# Course Plan

MCA

2023-25

Semester 3

Department of Computer Science



Rajagiri College of Social Sciences
(Autonomous), Kalamassery,683104

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## PREFACE TO THE SEMESTER

The 3$^{rd}$ semester of the MCA 2-year programme focusses on advanced learning and placement activities. The semester emphasizes on advanced courses and preparing students to be industry ready. To foster and guide the students to the career of their interest, electives are offered in three streams viz. Programming, Security and Analytics. To further assist them towards seizing placement opportunities a course on Employability and Skill development is continued in the semester.

## SCHEME OF THE SEMESTER FROM THE SYLLABUS

| Code | Course Name | Type | Hours | | | Exam | CAE | ESE | Credit |
|---|---|---|---|---|---|---|---|---|---|
| | | | Lecture | Tutorial | Practical | (hours) | Marks | Marks | Total |
| MCA301 | Business Management and Financial Accounting | Core | 3 | 1 | 0 | 3 | 25 | 75 | 3 |
| MCA302 | Theory of Computation and Compilers | Core | 3 | 1 | 0 | 3 | 25 | 75 | 3 |
| MCA303 | Data Mining | Core | 3 | 1 | 0 | 3 | 25 | 75 | 3 |
| MCA304 | Information Security | Core | 3 | 1 | 0 | 3 | 25 | 75 | 3 |
| MCA3XX | Elective-I | Core | 3 | 1 | 0 | 3 | 25 | 75 | 4 |
| MCA306 | Data Analytics using Python | Lab | | | 6 | 3 | 25 | 75 | 3 |
| MCA307 | Android | Lab | | | 4 | 3 | 25 | 75 | 2 |
| MCA308 | Employability and Skill development -2 | Lab | 2 | | 2 | 2 | 50 | | 2 |
| | **Total marks** | | **750** | | | **Total Credits** | | | **23** |

# COURSE ALLOCATION- FACULTY LIST

MCA301Business Management and Financial Accounting – Dr. Bharathi Rajan

MCA302Theory of Computation and Compilers - Dr. Ann Baby

MCA303 Data Mining - Dr. Shoby Sunny

MCA304 Information Security - Dr. Keerthy A S

MCA322 Microsoft .NET Framework Using C# - Ms. Ann Rija

MCA332 Web and Database security – Ms. Neethu Narayanan

MCA306 Data Analytics using Python – Mr. Diljith K Benny

MCA307 Android – Ms. Sunu Fathima

MCA308 Employability and Skill Development-2 Mr. Diljith K Benny

## TIMETABLE

| | | | | | |
|---|---|---|---|---|---|
| **MCA SEMESTER - 3** | | | | | |
| Tutor: Dr. Keerthy A S | | | | | |
| | **9.00-09.55** | **10.00-10.50** | **11.10 – 12.00** | **12.05-1.00** | **2.00pm – 4.00pm** |
| **MONDAY** | IS(K) | IS(K) | DM(Shoby) | DM(Shoby) | DAUP(DKB) |
| **TUESDAY** | Android (SF) | Android (SF) | .NET(Rija) / WDBS (N) | .NET(Rija) / WDBS (N) | CSTAR [02.00pm] |
| **WEDNESDAY** | TCC (AB) | TCC (AB) | BMFA (BR) | BMFA (C1) | DAUP(DKB) |
| **THURSDAY** | WDBS(N) /.NET(Rija) | WDBS(N) / .NET(Rija) | IS(K) | IS(K) | Android (SF) |
| **FRIDAY** | DM(Shoby) | DM(Shoby) | TCC (AB) | TCC (AB) | BMFA (BR) |
| **SATURDAY** | ESD-2 / PT | ESD-2 / PT | ESD-2 / PT | ESD-2 / PT | |

ACADEMIC CALENDAR FOR THE SEMESTER INCLUDING THE INTERNAL COMPONENT SUBMISSION DATES.

| Month/Year | Date | Day | General | MCA 2023-2025 |
|---|---|---|---|---|
| May-24 | 27-05-2024 | Monday | | Semester 3 Commence Placement Sessions |
| | 28-05-2024 | Tuesday | | |
| | 29-05-2024 | Wednesday | | |
| | 30-05-2024 | Thursday | | |
| | 31-05-2024 | Friday | | |
| Jun-24 | 01-06-2024 | Saturday | | |
| | 02-06-2024 | Sunday | | |
| | 03-06-2024 | Monday | | D1 |
| | 04-06-2024 | Tuesday | | D2 |
| | 05-06-2024 | Wednesday | | D3 |
| | 06-06-2024 | Thursday | | D4 |
| | 07-06-2024 | Friday | | D5 |
| | 08-06-2024 | Saturday | | |
| | 09-06-2024 | Sunday | | |
| | 10-06-2024 | Monday | Component 1 301 | D6 |
| | 11-06-2024 | Tuesday | | D7 |
| | 12-06-2024 | Wednesday | | D8 |
| | 13-06-2024 | Thursday | | D9 |
| | 14-06-2024 | Friday | | D10 |
| | 15-06-2024 | Saturday | | D11 |
| | 16-06-2024 | Sunday | | |
| | 17-06-2024 | Monday | Bakrid | |
| | 18-06-2024 | Tuesday | Component 1 302 | D12 |
| | 19-06-2024 | Wednesday | | D13 |
| | 20-06-2024 | Thursday | | D14 |
| | 21-06-2024 | Friday | | D15 |
| | 22-06-2024 | Saturday | | D16 |
| | 23-06-2024 | Sunday | | |
| | 24-06-2024 | Monday | Component 1 303 | D17 |
| | 25-06-2024 | Tuesday | | D18 |
| | 26-06-2024 | Wednesday | | D19 |
| | 27-06-2024 | Thursday | | D20 |
| | 28-06-2024 | Friday | | D21 |
| | 29-06-2024 | Saturday | | D22 |
| | 30-06-2024 | Sunday | | |
| Jul-24 | 01-07-2024 | Monday | Component 1 304 | D23 |
| | 02-07-2024 | Tuesday | | D24 |
| | 03-07-2024 | Wednesday | St. Thomas Day | |
| | 04-07-2024 | Thursday | | D25 |
| | 05-07-2024 | Friday | | D26 |

| | 06-07-2024 | Saturday | | D27 |
|---|---|---|---|---|
| | 07-07-2024 | Sunday | | |
| | 08-07-2024 | Monday | Component 1 305 | D28 |
| | 09-07-2024 | Tuesday | | D29 |
| | 10-07-2024 | Wednesday | | D30 |
| | 11-07-2024 | Thursday | | D31 CAE#1 |
| | 12-07-2024 | Friday | | D32 CAE#1 |
| | 13-07-2024 | Saturday | | |
| | 14-07-2024 | Sunday | | |
| | 15-07-2024 | Monday | | |
| | 16-07-2024 | Tuesday | Muharam | |
| | 17-07-2024 | Wednesday | | D33CAE#1 |
| | 18-07-2024 | Thursday | | D34CAE#1 |
| | 19-07-2024 | Friday | | D35CAE#1 |
| | 20-07-2024 | Saturday | | D36 |
| | 21-07-2024 | Sunday | | |
| | 22-07-2024 | Monday | | D37 |
| | 23-07-2024 | Tuesday | | D38 |
| | 24-07-2024 | Wednesday | | D39 |
| | 25-07-2024 | Thursday | | D40 |
| | 26-07-2024 | Friday | Component 2 301 | D41 |
| | 27-07-2024 | Saturday | | D42 |
| | 28-07-2024 | Sunday | | |
| | 29-07-2024 | Monday | | D43 |
| | 30-07-2024 | Tuesday | | D44 |
| | 31-07-2024 | Wednesday | | D45 |
| | 01-08-2024 | Thursday | | D46 |
| | 02-08-2024 | Friday | Component 2 302 | D47 |
| | 03-08-2024 | Saturday | Karkidaka Vaavu | |
| | 04-08-2024 | Sunday | | |
| | 05-08-2024 | Monday | | D48 |
| | 06-08-2024 | Tuesday | | D49 |
| | 07-08-2024 | Wednesday | | D50 |
| | 08-08-2024 | Thursday | | D51 |
| | 09-08-2024 | Friday | Component 2 303 | D52 |
| Aug-24 | 10-08-2024 | Saturday | | |
| | 11-08-2024 | Sunday | | |
| | 12-08-2024 | Monday | | D53 |
| | 13-08-2024 | Tuesday | | D54 |
| | 14-08-2024 | Wednesday | | D55 |
| | 15-08-2024 | Thursday | Independence Day | |
| | 16-08-2024 | Friday | Component 2 304 | D56 |
| | 17-08-2024 | Saturday | | D57 |
| | 18-08-2024 | Sunday | | |
| | 19-08-2024 | Monday | | D58 |

| | 20-08-2024 | Tuesday | Sree Narayana Guru Jayanti | |
|---|---|---|---|---|
| | 21-08-2024 | Wednesday | | D59 |
| | 22-08-2024 | Thursday | | D60 |
| | 23-08-2024 | Friday | Component 2 305 | D61 |
| | 24-08-2024 | Saturday | | D62 |
| | 25-08-2024 | Sunday | | |
| | 26-08-2024 | Monday | Sree Krishna Jayanti | |
| | 27-08-2024 | Tuesday | | D63CAE#2 |
| | 28-08-2024 | Wednesday | | D64 CAE#2 |
| | 29-08-2024 | Thursday | | D65 CAE#2 |
| | 30-08-2024 | Friday | | D66 CAE#2 |
| | 31-08-2024 | Saturday | | D67 CAE#2 |
| Sep-24 | 01-09-2024 | Sunday | | |
| | 02-09-2024 | Monday | | D68 |
| | 03-09-2024 | Tuesday | | D69 |
| | 04-09-2024 | Wednesday | | D70 |
| | 05-09-2024 | Thursday | | D71 |
| | 06-09-2024 | Friday | | D72 |
| | 07-09-2024 | Saturday | CIA - 308 | D73 |
| | 08-09-2024 | Sunday | | |
| | 09-09-2024 | Monday | | D74 |
| | 10-09-2024 | Tuesday | | D75 |
| | 11-09-2024 | Wednesday | | D76 |
| | 12-09-2024 | Thursday | | D77 |
| | 13-09-2024 | Friday | | D78 |
| | 14-09-2024 | Saturday | Onam Holidays | |
| | 15-09-2024 | Sunday | | |
| | 16-09-2024 | Monday | | |
| | 17-09-2024 | Tuesday | | |
| | 18-09-2024 | Wednesday | | |
| | 19-09-2024 | Thursday | | |
| | 20-09-2024 | Friday | | |
| | 21-09-2024 | Saturday | | |
| | 22-09-2024 | Sunday | | |
| | 23-09-2024 | Monday | | D79 |
| | 24-09-2024 | Tuesday | | D80 CAEP |
| | 25-09-2024 | Wednesday | | D81 CAEP |
| | 26-09-2024 | Thursday | | D82 |
| | 27-09-2024 | Friday | | D83 |
| | 28-09-2024 | Saturday | | |
| | 29-09-2024 | Sunday | | |
| | 30-09-2024 | Monday | | |
| Oct-24 | 01-10-2024 | Tuesday | | |
| | 02-10-2024 | Wednesday | Gandhi Jayanti | |

| Date | Day | | |
|------|-----|---|---|
| 03-10-2024 | Thursday | | |
| 04-10-2024 | Friday | | ESE-1 |
| 05-10-2024 | Saturday | | |
| 06-10-2024 | Sunday | | |
| 07-10-2024 | Monday | | ESE-2 |
| 08-10-2024 | Tuesday | | |
| 09-10-2024 | Wednesday | | ESE-3 |
| 10-10-2024 | Thursday | Pooja Holidays | |
| 11-10-2024 | Friday | | |
| 12-10-2024 | Saturday | | |
| 13-10-2024 | Sunday | | |
| 14-10-2024 | Monday | | |
| 15-10-2024 | Tuesday | | |
| 16-10-2024 | Wednesday | | ESE-4 |
| 17-10-2024 | Thursday | | |
| 18-10-2024 | Friday | | ESE-5 |
| 19-10-2024 | Saturday | | |
| 20-10-2024 | Sunday | | |
| 21-10-2024 | Monday | | |
| 22-10-2024 | Tuesday | | |
| 23-10-2024 | Wednesday | | ESE-Lab |
| 24-10-2024 | Thursday | | ESE-Lab |
| 25-10-2024 | Friday | | ESE-Lab |
| 26-10-2024 | Saturday | | ESE-Lab |
| 27-10-2024 | Sunday | | |
| 28-10-2024 | Monday | | |
| 29-10-2024 | Tuesday | | |
| 30-10-2024 | Wednesday | | |
| 31-10-2024 | Thursday | Deepavali | |

## LIST OF STUDENTS ENROLLED

| Sl No | Candidate Full Name | Sl No | Candidate Full Name |
|---|---|---|---|
| 1 | ABEY THOMSON KOZHIPPAT | 32 | MEGHA P VARGHESE |
| 2 | ABHIJITH SURESH | 33 | MERIN JAI |
| 3 | ABHINAV M S | 34 | MERRIN MARIYA JAISON |
| 4 | ADITHYA K L | 35 | MINU ROSE VAZHAPPILLY |
| 5 | ALBIN JOSEPH | 36 | MUHAMMAD ANSHAD P A |
| 6 | ALFIA A H | 37 | MUHAMMED NIHAL |
| 7 | ANJALEENA SARAH K R | 38 | NDIKUMANA MUGARA STEVEN |
| 8 | ANNIE SUSAN JENNINGS | 39 | NEEMA VARGHESE |
| 9 | ANTONY JEES T J | 40 | NINTU VARUGHESE |
| 10 | ARYAMOL U | 41 | NIVYA VARGHESE |
| 11 | ASHNA MARIA | 42 | P V ANJALI |
| 12 | ASWIN K S | 43 | P V VISHNU PRASAD |
| 13 | BHAGYA BIJOY | 44 | PAUL SHARON SIMENTHY |
| 14 | DEEPAK K V | 45 | R NANDAKISHORE |
| 15 | DEVANA ROSE EMMANUEL | 46 | REVATHI J |
| 16 | DHAIVATH LAL | 47 | RIDHA ANSAR |
| 17 | DHILNA M. D | 48 | SAALIM T S |
| 18 | DILSHA C P | 49 | SAM V S |
| 19 | GRACEN K SHAJI | 50 | SANJAY BENOY |
| 20 | HANOCK P MANI | 51 | SARATH CHANDRAN M |
| 21 | HARIPRIYA S NAIR | 52 | SARATH PRASAD TS |
| 22 | HELAN MARIYA M B | 53 | SHARISSA MARIAN HURTIS |
| 23 | HRISHIKESH U | 54 | SHELVIN SUNIL PHILIP |
| 24 | JIBIN SABU JOHN | 55 | SILPA CHANDRIKA ANIL |
| 25 | JOYCE MATHEWS | 56 | SIVANAND M PRABHU |
| 26 | KAVYA NAIR | 57 | SNEHA CHANDRIKA ANIL |
| 27 | KHADEEJA BEEVI C N | 58 | SREEKESH K PRABHU |
| 28 | KWIZERA MUGARA GENTIL | 59 | SREEKUMAR M S |
| 29 | LEO THOMAS | 60 | SUDHA CHANDRIKA ANIL |
| 30 | MAJO AUGUSTINE | 61 | URMILA CHAUDHARY |
| 31 | MANU SANKAR U | 62 | VARGHESE P ROY |

| Tool/Grade/Mark | 100% | 80% | 50% | 30% | 10% |
|---|---|---|---|---|---|
| Assignment | Completes the work with ample references/ illustrations to the concepts asked in the assignment | Completes the work with minor mistakes; higher levels of thinking not reflected in the work. | Completes the work with mistakes and/or Document ation is not neat. | Incomplete work with mistakes. | Not attempted |
| CAE1 & CAE2 | Correctly answer the conceptual questions which are not straight forward, may be combining different concepts of statistical measures and analysis | Answer direct questions perfectly. | Attempts direct questions and answers partially. | Attempts questions. Concepts not clear | Cannot answer any question. |
| Quiz | 100% correct answers | 80% Correct answers | 50% correct answers | Below 30% correct answers | Not attempted |
| Lab Performance | Program coded as per the requirements in the question with Correct output. | Program has no syntax errors but is incomplete with partial output. | Code has logical/syn tax errors. Partial output. | Unclear about the concept and implementation | Not attempted |
| Lab Record | Completed on time. Programs and output without mistakes. | On-time completion . Programs and output without mistakes. | On-time completio n. Minor mistakes in the document | Records not submitted on time. Incomplete and improper record work. | Not Submitted |

| | | | | | |
|---|---|---|---|---|---|
| | Record work is neat. | Neatness of record not up to the mark. | ation. Record work is not neat. | | |
| Project | Completed on time with specified requirements. | On-time completion without all the specified requirements or minor mistakes. | Partially completed | Partially completed with mistakes | Not submitted |
| CAEP and Viva | Programs and output without mistakes. Answers all questions correctly. | Program has no syntax errors but is incomplete with partial output. Answers questions but not completely correct. | Code has logical/syntax errors. Partial output. Answers questions but only has vague knowledge about the concept | Unclear about the concept and implementation Does not answer the viva questions. Unclear about the concepts asked. | Not attended |

# COURSE #1

GENERAL DETAILS OF THE COURSE

| Course Code | MCA301 |
|---|---|
| Course Name | Business Management and Financial Accounting |
| Course Type | Core |
| Credit | 3 |
| Semester | 3 |
| Course Objectives | 1. To understand the concept of management and role of a manger and the operations involved in a business environment<br><br>2. To understand the practical application of the functions of management in an organization<br><br>3. To help the students to develop cognizance of the importance of accounting in<br><br>organization financial statements<br><br>4. To enable students to synthesize accounts-related information and evaluate options for most logical and optimal solutions<br><br>5. To enable students to understand and analyse the final accounts and reports |
| Pre-requisites | Basic understanding on Business functions and Accounting |

| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
|---|---|---|---|
| | 3 | 1 | |

## COURSE OUTCOMES (CO)

| CO# | CO Description | Learning Domain* | Mapped PO/PSO |
|---|---|---|---|
| CO#1 | To understand the basic principle of Management | U | PO6, PO7, PO8, PO9, PO11 |
| CO#2 | To comprehend how to organize, direct and control the various aspects of Business | U | PO6, PO7, PO8, PO9, PO11 |
| CO#3 | To understand the underlying terminologies in Accounting | U | PO8, PO11 |
| CO#4 | To know and process the trial Balance in accounting | A | PO8, PO11 |
| CO#5 | To understand the how to process the final accounts and report | An | PO8, PO11 |

* Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

## CO-PSO-PO MAPPING MATRIX

| CO/ PSO | PO #1 | PO# 2 | PO# 3 | PO# 4 | PO# 5 | PO# 6 | PO# 7 | PO# 8 | PO# 9 | PO# 10 | PO# 11 | PO# 12 | PSO #1 | PSO #2 | PSO #3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO#1 | | | | | | 3 | 3 | 3 | 3 | | 3 | | | | |
| CO#2 | | | | | | 3 | 3 | 3 | 3 | | 3 | | | | |
| CO#3 | | | | | | | | 3 | | | | 2 | | | |
| CO#4 | | | | | | | | 3 | | | | 2 | | | |
| CO#5 | | | | | | | | 3 | | | | 2 | | | |

COURSE CONTENT

| Module No | | Module Content | Hours Required |
|---|---|---|---|
| 1 | 1.1 | Introduction to management Principles Definition, Management, Role of managers , Organization and the environmental factors | 10 |
| | 1.2 | Trends and Challenges of Management in Global Scenario | |
| | 1.3 | PLANNING Nature and purpose of planning , Planning process, Types of plans, Objectives | |
| | 1.4 | Managing by objective (MBO) Strategies - Types of strategies - Policies | |
| | 1.5 | Decision Making - Types of decision - Decision Making Process - Rational Decision Making | |
| 2 | 2.1 | Organizing, Directing and Controlling Business Nature and purpose of organizing - Organization structure - Formal and informal groups organization - Line and Staff authority | 5 |
| | 2.2 | Departmentation - Span of control - Centralization and Decentralization - Delegation of authority | |
| | 2.3 | Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - - Performance Appraisal. Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective communication | |
| | 2.4 | Organization Culture - Elements and types of culture - Managing cultural diversity. Process of controlling - Types of control - Budgetary and non-budgetary control. | |
| 3 | 3.1 | Introduction to Accounting Meaning and definition of Accounting, Systems of bookkeeping, Objectives of accounting, Users of accounting information, Basic terminologies | 10 |
| | 3.2 | Accounting Principles- Accounting Concepts and Conventions, Accounting Standards, Accounting process | |
| | 3.3 | Double Entry System-Journal | |
| | 3.4 | Ledger, Trial balance | |
| 4 | 4.1 | Sub division of Journal- Cash Book, Purchase Book | |

| | 4.2 | Sales Book, Purchase Returns Book | |
|---|---|---|---|
| | 4.3 | Sales Returns Book, Journal Proper | 10 |
| | 4.4 | Bank Reconciliation Statement | |
| 5 | 5.1 | Final Account : Preparation of Trading account | |
| | 5.2 | Profit and Loss | 10 |
| | 5.3 | Balance Sheet preparation (with adjustments) | |

REFERENCES (Text books/ Researches/ Online URLs)

| |
|---|
| **MANAGEMENT: Essentials of Management, by Harold Koontz** |
| **Fundamentals of Management** , *David A. DeCenzo, Mary K Coulter, and Stephen P. Robbins* |
| *Management Principles and Practice, Gupta CB , Sultan Chand* |
| **Introduction To Accountancy : T.S. Grewal and S.C. Gupta** |
| **Principles and Practice of Accounting** *By Tushar Tulsian & CA Bharat Tulsian CA & Dr. P C Tulsian* |
| **Financial Accounting**: *S. N. Maheshwari, Suneel K Maheshwari* |
| **Accounting Basics: The Simple Guide for Beginners**, *Andrew P.C.* |
| **Principles of Management**, *L M Prasad, Sultan Chand Publications* |

Instruments to evaluate the CO

| Evaluated CO | Tool | Date of Evaluation |
|---|---|---|
| CO#1 | CAE#1 | |
| CO#2 | CAE#1 | |
| CO#3 | CAE#2 | |
| CO#4 | CAE#2 | |
| CO#5 | Quiz | |

DETAILED SESSION PLAN

Note:

(1) Specify the span of the session as 1 hour/ 2 hour
(2) For a 3-credit paper, session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session#/ 3hr | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | Introduction to management Principles Definition, Management, Role of managers, Organization and the environmental factors | Lecture, Group discussion and Case study (ppt) | CO1 | |
| | Trends and Challenges of Management in Global Scenario | " | CO1 | |
| 2 | PLANNING Nature and purpose of planning, Planning process, Types of plans, Objectives | Lecture, Group discussion and Case study (ppt) | CO1 | |
| | Managing by objective (MBO) Strategies - Types of strategies - Policies | " | CO1 | |
| | Decision Making - Types of decision - Decision Making Process - Rational Decision Making | " | CO1 | |
| 3 | Organizing, Directing and Controlling Business Nature and purpose of organizing - Organization structure - Formal and informal groups organization - Line and Staff authority | Lecture, Group discussion and Case study (ppt) | CO2 | |

| | | | | |
|---|---|---|---|---|
| | | | | |
| 4 | Departmentation - Span of control - Centralization and Decentralization - Delegation of authority | Lecture, Group discussion and Case study (ppt) | CO2 | |
| 5 | Staffing - Selection and Recruitment - Orientation - Career Development - Career stages – Training - - Performance Appraisal. Creativity and Innovation - Motivation and Satisfaction - Motivation Theories - Leadership Styles - Leadership theories - Communication - Barriers to effective communication | Lecture, Group discussion and Mock recruitment (ppt) | CO2 | |
| | Organization Culture - Elements and types of culture - Managing cultural diversity. Process of controlling - Types of control - Budgetary and non-budgetary control. | '' | CO2 | |
| 6 | Introduction to Accounting Meaning and definition of Accounting, Systems of bookkeeping, Objectives of accounting, Users of accounting information, Basic terminologies | Lecture, Practice problem questions (ppt) | CO3 | |
| 7 | Accounting Principles- Accounting Concepts and Conventions, Accounting Standards, Accounting process | Lecture, Practice problem questions (ppt) | CO3 | |
| 8 | Double Entry System-Journal | '' | CO3 | |

| | | | | |
|---|---|---|---|---|
| | Ledger, Trial balance | " | CO3 | |
| 9 | Sub division of Journal- Cash Book, Purchase Book | Lecture, Practice problem questions (ppt) | CO4 | |
| 10 | Sales Book, Purchase Returns Book | " | CO4 | |
| | Sales Returns Book, Journal Proper | " | CO4 | |
| 11 | Bank Reconciliation Statement | Lecture, Practice problem questions (ppt) | CO4 | |
| 12 | Final Account: Preparation of Trading account | " | CO5 | |
| 13 | Profit and Loss | " | CO5 | |
| 1 4 | Balance Sheet preparation (with adjustments) | Lecture, Practice problem questions (ppt) | CO5 | |
| 15 | Quiz | | CO5 | |

## Course #2

| Course Code | MCA302 | | |
|---|---|---|---|
| Course Name | Theory of Computation and Compilers | | |
| Course Type | Core | | |
| Credit | 3 | | |
| Semester | 3 | | |
| Course Objectives | 1. To understand the basic mathematical model of computation<br>2. To assess the working of a compiler. | | |
| Pre-requisites | Knowledge in Programming languages | | |
| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
| | 3 | 1 | |

## Course Outcomes (CO)

| CO# | CO Description | Learning Domain* | Mapped PSO |
|---|---|---|---|
| CO#1 | Demonstrate knowledge of basic mathematical models of computation and describe how they relate to formal languages. | S | PO1, PO7, PO11, PO12, PSO2 |
| CO#2 | Understanding the concept of pushdown automata and context free grammar. | U | PO2, PO7, PO11, PO12, PSO2 |
| CO#3 | Understand the phases of a compiler. | U | PO1, PO2, PO7, PO11, PO12, PSO2 |
| CO#4 | Analyse various parsing techniques. | An | PO2, PO7, PO11, PO12, PSO2 |
| CO#5 | To apply the design and implementation of parsers. | A | PO2, PO7, PO11, PO12, PSO2 |

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

## CO-PSO-PO Mapping Matrix

| CO/PSO | PO#1 | PO#2 | PO#3 | PO#4 | PO#5 | PO#6 | PO#7 | PO#8 | PO#9 | PO#10 | PO#11 | PO#12 | PSO#1 | PSO#2 | PSO#3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO#1 | 3 | | | | | | 1 | | | | 2 | 2 | | 2 | |
| CO#2 | | 3 | | | | | 1 | | | | 2 | 2 | | 2 | |
| CO#3 | 3 | 2 | | | | | 1 | | | | 2 | 2 | | 2 | |
| CO#4 | | 3 | | | | | 1 | | | | 2 | 2 | | 2 | |
| CO#5 | | 2 | | | | | 1 | | | | 2 | 2 | | 2 | |

COURSE CONTENT

| Module No | | Module Content | Hours Required |
|---|---|---|---|
| 1 | 1.1 | Formal Language, Non-Computational Problems, Diagonal Argument, Russels's Paradox | 9 |
| | 1.2 | Deterministic Finite Automaton (DFA), Non-Deterministic Finite Automaton (NDFA), Equivalence of DFA and NDFA | |
| | 1.3 | Regular Languages, Regular Grammars, Regular Expressions | |
| | 1.4 | Properties of Regular Language, Pumping Lemma, Non Regular Languages. | |
| 2 | 2.1 | Pushdown Automaton (PDA), Non-Deterministic Pushdown Automaton (NPDA) | 9 |
| | 2.2 | Context Free Grammar, Chomsky Normal Form, Greibach Normal Form | |
| | 2.3 | Ambiguity, Parse Tree Representation of Derivation Trees | |
| | 2.4 | Equivalence of PDA's and Context Free Grammars; Properties of Context Free Language. | |
| 3 | 3.1 | Introduction to compiling, Compilers | 9 |
| | 3.2 | Analysis of a source program, the phases of a compiler | |
| | 3.3 | Lexical analysis:-The role of the lexical analyser, Input buffering, specification of tokens | |
| | 3.4 | Recognition of tokens. | |
| 4 | 4.1 | Syntax analysis: - the role of the parser, Top down parsing, Bottom up parsing | 9 |
| | 4.2 | Syntax directed translation, syntax directed definition, Construction of Syntax Tree | |
| | 4.3 | LL parsers, Operator precedence grammar | |
| | 4.4 | LR(0) , SLR parser, LALR(1) parser. | |
| 5 | 5.1 | Intermediate code generation-postfix notation, syntax tree | 9 |
| | 5.2 | three-address code, basic blocks and flow graph, Back patching | |

| | | |
|---|---|---|
| 5.3 | Code optimization: - The principal sources of optimization, optimization of basic blocks, loops in flow graphs | 25 |
| 5.4 | Peephole optimization Code Generations: - Issues in the design of a code generator | |

## References (Text books/ Researches/ Online URLs)

| |
|---|
| Peter Linz, An Introduction to Formal Languages and Automata, Third Edition, Jones and Bartlett, 2001. |
| Introduction to Automata Theory, Languages, and Computation By John E. Hopcroft, Rajeev Motwani and Jeffrry D Ullman. |
| Compilers Principles, Techniques and Tools- Alfred V Aho, Ravi Sethi, Jeffrry D Ullman |
| Steven S Muchnik, "Advanced Compiler Design and Implementation" |

## Instruments to evaluate the CO

| Evaluated CO | Tool | Date of Evaluation |
|---|---|---|
| CO#1 | CAE#1 | |
| CO#2 | CAE#1 | |
| CO#3 | CAE#2 | |
| CO#4 | CAE#2 | |
| CO#5 | Quiz | |

DETAILED SESSION PLAN

Note:

(1) Specify the span of the session as 1 hour/ 2 hour
(2) For a 3-credit paper, session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session# 2hr/session | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | Formal Language, Non-Computational Problems, | Theory | CO1 | |
| 2 | Diagonal Argument, Russels's Paradox | Theory | CO1 | |
| 3 | Deterministic Finite Automaton (DFA), Non-Deterministic Finite Automaton (NDFA) | Theory | CO1 | |
| 4 | Equivalence of DFA and NDFA | Theory | CO1 | |
| 5 | Regular Languages, Regular Grammars, Regular Expressions, Properties of Regular Language, | Theory | CO1 | |
| 6 | Pumping Lemma, Non Regular Languages. | Theory | CO1 | |
| 7 | Pushdown Automaton (PDA), Non-Deterministic Pushdown Automaton (NPDA) | Theory | CO2 | |

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 8 | Context Free Grammar, Chomsky Normal Form | Theory | CO2 | |
| 9 | Greibach Normal Form | Theory | CO2 | |
| 10 | Ambiguity, Parse Tree Representation of Derivation Trees | Theory | CO2 | |
| 11 | Equivalence of PDA's and Context Free Grammars; Properties of Context Free Language. | Theory | CO2 | |
| 12 | Introduction to compiling, Compilers, Analysis of a source program, the phases of a compiler | Theory | CO3 | |
| 13 | Lexical analysis:-The role of the lexical analyser | Theory | CO3 | |
| 14 | Input buffering, specification of tokens | Theory | CO3 | |
| 15 | Recognition of tokens. | Theory | CO3 | |
| 16 | Syntax analysis | Theory | CO4 | |
| 17 | the role of the parser | Theory | CO4 | |

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 18 | Top down parsing, | Theory | CO4 | |
| 19 | Bottom up parsing | Theory | CO4 | |
| 20 | syntax directed definition | Theory | CO4 | |
| 21 | Construction of Syntax Tree, LL parsers | Theory | CO4 | |
| 22 | Operator precedence grammar, LR(0) | Theory | CO4 | |
| 23 | SLR parser, LALR(1) parser. | Theory | CO4 | |
| 24 | Intermediate code generation-postfix notation | Theory | CO5 | |
| 25 | syntax tree | Theory | CO5 | |
| 26 | three-address code, basic blocks and flow graph | Theory | CO5 | |
| 27 | Back patching | Experiential Learning | CO5 | |

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 28 | Code optimization: - The principal sources of optimization, optimization of basic blocks, | Theory | CO5 | |
| 29 | loops in flow graphs | Theory | CO5 | |
| 30 | Peephole optimization Code Generations | Theory | CO5 | |
| 31 | Issues in the design of a code generator | Theory | CO5 | |

# COURSE #3

## GENERAL DETAILS OF THE COURSE

| Course Code | MCA 303 | | |
|---|---|---|---|
| Course Name | Data Mining | | |
| Course Type | Core | | |
| Credit | 3 | | |
| Semester | 3 | | |
| Course Objectives | 1. Acquire knowledge in Data mining and warehousing<br>2. Learn the different techniques for discovery of patterns hidden in large data sets and their Visualizations<br>3. Learn data mining tasks such as classification, estimation, prediction, affinity grouping and clustering. | | |
| Pre-requisites | MCA101, MCA 104 | | |
| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
| | 3 | 1 | |

## COURSE OUTCOMES (CO)

| CO# | CO Description | Learning Domain* | Mapped PSO |
|---|---|---|---|
| CO#1 | To introduce the students, the basic concepts and techniques of Data mining and Warehousing and data pre-processing | U | PO1, PO2, PO4, PSO1 |
| CO#2 | Understand association mining algorithms for discovery of frequent item patterns in large data sets and their Visualizations | An | PO1, PO2, PO4,PSO1 |
| CO#3 | Understand classification analysis algorithms for discovery and generation of rules in large data sets and their Visualizations | A, An | PO1, PO2, PO4,PSO1 |
| CO#4 | Understand basic and advanced clustering analysis algorithms and Visualizations in Data Mining | An | PO1, PO2, PO4,PSO1 |

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

## CO-PSO-PO Mapping Matrix

| CO/PSO | PO#1 | PO#2 | PO#3 | PO#4 | PO#5 | PO#6 | PO#7 | PO#8 | PO#9 | PO#10 | PO#11 | PO#12 | PSO#1 | PSO#2 | PSO#3 |
|--------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO#1 | 3 | 2 | | 1 | | | | | | | | | 2 | | |
| CO#2 | 1 | 1 | | 1 | | | | | | | | | 1 | | |
| CO#3 | 1 | 1 | | 1 | | | | | | | | | 1 | | |
| CO#4 | 1 | 1 | | 1 | | | | | | | | | 1 | | |

## Course Content

| Module No | | Module Content | Hours Required |
|-----------|-----|----------------|----------------|
| 1 | 1.1 | Data Warehousing, Multidimensional Data Model | 9 |
| | 1.2 | OLAP Operations, Introduction to KDD process, | |
| | 1.3 | Data mining, Data mining -On What kinds of Data, Data mining Functionalities, Classification of Data Mining Systems. | |
| | 1.4 | Data Pre-processing Data Cleaning, Data Integration and Transformation, Data Reduction, Data discretization and concept hierarchy generation | |
| 2 | 2.1 | Exploring Data and Visualization Techniques General Concepts, Techniques, Visualizing Higher Dimensional Data, Tools | 9 |
| | 2.2 | Association Analysis Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods | |
| | 2.3 | Apriori Algorithm, generating association Rules from Frequent Item sets, Improving the Efficiency of Apriori. | |
| | 2.4 | Mining Frequent item-sets without Candidate Generation, Evaluation of Association Patterns, Visualization. A Case Study on Association using Orange Tool | |
| 3 | 3.1 | Classification Introduction to Classification and Prediction, Classification by Decision Tree Induction: | |

| | | | |
|---|---|---|---|
| | 3.2 | Decision Tree induction, Attribute Selection Measures, Tree Pruning, Bayesian Classification: | |
| | 3.3 | Bayes' theorem, Naïve Bayesian Classification, Rule Based Algorithms: Using If - Then rules of Classification, Rule Extraction from a Decision Tree | 9 |
| | 3.4 | Rule Induction Using a Sequential Covering algorithm, K- Nearest Neighbour Classifiers, Support Vector Machine. Evaluating the performance of a Classifier, Methods for comparing classifiers, Visualization. A Case Study on Classification using Orange Tool | |
| 4 | 4.1 | Prediction Linear Regression, Nonlinear Regression, Other Regression-Based Methods | |
| | 4.2 | Cluster Analysis I: Basic Concepts and Algorithms Cluster Analysis, Requirements of Cluster Analysis' Types of Data in Cluster Analysis, Categorization of Major Clustering Methods | 9 |
| | 4.3 | Partitioning Methods: k-Means and k- Medoids, From K-Medoids to CLARANS | |
| | 4.4 | A Case Study on Clustering using Orange Tool | |
| 5 | 5.1 | Cluster Analysis II: Hierarchical Method: Agglomerative and Divisive Hierarchical Clustering | |
| | 5.2 | Comparison of data mining methods. | 9 |
| | 5.3 | Applicability of data mining methods for different scenarios Considerations for mining unstructured data | |
| | 5.4 | Case Study | |

References (Text books/ Researches/ Online URLs)

| |
|---|
| Pang-Ning Tan, Michael Steinbach, Vipin Kumar, 'Introduction to Data Mining' |
| Data Mining Concepts and Techniques – Jiawei Han and Micheline Kamber, Second Edition, Elsevier, 2006 |
| G. K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006. |
| Making sense of Data: A practical guide to exploratory Data Analysis and Data Mining-Glenn J Myatt |

## INSTRUMENTS TO EVALUATE THE CO

| Evaluated CO | Tool | Date of Evaluation |
|:---:|:---:|:---:|
| CO#1 | CAE#1 | |
| CO#2 | CAE#1 | |
| CO#3 | CAE#2 | |
| CO#4 | CAE#2, Quiz | |

DETAILED SESSION PLAN

Note:

(1) Specify the span of the session as 1 hour/ 2 hour
(2) For a 3-credit paper, a session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session# 2hrs/session | Topic | Model of Delivery/Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | Introduction Data Warehousing, Multidimensional Data Model, OLAP Operations | Lecture | CO1 | |
| 2 | Introduction to KDD process, Data mining, Data mining -On What kinds of Data | Lecture | CO1 | |
| 3 | Data mining Functionalities, Classification of Data Mining Systems<br><br>Data Pre-processing Data Cleaning, Data Integration and Transformation | Lecture /Hands on | CO1 | |
| 4 | Data Reduction, Data discretization and concept hierarchy generation | Lecture | CO1 | |
| 5 | Exploring Data and Visualization Techniques, General Concepts, Techniques<br><br>Demonstration | | CO2 | |

| | | | | |
|---|---|---|---|---|
| | Visualizing Higher Dimensional Data, Tools | | | |
| 6 | Association Analysis Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods: Apriori Algorithm | Lecture | CO2 | |
| 7 | Generating association Rules from Frequent Item sets, Improving the Efficiency of Apriori | Lecture | CO2 | |
| 8 | Mining Frequent item-sets without Candidate Generation | Lecture/ Demonstration | CO2 | |
| 9 | Evaluation of Association Patterns, Visualization. A Case Study on Association using Orange Tool | Lecture | CO2 | |
| 10 | Classification Introduction to Classification and Prediction, Classification by Decision Tree Induction | Lecture | CO3 | |
| 11 | Decision Tree induction, Attribute Selection Measures, Tree Pruning Bayesian Classification: Bayes' theorem, Naïve Bayesian Classification | Lecture | CO3 | |
| 12 | Rule Based Algorithms: Using If - Then rules of Classification | Lecture | CO3 | |

| 13 | Rule Extraction from a Decision Tree <br><br> Rule Induction Using a Sequential Covering algorithm | Lecture | CO4 | |
|---|---|---|---|---|
| 14 | K- Nearest Neighbour Classifiers <br><br> Support Vector Machine. Evaluating the performance of a Classifier | Lecture | CO4 | |
| 15 | Methods for comparing classifiers, Visualization. A Case Study on Classification using Orange Tool | Lecture/ Hands-on training | CO4 | |
| 16 | Prediction Linear Regression <br><br> Nonlinear Regression, Other Regression-Based Methods | Lecture | CO4 | |
| 17 | Cluster Analysis I: Basic Concepts and Algorithms Cluster Analysis | Lecture | CO4 | |
| 18 | Requirements of Cluster Analysis' Types of Data in Cluster Analysis | Lecture | CO4 | |
| 19 | Categorization of Major Clustering Methods <br><br> Partitioning Methods: k-Means and k- Medoids | Lecture | CO4 | |

| 20 | From K-Medoids to CLARANS A Case Study on Clustering using Orange Tool | Lecture/ Case Study | CO4 | |
|---|---|---|---|---|
| 21 | Comparison of data mining methods | Lecture | CO4 | |
| 22 | Applicability of data mining methods for different scenarios. Considerations for mining unstructured data | Lecture | CO4 | |
| 23 | Quiz | Moodle Quiz | CO4 | |

# Course #4

## General Details of the Course

| Course Code | MCA304 | | |
|---|---|---|---|
| Course Name | Information Security | | |
| Course Type | Core | | |
| Credit | 3 | | |
| Semester | 3 | | |
| Course Objectives | 1. To understand the fundamentals of Cryptography<br><br>2. To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.<br><br>3. To understand the various key distribution and management schemes. | | |
| Pre-requisites | MCA101, MCA104 | | |
| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
| | 3 | 1 | |

## Course Outcomes (CO)

| CO# | CO Description | Learning Domain* | Mapped PO/PSO |
|---|---|---|---|
| CO#1 | Understand the basics of abstract algebra and modular arithmetic. | U | PO1, PO8, PO12, PSO3 |
| CO#2 | Understand the applications of number theory in security | U | PO1, PO8, PO12, PSO3 |
| CO#3 | Encrypt and decrypt messages using block ciphers | A | PO8, PO12, PSO3 |
| CO#4 | Understand the working of RSA algorithm and Diffie-Hellman key exchange. | A | PO1, PO12, PSO3 |
| CO#5 | To be familiar with authentication and hash functions | U | PO8, PO12, PSO3 |

* Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

## CO-PSO-PO Mapping Matrix

| CO/PSO | PO#1 | PO#2 | PO#3 | PO#4 | PO#5 | PO#6 | PO#7 | PO#8 | PO#9 | PO#10 | PO#11 | PO#12 | PSO#1 | PSO#2 | PSO#3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO#1 | 3 | | | | | | | 2 | | | | 1 | | | 2 |
| CO#2 | 1 | | | | | | | 3 | | | | 2 | | | 2 |
| CO#3 | | | | | | | | 3 | | | | 2 | | | 2 |
| CO#4 | 2 | | | | | | | | | | | 3 | | | 2 |
| CO#5 | | | | | | | | 3 | | | | 3 | | | 2 |

COURSE CONTENT

| Module No | | Module Content | Hours Required |
|---|---|---|---|
| 1 | 1.1 | Mathematical Foundations of Information Security - Abstract Algebra Fundamentals of Abstract Algebra : Groups, Rings, Fields | 12 |
| | 1.2 | Modular Arithmetic, Euclidean Algorithm | |
| | 1.3 | Finite Fields of the form GF(p), Polynomial Arithmetic, | |
| | 1.4 | Finite Fields of the form GF(2n) | |
| 2 | 2.1 | Mathematical Foundations of Information Security - Number Theory Introduction to Number Theory: Prime Numbers, Fermat's and Euler's Theorems | 6 |
| | 2.2 | Testing for Primality | |
| | 2.3 | The Chinese Remainder Theorem | |
| | 2.4 | Discrete Logarithms | |
| 3 | 3.1 | Private Crypto – Systems. Introduction to Cryptography, Classical Encryption techniques | 12 |
| | 3.2 | Block Ciphers and Data Encryption Standard | |
| | 3.3 | Advanced Encryption Standard, Multiple Encryption and Triple DES, | |
| | 3.4 | Block Cipher Modes of operation, Stream Ciphers and RC4, Confidentiality using Symmetric Encryption | |
| 4 | 4.1 | Public Cryptosystems: Public-Key Cryptography | 6 |
| | 4.2 | RSA Key Management | |
| | 4.3 | DiffieHellman Key Exchange, | |
| | 4.4 | Elliptic Curve Arithmetic, Elliptic Curve Cryptography | |
| 5 | 5.1 | Authentication and hash functions Authentication requirements - Authentication functions - Message Authentication Codes | |
| | 5.2 | Hash Functions, Security of Hash Functions and MACs | |

| | | | |
|---|---|---|---|
| | 5.3 | MD5 message Digest algorithm - Secure Hash Algorithm - Authentication Protocols | 9 |
| | 5.3 | Digital Signature Standard | |

## REFERENCES (TEXT BOOKS/ RESEARCHES/ ONLINE URLs)

| |
|---|
| K.H. Rosen," Elementary Number Theory", Addison-Wesley, ISBN 0-441-57889-1 |
| Elementary Number Theory William Stein October 2005 |
| Introduction to Modern Cryptography Mihir Bellare1 Phillip ogaway May 11, 2005 |
| Handbook of applied cryptography, by A. Menezes, P. Van Oorschot, and S. Vanstone, CRC Press, 1996. |
| Stallings, W., Cryptography and Network Security. Principles and Practice, 4th edition, Prentice Hall. |

## INSTRUMENTS TO EVALUATE THE CO

| Evaluated CO | Tool | Date of Evaluation |
|---|---|---|
| CO#1 | CAE#1 | |
| CO#2 | CAE#1 | |
| CO#3 | CAE#2 | |
| CO#4 | CAE#2 | |
| CO#5 | Quiz | |

DETAILED SESSION PLAN

Note:

(1) Specify the span of the session as 1 hour/ 2 hour
(2) For a 3-credit paper, a session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session#/ 2hr/session | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | Mathematical Foundations of Information Security - Abstract Algebra Fundamentals of Abstract Algebra: Groups, Rings, Fields | PPT Presentation | CO1 | |
| 2 | Fundamentals of Abstract Algebra: Groups, Rings, Fields | PPT Presentation | CO1 | |
| 3 | Modular Arithmetic, Euclidean Algorithm | Group activity | CO1 | |
| 4 | Modular Arithmetic, Euclidean Algorithm | Group activity | CO1 | |
| 5 | Finite Fields of the form GF(p), Polynomial Arithmetic, | PPT Presentation | CO1 | |
| 6 | Finite Fields of the form GF(2n) | PPT Presentation | CO1 | |
| 7 | Mathematical Foundations of Information Security - Number Theory Introduction to Number Theory: Prime Numbers, Fermat's and Euler's Theorems | Group activity | CO2 | |

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 8 | Testing for Primality | PPT Presentation | CO2 | |
| 9 | The Chinese Remainder Theorem, Discrete Logarithms | PPT Presentation | CO2 | |
| 10 | Private Crypto – Systems. Introduction to Cryptography, Classical Encryption techniques | Mystery Games | CO3 | |
| 11 | Classical Encryption techniques | Mystery Games | CO3 | |
| 12 | Block Ciphers | PPT Presentation | CO3 | |
| 13 | Data Encryption Standard | PPT Presentation | CO3 | |
| 14 | Advanced Encryption Standard, Multiple Encryption and Triple DES, | PPT Presentation | CO3 | |
| 15 | Block Cipher Modes of operation, Stream Ciphers and RC4, Confidentiality using Symmetric Encryption | PPT Presentation | CO3 | |
| 16 | Public Cryptosystems: Public-Key Cryptography | PPT Presentation | CO4 | |

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 17 | RSA Key Management | PPT presentation | CO4 | |
| 18 | DiffieHellman Key Exchange | PPT Presentation | CO4 | |
| 19 | Elliptic Curve Arithmetic, Elliptic Curve Cryptography | PPT Presentation | CO4 | |
| 20 | Authentication and hash functions Authentication requirements - Authentication functions - Message Authentication Codes | PPT Presentation | CO5 | |
| 21 | Hash Functions, Security of Hash Functions and MACs | PPT Presentation | CO5 | |
| 22 | MD5 message Digest algorithm - Secure Hash Algorithm - Authentication Protocols | PPT Presentation | CO5 | |
| 23 | Digital Signature Standard | PPT Presentation | CO5 | |

# Course #5(Elective-1)

## General Details of the Course

| Course Code | MCA322 | | |
|---|---|---|---|
| Course Name | Microsoft .NET Framework using C# | | |
| Course Type | Core | | |
| Credit | 4 | | |
| Semester | 3 | | |
| Course Objectives | 1. To achieve an understanding of the goals and objectives of the .NET Framework<br><br>2. To provide a working knowledge of the C# programming language<br><br>3. To achieve an understanding of how to use forms to develop GUI programs under .NET | | |
| Pre-requisites | MCA102, MCA105 | | |
| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
| | 3 | 1 | |

## Course Outcomes (CO)

| CO# | CO Description | Learning Domain* | Mapped PSO |
|---|---|---|---|
| CO#1 | Ability to solve problems using only pure object oriented concepts and frameworks | A | PO3, PSO2 |
| CO#2 | Ability to design and develop database applications | A | PO3, PO5, PSO2 |
| CO#3 | Able to develop networking and distributed applications | S | PO3, PSO2 |
| CO#4 | Ability to design GUI applications | S | PO3, PO5 |
| CO#5 | Design and develop Web applications | C | PO3, PO5, PO8, PSO2 |

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

## CO-PSO-PO Mapping Matrix

| CO/PSO | PO #1 | PO# 2 | PO# 3 | PO# 4 | PO# 5 | PO# 6 | PO# 7 | PO# 8 | PO# 9 | PO# 10 | PO# 11 | PO# 12 | PSO #1 | PSO #2 | PSO #3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO#1 | | | 1 | | | | | | | | | | | 2 | |
| CO#2 | | | 1 | | 2 | | | | | | | | | 2 | |
| CO#3 | | | 2 | | | | | | | | | | | 1 | |
| CO#4 | | | 2 | | 2 | | | | | | | | | | |
| CO#5 | | | 2 | | 2 | | | 1 | | | | | | 3 | |

## Course Content

| Module No | | Module Content | Hours Required |
|---|---|---|---|
| 1 | 1.1 | .NET Introduction and framework | 12 |
| | 1.2 | Introduction to C# | |
| | 1.3 | Object oriented programming - introduction | |
| | 1.4 | Object oriented programming - properties | |
| 2 | 2.1 | Advanced .NET | 12 |
| | 2.2 | Multithreaded Programming | |
| | 2.3 | Data Base Connectivity- ADO.NET Architecture | |
| | 2.4 | Understanding the Data View Object, Working with System.Data.OleDb | |
| 3 | 3.1 | IO, Object serialization and Remoting | 12 |
| | 3.2 | Distributed Applications, COM/DCOM in Distributed Environment | |
| | 3.3 | Implementing a Simple Remoting Client and Server | |
| | 3.4 | Network programming: Socket programming, TCP/IP, UDP | |
| 4 | 4.1 | Windows Programming: Using Textbox, Button, CheckBox, RadioButtons, ComboBox, GroupBox etc | |

| | | | |
|---|---|---|---|
| | 4.2 | Event handling, Handling mouse and keyboard events | 12 |
| | 4.3 | Building an ImageList and add them to the ListView, Using details inside the ListView etc. | |
| | 4.4 | DataBase: Windows Database Connectivity | |
| 5 | 5.1 | Web Applications: Introduction to Web Applications, Understanding architecture ASP.NET | 12 |
| | 5.2 | Creating ASP.NET Pages – Web Forms, Working with web controls | |
| | 5.3 | Cookies, Sessions and Applications, Validation controls, FileUpload, AdRotator, MultiView, Calendar etc. | |
| | 5.4 | Web Database Connectivity: sqldatasoruce-insert, delete, update, report generation. Concept of Master pages and web services. | |

REFERENCES (TEXT BOOKS/ RESEARCHES/ ONLINE URLS)

| |
|---|
| C# 2012 Programming, Covers .Net 4.5, Black Book |
| Professional .NET programming - wrox publication |
| Professional ASP.NET 4.5 in C# - Jason N. Gaylord (Author), Christian Wenz (Author), Pranav Rastogi (Author), Todd Miranda (Author), |
| Professional C# Web Services: Building .NET Web Services with ASP .NET and• .NET |
| Remoting - Zach Greenvoss and Christian Nagel |

INSTRUMENTS TO EVALUATE THE CO

| Evaluated CO | Tool | Date of Evaluation |
|---|---|---|
| CO#1 | CAE#1 | |
| CO#2 | CAE#1 | |
| CO#3 | CAE#2 | |
| CO#4 | CAE#2 | |
| CO#5 | Quiz | |

DETAILED SESSION PLAN

Note:

(1) Specify the span of the session as 1 hour/ 2 hour
(2) For a 3-credit paper, a session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session# 1hr/session | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | .NET Framework: Introduction | Lecture, PPT presentation | CO1 | |
| 2 | Common Language Runtime (CLR) | Lecture, PPT presentation | CO1 | |
| 3 | MSIL, The .NET Framework Class Library | Lecture, PPT presentation | CO1 | |
| 4 | Introduction to C#: structure of a C# program | Lecture, PPT presentation | CO1 | |
| 5 | Data types, operators in C# | Lecture, PPT presentation | CO1 | |
| 6 | Decision making branching and Looping in C# and arrays in C# | Lecture, PPT presentation | CO1 | |
| 7 | Object oriented programming: Encapsulation, Inheritance in C# | Lecture, PPT presentation | CO1 | |

| | | | | |
|---|---|---|---|---|
| 8 | Object oriented programming: Polymorphism in C# | Lecture, PPT presentation | CO1 | |
| 9 | Properties and indexers, Interfaces, Structures, Enumeration in C# | Lecture, PPT presentation | CO1 | |
| 10 | Namespaces and Access specifiers, Partial classes, Partial methods, Delegates and Events, Attributes and Reflection. | Lecture, PPT presentation | CO1 | |
| 11 | Develop a small desktop application using Windows Forms, such as a calculator, text editor, or contact management system. | Group work- web development - project phase 1 | CO1 | |
| 12 | Revision- Module Test | Evaluation | CO1 | |
| 13 | Advanced .NET: String Handling. Generics, | Lecture, PPT presentation | CO2 | |
| 14 | Generic Class, Generic methods, Assemblies –private and shared Assemblies, | Lecture, PPT presentation | CO2 | |
| 15 | Global Assembly Cache - .NET Framework | Lecture, PPT presentation | CO2 | |
| 16 | Handling and throwing exceptions in .NET | Lecture, PPT presentation | CO2 | |

| 17 | Multithreaded Programming, synchronization | Lecture, PPT presentation | CO2 | |
|---|---|---|---|---|
| 18 | Input / Output – Files –reading and writing– Directory manipulation | Lecture, PPT presentation | CO2 | |
| 19 | Data Base Connectivity: ADO.NET Architecture | Lecture, PPT presentation | CO2 | |
| 20 | Understanding the Connection Object, Building the Connection String, Understanding the CommandObject | Lecture, PPT presentation | CO2 | |
| 21 | Understanding DataReaders, Understanding DataSets and DataAdapters, DataTable, DataColumn, DataRow | Lecture, PPT presentation | CO2 | |
| 22 | Differences between DataReader Model and DataSet Model, Understanding the DataViewObject, Working with System.Data.OleDb, Using DataReaders, Using DataSets, Working with SQL.NET, Using

Stored Procedures | Lecture, PPT presentation | CO2 | |
| 23 | Create a database for any commercial website | Group work- web development - project phase 2 | CO2 | |

| | | | | |
|---|---|---|---|---|
| 24 | Revision, Module Test 2 | Evaluation | CO2 | |
| 25 | IO, Object serialization and Remoting: System.IO, Streams, TextWriter, TextReader, BinaryWirter, BinaryReader, | Lecture, PPT presentation | CO3 | |
| 26 | Serialized Object Persistence and formatters, binary formatter, soap formatter | Lecture, PPT presentation | CO3 | |
| 27 | Remoting- Distributed Applications, | Lecture, PPT presentation | CO3 | |
| 28 | COM/DCOM in Distributed Environment | Lecture, PPT presentation | CO3 | |
| 29 | Drawbacks of DCOM | Lecture, PPT presentation | CO3 | |
| 30 | .NET Remoting | Lecture, PPT presentation | CO3 | |
| 31 | New distributed environment, Advantages & Disadvantages. | Lecture, PPT presentation | CO3 | |
| 32 | Implementing a Simple Remoting Client and Server | Simple Chat bot Exercise- Group Activity | CO3 | |
| 33 | Network programming: Socket | Lecture, PPT presentation | CO3 | |

| | | | | |
|---|---|---|---|---|
| | programming | | | |
| 34 | Network programming -TCP/IP | Lecture, PPT presentation | CO3 | |
| 35 | Network programming ,UDP | Lecture, PPT presentation | CO3 | |
| 36 | Revision- Module Test 3 | Evaluation | CO3 | |
| 37 | Windows Programming: Using Textbox, Button, CheckBox, RadioButtons, ComboBox, GroupBox etc. | Lecture, PPT presentation | CO4 | |
| 38 | Event handling, Handling mouse and keyboard events, Using menus and multiple windows. | Lecture, PPT presentation | CO4 | |
| 39 | Adding a Tab-Control, Anchoring Controls, ListView and TreeView controls. | Lecture, PPT presentation | CO4 | |
| 40 | Building an ImageList and add them to the ListView, Using details inside the ListView, | Lecture, PPT presentation | CO4 | |
| 41 | Building an ImageList and add them to the ListView, Using details inside the ListView | Lecture, PPT presentation | CO4 | |
| 42 | Attaching a Context Menu, Adding a | Lecture, PPT presentation | CO4 | |

| | | | | |
|---|---|---|---|---|
| | TreeView. | | | |
| 43 | Creating window services.  – part 1 | Lecture, PPT presentation | CO4 | |
| 44 | Creating window services.  – part 2 | Lecture, PPT presentation | CO4 | |
| 45 | DataBase: Windows Database Connectivity – part 1 | Lecture, PPT presentation | CO4 | |
| 46 | DataBase: Windows Database Connectivity – part 2 | Lecture, PPT presentation | CO4 | |
| 47 | DataBase: Windows Database Connectivity – part 3 | Project phase 3-Database connectivity -Group activity | CO4 | |
| 48 | Revision – Module Test 4 | Evaluation | CO4 | |
| 49 | Web Applications: Introduction to Web Applications, report generation. | Lecture, PPT presentation | CO5 | |
| 50 | Understanding architecture ASP.NET. | Lecture, PPT presentation | CO5 | |
| 51 | Creating ASP.NET Pages – Web Forms. | Lecture, PPT presentation | CO5 | |

| 52 | Working with web controls – Button, Textbox etc. | Lecture, PPT presentation | CO5 | |
|---|---|---|---|---|
| 53 | Postback and ViewState concepts. | Lecture, PPT presentation | CO5 | |
| 54 | State Management – Cookies, Sessions and Applications. | Lecture, PPT presentation | CO5 | |
| 55 | Validation controls, FileUpload, AdRotator, MultiView, Calendar etc. | Lecture, PPT presentation | CO5 | |
| 56 | Web Database Connectivity: sql datasoruce-insert, delete, update- part 1 | Lecture, PPT presentation | CO5 | |
| 57 | Web Database Connectivity: sql datasoruce-insert, delete, update- part 2 | Project phase 4 - Case study (ppt) | CO5 | |
| 58 | Web Database Connectivity: sql datasoruce-insert, delete, update- part 3 | Project phase 4 - Case study (ppt) | CO5 | |
| 59 | Concept of Master pages and web services | Project phase 4 - Case study (ppt) | CO5 | |
| 60 | Revision – Module 5 Test | Evaluation | CO5 | |

# COURSE #5(ELECTIVE-2)

## GENERAL DETAILS OF THE COURSE

| Course Code | MCA 332 | | |
|---|---|---|---|
| Course Name | Web and Database Security | | |
| Course Type | Elective | | |
| Credit | 4 | | |
| Semester | 3 | | |
| Course Objectives | To understand the application of security concept to database technology and web technology | | |
| Pre-requisites | MCA104 | | |
| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
| | 3 | 1 | |

## COURSE OUTCOMES (CO)

| CO# | CO Description | Learning Domain* | Mapped PSO |
|---|---|---|---|
| CO#1 | Learn the Web application architecture, its components and potential security weaknesses. | U | PSO3 |
| CO#2 | To impart knowledge about securing web application | A | PO1, PO10, PSO3 |
| CO#3 | Learn the levels of database security and SQL injection | An | PO1, PSO3 |
| CO#4 | Understand information leakage and securing database to database communication | An | PO10, PSO3 |

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

## CO-PSO-PO Mapping Matrix

| CO/PSO | PO#1 | PO#2 | PO#3 | PO#4 | PO#5 | PO#6 | PO#7 | PO#8 | PO#9 | PO#10 | PO#11 | PO#12 | PSO#1 | PSO#2 | PSO#3 |
|--------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO#1 | | | | | | | | | | | | | | | 2 |
| CO#2 | 1 | | | | | | | | | 1 | | | | | 2 |
| CO#3 | 1 | | | | | | | | | | | | | | 2 |
| CO#4 | | | | | | | | | | 1 | | | | | 2 |

## Course Content

| Module No | | Module Content | Hours Required |
|-----------|-----|----------------|----------------|
| 1 | 1.1 | Introduction to Web Applications and Security | 12 |
| | 1.2 | Profiling, Hacking Web Servers, the Threats – Classes of threats | |
| | 1.3 | The Hacker's Workbench | |
| | 1.4 | Cryptography and the Web, Digital Identifications | |
| 2 | 2.1 | Privacy- protecting techniques | 12 |
| | 2.2 | Privacy- protecting technologies, Backups and antitheft | |
| | 2.3 | Web Server Security | |
| | 2.4 | Host security for servers | |
| 3 | 3.1 | Securing web applications | 12 |
| | 3.2 | Protecting an organization – Network layout | |
| | 3.3 | Safe hosts in a hostile environment | |
| | 3.4 | Intrusion detection. | |
| 4 | 4.1 | Introduction to Database, Levels of Database Security | 12 |
| | 4.2 | Human level, network/user interface | |
| | 4.3 | Human level, network/user interface, database application program, database system, operating system, and physical level | |
| | 4.4 | Authentication and Password Security, Application Security – SQL Injection | |

| 5 | 5.1 | Securing Database-to-Database Communication | 12 |
|---|-----|---------------------------------------------|----|
|   | 5.2 | Trojans, Encryption, Passwords in script | |
|   | 5.3 | Insider/outsider attacks, users, programmers, | |
|   | 5.4 | super users, information leakage. | |

REFERENCES (TEXT BOOKS/ RESEARCHES/ ONLINE URLS)

| |
|---|
| Joel Scambray, Mike Shema, Caleb Sima, Hacking Exposed Web Applications, Second Edition |
| Simson Garfinkel, Gene Spafford, Web Security, Privacy & Commerce, Second Edition |
| Mike Shema, HackNotes(tm) Web Security Pocket Reference |
| Matt Bishop, "Computer Security: Art and Science", Pearson Education. |
| Fundamentals of Database Systems (3rd Ed.) - R.Elmasri, S. Navathe |
| An Introduction to database systems (5th Ed.) - C. J. Date |
| Database system concepts – H. Korth , A. Silberschatz |
| Implementing Database Security & Auditing – Ron Ben Vatan |
| Security of Data and Transaction- Vijay Atluri, PierangelaSamarati |
| Computer Security Lab Manual, Vincent J. Nestler, Wm. Arthur Conklin, Gregory B |

INSTRUMENTS TO EVALUATE THE CO

| Evaluated CO | Tool | Date of Evaluation |
|--------------|------|--------------------|
| CO#1 | CAE#1 | |
| CO#2 | CAE#1 | |
| CO#3 | CAE#2 | |
| CO#4 | CAE#2, Quiz | |

DETAILED SESSION PLAN

Note:

(1) Specify the span of the session as 1 hour/ 2 hour
(2) For a 3-credit paper, a session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | Introduction to Web Applications and Security | PPT | CO1 | |
| 2 | Profiling, Hacking Web Servers, | PPT | CO1 | |
| 3 | Threats | PPT | CO1 | |
| 4 | Classes of threats | PPT | CO1 | |
| 5 | The Hacker's Workbench | PPT | CO1 | |
| 6 | Cryptography | PPT | CO1 | |
| 7 | The Web, Digital Identifications | Lecture (PPT) | CO1 | |
| 8 | Privacy- protecting techniques | Lecture /hands on session | CO1 | |

| | | | | |
|---|---|---|---|---|
| 9 | Privacy- protecting technologies, | Lecture /hands on session | CO1 | |
| 10 | Backups and anti theft | Lecture /hands on session | CO2 | |
| 11 | Web Server Security | Lecture /hands on session | CO2 | |
| 12 | Host security for servers | Lecture /hands on session | CO2 | |
| 13 | Securing web applications | Demonstration | CO2 | |
| 14 | Protecting an organization – Network layout | Demonstration | CO2 | |
| 15 | Safe hosts in a hostile environment | Lecture and case study | CO2 | |
| 16 | Intrusion detection. | Lecture and case study | CO2 | |
| 17 | Intrusion detection.Case study | Lecture and case study | CO3 | |
| 18 | Introduction to Database | Lecture and case study | CO3 | |
| 19 | Introduction to Database continues… | Lecture and case study | CO3 | |
| 20 | Levels of Database Security | Lecture and case study | CO3 | |

| | | | | |
|---|---|---|---|---|
| 21 | Human level, network/user interface | Lecture and case study | CO3, CO4 | |
| 22 | Database application program | Lecture and case study | CO3, CO4 | |
| 23 | Database system, | Lecture and case study | CO3, CO4 | |
| 24 | operating system, and physical level | Lecture and case study | CO3, CO4 | |
| 25 | Authentication and Password Security, | Lecture and case study | CO3, CO4 | |
| 26 | Application Security – SQL Injection | Lecture and case study | CO3, CO4 | |
| 27 | Securing Database-to-Database Communication | Lecture and case study | CO3, CO4 | |
| 28 | Trojans, Encryption, Passwords in script | Case study (ppt) | CO3, CO4 | |
| 29 | Insider/outsider attacks, users, programmers, | Case study (ppt) | CO3, CO4 | |
| 30 | super users, information leakage. | Case study (ppt) | CO3, CO4 | |

## COURSE#6

| Course Code | MCA306 | | |
|---|---|---|---|
| Course Name | Data Analytics Using Python | | |
| Credit | 3 | | |
| Semester | 3 | | |
| Course Objectives | 1. To provide an understanding of programming concepts using Python<br>2. To learn the underlying concepts of Data science and implement using python | | |
| Pre-requisites | Basic Knowledge in Python Programming and data science, MCA101, MCA102 | | |
| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
| | | | 6 |

### COURSE OUTCOMES (CO)

| CO# | CO Description | Learning Domain* | Mapped PSO |
|---|---|---|---|
| CO#1 | Understand the data types and structures in python | A | PO1, PSO2 |
| CO#2 | Ability to understand object-oriented programming concepts and write programs in python. Handling Errors and Exceptions | A | PO3, PO5, PSO2 |
| CO#3 | Ability to design and develop database applications | C | PO3, PSO1 |
| CO#4 | Ability to solve data analysis problems using python | C | PO2, PO3, PO5, PSO1 |

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

### CO-PSO-PO Mapping Matrix

| CO/PSO | PO#1 | PO#2 | PO#3 | PO#4 | PO#5 | PO#6 | PO#7 | PO#8 | PO#9 | PO#10 | PO#11 | PO#12 | PSO#1 | PSO#2 | PSO#3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO#1 | 3 | | | | | | | | | | | | | 1 | |
| CO#2 | | | 2 | | 3 | | | | | | | | | 1 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO#3 | | 2 | | | | | | | | | 2 | |
| CO#4 | | 2 | 2 | 3 | | | | | | | 2 | |

COURSE CONTENT

| Module No | | Module Content | Hours Required |
|---|---|---|---|
| 1 | 1.1 | **Data Types and Data Structures**<br><br>Introduction to Python: - using the Python interpreter. | 9 |
| | 1.2 | Overview of programming in Python, Expressions and Variables-String Operations. | |
| | 1.3 | Python Data Structures: lists & Tuple –Sets - Dictionaries. | |
| | 1.4 | Programming Fundamentals: Conditions and Branching- Loops- Functions: formal arguments, variable-length arguments. | |
| 2 | 2.1 | **Classes, files and modules**<br><br>Introduction to Classes and Objects: -classes, class attributes, instances, instance attributes, binding and method invocation, inheritance, polymorphism, Built-in functions for classes and instances. | 9 |
| | 2.2 | Files and input/output, reading and writing files, methods of file objects, using standard library functions, dates and times. | |
| | 2.3 | Exceptions, detecting and handling exceptions. | |
| 3 | 3.1 | **Database and web programming**<br><br>Python database application programmer's interface (DB- API), connection and cursor objects, Type objects and constructors, python database adapters. | 9 |
| | 3.2 | Creating simple web clients, introduction to CGI, CGI module, building CGI applications. | |
| 4 | 4.1 | **Introduction to Data Science using Python**<br><br>Python libraries: Numpy- Scikit- Pandas- Matplotlib- Data Visualization. | 9 |

| | | | |
|---|---|---|---|
| | 4.2 | Importing Datasets: Importing and Exporting Data in Python- Basic Insights from Datasets. Data cleansing and pre-processing: Identify and Handle Missing Values. | 9 |
| | 4.3 | Summarizing the Data Frame: Descriptive Statistics- Basic of Grouping- ANOVA- Correlation. | |
| 5 | 5.1 | **Model Development and Evaluation**<br><br>Regression Models: Linear Regression (SLR & MLR)- Logistic Regression- | 9 |
| | 5.2 | Decision Tree- Random Forest. | |
| | 5.3 | Clustering Techniques: K means clustering – Apriori algorithm. | |
| | 5.4 | Model Evaluation: Over-fitting, Under-fitting. | |

REFERENCES (TEXT BOOKS/ RESEARCHES/ ONLINE URLs)

| |
|---|
| Core Python Programming by Wesley J. Chun, 2nd Edition, Pearson Education |
| An Introduction to Python by Guido Van Russom, Fred L.Drake, Network Theory Limited. |
| Beginning Python: From Novice To Professional By Magnus Lie Hetland, Second<br><br>Edition Apress |
| Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython ,2nd edition, Wes McKinney, O'Reilly Media (2017) |
| Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, Aurélien Géron, O'Reilly Media (2017) |
| Data Science from Scratch: First Principles with Python, Joel Grus, O'Reilly Media (2015) |

INSTRUMENTS TO EVALUATE THE CO

| Evaluated CO | Tool | Date of Evaluation |
|---|---|---|
| CO1 | CAEP, Project | |
| CO2 | CAEP, Project | |
| CO3 | CAEP, Project | |
| CO4 | CAEP, Project | |

DETAILED SESSION PLAN

Note:

(1) Specify the span of the session as 1 hour/ 2 hour
(2) For a 3-credit paper, session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | **Data Types and Data Structures**<br>Introduction to Python: - using the Python interpreter. | Hands-On session | CO1 | |
| 2 | Overview of programming in Python, Expressions and Variables-String Operations. | Hands-On session | CO1 | |
| 3 | Python Data Structures: lists & Tuple –Sets - Dictionaries. | Hands-On session | CO1 | |
| 4 | Programming Fundamentals: Conditions and Branching-Loops- Functions: formal arguments, variable-length arguments. | Hands-On session | CO1 | |
| 5 | Introduction to Classes and Objects: -classes, class attributes, instances, instance attributes, binding and method invocation. | Hands-On session | CO2 | |
| 6 | inheritance, polymorphism, Built-in functions for classes and instances. | Hands-On session | CO2 | |
| 7 | Files and input/output, reading and writing files, methods of file objects, using standard library functions, dates and times. | Hands-On session | CO2 | |
| 8 | Exceptions, detecting and handling exceptions. | Hands-On session | CO2 | |

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 9 | Python database application programmer's interface (DB-API), connection and cursor objects, Type objects and constructors, python database adapters. | Hands-On session | CO3 | |
| 10 | Creating simple web clients, introduction to CGI, CGI module, building CGI applications. | Hands-On session | CO3 | |
| 11 | Python libraries: Numpy- Scikit- Pandas- Matplotlib- Data Visualization. | Hands-On session | CO4 | |
| 12 | Python libraries: Numpy- Scikit- Pandas- Matplotlib- Data Visualization. | Hands-On session | CO4 | |
| 13 | Python libraries: Numpy- Scikit- Pandas- Matplotlib- Data Visualization. | Hands-On session | CO4 | |
| 14 | Importing Datasets: Importing and Exporting Data in Python- Basic Insights from Datasets. Data cleansing and pre-processing: Identify and Handle Missing Values. | Hands-On session | CO4 | |
| 15 | Summarizing the Data Frame: Descriptive Statistics- Basic of Grouping- | Hands-On session | CO4 | |
| 16 | ANOVA- Correlation. | Hands-On session | CO4 | |
| 17 | Regression Models: Linear Regression (SLR & MLR)- | Hands-On session | CO4 | |
| 18 | Logistic Regression- | Hands-On session | CO4 | |

| 19 | Decision Tree- Random Forest. | Hands-On session | CO4 | |
|----|-------------------------------|------------------|-----|---|
| 20 | Clustering Techniques: K means clustering – | Hands-On session | CO4 | |
| 21 | Apriori algorithm. | Hands-On session | CO4 | |
| 22 | Model Evaluation: Over-fitting, Under-fitting. | Hands-On session | CO4 | |
| 23 | Project | Hands-On session/ Based on student choice | CO1 – CO4 | |
| 24 | Project | Hands-On session/ Based on student choice | CO1 – CO4 | |
| 25 | Project | Hands-On session/ Based on student choice | CO1 – CO4 | |

# COURSE #7

## GENERAL DETAILS OF THE COURSE

| Course Code | MCA307 | | |
|---|---|---|---|
| Course Name | Android | | |
| Course Type | Core | | |
| Credit | 3 | | |
| Semester | 3 | | |
| Course Objectives | 1. To create apps based on android platforms<br><br>2. To create apps based on multimedia and internet application<br><br>3. To achieve the designing of platform independent applications<br><br>4. To access and work with databases under the Android operating system | | |
| Pre-requisites | MCA104, MCA304 | | |
| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
| | | | 4 |

## COURSE OUTCOMES (CO)

| CO# | CO Description | Learning Domain* | Mapped PSO |
|-----|----------------|------------------|------------|
| CO#1 | Able to develop simple apps | C | PSO2 |
| CO#2 | Able to develop apps based on different types of menus | C | PSO2 |
| CO#3 | Make decision to solve a problem using package, library and threads Handling Errors and Exceptions | A, C | PSO2 |
| CO#4 | Ability to design and develop database applications | An, C | PSO2 |
| CO#5 | Able to design and develop mobile applications works with internet applications | An, C | PSO2 |

* Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

## CO-PSO-PO MAPPING MATRIX

| CO/PSO | PO#1 | PO#2 | PO#3 | PO#4 | PO#5 | PO#6 | PO#7 | PO#8 | PO#9 | PO#10 | PO#11 | PO#12 | PSO#1 | PSO#2 | PSO#3 |
|--------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO#1 | | | 1 | | 3 | | | | | | 2 | | | 2 | |
| CO#2 | | | 1 | | 3 | | | | | | 2 | | | 2 | |
| CO#3 | | | 2 | | | | | | | | 2 | | | 1 | |
| CO#4 | | | 2 | | 3 | | | | | | 2 | | | 3 | |
| CO#5 | | | 2 | | 3 | | | | | | 2 | | | 3 | |

## COURSE CONTENT

| Module No | | Module Content | Hours Required |
|-----------|-----|----------------|----------------|
| 1 | 1.1 | Mobile Computing & Development Introduction: Mobile system architecture and development challenges | 6 |
| | 1.2 | The Android Platform: Android SDK Features, Introduction to the development Framework, Android Development Tools | |
| | 1.3 | Android Application Life Cycle, Activity, Service, Intent, MVC and User Interfaces | |

| | | | |
|---|---|---|---|
| | 1.4 | Application Structure: AndroidManifest.xml, uses-permission & uses-sdk, Resources & R.java, Assets, Layouts &Drawable Resources, Activities and Activity lifecycle | |
| 2 | 2.1 | Android Graphical User Interface: Linear Layout, Relative Layout, Table Layout, Grid View, Tab Layout, List View, Custom List View Element | 8 |
| | 2.2 | Fragments, Time and Date, Images and media, Composite, AlertDialogs, Toast | |
| | 2.3 | Popup Menus:- Option menu , Context menu, Sub menu, menu from xml, menu via code, Application Menu, ActionBar, ActionBar& Tabs, View Pager, Action Bar & View Pager | |
| 3 | 3.1 | Intents – Explicit Intents, Implicit intents, intents and broadcast receivers, intent filters | 12 |
| | 3.2 | Adapters and Widgtes:- ArrayAdapters, BaseAdapters, ListView and ListActivity, Custom listview, GridView using adapters, Gallery using adapters | |
| | 3.3 | Notifications: Broadcast Receivers, Services and notifications, Alarms | |
| | 3.4 | Threads:- Threads running on UI thread (runOnUiThread), Worker thread, Handlers & Runnable, AsynTask (in detail) | |
| 4 | 4.1 | Databases and Content Providers:- SQLite Databases: Basics of SQLite DB, Various Data Types, SQLite Queries, Adding / Updating / Deleting Contents of SQLite | 10 |
| | 4.2 | Content Providers:- SQLite Programming, SQLiteOpenHelper, SQLiteDatabse, Cursor, Content providers ,Defining and using content providers | |
| | 4.3 | Example- Sharing database among two different applications using content providers, Reading and updating Contents, Reading bookmarks | |
| 5 | 5.1 | Advanced Features: Live Folders, Using sdcards, XML Parsing, JSON Parsing, Maps, GPS, Location based Services, Accessing Phone services (Call, SMS, MMS), Network connectivity services | 9 |
| | 5.2 | Hardware Sensors:- Sensors and Sensor Managers, Monitoring device movement and orientation, Environmental sensors | |

## REFERENCES (TEXT BOOKS/ RESEARCHES/ ONLINE URLS)

| |
|---|
| Professional Android 4 application development – Reto Meier |
| Android Wireless Application Development By Lauren Darcey and Shane Conder, Pearson Education, 2nd ed. |
| Beginning Android Application Development By Wei-Meng Lee, Wrox Publication |
| Unlocking Android Developer's Guide By Frank Ableson and Charlie Collins and Robi Sen, Manning Publication Co. |

## INSTRUMENTS TO EVALUATE THE CO

| Evaluated CO | Tool | Date of Evaluation |
|---|---|---|
| CO#1 | Viva | |
| CO#2 | Lab Assignment | |
| CO#3 | Case Study | |
| CO#4 | Project | |
| CO#5 | CAEP | |

DETAILED SESSION PLAN

Note:

(1) Specify the span of the session as 1 hour/ 2 hour
(2) For a 3-credit paper, session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | Mobile Computing & Development Introduction: Mobile system architecture and development challenges.<br><br>The Android Platform: Android SDK Features, Introduction to the development Framework, Android Development Tools | Hands On, Lecturing | CO1 | |
| 2 | Android Application Life Cycle, Activity, Service, Intent, MVC and User Interfaces | Hands On, Lecturing | CO1 | |
| 3 | Application Structure: AndroidManifest.xml, uses-permission & uses-sdk, Resources & R.java, Assets, Layouts & Drawable Resources,  Activities and Activity lifecycle | Hands On, Lecturing | CO1 | |
| 4 | Android Graphical User Interface: Linear Layout, Relative Layout, Table Layout, Grid View, Tab Layout, List View, Custom List View Element | Hands On (Self Learning) | CO1 | |

| 5 | Fragments, Time and Date | Hands On | CO1 | |
|---|---|---|---|---|
| 6 | Images and media, Composite, Alert Dialogs, Toast | Hands On | CO1 | |
| 7 | Popup Menus:- Option menu , Context menu, Sub menu, menu from xml, menu via code, Application Menu, ActionBar, ActionBar & Tabs, View Pager, Action Bar & View Pager | Hands On (Self Learning) | CO2 | |
| 8 | Intents – Explicit Intents | Hands On | CO3 | |
| 9 | Implicit intents, Intents and broadcast receivers, intent filters | Hands On | CO3 | |
| 10 | Adapters and Widgets:- ArrayAdapters, BaseAdapters, ListView and ListActivity, Custom listview, GridView using adapters, Gallery using adapters | Hands On (Self Learning) | CO3 | |
| 11 | Notifications: Broadcast Receivers, Services and notifications, Alarms | Hands On | CO3 | |
| 12 | Threads:- Threads running on UI thread (runOnUiThread), Worker thread, Handlers & Runnable | Hands On | CO3 | |
| 13 | AsynTask (in detail) | Hands On | CO3 | |

| 14 | Databases and Content Providers:- SQLite Databases: Basics of SQLite DB, Various Data Types, SQLite Queries | Hands On | CO4 | |
|---|---|---|---|---|
| 15 | Adding / Updating / Deleting Contents of SQLite | Hands On | CO4 | |
| 16 | Content Providers:- SQLite Programming, SQLiteOpenHelper, SQLiteDatabase, Cursor, Content providers , Defining and using content providers | Hands On | CO4 | |
| 17 | Example- Sharing database among two different applications using content providers | Hands On | CO4 | |
| 18 | Reading and updating Contents, Reading bookmarks | Hands On | CO4 | |
| 19 | Advanced Features: Live Folders, Using sd cards, XML Parsing, JSON Parsing | Hands On | CO5 | |
| 20 | Maps, GPS, Location based Services | Hands On | CO5 | |
| 21 | Accessing Phone services (Call, SMS, MMS), Network connectivity services | Hands On | CO5 | |
| 22 | Hardware Sensors:- Sensors and Sensor Managers, Monitoring device movement and orientation, Environmental sensors | Hands On | CO5 | |

# Course #8

## General Details of the Course

| Course Code | MCA308 | | |
|---|---|---|---|
| Course Name | Employability and Skill development-2 | | |
| Credit | 2 | | |
| Semester | 3 | | |
| Course Objectives | 1. Develop foundational knowledge and problem-solving skills in quantitative aptitude, including arithmetic, algebra, geometry, and trigonometry.<br>2. Enhance analytical and logical reasoning abilities through exposure to various reasoning topics and practice exercises.<br>3. Cultivate essential behavioural skills and interview techniques necessary for professional success, including communication, listening, confidence, and professional etiquette. | | |
| Pre-requisites | 1. Basic understanding of mathematics including algebra, geometry, and arithmetic.<br>2. Familiarity with logical thinking and problem-solving approaches. | | |
| Course Details | Lecture Hours | Tutorial Hours | Practical Hours |
| | 2 | | |

## Course Outcomes (CO)

| CO# | CO Description | Learning Domain* | Mapped PSO |
|---|---|---|---|
| CO#1 | Apply quantitative aptitude skills to solve real-world problems efficiently and accurately. | A | PO1, PO3, PSO2 |
| CO#2 | Analyse and interpret data effectively for decision-making purposes. | An | PO1, PO2, PO3, PO4, PSO2 |
| CO#3 | Employ logical reasoning techniques to solve a variety of complex problems. | A | PO4, PSO1 |
| CO#4 | Demonstrate professional behaviour and effective communication skills in interview settings. | S, I | PO6 |
| CO#5 | Evaluate personal strengths and areas for improvement in quantitative aptitude and reasoning. | E | PO6 |

*\* Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)*

## CO-PSO-PO Mapping Matrix

| CO/PSO | PO #1 | PO# 2 | PO# 3 | PO# 4 | PO# 5 | PO# 6 | PO# 7 | PO# 8 | PO# 9 | PO# 10 | PO# 11 | PO# 12 | PSO #1 | PSO #2 | PSO #3 |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|
| CO#1 | 2 | | 1 | | | | | | | | | | | 2 | |
| CO#2 | 1 | 2 | 2 | 2 | | | | | | | | | | 2 | |
| CO#3 | | | | 2 | | | | | | | | | 1 | | |
| CO#4 | | | | | | 3 | | | | | | | | | |
| CO#5 | | | | | | 3 | | | | | | | | | |

## Course Content

| Module No | | Module Content | Hours Required |
|-----------|-----|----------------|----------------|
| 1 | 1.1 | **Behavioural Skills** | 5 |
| 2 | 2.1 | **Quantitative Aptitude**<br>Sets<br>Simple and Compound Interest<br>Simplification and Approximation<br>Speed, Distance and Time<br>Time and Work<br>Trains, boats and streams<br>Trigonometry, Heights and Distances<br>Pipes and Cisterns<br>Time and Work<br>Probability<br>Permutation and Combination<br>Percentage<br>Speed and Distance<br>Averages<br>Geometry | 7 |
| 3 | 3.1 | **Data Interpretation and Logical Reasoning**<br>Input-Output<br>Mirror and Water Images<br>Odd One Out<br>Picture Series and Sequences<br>Paper Folding<br>Puzzles<br>Pattern Series and Sequences<br>Order & Ranking<br>Seating Arrangements<br>Shape Construction<br>Statement and Assumptions | 7 |

| | | | |
|---|---|---|---|
| | | Statement and Conclusions<br>Syllogism | |
| 4 | 4.1 | **Interview Skills**<br>Research<br>Preparation<br>Punctuality<br>Professionalism<br>Communication<br>Listening<br>Ask questions<br>Confidence<br>Showing interest<br>Follow-up | 6 |
| 5 | 5.1 | **Grooming**<br>Attire<br>Body language | 5 |

## REFERENCES (TEXT BOOKS/ RESEARCHES/ ONLINE URLS)

| |
|---|
| "Quantitative Aptitude for Competitive Examinations" by R.S. Aggarwal |
| "Logical Reasoning and Data Interpretation for the CAT" by Nishit K. Sinha |
| "Interview Skills That Win the Job: Simple Techniques for Answering All the Tough Questions" by Michael Spiropoulos |
| Khan Academy - https://www.khanacademy.org/math |
| IndiaBIX - https://www.indiabix.com/ |
| GeeksforGeeks - https://www.geeksforgeeks.org/ |

## INSTRUMENTS TO EVALUATE THE CO

| Evaluated CO | Tool | Date of Evaluation |
|---|---|---|
| CO#1 | MCQ | |
| CO#2 | MCQ | |
| CO#3 | MCQ | |
| CO#4 | MCQ | |
| CO#5 | MCQ | |

## DETAILED SESSION PLAN

Note:

(3) Specify the span of the session as 1 hour/ 2 hour
(4) For a 3-credit paper, session plan for 45 hours and for a 4-credit paper, a session plan for 60 hours is to be given.

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 1 | Behavioral Skills | Lecture & Demo | CO1 | |
| 2 | Behavioral Skills | Lecture & Demo | CO1 | |
| 3 | Behavioral Skills | Lecture & Demo | CO1 | |
| 4 | **Quantitative Aptitude**<br>Sets<br>Simple and Compound Interest<br>Simplification and Approximation | Problem Solving - Practice | CO2 | |
| 5 | **Quantitative Aptitude**<br>Speed, Distance and Time<br>Time and Work<br>Trains, boats and streams<br>Trigonometry, Heights and Distances | Problem Solving - Practice | CO2 | |
| 6 | **Quantitative Aptitude**<br>Pipes and Cisterns<br>Time and Work<br>Probability<br>Permutation and Combination | Problem Solving - Practice | CO2 | |

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 7 | **Quantitative Aptitude**<br>Percentage<br>Speed and Distance<br>Averages<br>Geometry | Problem Solving - Practice | CO2 | |
| 8 | **Data Interpretation and Logical Reasoning**<br>Input-Output<br>Mirror and Water Images<br>Odd One Out | Problem Solving - Practice | CO3 | |
| 9 | **Data Interpretation and Logical Reasoning**<br>Picture Series and Sequences<br>Paper Folding<br>Puzzles<br>Pattern Series and Sequences | Problem Solving - Practice | CO3 | |
| 10 | **Data Interpretation and Logical Reasoning**<br>Order & Ranking<br>Seating Arrangements<br>Shape Construction | Problem Solving - Practice | CO3 | |
| 11 | **Data Interpretation and Logical Reasoning**<br>Statement and Assumptions<br>Statement and Conclusions<br>Syllogism | Problem Solving - Practice | CO3 | |
| 12 | **Interview Skills**<br>Research<br>Preparation<br>Punctuality | Lecture & Demo | CO4 | |

| Session# | Topic | Model of Delivery/ Experiential Component | Related CO | Actual Date of the Session |
|---|---|---|---|---|
| 13 | **Interview Skills**<br>Professionalism<br>Communication<br>Listening | Lecture & Demo | CO4 | |
| 14 | **Interview Skills**<br>Ask questions<br>Confidence<br>Showing interest<br>Follow-up | Mock Interview | CO4 | |
| 15 | **Grooming**<br>Attire<br>Body language | Lecture & Demo | CO5 | |
| 16 | **Grooming**<br>Attire<br>Body language | Lecture & Demo | CO5 | |