SHIVAJI UNIVERSITY KOLHAPUR

Syllabus for

SECOND YEAR,

MASTER OF COMPUTER APPLICATION (MCA)

Under Faculty of Science and Technology
(Engineering and Technology)

(w. e. f. Academic Year: 2023-24)

SECOND YEAR MASTER OF COMPUTER APPLICATION																			
SEMESTER III																			
SR. NO.	**SUBJECT CODE**	**TEACHING SCHEME**									**EXAMINATION SCHEME**								
		THEORY			**TUTORIAL**			**PRACTICAL**			**THEORY**				**PRACTICAL**		**TERM WORK**		
		Credit	No. Of Lectures	Hours	Credit	No. Of Hours	Hours	Credit	No. Of Hours	Hours	Mode	Marks	Total Marks	Min	MAX	MIN	MAX	MIN	
1	PCC-MCA-C10	4	4	4	1	1	1	-	-	-	CIE	30	100	12	-	-	50	20	
											ESE	70		28					
2	PCC-MCA-C11	4	4	4	1	1	1	-	-	-	CSE	30	100	12	-	-	50	20	
											ESE	70		28					
3	PCC-MCA-C12	3	3	3	-	-	-	2	4	4	-	-	-	-	50	20	50	20	
4	**Elective 01** PCC-MCA-C13 OR PCC-MCA-C14 OR PCC-MCA-C15	4	4	4	-	-	-	1	2	2	CSE	30	100	12	50	20	50	20	
											ESE	70		28					
5	PCC-MCA-C16	-	-	-	-	-	-	4	8	8	-	-			100	40	100	40	
TOTAL		**15**	**15**	**15**	**2**	**2**	**2**	**7**	**14**	**14**			**300**		**200**		**300**		
SEMESTER IV																			
1	**Elective 02** PCC-MCA-C17 OR PCC-MCA-C18 OR PCC-MCA-C19	3	3	3	1	1	1	-	-	-	CIE	30	100	12	-	-	25	10	
											ESE	70		28					
2	**Elective 03** PCC-MCA-C20 OR PCC-MCA-C21 OR PCC-MCA-C22	3	3	3	1	1	1	-	-	-	CIE	30	100	12	-	-	25	10	
											ESE	70		28					
3	PCC-MCA-C23	-	-	-	-	-	-	10	20	20	-	-	-	-	200	80	100	40	
4	PCC-MCA-C24	-	-	-	-	-	-	6	12	12	-	-	-	-	100	40	50	20	
TOTAL		**6**	**6**	**6**	**2**	**2**	**2**	**16**	**32**	**32**			**200**		**300**		**200**		
SECOND YEAR TOTAL		**21**	**21**	**21**	**4**	**4**	**4**	**23**	**46**	**46**			**500**		**500**		**500**		

CIE: Continuous Internal Evaluation

ESE: End Semester Examination

Candidate contact hours per week : 30 Hours (Minimum)	Total Marks for MCA Semester III & IV : **500 + 500 + 500 = 1500**
Theory and Practical Lectures : 60 Minutes Each	Total Credits for MCA Semester III & IV : **48 (SEM-III: 24 + SEM–IV: 24)**

- In theory examination there will be a passing based on separate head of passing for examination of CIE and ESE.
- There shall be separate passing for theory and practical (term work) courses.
- ****** Indicates that the theory examination is of 04 hours duration.

Note:

PCC-MCA: Professional Core Course (Master in Computer Applications).

Semester III and Semester IV

Sr. No.	Code No.	Subject	Semester	Credits
01	PCC-MCA-C10	Internet Of Things	3	05
02	PCC-MCA-C11	Cloud Computing	3	05
03	PCC-MCA-C12	Mobile Application Development	3	05
04	PCC-MCA-C13	Data Analytics	3	05
05	PCC-MCA-C14	Data Mining	3	05
06	PCC-MCA-C15	Big Data Analytics	3	05
07	PCC-MCA-C16	Minor Project	3	04
08	PCC-MCA-C17	Cyber Security	4	04
09	PCC-MCA-C18	Digital Forensics	4	04
10	PCC-MCA-C19	Information Security	4	04
11	PCC-MCA-C20	Enterprise Resource Planning	4	04
12	PCC-MCA-C21	E-Governance	4	04
13	PCC-MCA-C22	Business Intelligence	4	04
14	PCC-MCA-C23	Major Project	4	10
15	PCC-MCA-C24	Seminar	4	06

***** For Theory CIE 30 Marks,**

Two tests of 30 marks at college should be conducted and best of two marks should be communicated touniversity.

***** Guidelines to paper setter:**

In theory ESE examination of 70 marks following points should be considered,

1. First question of 10 marks should be allotted to Objective type questions.
2. In Remaining 60 marks, four questions of 15 marks should be considered

***** CGPA Calculation**

The CGPA shall be calculated at the end of all semesters.

For calculation of CGPA, a formula given in guidelines shall be used. The standard of passing shall be in accordance with the following table.

Marks Obtained	Numerical Grade (Grade Point)		CGPA	Letter Grade
Absent	0 (zero)		-	-
0 – 39	0 (zero)		0.0 – 4.99	F (Fail)
40 – 49	5		5.00 – 5.49	C
50 – 59	6		5.50 – 6.49	B
60 – 69	7		6.50 – 7.49	B+
70 – 79	8		7.50 – 8.49	A
80 – 89	9		8.50 – 9.49	A+
90 – 100	10		9.50 – 10.0	O (Outstanding)

Note:
The award of the final Grade for the degree of Master of Computer Application shall be based on CGPA calculated for two years.

M.C.A. Part-II Semester III

Paper MCA-C10: Internet of Things

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**PCC- MCA-C10: : Internet of Things**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**4 Hrs. + 1 Hr.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 4 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 50 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Understand the role of IoT in various application domains.
2. Illustrate different technologies of IoT.
3. Identify various communication protocols used for IoT.
4. Elaborate emerging trends in IoT.

Unit 1: Introduction to IoT **12 HOURS**

Fundamentals of IoT, IoT architecture: Design principals of IoT architecture, Outline of IoT architecture, IoT architectural Reference Model (ARM), Functional view, Information View, Deployment View and Operational View, Various platforms of IoT, Real time examples of IoT, Challenges of IoT.

Unit 2: Arduino Environment **12 HOURS**

Arduino Uno architecture, Arduino IDE, Software and Libraries, Basics of Embedded C programming for Arduino, Interfacing basic hardware components with Arduino, Types of Sensors, Working of Sensors, Interfacing Sensors with Arduino. IoT communication technologies: Bluetooth, RFID, Wi-Fi.

Unit 3: IoT Application Development **12 HOURS**

Introduction to ESP8266 Wi-Fi module, Wi-Fi libraries, Configuring ESP8266 with Arduino, Setting up Web Client for IoT, Interfacing ESP8266 with web services, Web Server for IoT: Introduction to Web server, Installation of Web server for IoT, Configuration of Web server for IoT, Posting data to web server.

Unit 4: RaspberryPi and Emerging Trends in IoT **12 HOURS**

Introduction to RaspberryPi, Introduction to board of RaspberryPi, Operating systems on RaspberryPi, Configuring RaspberryPi, Programing RaspberryPi with Python, Accessing RaspberryPi, Other IoT devices, Role of Big data, Machine learning and Cloud computing in IoT.

Text Books:

1. Internet of Things, Srinivasa K. G., Cengage Learning India, 2017.
2. Internet of Things (A Hands on approach), Vijay Madisetti and Arshadeep Bagha, 1st edition, VPT, 2014

Reference Books:

1. Internet of Things: Architecture and Design principles, 1st edition, McGraw Hill, 2017
2. Arduino Programing in 24 hours, Richard Blum, Sams, 1st edition
3. RaspberryPi cookbook, Simon Mark, O'Reilly, 3rd edition

M.C.A. Part-II Semester III

Paper MCA-C11: Cloud Computing

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**PCC- MCA-C11: Cloud Computing**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**4 Hrs. + 1 Hr.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 4 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 50 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Differentiate between different types and services of cloud computing.
2. Assess the role of virtualization in cloud computing.
3. Identify security issues in cloud computing.
4. Describe risk assessment and management in cloud.

Unit 1: Introduction to Cloud Computing: 12 HOURS

Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Cloud Architecture, Services and Applications: Infrastructure as a Service, Platform as a Service, Using PaaS Application Frameworks, Software as a Service, Identity as a Service, and Compliance as a Service.Cloud Infrastructure Management, Infrastructure as a Service Providers, Platform as a Service Providers, Benefits and Disadvantages of Cloud Computing, Challenges and Risks of Cloud computing.

Unit 2: Abstraction and Virtualization: 12 HOURS

Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hyper visors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability Virtual Machine Migration Services, Virtual Machine Provisioning and Migration in Action, Provisioning in the Cloud Context

Unit 3: Securing the Cloud: 12 HOURS

Administrating the Clouds, Cloud Management Products, 15 Periods 9 Emerging Cloud Management Standards, Securing the Cloud, Securing Data, Establishing Identity and Presence, Storage Area Networks, Disaster Recovery in Clouds

Unit 4: Managing Risks in Cloud: 12 HOURS

Risk of Cloud computing and Related Cost :Risk Assessment and Management , Risk of Vendor Lock- in, Risk of Loss of control over IT services Risk of Poor Provisioning, Risk of Multi, tenant environment , Risk failure of cloud provider, SLA risk, security, malware and Internet Attacks, Risk with Application Licensing

Reference Books:-

1. Cloud Computing, U S Pandey & Kavita Choudhary, S.Chand, 1st edition, 2014
2. Sosinsky B., “Cloud Computing Bible”, Wiley India ISBN 13: 9788126529803.
3. Buyya R., Broberg J., Goscinski A., “Cloud Computing: Principles and Paradigm”, John Wiley & Sons ISBN NO: 81–7758– 575-4
4. Velte T., Velte A., Elsenpeter R., “Cloud Computing – A practical Approach”, Tata McGrawHill.
5. Cloud Computing with Security, Naresh KumarSehgal, Springer, 2019

M.C.A. Part-II Semester III

Paper MCA-C12: Mobile Application Development

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**PCC- MCA-C12: Mobile Application Development**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Practical	**3 Hrs. + 4Hrs.**
Credits	**3 + 2**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**NA**
Practical: 4 Hr./Week	**POE: 50 Marks TW: 50 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Understand fundamentals of Android Application Development Environment.
2. Identify various components of Android Framework for developing mobile Applications.
3. Apply Android Application Framework for developing mobile Applications.
4. Analyze different security threats for android mobile applications.

Unit 1: Introduction to Android **12 HOURS**

Introduction to Mobile operating System, Android versions and its feature, Characteristics of Mobile Applications. Comparison between Android, Windows and IoS. Architecture & Environment: SDK, Android Development Tools, Android Virtual Devices, Emulators, Dalvik Virtual Machine, Android Directory Structure.

Unit 2: Android Application Framework **12 HOURS**

UI components: TextView, Buttons, Check Boxes and Radio Groups, Spinner, DatePicker, TimePicker. Android Menu: Option Menu, Context Menu, Popup Menu. Activity: Activity Lifecycle, Activity Example, View:GridView, WebView, ScrollView. Layout Manager: Relative Layout, Linear Layout, Table Layout, Grid Layout. Intent: Overview, Implicit Intents, Explicit Intents, Intents with Activities

Unit 3: Advanced Android Applications **12 HOURS**

SQLite Database: Creating SQLite Database, Creating, Updating, and Deleting Database Records, Closing and Deleting a SQLite Database. Telephony API: Telephony Manager, Get Call State, Making Phone Call, Send SMS, Send Email. Location API: Location API Fundamental, Example of Android Location API, Working with Google Maps.

Unit 4: Android Security **12 HOURS**

Mobile application threats: Working of mobile applications, Client-side vulnerabilities, Server-side vulnerabilities, Mobile application threats, Risks for users. Android Security: SystemLevel Security, Application Security, Application Security measures, Application Security Scans.

Reference Books:-

1. Android, P.K. Dixit, Vikas Publication
2. Android Application Development – BlackBook Pradip Kotari, Dreamtech
3. Composing Mobile Apps Learn, Explorer, Apply using Android Anubhav Pradhan, Anil Deshpande, Wiley.
4. Android Wireless Application Development By Lauren Darcey and Shane Conder, Pearson Education, 2 nd Edition.
5. Unlocking Android Developer's Guide By Frank Ableson and Charlie Collins and RobiSen, Manning Publication Co.
6. Android Security Internals: An In-Depth Guide to Android's Security Architecture 1st Edition, ElenkovNikolay, No Starch Press

M.C.A. Part-II Semester III

Paper MCA-C13: Data Analytics

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**PCC- MCA-C13: Data Analytics**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Practical	**4 Hrs. + 2 Hr.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 4 Hrs. /Week	**Theory: 100 Marks,** 70 (ESE) +30 (CIE)
Practical: 4 Hr./Week	**POE: 50 Marks TW: 50 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Understand basics of Data analysis.
2. Identify tools available for data analytics in python.
3. Evaluate different libraries of python for data analytics
4. Analyze visualization tools for graphical representation of data in python

Unit 1: Data Analytics **12 HOURS**

Data Analysis vs Data Reporting, Data Analysis Process, Types of Data Analysis, Characteristics of Data Analysis, Applications of Data Analysis, Python in Data Science-Introduction to Numpy, Pandas, SciPy, Matplotlib

Unit 2: NumPy Basics **12 HOURS**

Arrays and Vectorized Computation, The NumPyndarray: A Multidimensional Array Object, Universal Functions: Fast ElementWise Array Functions, Array-Oriented Programming with Arrays, File Input and Output with Arrays, Pseudorandom Number Generation

Unit 3: Pandas **12 HOURS**

pandas Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics, Data Loading, Storage, and File Formats-Reading and Writing Data in Text Format, Reading Text Files in Pieces, Writing Data to Text Format, Working with Delimited Formats, Web Scraping , Binary Data Formats, Reading Microsoft Excel Files.

Unit 4: Data Cleaning and Preparation **12 HOURS**

Handling Missing Data, Data Transformation, String Manipulation, Plotting and Visualization-matplotlib API Primer, Plotting with pandas

Reference Books:-

1. Introducing Data Science Big Data, Machine Learning, And More, Using Python Tools ,Davy Cielen,Arno D. B. Meysman, Mohamed Ali
2. Data Science from Scratch, Joel Grus
3. Python Data science HandBook
4. Python for Data Analysis 5. Data Wrangling with Pandas, NumPy, and Python
6. Python-for-Data-Analysis-2nd-EditionWes McKinney

M.C.A. Part-II Semester III

Paper MCA-C14: Data Mining

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**PCC- MCA-C14: Data Mining**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Practical	**4 Hrs. + 2 Hr.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 4 Hrs. /Week	**Theory: 100 Marks,** 70 (ESE) +30 (CIE)
Practical: 4 Hr./Week	**POE: 50 Marks TW: 50 Marks**

Course Outcomes:

Course Outcomes:

After completion of this course student should be able to

1. Describe the designing of Data Warehousing so that it can be able to solve the root level problems
2. Understand various tools of Data Mining and their techniques to solve the real time problems.
3. Develop ability to design various algorithms based on data mining tools and design of new Data Mining techniques.

Unit 1: Introduction **12 HOURS**

Classification, cluster analysis, outlier analysis, regression for predictive analysis, data mining applications. Data Pre-processing Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

Unit 2: Data Warehousing and Online Analytical Processing **12 HOURS**

Data Warehouse: Basic Concepts, Modeling: Data warehouse architecture, Data Cube and OLAP, Design and Usage, portioning strategies, data marting.

Unit 3: Association and Classification **12 HOURS**

Basic concepts, frequent item sets mining methods-Apriori algorithm, FP tree. Basic Concepts, Decision Tree Induction, ID3, C4.5, SLIQ algorithms, Bayes' Classification Methods, Rule-Based Classification

Unit 4: Cluster Analysis and Outlier Detection **12 HOURS**

Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering. Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches.

Text Books:

1. Data mining - Concepts & Techniques, Jiawei Han, Micheline Kamber, Jian Pei,3rd Ed.2012, MK publications.
2. Data Warehousing in the Real World-Sam Anahory, Dennis Murray, 3rd Ed. 2008, Pearson Education.

Reference Books:

1. Mastering Data Mining- Michael J. A. Berry, Gordon S. Linoff, 2nd Edition Wiley publications.
2. Fundamentals of Database Systems, Navathe and Elmasry, Addison Wesley, 2000
3. Oracle 8i Data Warehousing, Michale Corey, Michale Abbey, Tata McGraw Hill

M.C.A. Part-II Semester III

Paper MCA-C15: Big Data Analytics

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**PCC- MCA-C15: Big Data Analytics**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Practical	**4 Hrs. + 2 Hr.**
Credits	**4 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 4 Hrs. /Week	**Theory: 100 Marks,** 70 (ESE) +30 (CIE)
Practical: 4 Hr./Week	**POE: 50 Marks TW: 50 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Understand the Big Data challenges.
2. Gain conceptual understanding of NOSQL Database, map and reduce and functional programming.
3. Apply concepts of Hadoop Distributed File System.

Unit 1: "Big Data" in the Enterprise **12 HOURS**

Big Data Concepts, Challenges. Opportunities from Big Data Enterprise Information Management: New Approach to Enterprise Information Management for Big Data, Capabilities needed for Big data Big Data Implications for Industries Big Data Analytics for Telecom/Banking/Retail/HealthCare/IT/Operations.

Unit 2: Data Modelling **12 HOURS**

Understanding data integration Pattern Big Data Workload Design Approaches Map-Reduce patterns, Algorithms and Use Cases. Introduction of NoSQL Database concepts: ACID Vs. BASE, Advantages, Where Applicable, Schema, Two Phase Commit, Sharding and Share Nothing Architecture, NoSQL Databases, Brewers CAP Theorem, Features and comparisons of few NOSQL Databases (Cassandra, MongoDB, Cloudera, CouchDB, HBase)

Unit 3: Hadoop Framework **12 HOURS**

Hadoop Architecture, History of Hadoop – Facebook, Dynamo, Yahoo, Google Components Of Hadoop Framework :HDFS, MAP Reduce Introduction to Pig, Hive, Mahout Installation of Single Node cluster-installation of Java, Hadoop Configuration.

Unit 4: Big Data Analytics Methodology **12 HOURS**

Big data Analytics Methodology- Analyse& Evaluate Business Cases Develop Business Hypothesis-Analyse outcomes, Build & Prepare Data sets, Select & Build Analytical Model, Design For Big data Scale, Build production ready System, Setting up the Big Data Analytics System, Gathering data, Measure & Monitor. Extracting Value From Big Data: Real time Analytics, Apache Spark, In-Memory Data Grid for Real time Analysis , Map Reduce & Real Time Processing ,Use Case.

Text Books:

1. Madhu Jagadeesh, Soumendra Mohanty, Harsha Srivatsa, “Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics”, 1st Edition, A press (2013)

Reference Books:

1. Frank J. Ohlhorst, “Big Data Analytics: Turning Big Data into Big Money”, Wiley Publishers (2012)
2. Cristian Molaro, Surekha Parekh, Terry Purcell, “DB2 11: The Database for Big Data &Analytics”,MC Press, (2013)
3. Tom White, “Hadoop –The Definitive Guide, Storage and analysis at internet scale”,SPD,O’Really

M.C.A. Part-II Semester III

Paper MCA-C16: Minor Project

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester III**
Course Code and Course Title	**PCC- MCA-C16: Minor Project**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Practical	**8 Hrs.**
Credits	**4**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: NA	**NA**
Practical: 4 Hr./Week	**POE: 100 Marks TW: 100 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Identify the problem in existing system.
2. Develop SRS document for proposed system.
3. Develop application using appropriate technology platform.
4. Validate the developed application

A group of maximum two students prepare a mini project under the guidance of internal guide. Project report will be evaluated by the internal teacher out of 20 marks and there will be viva-voce examination for 80 marks. The student should prepare the project report based courses studied in Semester I, Semester II and Semester III. Guidelines of Major Projects should be followed except industry certificate, joining report and industry work progress report.

M.C.A. Part-II Semester IV

Paper MCA-C17: Cyber Security

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**PCC- MCA-C17: Cyber Security**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 25 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Understand the fundamentals of Cyber security vulnerabilities.
2. Demonstrate different Cyber Security techniques.
3. Apply different Internet and Cyber Security Controls.
4. Describe Information Technology Act 2000.

Unit 1: Introduction to Cyber Security Vulnerabilities 12 HOURS

Introduction to Cyber space and security, Internet Security, Cloud Computing &Security, Social Network sites security, Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Authorization, Unprotected Broadband communications, Cyber Security Awareness.

Unit 2: Cyber Security Techniques 12 HOURS

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography . Overview of Firewalls Types of Firewalls. Intrusion detection system: Types of Intrusion Detection System, Features and limitations. Intrusion prevention system: Honeypots, Types of Honeypots, Introduction to Honeynets.

Unit 3: Internet Security Controls 12 HOURS

Internet Security: Secure Socket Layer (SSL), Secure Hypertext Transfer Protocol(S/HTTP), IPSec, Secure Multipurpose Internet Mail 15Periods 6 Extensions(S/MIME). Web browser security: Filtering services in web browser. E-mail Security:, Encryption for Secure E-Mail, Secure E- Mail System: PGP (Pretty Good Privacy), S/MIME (Secure Multipurpose Internet Mail Extensions); Cyber Security Standards: ISO/IEC 27032, NIST- CSF

Unit 4: Cyber Law **12 HOURS**

Introduction to Cyber Laws, Why do we need Cyber law: The Indian Context, Three Bodies of Law, Types, Levels, Computers Related Laws, Cybercrime and the Indian ITA 2000 and amendments, Honeypots, The Indian Penal Code (IPC) 1860, Mapping of Cybercrime with IT Act, Technology and Students: Indian Scenario.

Reference Books:-

1. Charlie Kaufman and Radia Perlman, Mike Speciner, “Network Security, Second Edition,
2. Private Communication in Public World”, PHI 2002.
3. Tony Bradley, “Essential Computer Security: Everyone’s Guide to Email, Internet and
4. Wireless security”, Syngress Publication 2006.
5. Behrouz A. Ferouzan, “Cryptography & Network Security”, Tata McGraw Hill, 2007.
6. Information & Network Security for GTU, I. A. Dhotre V. S. Bagad, Technical publication,
7. Cyber frauds, cyber crimes and law in India, Pavan duggal.
8. Digital forensics, DSCI.Nasscom, 2012.
9. Cyber crime investigation, DSCI.Nasscom, 2013 Other resources.
10. Dr. Farooq Ahmad, Cyber Law in India, Allahbad Law Agency- Faridabad.

M.C.A. Part-II Semester IV

Paper MCA-C18: Digital Forensics

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**PCC- MCA-C18: Digital Forensics**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 25 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Understand concepts and comprehension of digital forensic as a profession.
2. Apply the technical tools and techniques used in the field of digital forensics to evaluate an emerging issue in computer and cyber forensics.
3. Analyze the position or arguments around the issue, and present his/her knowledge in a written logical professional manner.

Unit 1: Introduction of Cyber Crime and Digital Evidences **12 HOURS**

Types, The Internet spawns crime, Computers' roles in crimes, Prevention of Cybercrimes, A global Perspective on cybercrimes, Digital Forensics: Historical Background of Digital Forensics, Importance of Digital Forensics, Digital Forensics Rules, Digital Forensics Investigation, DF Investigation Processes/Models/Framework. Digital Evidences and its rules, Digital Evidence Characteristics, Types, Challenges in Evidence Handling, Volatile Evidences, Evidence Handling Procedures. Incident Response: Overview of Incident Response, People involved in Incident Response Process, Incident Response Methodology, Activities in Initial Response, Phase after detection of an incident.

Unit 2: Data Collection: **12 HOURS**

Introduction to Data Collection, People Involved in Data Collection Techniques, Live Data Collection, Data Collection from Windows, Unix. Forensic Duplication: Forensic Duplication Rules, Need of Forensic Duplication, Forensic Duplicates as Admissible Evidence, Important Terms, Forensic Duplication Tools, Creating a Forensic Duplicate of a Hard Drive.

Unit 3: Network Forensics and Data Analysis. 12 HOURS

Introduction to Intrusion Detection System, Types of Intrusion Detection System, Advantages and Disadvantages of IDS, Understanding Network Intrusions and Attacks, Recognizing Pre-Intrusion/Attack Activities, Port Scans, Address Spoofing, Attacking with Trojans, Viruses and Worms, Kerberos, Collecting Network-Based Evidence. Email Forensics, Mobile Phone Forensics, Cloud Forensics Digital Forensics Tools. Data Analysis: Data Analysis Techniques, Forensic Analysis of File Systems Report Writing: Goals of Report, Investigative Report Layout, Guidelines for Report Writing.

Unit 4: Cyber Law 12 HOURS

Introduction to Cyber Laws, Why do we need Cyber law: The Indian Context, Three Bodies of Law, Types, Levels, Computers Related Laws, Cybercrime and the Indian ITA 2000 and amendments, Honeypots, The Indian Penal Code (IPC) 1860, Mapping of Cybercrime with IT Act, Technology and Students: Indian Scenario.

Reference Books:-

1. Indian Computer Emergency Response Team https://www.cert-in.org.in/
2. CDAC, Cyber Security and Cyber Forensics, https://www.cdac.in/index.aspx?id=cyber_security
3. Maharashtra Judicial Academy and Indian Mediation Centre and Training Institute http://mja.gov.in/Site/Home/Index.aspx
4. Secure India- A Group of Cyber Security Specialists http://www.secureindia.in/
5. Resource Centre for Cyber Forensics – India http://www.cyberforensics.in
6. Cyber Law of India http://www.cyberlawsindia.net
7. International Forensic Sciences Education Dept. (Forensic Sciences and Investigation Courses) http://www.ifs.edu.inhttp://www.forensic.co.in/
8. Computer Forensic Training Centre Online http://www.cftco.com/
9. Digital Forensic Magazine http://www.digitalforensicsmagazine.com/
10. The Journal of Digital Forensics, Security and Law https://commons.erau.edu/jdfsl/

M.C.A. Part-II Semester IV

Paper MCA-C19: Information Security

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**PCC- MCA-C19: Information Security**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 25 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Understand various concepts of Cryptography and authentication.
2. Explain Digital certificates and Cryptography standards.
3. Get awareness of Internet and Web Security.
4. Get awareness of Database and OS Security.

Unit 1: Introduction to Information Security **12 HOURS**

Introduction to Information Security, principles, services and attacks, functional requirements of security, current trends in security. Need for security, Security approaches.

Unit 2: Cryptography and Authentication **12 HOURS**

Concept: Symmetric and Asymmetric Cryptography. Mathematics of cryptography: Modular Arithmetic Additive Inverse, Multiplicative Inverse, Euclidean Algorithm and Extended Euclidean Algorithm,Stream Cipher and Block Cipher, Concept of Confusion and Diffusion. Modes of Operation of Block Cipher: ECB, CBC, OFB, CFB, DES, RSA. **Authentication:** Types of authentication, Biometric Authentication and Third Party Authentication using KDC and Kerberos Version 5, Mutual authentication, reflection attack.

Unit 3: Digital certificates and integrity **12 HOURS**

Concept, Compare Digital Signature with Public Key Cryptography, Digital Signature Schema,Public Key Infrastructure (PKI): Private key management, Public Key Cryptography Standards (PKCS). Digital Certificate Creation Steps, X.509 Certificate, Certificate Revocation. Message Integrity, Hash functions Properties Algorithm: MDC, MAC, HMAC, MD5, and SHA - 512

Unit 4: Internet security, web security, database security and OS Security 12 HOURS

SSL, IPSec, Email Security- PGP, Email attacks Web services Security: web app versus web service concept, WS-Security, SOAP web service, SAML assertion, Browser attacks, web attacks targeting users, obtaining user or website data. Introduction to database, Security requirements of database, sensitive data, Database access control, inference, Security in operating systems: Operating System Structure, Security Features of Ordinary Operating Systems, Operating System Tools to Implement Security Functions, Rootkit: Phone Rootkit, Sony XCP Rootkit, TDSS Rootkits

Reference Books:-

1. Principles of Information Security by Michael E. Whitman and Herbert J. Mattord
2. Elementary Information Security by Richard E. Smith
3. Fundamentals of Information Systems Security By David Kim and Michael G. Solomon
4. Information Security: Principles and Practice By Mark Stamp

M.C.A. Part-II Semester IV

Paper MCA-C20: Enterprise Resource Planning

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**PCC- MCA-C20: Enterprise Resource Planning**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 25 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Make basic use of Enterprise software, and its role in integrating business functions
2. Analyze the strategic options for ERP identification and adoption.
3. Design the ERP implementation strategies.
4. Create reengineered business processes for successful ERP implementation.

Unit 1: Introduction To ERP **12 HOURS**

What is ERP, Why ERP, Need for Enterprise Resource Planning, Definition of ERP, Evolution of Enterprise Resource Planning, Pre material requirement planning (MRP stage) Material requirement planning, MRP- II, ERP, Extended ERP, ERP Planning –II, ERP-A manufacturing perspective, Risks and benefits – ,Risk implementation, Fundamental technology of ERP Issues to be consider in planning design and, implementation of cross functional integrated ERP systems.

Unit 2: ERP Solution and Functional Modules **12 HOURS**

Overview of ERP software solutions, Small, medium and large enterprise vendor solutions, Business process Reengineering, Business process Management, Steps of BPM, Functional Modules, ERP Production planning module, ERP purchasing module, ERP Inventory control module, ERP Sales module, ERP Marketing module, ERP Financial module, ERP HR module

Unit 3: ERP Implementation **12 HOURS**

Planning Evaluation and selection of ERP systems, ERP Implementation life cycle, Pre-evaluation Screening, Package Evaluation, Project Planning Phase, Gap-Analysis, Reengineering, Configuration Implementation Team Training, Testing, Going Live, End-user training, Post – implementation, ERP implementation, Methodology and Frame work, Training, Data Migration, People Organization in implementation, Consultants and Vendors, Employees.

Unit 4: Post Implementation **12 HOURS**

ERP Implementation, Maintenance of ERP, Organizational and Industrial impact, Success factors of ERP Implementation, Key success factors, Failure factors of ERP Implementation.

Text Books:

1 Enterprise Resource Planning – Alexis Leon – Second Edition – TMH
2. Enterprise resource planning, Vinod Kumar Garg, N. K. Venkita Krishna, 2nd Edition , PHI, 2003
3. ERP in practice – Vaman – TMH

Reference Books:

1. Enterprise Resource Planning Systems, Daniel E.O'Leary, Cambridge University Press,2002
2. Concepts in Enterprise resource planning, Ellen Monk, Bret Wagner, Cengage learning, Third edition, 2009.
3. Essentials of Business Processes and Information Systems, by Simha R. Magal and Jeffrey Word ,2010,
4. ERP-A Managerial Perspective, S. Sadagopan, McGraw Hill

M.C.A. Part-II Semester IV

Paper MCA-C21: E-Governance

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**PCC- MCA-C21: E-Governance**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks,** **70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 25 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Gain a familiarity with the basic concepts, terminology and technology of egovernment.
2. In-depth understanding of e-governance and the necessary experience to ensure successful implementation of the same.
3. Increased confidence to drive change and operate online management through egovernance within your organization.
4. A more secure career by introducing the newest form of governance within the organization, in turn, building one's competency and competitiveness with market standards.
5. Develop skills to critically evaluate E-readiness and strategies

Unit 1: Introduction **12 HOURS**

Overview of E-Government and E-Governance, Stages of E-Governance, National E- Governance Plan (NeGP), Mission Mode Projects and their implementation status, E-Governance , Introduction to E-governance, Role of ICT's in e-governance, Need, importance of E-governance. Categories of E-governance, Key Issues of E-Governance, Technology, Policies, Infrastructure, Training, Copyrights , Consulting Funds, E-governance Models, Model of Digital Governance, Broadcasting /Wider Dissemination Mode.

Unit 2: E Governance Models **12 HOURS**

Critical Flow Model, Interactive-service model/Government –to-Citizen-toGovernment Model (G2C2G), Major areas of E-governance Services, Public Grievances: Telephone, Ration card, transportation, Rural services Land Records, Police: FIR registration, Lost and found, Social services: Death, domicile, school certificates

Unit 3: E Governance use at Public and Commercial places. **12 HOURS**

Public information: employment, hospitals, railway, Agricultural sector: Fertilizers, Seeds, Utility payments Electricity, water, telephone, Commercial: income tax, custom duty, excise duty-Governance Infrastructure, stages in evolution and strategies for success, -Governance Infrastructure, stages in evolution and strategies for success.

Unit 4: Preparedness and Challenges **12 HOURS**

Human Infrastructural preparedness, Challenges against E-governance, Study of E-governance initiatives in Indian states, E-readiness, Legal Infrastructural preparedness.

Text Books:

1 Governance.Com: Democracy in the Information Age, Elaine CiullaKamarck
2 Egov: E-business Strategies for Government by Douglas Holmes

Reference Books:

1 Electronic Government: Design, Applications and Management, AkeGronlund (Editor).
2 Gordon, E. (2013). Beyond Participation: Designing for the Civic Web. Journal of Digital and Media Literacy, 1(1). Available at: http://www.jodml.org/2013/02/01/design-for-civic-web/
3 Reinventing Government in the Information Age : International Practice in ITenabled Public Sector Reform, Richard Heeks(Editor),Routledg,January 2001
4 Silcock, R. (2001). What is e-government?. Parliamentary Affairs, 54, 88-101
5 Wong, K., Fearon, C. & Philip, G. (2007). Understanding e-government and egovernance: Stakeholders, partnerships and CSR

M.C.A. Part-II Semester IV

Paper MCA-C22: Business Intelligence

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**PCC- MCA-C22: Business Intelligence**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Lectures + Tutorial	**3 Hrs. + 1 Hr.**
Credits	**3 + 1**
Evaluation Scheme ESE + CIE for Theory	**70 (ESE) + 30 (CIE)**

Teaching scheme	**Examination scheme**
Lectures: 3 Hrs. /Week	**Theory: 100 Marks, 70 (ESE) +30 (CIE)**
Tutorial: 1 Hr./Week	**TW: 25 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Use BI systems and technology to support decision making.
2. Design and build BI applications based on user's needs
3. Identify business and technical requirements for a BI solution

Unit 1: Introduction **12 HOURS**

Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

Unit 2: Knowledge Delivery and Efficiency **12 HOURS**

The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization. Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis

Unit 3: Mathematical models for decision making **12 HOURS**

Structure of mathematical models, Development of a model, Classes of models, Notes and readings. Introduction to m-commerce: Emerging applications, different players in mcommerce, m-commerce life cycle Mobile financial services, mobile entertainment services, and proactive service management

Unit 4: Business Intelligence Applications **12 HOURS**

Marketing models – Logistic and Production models – Case studies.

Text Books:

1 Carlo Vercellis, “Business Intelligence: Data Mining and Optimization for Decision Making”, 1st edition, Wiley Publications, 2009.
2 Larissa T. Moss, S. Atre, “Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making”, 1stedition, Addison Wesley, 2003.

Reference Books:

1 David Loshin Morgan, Kaufman, “Business Intelligence: The Savvy Manager’s Guide”, Second Edition, 2012.
2 Cindi Howson, “Successful Business Intelligence: Secrets to Making BI a Killer App”, 1st edition, McGrawHill, 2007

M.C.A. Part-II Semester IV

Paper MCA-C23: Major Project

(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**PCC- MCA-C23: Major Project**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Practical	**20 Hrs.**
Credits	**10**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: NA	**NA**
Practical: 20 Hr./Week	**POE: 200 Marks TW: 100 Marks**

Course Outcomes:

After completion of this course student should be able to

1. Identify the problem in existing system and develop SRS.
2. Understand the industrial line of work and corporate work culture.
3. Select appropriate technology platform for problem solving
4. Develop application using appropriate technology platform.
5. Test developed application for user acceptance.
6. Write project report in professional format.

Guide Lines for Projects:

A student has to take project work at the end of third semester of MCA

1. For major project student should go for in-plant training of 90 days after completion of semester III.
2. Project report will be submitted to institute/department before university examination of 4th Semester.
3. Project work will be done individually and students should take guidance from assigned guide and prepare a Project Report on “Project Work" to be submitted to the Head of the Department.
4. Acceptance/Rejection of Project Report:
    a. The student should submit progress report with draft project report to the guide.
    b. Respective guide has right to suggest modifications for resubmission or accept the project.
    c. Only on acceptance of draft project report, the student should make the final copy.

Following format for the submission of the Project Report.

a. Paper:

The Report shall be typed on white paper, A4 size, for the final submission. The report to be submitted must be original and subsequent copies may be photocopied on any paper.

b. Typing:
The typing shall be of standard letter size, 1.5 spaced and on both side of the paper. (Normal text should have Times New Roman, Font size 12. Headings can have bigger size)
c. Margins: The typing must be done in the following margins: Left -----1.5 inch, Right ----- 1 inch Top ----- 1 inch, Bottom ----- 1 inch
d. Front Cover: The front cover should contain the following details:
TOP: The title in block capitals of 6mm to 15mm letters.
CENTRE: Full name in block capitals of 6mm to 10mm letters.
BOTTOM: Name of the University, Course, Year of submission -all in block capitals of 6mm to 10mm letters on separate lines with proper spacing with center alignment.
e. Blank Sheets: At the beginning and end of the report, two white black papers should be provided, one for the purpose of binding and other to be left blank.

Documentation Format
a) Cover Page
b) Institute/College Recommendation
c) Organization Certificate
d) Guide Certificate
e) Declaration
f) Acknowledgement
g) Index

Chapter Scheme
1) Introduction to Project
- Introduction
- Existing System
- Need and scope of Computer System
- Organization Profile (Optional & applicable for live project only)

2) Proposed System
- Objectives
- Requirement Engineering.
    - Requirement Gathering
    - Software Requirements

3) System Analysis
- System Diagram
    - DFD
    - ERD

Note: Use advanced tools and techniques as per requirement.

4) System Design
- Database Design
- Input Design & its samples
- Output Design (on screen)

5) Implementation

- System Requirement
- Hardware
- Software
- Installation process
- User Guideline

6) Reports (with valid Data)

(Minimum 6-10 reports)

7) Conclusion and Suggestions

- Conclusion
- Limitations
- Suggestion

Annexure

- Source code (Include Main Logic source code)
- Questioner/Schedule (if used)
- Joining Report, Progress Reports, Student Guide Meet Record

JOINING REPORT FORMAT

Date:

To,

The Director/Principal,

……..

……..

…….

Sub: Joining Report

Respected Sir,

I, Shri/Ms. ……have joined ……. for the summer in-plant training from ..... for the Project Work to be carried out.

I would be carrying out project work under the guidance and supervision of Shri. /Ms. ……. (Designation) ……in ……area. The title of my project work is……

I shall join the college immediately after completion of my training i.e. on …….. without fail.

(Name & signature of the Student) (Name & Signature of Industry Guide)

Seal of Organization

WEEKLY PROGRESS REPORT

Weekly Progress Report No.

Name of Student	
Title of the Project	
Name of Guide	
Organization	
Date of Joining Organization	
Date of Progress Report	
Period Of Progress Report	
Progress:	

Signature of Student

Signature of Industry Guide

GUIDE STUDENT MEETING RECORD

Student Name: Guide Name:
Contact No.
Contact No.
Topic
Industry Name: -
Industry Guide name:-.

Designation:-
Contact No:-

Sr.	Date	Description	Signature of Institute Guide	Signature of Student
1		Problem Identification , Topic finalization Submission of synopsis. (First week of inplant training)		
2		SRS submission and approval (Fourth week of Inplant training)		
3		Logical Design of System (DFD, System flowchart, ERD, UML diagram, Decision tables, Decision tree etc.which is applicable) (Fifth week of Inplant training)		
4		Database Design (Sixth week of Inplant training)		
5		I/O Design (Eight week of Inplant training)		
6		Submission of First Draft. (Second Week of Sem III)		
7		Submission of Second Draft (Fifth Week of Sem III)		
8		Submission of Final Draft (Tenth Week of Sem III)		
Sr No	**Date**	**Description of Discussion**	**Signature of Guide**	**Signature of Student**
1				
2				
3				
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12				

Head of Department

M.C.A. Part-II Semester IV
Paper MCA-C24: Seminar
(Choice Based Credit System)

Course Details:

Course Details Class	**Second Year M.C.A. Semester IV**
Course Code and Course Title	**PCC- MCA-C24: Seminar**
Prerequisites	**Computer Fundamentals**
Teaching scheme: Practical	**12 Hrs.**
Credits	**6**
Evaluation Scheme ESE + CIE for Theory	**NA**

Teaching scheme	**Examination scheme**
Lectures: NA	**NA**
Practical: 12 Hr./Week	**POE: 100 Marks TW: 50 Marks**

Course Outcomes:
After completion of this course student should be able to
1. to 1. To develop and support a relevant and informed thesis, or point of view, that is appropriate for its audience, purpose, discipline, and theme.
2. To demonstrate effective writing skills and processes by employing the rhetorical techniques of academic writing, including invention, research, critical analysis and evaluation, and revision.
3. To incorporate and document appropriate sources in accordance with the formatting style proper for the discipline and effectively utilize the conventions of standard written English.

Nature of Seminar
The aim of this seminar is to make the students to study regarding industrial project. They are expected to go through the latest trend pertaining to computer and allied fields, to do the literature survey and deliver the seminar on their work done in an industrial project. The other important aim of the seminar is to encourage and develop the personality, aptitude and knowledge of the students

1. Seminar work should be continually evaluated based on the contributions of an individual student, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Three mid-term evaluations should be done, which includes presentations and demos of the work done.

Project Report Format:
1. Page Size: Trimmed A4
2. Top Margin: 1.00 Inch
3. Bottom Margin: 1.32 Inches

4. Left Margin: 1.5 Inches
5. Right Margin: 1.0 Inch
6. Para Text: Times New Roman 12 Point Font
7. Line Spacing: 1.5 Lines
8. Page Numbers: Right Aligned at Footer. Font 12 Point. Times New Roman
9. Headings: Times New Roman, 14 Point Bold Face
10. Certificate: All students should attach standard format of Certificate as described by the department. Certificate should be awarded to batch and not to individual student. Certificate should have signatures of Guide, Head of Department and Principal/ Director.
11. Index of Report:
a. Title Sheet
b. Certificate
c. Acknowledgement
d. Table of Contents
e. List of Figures
f. List of Tables
12. References: References should have the following format
For Books: "Title of Book", Authors, Publisher, Edition
For Papers: "Title of Paper", Authors, Journal/Conference Details, Year

Useful Links:

- **http://www.geeksforgeeks.org/**
- **https://in.udacity.com/**
- **https://graphics.stanford.edu/~seander/bithacks.html**
- **https://www.youtube.com/results?search_query=mycodeschool**
- **https://www.hackerrank.com/**