Core topics like classification, clustering and association rules are exhaustively dealt with.

- To introduce the concept of data warehousing that covers special emphasis on architecture and design.

COURSE OUTLINE:

UNIT I : **Introduction –** Why Data Mining? What isData Mining? What kinds of Data can be mined? What kinds of Patterns can be Mined? Technologies used- Kinds of applications targeted – major issues - Know your Data – Data Objects and Attribute Types - Basic Descriptions of Data – Data Visualization – Measuring Data Similarity and Dissimilarity
9Hrs

UNIT II : DATA PREPROCESSING **–** Overview- Data Cleaning – Data Integration – Data Reduction – Data Transformation and Data Discretization - Data Warehousing and Online Analytical Processing – Basic Concepts – Data Warehouse Modeling – Data Warehouse Design and Usage – Data Warehouse Implementation – Data Generalization 9 Hrs

UNIT III : Data Cube Technology – Data Cube Computation and Methods – Exploring Cube Technology – Multidimensional Data Analysis - Mining Frequent Patterns – Basic concepts – Frequent Itemset Mining Methods – Pattern Evaluation Methods 9 Hrs

UNIT IV : CLASSIFICATION - Basic concepts – Decision Tree Induction – Bayes

Classification Methods – Rule Based Classification – Advanced Methods – Baysian Belief Networks – Back Propagation – Support Vector Machines

9 Hrs

UNIT V : Cluster Analysis - - Partitioning methods –Advanced Cluster Analysis – Clustering High Dimensional Data – Network Data - Outlier Detection – Outlier Detection Methods – Data Mining Trends and Research Frontiers

9 Hrs

TEXT BOOKS:

1. J. Han, M. Kamber, "Data Mining: Concepts and Techniques", Morgan Kauffman, 2011.
2. Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education 2004.
3. Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education 2003.
4. David Hand, Heikki Manila, PadhraicSymth, "Principles of Data Mining", PHI 2004.
5. Alex Bezon, Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", McGraw-Hill Edition, 2001.

WEBSITE AND E-LEARNING SOURCE:

www.mhhe.com,
www.comp.lancs.ac.uk
www.ntpel.iitm.ac.in

SEMESTER –V
BIG DATA ANALYTICS

PAPER NO – XXXVIII **COURSECODE: MCA15/5E5/BDA**
Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**
L T P : 2 1 0

OBJECTIVE:

- To explore the fundamental concepts of big data analytics
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream.
- To understand the applications using Map Reduce Concepts

COURSE OUTLINE :

UNIT I : Introduction to Big Data Platform: Challenges of Conventional Systems - Intelligent data analysis – Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error 9 Hrs

UNIT II : Introduction To Streams Concepts: Stream Data Model and Architecture - Stream Computing -Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions 9 Hrs

UNIT III : History of Hadoop: The Hadoop Distributed File System – Components of Hadoop- Analyzing the Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFSBasics- Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats- Map Reduce Features.9 Hrs

UNIT IV : Setting up a Hadoop Cluster: Cluster specification - Cluster Setup and Installation – HadoopConfiguration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance-Hadoop benchmarks- Hadoop in the cloud. 9 Hrs

UNIT V : Applications on Big Data Using Pig and Hive: Data processing operators in Pig – Hive services – HiveQL – Querying Data in Hive - fundamentals of HBase and ZooKeeper - IBM InfoSphereBigInsights and Streams. Visualizations - Visual data analysis techniques, interaction techniques-Systems and applications. 9 Hrs

BOOKS FOR REFERENCES:

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Tom White " Hadoop: The Definitive Guide" Third Edition, O'reilly Media, 2012.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, "Understanding BigData: Analytics for Enterprise Class Hadoop and Streaming Data", McGrawHill Publishing, 2012
4.AnandRajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.
5. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams
with Advanced Analytics", JohnWiley& sons, 2012.
6. Glenn J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007

E-LEARNING RESOURCES:

www.tutorialspoint.com/hadoop/

SEMESTER – IV
INFORMATION SECURITY

PAPER NO – XXXVIII **COURSE CODE: MCA15/5E5/ISY**

Teaching Hours: 15 x 4 = 60 Hrs **Credits : 3**

L T P : 3 1 0

OBJECTIVES:

- To understand what a security policy is and what the major mechanisms for implementing security policies.
- To be familiar with how threats to an organization are discovered, analyzed and dealt with.
- To master protocols for security services.

COURSE OUTLINE:

UNIT I : Information Security : Introduction – Information Security Principles – Security Management – Types of Policies – Development and Management - HIPAA 12 Hrs

UNIT II : Security Architecture and Models: Disaster Recovery – Computer Crime – Computer and Law – Intellectual Property Law. 12 Hrs

UNIT III : Physical Security Control : Operations Security – Cryptography to Information System – Strength of Cryptosystems 12 Hrs

UNIT IV : Access Control Systems and Methodology: Telecommunications, Network, and Internal Security 12 Hrs

UNIT V : Application Development Security: Monitoring and Vigilance – Growing Threats 12 Hrs

BOOKS FOR REFERENCES:

1. Mark Merkow, Jim Breithaupt, "Information Security –Principles and Practices", Pearson Education Pvt. Ltd, 2013.
2. Timothy P. Layton, "Information Security – Design, Implementation, Measurement, and Compliance" ,Auerbach Publications, 2009.
3. Jason Andress, "The Basics of Information Security", 1st Edition, Syngress Press, Elsevier Publications, 2011.

E-LEARNING RESOURCES:

www.ntpel.iitm.ac.in

SEMESTER –V
MOBILE PROGRAMMING

PAPER NO – XXXVIII **COURSECODE: MCA15/5E5/MPG**
Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**
L T P : 2 1 0

OBJECTIVES:

- Understand system requirements for mobile applications
- Generate suitable design using specific mobile development frameworks
- Generate mobile application design
- Implement the design using specific mobile development frameworks
- Deploy the mobile applications in marketplace for distribution

COURSE OUTLINE:

UNIT I : Introduction:Introduction to mobile applications – Embedded systems -Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications 5 Hrs

UNIT II : Basic Design:Introduction – Basics of embedded systems design – Embedded OS - Design constraints formobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints –performance, usability, security, availability and modifiability. 8 Hrs

UNIT III : Advanced Design:Designing applications with multimedia and web access capabilities – Integration with GPS andsocial media networking applications – Accessing applications hosted in a cloud computingenvironment – Design patterns for mobile applications. 8 Hrs

UNIT IV : Technology I – Android: Introduction – Establishing the development environment – Android architecture – Activities andviews – Interacting with UI – Persisting data using SQLite –Using Google Maps, GPS and Wifi – Integration with social media applications. 12 Hrs

UNIT V : Technology Ii – Ios:Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Datapersistence using Core Data and SQLite – Location aware applications using Core Location andMap Kit – Integrating calendar and address book with social media application. 12 Hrs

BOOKS FOR REFERENCES:

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
2. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012
3. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012
4. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS 6 Development: Exploring the iOS SDK”, Apress, 2013.
Web Source :http://developer.android.com/develop/index.html

EXTRA DISCIPLINARY COURSES

SEMESTER – III

RESOURCE MANAGEMENT TECHNIQUES

PAPER NO – XXI **COURSECODE: MCA15/3ED2/RMT**

Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**

L T P : 2 1 0

OBJECTIVES:

- To develop Computational Skills
- To develop Logical thinking in formulating industry oriented problems.
- To apply these techniques in real life situations.

COURSE OUTLINE:

UNIT I **:** Linear Programming: Formulation – Solution to LPP by Graphical & Simplex Method – Artificial Variable Technique – Big M Method. 9 Hrs

UNIT II **:** Transportation Problem: Assignment Problem – Travelling Salesman Problem. 9 Hrs

UNIT III **:** Sequencing: Sequence Problem: Processing N Jobs on 2 machines & 3 machines – Processing 2 jobs on 'n' machines. Game theory: Introduction – 2 persons zero – sum game – Max & Min Max principle – saddle point & value of game – Games without saddle points – Mixed Strategies. 12 Hrs

UNIT IV **:** Construction of Network: Types of floats – Project Scheduling by CPM / PERT – Difference between CPM and PERT. 10 Hrs

UNIT V **:** Interpolation: Definition: Newton Forward & Backward formulae for equally spaced arguments – Lagrange Formula for unequally spaced arguments. 5 Hrs

(*Note: No Derivation required for All UNITS.)

BOOKS FOR REFERENCES:

1. V.Sundaresan , K. Ganesan , K.S. Ganapathy Subramanian , " Resource Management Techniques Operation Research " , New Delhi , India , A.R. Publications 2009.
2. P.Kandasamy, K. Thilagavathy ," Calculus of Finite differences and Numerical Analysis " , S.Chand ,2012.
3. S.D.Sharma , " Operations Research – Theory , Methods & Applications", Kedarnath, 2012.
4. KantiSwarup , P.K. Gupta , Man Mohan , " Operations Research ", Sultanchand ,2010.
5. R.K.Gupta , " Operations Research ", Krishnan Prakashan, 33 edition,2014.
6. S.G. Venkatachalapathy, "Calculus of Finite differences and Numerical Analysis " , Margham Publications , 2012.

E – LEARNING RESOURCES

http://nptel.ac.in/syllabus/syllabus.php?subjectId=111107064

SEMESTER – IV

ACCOUNTING AND FINANCIAL MANAGEMENT

PAPER NO – XXIX **COURSECODE: MCA15/4ED2/AFM**

Teaching Hours: 15 x 3 = 45Hrs **Credits : 3**

L T P : 2 1 0

OBJECTIVE:

- To know the result of the business over a period of time. The result of a business may be profit or loss.
- To know the financial position of business at a point of time. This can be known by presenting all assets and liabilities in the form of a statement known as a Balance Sheet.
- To maintain all records for a given period to serve as permanent reference in future.
- To know the amount which a business owes to others for having bought goods on credit basis.
- To know the amount due to business by others on account of goods sold on credit basis.

COURSE OUTLINE:

UNIT I : Principles Of Accounting : Principles of double entry-Assets and liabilities-Accounting records and systems-Trial balance and preparation of financial statements-Trading - Manufacturing, profit and loss accounts- Balance sheet including adjustments(simple problems only).9 Hrs

UNIT II : Analysis And Interpreting Accounts And Financial Statements: Ratio analysis-Use of ratios in interpreting the final accounts (trading accounts and loss a/c and balance sheet)-final a/c to ratio as well as ratios to final accounts. 9 Hrs

UNIT III : Break Even Analysis And Marginal Costing: Meaning of variable cost and fixed cost-Cost-Volume – profit analysis-Calculation of breakeven point-profit planning- sales planning and other decision-making analysis involving

break-even analysis-Computer Accounting and algorithm.(differential cost analysis to be omitted) 9 Hrs

UNIT IV : Budget/Forecasting - Preparation of and characteristics of functional budgets-production- sales- purchases- cash and flexible budgets. 9 Hrs

UNIT V : Project Appraisal - Method of capital investment decision making-Payback method- APR method-Discounted cash flows-Net present values-internal rate of return-sensitivity analysis-cost of capital. 9 Hrs

BOOKS FOR REFERENCES:

1. Shukla M.C and T.S.Grewal,"AdvancedAccounts",NewDelhi,S.Chand& Co. , 1991.
2. Gupta R.L &M.Radhaswamy,"Advanced Accounts(Vol II)",New Delhi,S.Chand& sons,1991.
3. Man Mohan & S.N. Goyal,"Principles of Management Accounting",AryaSahitya Bhawan,1987.
4. Kuchhal S.C. "Financial Management",chaitanya,1980.
5. A.Murthy"Financial Management"Margham Publication.
6. Prof T.S.Reddy&Dr.Y.HariprasadReddy,"Management Accounting"

SOFT SKILL COURSES

SEMESTER - I

BUSINESS COMMUNICATION

PAPER NO:VICOURSE CODE:MCA15/1S1/BCN
Teaching Hours: 15 x 2 = 30Hrs Credits : 2
L T P : 0 0 4

OBJECTIVES:

- It is a skill based qualification. It gives the students the opportunity to learn practical language skills in four key areas: reading, writing, listening and speaking

COURSEOUTLINE:

	BEC Preliminary	**BEC Vantage**	**BEC Higher**
Reading	7 parts / 45 items 1 hour 30 minutes (NB reading and writing)	5 parts / 45 items 1 hour	6 parts/2 items 1 hour
Writing	2 tasks	2 tasks 45 minutes	2 tasks 1 hour 10 minutes
Listening	4 parts/30 items about 40 minutes	3 parts / 30 items about 40 minutes	3 parts / 30 items about 40 minutes

	including transfer time	including transfer time	including transfer time
Speaking	3 parts 12 minutes	3 parts 14 minutes	3 parts 16 minutes

BOOKS FOR REFERENCE:

Materials from University of Cambridge

SEMESTER – I

SPOKEN AND PRESENTATION SKILLS

PAPER NO: VII COURSE CODE : MCA15/1S2/SPS
Teaching Hours: 2 x 15 = 30Hrs Credits : 2
L T P : 0 2 0

OBJECTIVE:

- Coach students to identify, classify and apply relevant skill sets.Illustrate role of skills in real-life situations with case studies, role play, etc.
- Translate performance of skills into efficient habits.Enable students to perceive cultural codes involved in presentation and design language performance accordingly.

COURSE OUTLINE:

UNIT I : General Language Knowledge and Presentation. 6 Hrs

UNIT II : Special Language Knowledge and Presentation. 5 Hrs

UNIT III : General Communication Skills for Presentation. 6Hrs

UNIT IV : Professional Communication Skills for Presentation 6 Hrs

UNIT V : Social Communication Skills for Presentation. 7 Hrs

BOOKS FOR REFERENCES:

1. Cathcart, Robert. S. and Larry A. Samovar. 1970. Small group Communication : A Reader. 5th Edition. Wm. C. Brown Publishers . Iowa.
2. Tamblyn, doni and Shrynweiss. 2000. The Big Book of Humours Training Games. 2004 Edition. Tata McGraw-Hill. New Delhi.

3. Andrews, sSudhor. 1988. How to succeed at Interviews. 21st Reprint. Tata McGraw-Hill. New Delhi.
4. Monippally, Matthkutty. M. 2001. Business Communication Strategies. 11th Reprint. Tata McGraw-Hill. New Delhi.

SEMESTER – II

FRENCH FOR BEGINNERS

PAPER NO: XVI COURSE CODE: MCA15/2S3/FFB
Teaching Hours: 15 x 2 = 30 Hrs Credits : 2
L T P : 0 2 0

PREREQUISITES: Complete beginners with no prior knowledge of the language.

OBJECTIVES :

- At a time when the knowledge of a foreign language has become an indispensable tool.
- This course in French will give an opportunity for students of other disciplines to get a basicknowledge of a widely used European language.
- The course is based on a minimum vocabulary necessary and sufficient to develop elementary language skills in French.

COURSE OUTLINE:

UNIT I : Alphabets and numbers- Simple Grammar: Basics of French conversation (To greet a person- Introducing oneself- Asking basic information)

UNIT II : Simple Grammar: Name and locate objects-colours and simple description of people.

UNIT III : Simple Grammar: Asking for directions- Giving suggestions

UNIT IV : Simple Grammar: Indicate date and time. Asking and giving information on one's profession and activities.

UNIT V : Simple Grammar: Use of past tense. Narrating past events. Giving one's opinion.

BOOKS FOR REFERENCES:

1. "Taxi" – Guy Cappelle and Robert Menand.

E-LEARNING RESOURCES:

www.fle.fr
www.bonjourdefrance.com
www.polarfle.com

SEMESTER – III
QUANTITIVE APTITUDE

PAPER NO – XXIV **COURSE CODE: MCA15/3S4/QAE**

Teaching Hours: 15 x 2 = 30 Hrs **Credits : 2**

L T P : 0 2 0

OBJECTIVES:

- This course prepares the students in areas like Quantitative Aptitude (including Data Interpretation & Data Sufficiency), Reasoning & Logical Ability (including Non-Verbal Reasoning), English Language & Grammar,
- To test the reasoning abilities and mental aptitude of the students.
- Designed to test the language abilities and understanding of English grammar

COURSE OUTLINE:

Quantitative Aptitude:

- Time-Speed-Distance- Work and time
- Number system: HCF- LCM- Geometric Progression, Arithmetic progression- Arithmetic mean- Geometric mean- Harmonic mean- Median- Mode- Number Base System- BODMAS
- Geometry- (Lines- angles- Triangles- Spheres- Rectangles- Cube- Cone etc) visit tutorial
- Averages- Percentages- Partnership
- Menstruation- Allegation & Mixtures- Work- Pipes and Cisterns visit tutorial
- Simple Interest & Compound Interest
- Set Theory- Venn diagram Ratios and Proportion- Ratios- Percentages- In-equations visit tutorial
- Installment Payments- Partnership- Clocks
- Probability- Permutations & Combination visit tutorial

- Quadratic and linear equations visit tutorial
- Algebra
- Profit & Loss

Reasoning:

- Critical reasoning- Visual reasoning- Assumption-Premise-Conclusion- Assertion and reasons- Statements and assumptions- identifying valid inferences - identifying Strong arguments and Weak arguments
- Statements and conclusions- Cause and Effect- Identifying Probably true- Probably false- definitely true- definitely false kind of statement- Linear arrangements- Matrix arrangements.
- Graphs can be Column graphs- Bar Graphs-gram- etc.
- Symbol Based problems- Coding and decoding- Sequencing - identifying next number in series- Puzzles- Syllogisms- Functions- Family tree - identifying relationship among group of people and etc.

English:

- Comprehension of passage
- Fill In the Blanks - Jumbled paragraphs with 4 or 5 sentences- Jumbled paragraphs (6 sentences with first and last fixed), Contextual usage- Analogies- Antonyms- etc...
- Sentence Correction- Foreign language words used in English- Sentence completion- odd man out- idioms- one word substitution- Different usage of same word etc.

BOOKS FOR REFERENCES:

1. R.S.Aggarwal , Quantitative Aptitude, S.Chand Publishing 2010.
2. P.K Aggarwal, Hand Book of Reasoning Quantitative Aptitude,S. Chand Publishing, 2009.

SEMESTER – IV
PERSONALITY ENRICHMENT

PAPER NO – XXXII **COURSE CODE: MCA15/4S5/PET**

Teaching Hours: 15 x 2 = 30 Hrs **Credits : 2**

L T P : 0 2 0

OBJECTIVES:

- To make students understand the concept and components of personality, thereby to apply the acquired knowledge to themselves and to march towards excellence in their respective academic careers.
- To enable students to keep themselves abreast of general knowledge and current information.
- To bring out creativity and other latent talents with proper goal setting so that self-esteem gets enhanced

COURSE OUTLINE:

UNIT I : Introduction: Definition of Personality, Determinants of Personality-biological, psychological and socio- cultural factors, Misconceptions and clarifications ,Need for personality development

UNIT II : Self-Awareness and Self Motivation:Self analysis through SWOT and Johari window , Elements of motivation, Seven rules of motivation,Techniques and strategies for self motivation, Motivation checklist and Goal setting based on principle of SMART, Self motivation and life, Importance of self-esteem and enhancementof self-esteem.

UNIT III : Memory and study skills: Definition and importance of memory, Causes of Forgetting , How to forget (thought stopping), how to remember (techniques for Improving memory) The technique of passing exams-management of examination fear.

UNIT IV : Power of positive thinking : Nurturing creativity, decision-making and problem solving. Thinking power- seven steps for dealing with doubt ,Traits of positive thinkers and high achievers , Goals and techniques for positive thinking , Enhancement of concentration through positive thinking ,Practicing a positive life style.

UNIT V : General knowledge and current affairs, Regional, national and international events, Geographical, political and historical facts, Information on sports and other recreational activities, Basic knowledge With regard to health and health promotion

BOOKS FOR REFERENCES:

1. Mile, D.J (2004). Power of positive thinking. Delhi: Rohan Book Company.
2. Pravesh Kumar (2005). All about self- Motivation. New Delhi: Goodwill Publishing House.
3. Dudley, G.A. (2004). Double your learning power. Delhi: Konark Press. Thomas Publishing Group Ltd.
4. Lorayne, H. (2004). How to develop a super power memory. Delhi: Konark Press. Thomas Publishing Group Ltd.

SEMESTER – V
TECHNICAL SEMINAR AND REPORT WRITING

PAPER NO – XLII **COURSECODE: MCA15/5S6/TSR**

Credits : 2

L T P : 0 2 0

OBJECTIVE:

- To provide a brief outline about any one field in information technology.
- To elaborate literature survey of the domain opted.
- To reveal and apply any technique to obtained the desired output.
- To present the paper in the review and write a technical paper.

The goal of this course is to train the students to critically evaluate a well-defined set of research subjects and to recapitulate the conclusion concisely in a paper of scientific quality. The paper will be evaluated based on the ability to understand a topic, communicate it and identify the issues. Results and Evaluation from this term paper will be presented to fellow students and a committee of faculty members of the department.

1. Every student selects a topic related to current trends and the same should be approved by the respective committee. This selection should have at least 5 distinct prime sources.
2. Every student must write a short analysis of the topic and present it to fellow Students and faculty (discuss the topic – expose the flaws – scrutinize the issues) Every week.
3. The faculty should assess the short review and award marks with respect to the following:
    a. Has the student analyzed – not merely quoted – the most significant portions of the major sources employed?
    b. Has the Š;ìš • Òø(äß-‰s□°)Ì[ì†□ës$’V<g

89X?K~?□ý“Vy°::Œ□
Þ*ºc®t0‹ÑMÇ5_UËÒ•~Â¸tWV • Ruöv{²àÁ89M • X±pÐ
————————————öÁ½-ªÍ¸Ýq

¼}Ìý6;,b,ñ®]ÊôÎ.»=——————————————©µªîHZq´5Dæ□!□©"È[Äƒ(«¶-
9kÞ_»“öëR&,;O□»Å»Æûš□ £-ú'q
±¼ZE±p±‰©nKß·ó¡šÚ!ý¾cW6Ýë©GdýÆ†4ÎøÔ‡90Ò„YŒÂ-
Â«®²ö…-"Z:&JÐ£¼ÏÒ‰°□>¿-9

Òã&tÙ¤uþÏö§éía‘S_èŒ‹‹

ÇKï©P-};□_LG’ J±8Ä-Ðë¹AcîÜÅO}□xîÑ□kn¼Ad□‡¤ø¦éPhÉ¥ñÙ¶1å
u0>»à¡Œq¥øîÅ?PÛúíºá-
«b³¾gx3|ÏÔæ

---

z§5°–“û"
y«·9)

G“½²œÉ□2†›šk
ikñ‘Ø,h9Üš½ú ®)óR½□□*%¹Ž @-
NX…£□ÿ“¥□…S□ÅÜê«³âtrÝçp2µñ¼©$cBHŠkÑ¶¥Ÿ□ÔPV‡W`

:ðtqã *ƒ* ZŒ • 6³íX[\í*<§93ýºUo>¡□È½Œ#ýÌ□Àµ

!‘Jam to defend themselves.

COURSE OUTCOMES:

1. Obtain a thorough knowledge about a particular domain.
2. Initiate the research process.
3. Expertise in the field.
4. Able to recognize the issues of any particular field.

TOPICS:

1. Information Security 2. Digital Image Processing 3. Computer Networks
4. Cloud Computing 5. Cryptography and Network Security‘