



SHIVAJI UNIVERISTY, KOLHAPUR-416 004. MAHARASHTRA
PHONE : EPABX-2609000 website- www.unishivaji.ac.in
FAX 0091-0231-2691533 & 0091-0231-2692333 – BOS - 2609094
शिवाजी विद्यापीठ, कोल्हापूर – 416004.
दुरध्वनी (ईपीएबीएक्स) २६०९०००० (अभ्यास मंडळे विभाग- २६०९०९४)
फॅक्स : ००९१-०२३१-२६९१५३३ व २६९२३३३.e-mail:bos@unishivaji.ac.in

Ref./SU/BOS/Com & Mgmt./ **No 0 0 3 1 8**

Date : 16/09/2021

To,

The Principal
All Affiliated (Commerce & Management) Colleges/Institutions,
Shivaji University, Kolhapur

Subject : Regarding Syllabi of MCA Part-II (Sem-III/IV) Choice Based Credit System (CBCS) degree programme under the Faculty of Commerce & Management.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the University authorities have accepted and granted approval to the revised syllabi of **MCA Part-II (Sem-III/IV) Choice Based Credit System (CBCS)** under the Faculty of Commerce & Management.

This syllabi shall be implemented from the academic year **2021-2022** onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in (Student - Online Syllabus).

The question papers on the pre-revised syllabi of above mentioned course will be set for two examination These chances are available for repeater students, if any.

You are therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Yours faithfully,


Dy. Registrar

Encl : As above

Copy to,

1. I/c Dean, Faculty of Commerce & Management
 2. Chairman, Board of Studies
 3. Director, BOEE
 4. Appointment Section
 5. P. G. Admission Section
 6. B.Com and O. E. 1 Section
 7. Affiliation Section (U.G./P.G.)
 8. Computer Center/I.T.
 9. Eligibility Section
 10. Distance Education
 11. P.G. Seminer Section
- for information
- for information and necessary action.

SHIVAJI UNIVERSITY, KOLHAPUR.



Estd. 1962

NAAC "A++" Grade

Faculty of Commerce and Management

Syllabus For

MCA Part II (Sem III & IV) (CBCS)

(To be implemented from June 2021 onwards)

(Subject to the modifications that will be made from time to time)

MCA Part II Syllabus w.e.f. 2021-22

M.C.A. Part-II Semester III Paper CC301: Java Programming (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to- 1. Explain and Apply the Object Oriented Concepts for Solving Real Problem. 2. Create, Debug and Run Simple Java Programs using the Java SDK Environment. 3. Develop the Small Applications using networking and Multithreading. 4. Apply Events Management and Layout Managers Using AWT, Swing for Developing the Software for Various Problems.		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	Java Basics Features of Java, Java Virtual Machine (JVM), JDK , JRE and JIT , Primitive Data Types, Java Operators, Type Casting , Control Flow and Looping statements, Classes: Objects, Instance and static Members, Methods, Wrapper Classes ,Final, Nested , Inner and Anonymous Classes , Constructor, Overloading, Overriding, this, super and final keywords , Abstract classes and Interfaces,, Arrays, Exception Handling in Java, Java Garbage Collection.		15Periods
Unit 2:	Java Packages and Java Input Output Java Packages: Package ,Sub packages Creation , JAR Files and Packages, Java-API Packages, String, StringBuffer, StringBuilder Class, Math, Date and Time class in Java, Collection Framework–List, Set & Map interfaces–Using Vector, ArrayList, StackTransitions. Java Input Output: FileOutputStream, FileInputStream,		15 Periods

	FileWriter & FileReader BufferedReader and BufferedWriter, Creating ,Reading and Writing streams, File, Random-access file, Serialization	
Unit 3:	<p>Multi Threading and Networking in Java</p> <p>Multi Threading: Overview of Threads, the Main Thread, Thread Creation, Synchronization, Thread Priorities, Synchronizing Threads.</p> <p>Networking in Java: Client and Server programming, Connection oriented and connectionless architectures, Socket, IP address classes. InetAddress, URL and URLConnection classes.</p>	15 Periods
Unit 4:	<p>Swing and Event Handling</p> <p>Swing: Components hierarchy, Panes, Individual Swings componentssuch as JButton, JTextField, JTextArea, JRadioButton, JCheckbox, JMenu, JColorChooser. Graphics in swing.</p> <p>Event Handling: Event-Handling Mechanism with Swing ,Event Classes and its methods, Adapter Classes, Working with Listeners</p>	15 Periods
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Core Java Volume I – Fundamentals, Cay S. Horstmann, 11th Edition, Prentice Hall 2. Java - The Complete Reference, Herbert Schildt, 11th Edition, McGraw Hill Education 3. Java Concurrency in Practice, Brian Goetz with Tim Peierls, Joshua Bloch, Joseph Bowbeer, David Holmes, and Doug Lea, 1st Edition, Addison-Wesley Professional 4. Effective Java, Joshua Bloch, 3rd Edition, Addison Wesley 5. Learning Java, 4th Edition, Patrick Niemeyer, Daniel Leuck, 2013, O'Reilly 		

M.C.A. Part-II Semester III Paper CC302:Data Analytics (Choice Based Credit System)			
Course	After completion of this course student should be able to-		
Outcomes	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		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	Data Analytics: 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		15Periods
Unit 2:	NumPy Basics: Arrays and Vectorized Computation, The NumPyndarray: A Multidimensional Array Object, Universal Functions: Fast Element-Wise Array Functions, Array-Oriented Programming with Arrays, File Input and Output with Arrays, Pseudorandom Number Generation		15 Periods
Unit 3:	Pandas 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,		15 Periods
Unit 4:	Data Cleaning and Preparation -Handling Missing Data, Data Transformation, String Manipulation, Plotting and Visualization-matplotlib API Primer, Plotting with pandas		15 Periods

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 CC303 : Cyber Security (Choice Based Credit System)		
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.	
Marks:100	Total Hours of Teaching: 60 University Exam :70	Internal : 30
Syllabus Contents:		
Unit 1:	Introduction to Cyber Security Vulnerabilities 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.	15Periods
Unit 2:	Cyber Security Techniques 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.	15Periods
Unit 3:	Internet Security Controls Internet Security: Secure Socket Layer (SSL), Secure Hypertext Transfer Protocol(S/HTTP), IPSec, Secure Multipurpose Internet Mail	15Periods

	<p>Extensions(S/MIME).</p> <p>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);</p> <p>Cyber Security Standards: ISO/IEC 27032, NIST- CSF</p>	
Unit 4:	<p>Cyber Law</p> <p>Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace. Digital laws and legislations, National Cyber Security Policy, Information Technology Act, 2000, Cyber crimes under IPC acts. Legal issues and challenges in India.</p> <p>Role of CERT-In(Indian Computer Emergency Response Team) in Cyber security.</p>	15Periods
<p>Reference Books:-</p> <ol style="list-style-type: none"> 1. Charlie Kaufman and Radia Perlman, Mike Speciner, “Network Security, Second Edition, Private Communication in Public World”, PHI 2002. 2. Tony Bradley, “Essential Computer Security: Everyone’s Guide to Email, Internet and Wireless security”, Syngress Publication 2006. 3. Behrouz A. Ferouzan, “Cryptography & Network Security”, Tata McGraw Hill, 2007. 4. Information & Network Security for GTU, I. A. Dhotre V. S. Bagad, Technical publication, 5. Edition 2018. 6. Cyber frauds, cyber crimes and law in India, Pavan duggal. 7. Digital forensics, DSCI.Nasscom, 2012. 8. Cyber crime investigation, DSCI.Nasscom, 2013 Other resources. 9. Dr. Farooq Ahmad, Cyber Law in India, Allahbad Law Agency- Faridabad. 10. J.P. Sharma, Sunaina Kanojia, Cyber Laws. 11. Harish Chander , Cyber Laws and IT Protection . 12. Justice Yatindra Singh , Cyber Laws . 13. Prof. R.K. Chaubey, An Introduction to cyber-crime and cyber law. 		

16. Garima Tiwari, Understanding Laws.
17. Karnika Seth, Justice Altamas Kabir, Computers Internet and New Technology Laws.
18. <https://sourcedaddy.com/networking/worm.html> .
19. https://www.tutorialspoint.com/information_security_cyber_law/useful_resources.htm.

M.C.A. Part-II Semester III Paper DSE304: 1. Cloud Computing (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 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. 		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	Introduction to Cloud Computing: 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.		15Periods
Unit 2:	Abstraction and Virtualization: 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		15 Periods
Unit 3:	Securing the Cloud: Administrating the Clouds, Cloud Management Products,		15 Periods

	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: 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	15 Periods
<p>Reference Books</p> <ol style="list-style-type: none"> 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 McGraw-Hill. 5. Cloud Computing with Security, Naresh KumarSehgal, Springer, 2019 		

M.C.A. Part-II Semester III Paper DSE 304:2. Digital Forensics (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to- 1. Understand basic and advanced concepts of Forensic Science. 2. Analyze need of Evidence Collection in computer forensics. 3. Identify role of Computer forensic analysis and validation. 4. Evaluate different Computer Forensic Tools.		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	Introduction Digital Forensic Computer Forensics Fundamentals: Introduction, Use of Computer Forensics in Law Enforcement, Human Resources / Employment Proceedings, Computer Forensics Services, Benefits of professional Forensics Methodology, Steps taken by Computer Forensics Specialists. Types of Computer Forensics Technology: - Types of Business, Military, Law Enforcement Computer Forensics Evidence and capture: Data Recovery Defined-Data Back-up and Recovery, The Role of Back -up in Data Recovery, The Data -Recovery Solution.		15Periods
Unit 2:	Evidence Collection and Data Seizure: Need of Evidence, Collection Options Obstacles, Types of Evidence, The Rules of Evidence, Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collections, Art facts, Collection Steps, Controlling Contamination: The chain of custody. Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene-Computer Evidence processing steps-Legal Aspects of collecting and Preserving Computer forensic Evidence.		15 Periods

	Computer image Verification and Authentication: Special needs of Evidential Authentication, Practical Consideration, Practical Implementation.	
Unit 3:	<p>Digital Forensic Analysis and Validation:</p> <p>Determining what data to collect and analyze, validating forensic data, addressing data-hiding techniques, performing remote acquisitions.</p> <p>Network Forensics: Network forensic overview, performing live acquisitions, developing standard procedures for network forensics, extracting logs, cross log analysis with the help SIEM tools.(SPLUNK/SNORT)</p> <p>Processing crime at incident scenes: Identifying digital evidence, collecting evidence in private-sector incident scenes, processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scene, seizing digital evidence at the scene, storing digital evidence, obtaining a digital hash, reviewing a case.</p>	15 Periods
Unit 4:	<p>Digital Forensic Tools:</p> <p>Evaluating need of computer forensic tool, computer forensic software tools and computer forensic hardware tools.</p> <p>E-mail investigations: Exploring the role of email in investigations, exploring the role of client and server in email, investigating email crimes and violations, understanding email servers, using specialized email forensic tools.</p> <p>Cell phone and mobile device forensics: Understanding mobile device forensic, understanding acquisition procedures for cell phones and mobile devices.</p>	15 Periods
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Cyber Eye : The Book For Digital Citizen Eye Opener Guide, by Tanmay S Dikshit (Author), Urjita V Gokhale (Author), Adv. D.S Rana (Foreword) 2. Cyber Case Studies: Better to Learn from Other’s Mistakes, Than to Commit the Same and 		

be Sorry Later Kindle Edition by S Khadsare (Author), Tanmay S Dikshit (Author)

3. Computer Forensics, Computer Crime Investigation by John R, Vacca, Firewall Media, New Delhi.
4. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning.
5. Real Digital Forensics by Keith j. Jones, Richard Bejtlich, Curtis W. Rose , Addison Wesley Pearson Education
6. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brain Jenkinson, Springer International edition.
7. Computer Evidence Collection & Presentation by Chrostopher L.T. Brown, Firewall Media.
8. Homeland Security , Techniques & Technologies by Jesus Mena, Firewall Media.
9. Software Forensics Collecting Evidence from the Scene of a Digital Crime by Robert M. Slade , TMH 2005
10. Windows Forensics by chad Steel, Wiley India Edition.

M.C.A. Part-II Semester III Paper DSE 304:3. Data Centre Management (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 1. Understand core concepts of data centre and its functionality. 2. Illustrate architecture and key elements incorporated in data centre. 3. Analyze Risk management process of a data centre environment. 4. Evaluate requirements and recommendations for security of data centre. 		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	Introduction to Data Centre History of data centers, Definition of data centers ,Different types of data centers ,Data Centre Development Process ,Data Centre Facilities and their functions, Critical services in Data Centers, Hardware in Data Centre, Power supply: Standby/backup power, Renewable power, Power efficiency indicators, Physical security components and Environmental control components.		15Periods
Unit 2:	Data Centre Components and Architecture Design and architecture of Data Centre, Data Centre standards, Structured cabling standards, Network Infrastructures: Network connectivity and cabling, Data Centre Cabling Topology, Routing, Switching and security. Cloud Infrastructure, Integration of cloud and on-premise services. Bandwidth requirements, Load balancer and Proxy servers. Server Architectures: Stand-alone, blades, stateless, clustering, scaling, optimization, virtualization, I/O connectivity, Storage Types and Media		15 Periods

Unit 3:	<p>Data Centre Risk Management</p> <p>Data Centre Risk Factors: Risk in facility, power, cooling, fire suppression, infrastructure, and IT services, Data Centre downtime: Impact of downtime, Main causes of downtime, Cost factors in downtime, Risk management process: Identification, Analysis, Evaluation, Treatment, Communication and consultation, Monitoring and review, Business Continuity Management, Disaster Recovery Planning</p>	15 Periods
Unit 4:	<p>Data Centre Security</p> <p>Managing Safety and Statutory Requirements, Safety policies and regulations , Reporting of safety issues, Security Controls & Management: Data Centre physical security, Data Centre Logical security, Security policies and procedures, Security standards and guidelines: Telecommunications Infrastructure Standard for Data Centres (TIA-942), ISO / IEC 27001:2005 and 27001:2013 Information Security Management System Standard , CERT-In Guidelines, Internal /external Safety and Security audits of data centres.</p>	15 Periods
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Data Center Management: Your guide to efficient Data Center operation, Dr. Mohammad Nawaz, July 31, 2019 2. Data Center Handbook 1st Edition, HwaiyuGeng, Wiley 3. Data Center for Beginners: A beginner's guide towards understanding Data Center Design (Data Center Design Guide), B.A. Ayomaya, Mar 31, 2020 4. Cloud Native Data Center Networking: Architecture, Protocols, and Tools, Dinesh G. Dutt , o'Reilly 5. Data Center Networks: Topologies, Architectures and Fault-Tolerance Characteristics 2013th Edition, Yang Liu, Jogesh K. Muppala, Springer 6. Enterprise Data Center Design and Methodology 1st Edition, Rob Snevely, Sun 7. Data Center Fundamentals (Cisco Press Fundamentals Series), Mauricio 		

Arregoces (Author), Maurizio Portolani, 4 December 2003

Suggested Additional Reading:

1. Data Center Blog | New York & Jersey Infrastructure | Nyi
2. Enterprise Data Storage, Virtualization Management Solutions | Tegile
3. The Continuity Council - Data Center Blog
4. Tufin Security Policy Orchestration Blog
5. Impex Technologies Blog

Suggested Research Journals:

1. Optical fiber technology: Special Issue on Data Center Communications
2. Data Center Research Journal : <https://www.datacenterresearch.com/research/cloud.html>

M.C.A. Part-II Semester III Paper DSE 304: 4. Web 2.0 (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to- 1. Identify web application development technique through the framework of Web 2.0. 2. Design and develop a modern web application solution using Rich Internet Applications and collaboration tools. 3. Define and discuss major tools and techniques of web services. 4. Analyze emerging web technologies and applications through Semantic Web.		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	Introduction to Web 2.0 Introduction to Web 2.0, Characteristics of Web 2.0 Technologies, Differentiating Web 1.0 and Web 2.0, Web 2.0 Technologies: Blog, Wiki, Social Bookmarking, Social Networking. Application Domains of Web 2.0: Business Applications, Educational Applications, Medical and Health Applications, Merits and demerits of Web 2.0.		15 Periods
Unit 2:	Rich Internet Application Introduction to Rich Internet Application, Features of Rich Internet Application, Framework of Rich Internet Application, Advanced Technologies used in Rich Internet Application: AJAX, JSON, AngularJS. Benefits of Rich Internet Application, Limitations of Rich Internet Application.		15 Periods
Unit 3:	Web Services Introduction to Web Services, Components of Web Services: Introduction to XML, SOAP, REST services. Advanced Web 2.0 Applications: Introduction to Mash up applications, Mash		15 Periods

	up Techniques, Remote data communication, strategies for data communication, Simple HTTPServices.	
Unit 4:	Semantic Web Introduction to Semantic Web: semantic web approach, benefits of semantic web, Characteristics of Semantic Web, building blocks of Semantic Web, Semantic Modeling, Resource Description Framework (RDF), Semantic Web Applications.	15 Periods
Reference Books:		
<ol style="list-style-type: none"> 1. Web 2.0 Architectures, James Governor, Dion Hinchcliffe, Duane Nickull, O'Reilly 2. Web 2.0 Mash-ups and the New Aggregators, O'Reilly 3. Professional Rich Internet Applications: AJAX and Beyond, Dana Moore, Wrox 4. Developing Enterprise Web Services: An Architect's Guide, Sandeep Chatterjee, James Webber, Prentice Hall 5. The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management , Michael C. Daconta, Leo J. Obrst, Kevin T. Smith, Wiley 		
Suggested Additional Reading:		
<ol style="list-style-type: none"> 1. Richardson, Will (2010). Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms. Corwin Press. p. 171. ISBN 978-1-4129-7747-0 2. Pal, Surendra Kumar. "Learn More About Web 2.0". academia.edu. Retrieved 2015-10-14. 3. O'Reilly, T., 2005. What is Web 2.0. Design Patterns and Business Models for the Next Generation of Software, p. 30 4. Berners-Lee, Tim; James Hendler; OraLassila (May 17, 2001). "The Semantic Web" (PDF). Scientific American. 410 (6832): 1023–4. 		
Suggested Research Journals:		
<ol style="list-style-type: none"> 1. Web 2.0 / Social Media / Social Networks. Charleston, South Carolina, SUA: MultiMedia. 2017. ISBN 978-1-544-63831-7. 2. WEB 2.O For Small And Medium Sized Companies: A practical Case Study Mark Abraham Magumba 		

M.C.A. Part-II Semester III Paper AEC305:Entrepreneurship Development (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to- 1. Understand the concept and significance of Entrepreneurship 2. Understand eco-system available for entrepreneurship development 3. Analyze risk and opportunities involved in IT business projects 4. Prepare feasibility report for a project		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	Entrepreneurship: Concept of entrepreneurship, Entrepreneur, Entrepreneurship and Enterprise, Economic Development, Skill Development and Entrepreneurship Development. Factors influencing Entrepreneurship Development- Economic and Non-economic factors. Innovations and Entrepreneurship- Link between innovation and entrepreneurship, Schumpeter's Theory Peter Ducker's systematic. Hagen's Theory- practical David McClelland's Need for achievement theory		15 Periods
Unit 2:	Entrepreneurship Policy and Support System: Micro, Small and Medium Entrepreneurship Development Act 2006, Policies for MSMEs, Concessions and Incentives, Financial support schemes, District Industries Centre's (DIC) Role and Functions. Start-up India, Make in India and Digital India and Export Promotion facilities for MSMEs and Global Vision for Entrepreneur. Entrepreneurship Training and Development- Objectives of Training, Programmes, Contents and Method, Various Training and Development Institutions in India.		15 Periods

Unit 3:	Business Plan: Contents, formulation of business plan, Planning commission's guidelines for formulating project report, Project Report: Contents of project report; Format of project report, Preparation of Feasibility Report on innovative IT business plan.	15 Periods
Unit 4:	Entrepreneurship in IT Sector: Scope, problems and prospects in Hardware, Software, Humanware, Networking industry. Scope in KPO, BPO, digital transaction processing. Applications of IT in rural entrepreneurship.	15 Periods
	(Note: Fieldwork may be conducted on each unit for getting practical exposure in entrepreneurship development in IT sector.)	
Reference Books: <ol style="list-style-type: none"> 1. Theories of Entrepreneurship; Vasant Desai; HPH 2. Entrepreneurship Development; Dr. S. S. Khanka; S. Chand 3. The Dynamics of Entrepreneurial Development and Management; Vasant Desai; HPH 4. Entrepreneurship- New Venture Creation; David H. Holt; PHI 		

M.C.A. Part-II Semester III Paper AEC306 :MOOC (Choice Based Credit System) Two Courses: 1. Angular JS and Bootstrap. 2. ERP			
Course Outcomes	After completion of this course student should be able to- 1. Build self learning capabilities through MOOC's. 2. Develop knowledge and skills in emerging areas of information technology.		
Marks:50	Total Hours of Teaching:30	University Exam :00	Internal : 50
Option - 1	Institute Faculty has to develop 2 credit 4 Quadrant MooC course on the course(s) mentioned above i.e. 1. Angular JS and Bootstrap. 2. ERP Which is relatively new in computer application and not covered in the existing syllabus of MCA. The course designed and developed needs to be delivered to the students through Videos, Study material and examination tutorials also need to be designed. The internal examination on the course is to be conducted to convey the marks out of 50 to university of respective student.		
Option - 2	The faculty dealing with MCA course affiliated to Shivaji University, Kolhapur collectively should design two MooC courses of 2 credits each and of 4 Quadrant. The courses are mentioned above in the title. The choice to the students to be given to select one out of 2 designed course(s) mentioned above i.e. 1. Angular JS and Bootstrap.		

	<p>2. ERP</p> <p>Which is relatively new in computer application and not covered in the existing syllabus of MCA.</p> <p>The course designed and developed needs to be delivered to the students through Videos, Study material and examination tutorials also need to be designed.</p> <p>The internal examination on the course is to be conducted to convey the marks out of 50 to university of respective student</p>	
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M.C.A. Part-II Semester III Paper CC307: Lab based on CC301 (Choice Based Credit System)		
Marks:50	Total Hours of Teaching:30	University Exam :50
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 1. Demonstrate different object oriented concepts through Java. 2. Apply various built in packages provided by Java. 	
Syllabus Contents:		
<p>This laboratory course should consist of programming exercises with focus on covering the following aspects.</p> <ol style="list-style-type: none"> 1. Installation of JDK environment & following utilities. What is javac , javap and javadoc. 2. Design an application by using array. 3. Implementation of package, Interface and abstract class 4. Design application using String, StringBuilder, StringTokenizer 5. Test any five of standard exception and user Defined Custom Exceptions in java 6. Threads creation and design applications by using Extending the Thread class/ Implementing the Runnable Interface. Application of multithreading in java. 7. Design java application using Collection in java such as Array List, Link List 8. Design GUI based java application using AWT, Swing with Event Handling. 9. Design and implement Networking applications. 		

M.C.A. Part-II Semester III
Paper CC308: Lab based on CC302
(Choice Based Credit System)

Marks:50	Total Hours of Teaching:30	University Exam :50
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 1. Solve different data analytics problems using NumPy and Pandas 2. Experiment with different aspects of data analytics. 	
Syllabus Contents:		
<p>This laboratory course should consist of programming exercises with focus on covering the following aspects with appropriate dataset.</p> <ol style="list-style-type: none"> 1. Write a NumPy program to split the element of a array with spaces. 2. Write a NumPy program to find the most frequent value in an array. 3. Write a NumPy program to generate five random numbers from the normal distribution 4. Write a NumPy program to sort the specified number of elements from beginning of a array 5. Write a NumPy program to calculate the difference between the maximum and the minimum values of a array 6. Write a NumPy program to compute the cross product of two vectors. 7. Write a NumPy program to create a three-dimension array 8. Write a Pandas program to convert a NumPy array to a Pandas series. 9. Write a Pandas program to convert the first column of a DataFrame as a Series 10. Write a Pandas program to join the two given dataframes along rows and assign all data. 11. Write a Pandas program to split the dataframe 12. Write a Pandas program to import excel data 13. Write a Pandas program to find and replace the missing values in a DataFrame 14. Write a Pandas program to split the datasets into groups 15. Write a Pandas program to create a line plot 		

M.C.A. Part-II Semester III Paper CC309 : Major Project (Choice Based Credit System)			
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.		
Marks:150		University Exam :100	Internal:50
Guide Lines for Projects:			
A student has to take project work at the end of first year (second semester) of MCA.			
<ol style="list-style-type: none"> 1. For major project student should go for inplant training of 60 days after completion of semester II. 2. Project report will be submitted to institute/department before university examination of 3rdSemester. 3. Project work will be done individually and students should take guidance from assigned guide and prepare a Project Report on "Project Work" in two copies to be submitted to the Director of the Institute/Head of the Department. 4. Acceptance/Rejection of Project Report: <ol style="list-style-type: none"> 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 copies. 			
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
 - UML(if applicable)

(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

References

In case of unsatisfactory project work and performance in the viva voce of the said candidate's project is to be rejected with written justification in the following format.

SHIVAJI UNIVERSITY, KOLHAPUR
Master of Computer Application (MCA) Part – II (Sem- III)
Examination Center:
Name of the Candidate:
Title of Project:
Name of the Guide:
The committee undersigned unanimously reject the project due to following reasons.
1. The performance of candidate is unsatisfactory hence rejected: Examiners Comments:
2. The project is found to be copied hence rejected*:

*In case of copied project the formal process of reporting copy to the university is to be followed with the said profarma duly filled and signed by members of committee.

Candidate in consultation with internal project guide has to work on the comments given in the report and resubmit the project in the fourth semester for the university examination viva voce. University reserve right to decide on the examination center for project viva voce of students appeared in the fourth semester.

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)
.....inarea. 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				
4				
5				

6				
7				
8				
9				
10				
11				
12				

Director/Principal

M.C.A. Part-II Semester IV Paper CC401 : Artificial Intelligence and Soft Computing (Choice Based Credit System)		
Course Outcomes	After completion of this course student should be able to 1 Understand building blocks of Artificial Intelligence. 2 Evaluate various AI Techniques for problem solving. 3 Analyze different soft computing techniques for solving problems. 4 Build artificial intelligence and soft computing models for real life scenario.	
Marks:100	Total Hours of Teaching: 60 University Exam :70	Internal :30
Syllabus Contents:		
Unit 1:	Introduction to Artificial Intelligence(AI) Introduction and Definition of Artificial Intelligence. Foundations of Artificial Intelligence; History of AI, Introduction to AI Searching techniques, Depth First Search, Breadth First Search, Generate and test, Hill Climbing, Best First Search, A* and AO* Algorithm. Introduction to Knowledge Representation, Propositional Logic: Representation, Inference, Reasoning Patterns, Resolution, First order Logic: Representation, Reasoning Patterns, Forward and Backward Chaining.	15Periods
Unit 2:	Introduction to Soft Computing and Genetic Algorithms Concept of computing systems."Soft" computing versus "Hard" computing , Characteristics of Soft computing , Applications of Soft computing techniques ,Concept of "Genetics" and "Evolution" and its application to probabilistic search techniques, Basic GA framework and different GA architectures. GA operators: Encoding, Crossover, Selection, Mutation, Solving optimization problems using GAs.	15Periods
Unit 3:	Fuzzy logic Introduction to Fuzzy logic. Fuzzy sets and membership functions. Operations on Fuzzy sets. Fuzzy relations, rules, propositions,	15Periods

	implications and inferences. Defuzzification techniques. Fuzzy logic controller design. Applications of Fuzzy logic.	
Unit 4:	Artificial Neural Networks Biological neurons and its working. Simulation of biological neurons to problem solving. Single layer feed forward ANN. Multilayer feed forward ANN. Activation functions. Training techniques for ANNs. Applications of ANNs to solve real life problems.	15Periods
*Note	Practical based on Syllabus using R/Python etc.	

Reference Books:

1. Elaine Rich and Kevin Knight Artificial Intelligence Third Edition, Tata McGraw-Hill Education Pvt. Ltd., 2008.
2. Satish Kumar “Neural Networks A Classroom Approach” Tata McGrawHill.
3. Zimmermann H.S “Fuzzy Set Theory and its Applications”Kluwer Academic Publishers.
4. Hagan, Demuth, Beale,” Neural Network Design” CENGAGE Learning, India Edition.
5. J.-S.R.Jang “Neuro-Fuzzy and Soft Computing” PHI 2003.
6. JacekM.Zurada “Introduction to Artificial Neural Systems” Jaico Publishing House.
7. AmitKonar, “Artificial Intelligence and Soft Computing”, First Edition,CRC Press, 2000.
8. George J. Klir and Bo Yuan, “Fuzzy Sets and Fuzzy Logic-Theory and Applications”, Prentice Hall
9. Mitchell Melanie, “An Introduction to Genetic Algorithm”, Prentice Hall, 1998.
10. Simon Haykin, “Neural Networks: A Comprehensive Foundation”, Prentice Hall,
11. S.Rajasekaran, G. A. Vijayalakshami, “Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications”, PHI.
12. E. Goldberg “ Genetic Algorithms: Search and Optimization”
13. Chin Teng Lin, C. S. George Lee “ Neuro-Fuzzy Systems”, PHI.
14. Joe choong, “ Build_Neural_Network_With_MS_Excel_sample”

M.C.A. Part-II Semester IV Paper CC402: Advance Java Programing (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to <ol style="list-style-type: none"> 1. Understand the concept of JDBC, Servlet and its life cycle. 2. Design and develop JSP applications using JSP tags. 3. Develop MVC based Java Applications using Spring and Struts. 4. Apply Java Technology to develop the Small Applications using JSF and Hibernate. 		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	JDBC and Servlets JDBC: Driver, Database Connection Steps, DriverManager Class, Statement Interface, ResultSet Interface, Transactions, Batch Processing, RowSet Interface, CRUD operations Servlets: Using IDE'S NetBeans/Eclipse for Java Development, Servlet Overview Life cycle of Servlet, Handling Web Form Data in Servlets., Dynamically including Content in Servlets, Session Tracking – Cookies, Session ID, Hidden Form Field, URL Rewriting,, HTTP Session, Servlet Filters, Accessing Databases using Servlets.		15 Periods
Unit 2:	JSP Basics of JSP, Life cycle of JSP, JSP API,JSP in Eclipse and other IDE's, Life cycle of JSP Page. Scripting elements, scriptlet tag, expression tag, declaration tag, Implicit Objects, Directive Elements, Action Elements , MVC in JSP, Custom tags		15 Periods
Unit 3:	Spring , Struts and Gwt Spring: Spring Framework, IoC container, Dependency Injection, Spring AOP, Building ,Building simple Spring		15 Periods

	<p>Applications,</p> <p>Struts: Struts Features, Introduction to Struts, Overview of Model, View, Controller (MVC) design pattern, Struts Framework applies MVC, Request handling in Struts, Struts configuration files, Simple Struts Application,</p> <p>GWT: Overview of GWT, Components of GWT, Introduction to GWT applications.</p>	
Unit 4:	<p>JSF and Hibernate</p> <p>JSF: JSF Features, JSF for Web Application, JSF components, JSF Tags, Life Cycle & Architecture, JSF Renderers, JSF HTML Tag Reference, Creating JSF applications.</p> <p>Hibernate: Introduction to O-R Mapping, Hibernate Basics, Hibernate Architecture, Hibernate Configurations, POJO (Plain Old Java Classes) classes and O/R Mapping, Creating Hibernate Applications.</p>	15 Periods
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. JDBC, Servlets, and JSP Black Book, , K. Santosh Kumar, Dreamtech Press India Pvt. Ltd, 2. Beginning Java 8 APIs, Extensions and Libraries: Swing, JavaFX, JavaScript, JDBC and Network Programming APIs, 1st Edition, KishoriSharan, Apress 3. Enterprise JavaBeans, Fourth Edition, O'Reilly, 2004 4. Beginning JSP, JSF and Tomcat web development, GiulioZambon, Apress, 2007 5. Beginning Hibernate 3rd Edition, Joseph Ottinger, Jeff Linwood, Apress 6. Spring in Action 3rd edition , Craig walls, Manning Publication 7. Hibernate 2nd edition, Jeff Linwood and Dave Minter, Beginning Après publication 8. Java Server Faces in Action, Kito D. Mann, Manning Publication 9. JSF2.0 CookBook, Anghel Leonard, PACKT publication 		
<p>Suggested Additional Reading:</p> <ol style="list-style-type: none"> 1. Black Book “ Java server programming” J2EE, 1st ed., Dream Tech Publishers, 2008. 2. Complete Reference J2EE by James Keogh mcgraw publication 		

3. Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest
Wiley Publication
4. SCWCD, Matthew Scarpino, Hanumant Deshmukh, Jignesh Malavie, Manning
publication
5. Core Java, Volume II: Advanced Features by Cay Horstmann and Gary Cornell Pearson
Publication
6. Java Persistence with Hibernate by Christian Bauer, Gavin King

M.C.A. Part-II Semester IV Paper CC403: Internet of Things (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 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. 		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal :30
Syllabus Contents:			
Unit 1:	Introduction to IoT 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.		15 Periods
Unit 2:	Arduino Environment 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.		15 Periods
Unit 3:	IoT Application Development 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.		15 Periods

Unit 4:	RaspberryPi and Emerging Trends in IoT 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.	15 Periods
Reference Books: <ol style="list-style-type: none"> 1. Internet of Things, Srinivasa K. G., Cengage Learning India, 2017 2. Internet of Things (A Hands on approach), Vijay Madiseti and Arshadeep Bagha, 1st edition, VPT, 2014. 3. Internet of Things: Architecture and Design principles, 1st edition, McGraw Hill, 2017. 4. Arduino Programing in 24 hours, Richard Blum, Sams, 1st edition. 5. RaspberryPi cookbook, Simon Mark, O'Reilly, 3rd edition. 		

M.C.A. Part-II Semester IV Paper DSE404.1: Block Chain Technology (Choice Based Credit System)			
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 1. Understand the structure of Blockchain 2. Identify basics of cryptocurrency. 3. Analyze different Blockchain Vulnerabilities. 4. Determine various applications of Blockchain. 		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	An Introduction to Blockchain Need of Blockchain, The Structure of Blockchain, Data Structure of Blockchain, Storage Structure, Data Distribution in Blockchain, Block Validation, Block Validators, Blockchain market, Blockchain vs. Banks		15Periods
Unit 2:	Cryptocurrency Bitcoin- Bitcoin Working, Buy Bitcoin, Transactions, Bitcoin Mining, Value of Bitcoin, Community, Politics and Regulations, Advantages, Disadvantages. Ethereum- Introduction to Ethereum, type of users in a typical Ethereum blockchain, DApp, Components of Ethereum, Hyperledger, Digital Tokens		15 Periods
Unit 3:	Blockchain Vulnerabilities Endpoint Vulnerabilities, Public and Private Key Security, Vendor Risks, Untested at Full Scale, Lack of Standards and Regulation, Untested Code, IOTA, CoCo Framework,		15 Periods
Unit 4:	Applications of Blockchain Technology Financial Applications: Private Securities(NASDAQ Private Equity, Medici, Blockstream, Coinsetter, Bitshares), Insurance: Everledger Non-Financial Applications: Applications of Blockchain in the Music		15 Periods

Reference Books:

1. Mastering Blockchain Second Edition, Distributed ledger technology, decentralization, and smart contracts explained by Imran Bashir
2. The Basics of Bitcoins and Blockchains by Antony Lewis
3. “Blockchain Revolution” by Don and Alex Tapscott
4. BLOCKCHAIN, Cybrosys Limited Edition
5. “The Blockchain Developer” by EladElrom

WebSite reading

1. <https://bitcoin.org>
2. <https://igniteoutsourcing.com/blockchain/blockchain-security-vulnerabilities-risks/>
3. <https://www.investopedia.com/terms/b/blockchain.asp>

M.C.A. Part-II Semester IV Paper DSE 404.2: Mobile Applications (Choice Based Credit System)			
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.		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal :30
Syllabus Contents:			
Unit 1:	Introduction to Android: 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.		15 Periods
Unit 2:	Android Application Framework: 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.		15 Periods
Unit 3:	Advanced Android Applications:		15 Periods

	<p>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.</p>	
Unit 4:	<p>Android Security Mobile application threats: Working of mobile applications, Client-side vulnerabilities, Server-side vulnerabilities, Mobile application threats, Risks for users. Android Security: System-Level Security, Application Security, Application Security measures, Application Security Scans</p>	15 Periods
<p>Reference Books:</p> <ol style="list-style-type: none"> 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 IV Paper DSE404.3: Web Application Security (Choice Based Credit System)			
Course	After completion of this course student should be able to-		
Outcomes	1. Understand the fundamentals of web application development. 2. Identify common web application security threats. 3. Determine tools and techniques for web application security. 4. Develop secure web applications by considering vulnerabilities associated with it.		
Marks:100	Total Hours of Teaching:60	University Exam :70	Internal : 30
Syllabus Contents:			
Unit 1:	Web Application Fundamentals Client-side scripting, Server-side scripting; Web server architecture - Windows & Linux, IIS and LAMP servers, Network protocols, Introduction to web applications, Web application hacking, Overview of browsers, extensions, and platforms, common web authentication mechanisms and online authentication services.		15Periods
Unit 2:	Web Application Security threats Advanced session analysis, hijacking, and fixation techniques, cross-site scripting, SQL injection, classic categories of malicious input, advanced SQL injection tools and techniques, stealth-encoding techniques and input validation/ output-encoding countermeasures. OWAPS guidelines.		15 Periods
Unit 3:	Web services vulnerabilities WSDL disclosure, input injection, external entity injection, and XPath injection. Web application management attacks against remote server management, web content management/authoring, admin misconfigurations, and developer-driven mistakes. Web browser exploits, Configuring vulnerability scans, Reporting scan results		15 Periods

Unit 4:	Web Application Security Scanner Definition, Tool Types, Functional Requirements, Issues with Web Application Security Scanner, Strengths and Weaknesses, Definition of Web Application Security Testing, Importance of Web Application Security Testing, Tools for Web Application Security Testing. Scanning a website to check for vulnerabilities, Capturing intruders through packet inspection.	15 Periods
Reference Book <ol style="list-style-type: none"> 1. Windows Server 2019 Cookbook: Over 100 recipes to effectively configure networks, manage security, and administer workloads, 2nd Edition Paperback – Import, 22 July 2020 by Mark Henderson (Author), Jordan Krause (Author) 2. Hacking Exposed Web Applications, 3rd edition, JOEL SCAMBRAY, VINCENT LIU, CALEB SIMA 3. The Web Application Hacker's Handbook Discovering and Exploiting Security Flaws By DafyddStuttard, Marcus Pinto 4. Rich Bowen, Ken Coar, “Apache Cookbook”, O’Reilly 5. Web Application Security, A Beginner's Guide, Bryan Sullivan, Vincent Liu, 2011, 		
Additional Reading. <ol style="list-style-type: none"> 1. Open Web Application Security Project. A Guide to Building Secure Web Applications and Web Services. http://www.owasp.org/index.php/Category:OWASP_Guide_Project 		

M.C.A. Part-II Semester IV Paper DSE404.4: Web Mining (Choice Based Credit System)		
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 1. Define the scope of data mining techniques in web mining. 2. Identify different types of web Mining. 3. Analyze various applications of web mining. 4. Evaluate Web Mining tools with their features and limitations. 	
Marks:100	Total Hours of Teaching: 60 University Exam :70	Internal :30
Syllabus Contents:		
Unit 1:	Data Warehouse Introduction to Data Warehouse, Data Warehouse design process, three tier data warehouse architecture, data warehouse models, meta data repository, OLAP,	15 Periods
Unit 2:	Data Mining Fundamentals Introduction to data mining, Scope of data mining, Tasks of data mining, architecture of Data mining, Data mining process, classification of Data mining, Knowledge discovery in Database.	15 Periods
Unit 3:	Web Mining Introduction to Web Mining, Applications of Web Mining, Comparison Between Data mining and Web mining, Types of Web Mining , Difference Between Web Content, Web Structure, and Web Usage Mining, Challenges in Web Mining, Application of Web Mining ,Web crawling, Indexing, Text analysis and classification, Link analysis	15 Periods
Unit 4:	Web Mining Tools 1) ProWebScraper - Overview, Features, Limitations 2) Scrapy (Web content mining tool) : Overview, Features, limitation. 3) Bixo (Web structure mining tool) Overview, Features, limitation.	15 Periods

	(Note: Practical based on above web mining tools)	
Reference Books:		
<ol style="list-style-type: none"> 1. Data Warehousing Concept, techniques, products and Applications, C.S.R. Prabhu 2. Introduction to data mining , Pang-nigTan, Michael Steinbach, Vipin Kumar, Person 3. Data Mining Introductory and Advanced Topic Margaret H. DunHan 4. Web Data Exploring Hyperlinks, Contentsand Usage Data Mining, Bing Liu Second Edition 		

M.C.A. Part-II Semester IV Paper AEC 405 : Research Methodology (Choice Based Credit System)		
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 1. Define various terms used in research process 2. Describe research design, sample design and sampling methods 3. Apply appropriate methods for data collection and data analysis for research work and write research report. 4. Design Research proposal in the area of Computer Application. 	
Marks:100	Total Hours of Teaching: 60 University Exam :70	Internal :30
Syllabus Contents:		
Unit 1:	Introduction to Research and Research Design: Research Introduction : Meaning, Objectives and Motivation in Research, Types of Research, Research Approaches, Research Process. Research Design: Meaning and Significance of Research Designs, Features of a Good Research Design, Types of Research Design, Contents of Research Design.	15 Periods
Unit 2:	Sampling and Data Collection: Sample Design: Steps in Sample Design, Determining the Size of	15 Periods

	<p>Sample, Sampling Methods - Simple Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling and Selective Sampling.</p> <p>Measurement of Data: Measurement and Scaling Techniques, Errors in Measurement, Tests of Sound Measurement, Scaling and Scale Construction Techniques.</p> <p>Data Collection: Types of Data, Sources of Data– Primary and Secondary, Methods of Collecting the Data. Tools For Data Collection: Questionnaire, interview, schedule, mail survey, email/ internet. Steps in Questionnaire Design, Characteristics of a Good Questionnaire, Testing the Validity of the Data.</p>	
Unit 3:	<p>Data Analysis and Report Writing</p> <p>Data Analysis: Introduction to data analysis, Statistical techniques for data analysis,</p> <p>Hypothesis: Meaning, Hypothesis Formulation, Types of Hypothesis, Characteristics of Good Hypothesis, Testing of Hypothesis, Types of Hypothesis test.</p> <p>Report writing and layout of report.</p> <p>(Use of Weka and R language for data analysis.)</p>	15 Periods
Unit 4:	<p>Case Studies on research areas in Computer Applications:</p> <p>Data mining, BigData, Cloud computing, expert system, Knowledge Management system, ERP, IS security, AI.</p> <p>(Note: Prepare research proposal on above mentioned case studies)</p>	15 Periods
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Research Methodology, G. C. Ramamurthy, Dreamtech Press 2. Research Methodology-Concepts and Cases, Deepak Chawala, Neena Sondhi, Vikas Publication 3. Research Methodology Methods & Techniques, C. R. Kothari, New Age International Zikmund Thomson SouthWestern, Edition, 2nd 4. Business Research Methods, Donald Cooper & Pamela Schindler, TMGH 5. Business Research Methods, Alan Bryman & Emma Bell, Oxford Univpress 		

M.C.A. Part-II Semester IV		
Paper AEC 406: Personality Development (Choice Based Credit System)		
Course Outcomes	After completion of this course student should be able to 1. Recognize factors that influence and groom one's personality. 2. Develop good interpersonal skills and employability skills.	
Marks: 50	Total Hours of Teaching: 30	Internal: 50
Syllabus Contents:		
Unit 1:	Self-Discovery: Define Personality, Determinants of Personality: Heredity and Environment Factors; Developing of Personality-Erikson's Eight life stages and Marlow's Hierarchy of Needs; SWOT Analysis; Goal Setting- How to set Goals: Short term goal and Long term goal ; Attitude Formation: Significance of Attitude, Factors affecting Attitude and How to build a Positive Attitude	15 Periods
Unit 2:	Essential Skills for Personality Development Developing Interpersonal Relationships: Eric Berne's Transaction Analysis and Johari Window; Emotional Intelligence; Stress Management; Leadership Skills; Team Role; Problem Solving; Communication Skills; Time Management; Employability Quotient: Resume Building, How to face an Interview?	15 Periods
Reference Books:		
1. Andrews, Sudhir. How to Succeed at Interviews. 21st (rep.) New Delhi. TMH 1988. 2. Heller, Robert. Effective leadership. Essential Manager series. Dk Publishing, 2002 3. Hindle, Tim. Reducing Stress. Essential Manager series. Dk Publishing, 2003 4. Lucas, Stephen. Art of Public Speaking. New Delhi. Tata - Mc-Graw Hill. 2001 5. Mile, D.J Power of positive thinking. Delhi. Rohan Book Company, (2004).		

6. Pravesh Kumar. All about Self- Motivation. New Delhi. Goodwill Publishing House. 2005.
7. Smith, B . Body Language. Delhi: Rohan Book Company. 2004
8. Essentials of Business Communication - Rajendra Pal and J. S. Korlhalli - Sultan Chand & Sons, New Delhi.
9. Personality Development and Career management: By R.M.Onkar (S Chand Publications)
10. Managing Soft Skills For Personality Development---B.N. Ghosh---- McGraw Hill Education
11. Personality Development, Interpersonal Skills and Career Management---Dr. C.S.G. Krishnamacharyulu and Dr. Lalitha Ramakrishnan ---- Himalaya Publishing House Pvt.Ltd.
12. Personality Development –R.C. Bhatia--- Ane Books Pvt.Ltd.
13. Soft Skills: An Integrated Approach to Maximise Personality ---Gajendra Singh Chauhan--- Wiley Publisher

Criteria of Internal Evaluation

Mock Interview	10 Marks
Role Play	10 Marks
Group Discussion	10 Marks
Written Assignment	10 Marks
Class Test	10 Marks

M.C.A. Part-II Semester IV DSE407 : Seminar (Choice Based Credit System)		
Course Outcomes	After completion of this course student should be able to - 1. Identify and summarize a topic pertaining to recent advancements in IT and prepare a report based on the formatting guidelines. 2. Develop presentation skills using multimedia tools.	
Marks:50	Total Hours of Teaching:30	Internal :50
Syllabus Contents:		
<p>The objective of the seminar is to develop knowledge and presentation skills of the students. i.e. students should learn emerging technologies on their own.</p> <p>The seminar topics should be other than syllabus. Students are expected to collect literature pertaining to their topics from different books, magazine, research paper, journals, websites etc. and present them in the form of seminars.</p> <p style="color: red;">Student should check seminar report for Plagiarism using any software and Plagiarism report from competent authority should be enclosed in seminar report and plagiarism should not be more than 30%.</p> <p>Distribution of Marks :</p> <p>Seminars Reports- 20 Marks</p> <p>Seminars Presentation- 30 Marks</p> <p>Assessment of the seminar is to be internal and assessment should be done by a panel of teachers.</p>		

M.C.A. Part-II Semester IV
CC408: Lab based on CC401
(Choice Based Credit System)

Course	After completion of this course student should be able to-
Outcomes	<ul style="list-style-type: none"> 3. Develop small scale applications using soft computing. 4. Apply various built in libraries in R/Python for AI.

Marks:50	Total Hours of Teaching:30	University Exam :50
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Syllabus Contents:

This laboratory course should include following programming exercises. Practical based on Syllabus using Python or R.

1. Take three fuzzy variables as service, food and tip (make sub-partitions of these three variables), Assign values to the variables.
 Set up rules as
 - i) If service is poor or food is rancid, then tip is cheap
 - ii) If service is good, then tip is average
 - iii) If service is excellent or food is delicious, then tip is generous
 Plot the graphs for each of them.
2. Create a file which contains the data of the iris plant. (150 observations)
 Implement a Neural Network for that data and plot the neural network.
3. Write a Program to implement Genetic Algorithm. Plot a graph for it
4. Write a program to implement AND function using Perception Neural Network with bipolar Inputs and Outputs.
5. Write a program to implement OR function using Perception Neural Network with bipolar Inputs and Outputs.
6. Implement Feed Forward and Back Propagation Neural Network for a given input and output pattern.

Problem Set

Sr.No	INPUTS			Outputs
Example1	0	0	1	0
2	1	1	1	1
3	1	0	1	1
4	0	1	1	0
New Situation	1	0	0	?

What should be the output?

7. Write a program to implement fuzzy set operations.

8. Display the triangular membership function for tipping problem.
9. Implement Fuzzy logic for binary string matching using Python. Use standard city name in db.
10. Implement Genetic Algorithm to guess Password with randomly generated initial sequence of letters, then mutate and change one random letter at a time until the sequence of letters is "University".
11. Write a program for maximizing $f(x) = x^2$ using Genetic Algorithm where x ranges from 0-31 perform 5 iterations only.
12. Design Fuzzy Inference model for "Tipping Problem". Tip at a restaurant based on the service and food quality, rated between 0 and 10. A tip is of between 0 and 25%.

Fuzzy Variables	Fuzzy Sets
Food	Rancid , Delicious
Service	Poor, Good, Excellent
Tip	Cheap, Average, Generous

13. Write a script to design Fuzzy control system for "Weather Reporting". The state of the weather (bad, OK, perfect) will be determined according to the variables Temperature, Humidity and Precipitation.

Fuzzy Variables	Fuzzy Sets
Temperature	Cold, Good, Hot
Humidity	Dry, Good, Wet
Precipitation	No rain, Little rain, Rain
Weather	Bad, OK, Perfect

14. Write a script to design Fuzzy system to estimate the level of risk involved in a project based on two inputs: project funding and project staffing.

Fuzzy Variables	Fuzzy Sets
Project funding	Inadequate, Marginal, Adequate
Project staffing	Small, Large
Risk	Low, Normal, High

15. Write a script to design Temperature control using Fuzzy Logic. Change the speed of a heater fan based on the room temperature and humidity.

Fuzzy Variables	Fuzzy Sets
Temperature	Cool, Warm, Hot
Humidity	Low, Medium, High
Fan Speed	No, Low, Medium, High

16. Write a script to implement Knapsack problem. You are going to spend a month in the wilderness. You're taking a backpack with you; however, the maximum weight it can carry is 20 kilograms. You have a number of survival items available, each with its own number of "survival points". Your objective is to maximize the number of survival points.

ITEM	SURVIVALPOINTS	WEIGHT IN KG
pocketknife	10.00	1.00
Beans	20.00	5.00
potatoes	15.00	10.00
Unions	2.00	1.00
sleeping bag	30.00	7.00
Rope	10.00	5.00
compass	30.00	1.00

- 17.** Write a script to implement genetic algorithm for optimizing two values to match pi and sqrt(50).
- 18.** Write a script to design Neural Network model to predict the species of the iris dataset (use package “nnet”).
- 19.** Write a script to design Neural Network model to predict the rating of the cereals, use Cereals dataset (use package “neuralnet”).
- 20.** Write a script to design Neural Network model to determine if a stock pays dividend or not, use dataset “dividendinfo” (use package “neuralnet”).

M.C.A. Part-II Semester IV CC409: Lab based on CC402 (Choice Based Credit System)		
Course Outcomes	After completion of this course student should be able to- <ol style="list-style-type: none"> 1. Demonstrate different server side scripts using Java. 2. Apply various MVC based architectures provided by Java. 	
Marks:50	Total Hours of Teaching:30	University Exam :50
Syllabus Contents:		
<p>This laboratory course should consist of 10 to 12 programming exercises with focus on covering the hands-on aspects covered in theory course.</p> <ol style="list-style-type: none"> 1. Implement TCP Server for transferring files using Socket and ServerSocket. 2. Implement cookies to store firstname and lastname using Java server pages. 3. Implement the shopping cart for users for the online shopping. Apply the concept of session. 4. Implement student registration form with enrollment number, first name, last name, semester, contact number. Store the details in database. Also implement search, delete and modify facility for student records. 5. Write a Servlet program to print system date and time. 6. Design a web page that takes the Username from user and if it is a valid username prints “Welcome Username”. Use JSF to implement. 7. Write Hibernate application to store customer records and retrieve the customer record including name, contact number, address. 8. Write an application to keep record and retrieve record of student. The record includes student id, enrollment number, semester, SPI. Use MVC architectures. 		

M.C.A. Part-II Semester IV Paper CC410: Mini Project (Choice Based Credit System)			
Course	After completion of this course student should be able to-		
Outcomes	<ol style="list-style-type: none"> 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. 		
Marks:100		University Exam :80	Internal : 20
	<p>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 Sem III and Sem IV.</p> <p>Guidelines of Major Projects should be followed except industry certificate, joining report and industry work progress report.</p>		