Government College of Engineering, Karad				
Second Year (Sem –III) Master of Computer Applications				
MC3301:Data Science				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Statistics and Probability , Programming and Data Manipulation

Course Outcomes (CO)

At the end of this course, the students will be able to:

CO1	Apply thy knowledge of Data Science and the skill set needed to be a Data Scientist
CO2	Use different tools for Data Science.
CO3	To create effective visualization of given data (to communicate or persuade).
CO4	Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbours (k-NN), k-means, Naive Bayes) for predictive modelling

	Course Contents	**CO**	**Hours**
Unit 1	**Introduction**: What is Data Science? - Big Data and Data Science hype – and getting past the hype - Why now? – Datafication - Current landscape of perspectives - Skill sets needed, Statistical Inference - Populations and samples - Statistical modelling, probability distributions, fitting a model - Intro to R	CO1	**(08)**
Unit 2	**Exploratory Data Analysis and the Data Science Process** - Basic tools (plots, graphs and summary statistics) of EDA - Philosophy of EDA - The Data Science Process	CO2	**(04)**
Unit 3	**Three Basic Machine Learning Algorithms** - Linear Regression - k-Nearest Neighbours (k-NN) - k-means, One More Machine Learning Algorithm and Usage in Applications - Motivating application: Filtering Spam - Why Linear Regression and k-NN are poor choices for Filtering Spam - Naive Bayes and why it works for Filtering Spam - Data Wrangling: APIs and other tools for scrapping the Web	CO2, CO3	**(08)**
Unit 4	**Feature Generation and Feature Selection (Extracting Meaning From Data**) - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests	CO2, CO3	**(06)**
Unit 5	**Mining Social-Network Graphs - Social networks as** graphs - Clustering of graphs - Direct discovery of communities in graphs - Partitioning of graphs - Neighbourhood properties in graphs	CO3, CO4	**(06)**
Unit 6	**Data Visualization** - Basic principles, ideas and tools for data visualization - Examples of inspiring (industry) projects - Exercise: create your own visualization of a complex dataset Data Science and Ethical Issues - Discussions on privacy, security, ethics - A look back at Data Science - Nextgeneration data scientists	CO2, CO3, CO4	**(08)**

Text Books

1.	Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014, ISBN: 9781449358655.

Reference Books

1.	Jure Leskovec, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press. 2014 (free online),ISBN -978-1107077232.
2.	Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2013
3.	Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013.
4.	Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, Second Edition. ISBN 0387952845. 2009. (free online)
5.	Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science, ISBN: 9781108485067.
6.	Mohammed J. Zakiand, Wagner Miera Jr. Data Mining and Analysis: Fundamental Concepts and Algorithms. Cambridge University Press. 2014,ISBN:0521766338.
7.	Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, Third Edition. ISBN 0123814790. 2011

Useful Links

1.	https://machinelearningmastery.com/

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	0	0	2	0	0	0	0	0	0	2	0	0
CO 2	3	1	2	0	0	-	0	0	0	0	0	0	1	2	0
CO 3	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0
CO4	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0

 1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	3	2	10
Understand	3	3	10
Apply	4	5	12
Analyse	5	5	14
Evaluate	5	5	14
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad				
Second Year (Sem – III) Master of Computer Applications				
MC3302 Mobile Technologies				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Programming Languages, Mobile Development Frameworks, User Interface (UI) Design

Course Outcomes (CO): Students will be able to

CO1	Learn Mobile Technology Fundamentals
CO2	Develop proficiency in Android Application Development
CO3	Improve proficiency in iOS Application Development
CO4	Perform Application of Mobile Development Skills

	Course Contents	CO	Hours
Unit 1	**Introduction to Mobile Technology:** Overview of mobile platforms (iOS, Android, etc.), Evolution of mobile technology, Mobile hardware, Components and architecture, Mobile operating systems and ecosystems.	CO1	(05)
Unit 2	**Android Development Basics:** Introduction to Android platform, Setting up the Android development environment, Basic Android application structure, User interface design with XML layouts, Handling user input and events.	CO2	(08)
Unit 3	**Advanced Android Development:** Android activity lifecycle, Working with fragments for modular UI design, Using Recycler View for dynamic lists, Storing data with SQLite databases, Handling permissions and security in Android apps.	CO2	(05)
Unit 4	**IOS Development Basics:** Introduction to iOS platform, Setting up the iOS development environment (Xcode),Basic iOS application structure, User interface design with Interface Builder, Handling user input and events in iOS apps.	CO3	(08)
Unit 5	**Advanced iOS Development:** iOS app architecture (MVC),Working with table views and collection views, Storing data with Core Data, Networking and data communication in iOS apps,Deploying iOS apps to the App Store.	CO3	(06)
Unit 6	**Cross-Platform Development:** Introduction to cross-platform development frameworks (e.g., React Native, Flutter), Pros and cons of cross-platform development, Building a simple cross-platform app, Strategies for code sharing and platform-specific optimizations.	CO4	(08)

Text Books

1.	"Android Programming: The Big Nerd Ranch Guide" by Bill Phillips and Chris Stewart by Bill Phillips, Chris Stewart, Kristin Marsicano Released January 2017 ISBN: 9780134706061
2.	"iOS Programming: The Big Nerd Ranch Guide" by Christian Keur and Aaron Hillegass ISBN-13: 9780137570386 Published 2022

Reference Books

1.	"Head First Android Development: A Brain-Friendly Guide" by Dawn Griffiths and David Griffiths ISBN 10: 1491974052 ISBN 13: 9781491974056Publisher: O'Reilly Media, 2017
2.	"Cross-Platform Development with Xamarin.Forms" by Paul Johnson ISBN-10 : 1784391190 ISBN-13 : 978-1784391195

Useful Links

1.	https://nptel.ac.in/courses/106106147 Prof.Sridhar Iyer, Prof. Pushpendra Singh IIIT Delhi

Mapping of COs and Pos

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	0	0	2	0	0	0	0	0	0	2	0	0
CO 2	3	1	2	0	0	0	0	0	0	0	0	0	1	2	0
CO 3	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0
CO 4	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	3	2	10
Understand	3	3	10
Apply	4	5	12
Analyse	5	5	14
Evaluate	5	5	14
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad
Second Year (Sem – III) M. C. A.
MC3303: Information Security

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Network Security, Security Management and Governance & Cyber security Fundamentals

Course Outcomes (CO): Students will be able to

CO1	Recount the history of computer security and how it evolved into information security.
CO2	Define key terms and understand critical concepts of information security
CO3	Classify technologies for network, transport and application layer security.
CO4	To be aware of cyber security trends.

	Course Contents	CO	Hours
Unit 1	**Information Security:** Introduction: Security mindset, Computer Security Concepts (CIA),Threats, Attacks, and Assets, Model for Information Security	CO1	(06)
Unit 2	**Symmetric Cryptography:** Concepts and Techniques, Symmetric key Ciphers- Substitution and transposition techniques – Caesar cipher, play fair, mono-alphabetic, steganography, DES structure, DES Analysis, Security of DES, variants of DES, Block cipher modes of operation , Block cipher design principles.	CO1, CO2	(08)
Unit 3	**Asymmetric key cryptography:** AES structure, Analysis of AES , Key distribution Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange	CO1, CO2	(06)
Unit 4	**Practical Cryptography:** Encryption, authentication, hashing, Digital Signatures and Certificates, Network security issues, Sniffing, IP spoofing	CO2, CO3	(06)
Unit 5	**Security at layers(Network, Transport, Application):** Network security issues, Sniffing, IP spoofing. IPsec, Secure Socket Layer(SSL), Transport Layer Security(TLS), Secure Electronic Transaction(SET), Pretty Good Privacy(PGP), S/MIME	CO2, CO3	(08)
Unit 6	**Intruders, Virus and Firewalls:** Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls	CO3, CO4	(06)

Text Books

1.	Cryptography and Network Security : William Stallings, Pearson Education,4th Edition
2.	Principles of Information Security: Michael E. Whitman, Herbert J. Mattord, CENGAGE Learning, 4th Edition.

Reference Books

1.	Network Security and Cryptography: Bernard Menezes, CENGAGE Learning
2.	Cryptography and Network Security : C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
3.	Introduction to Network Security: Neal Krawetz, CENGAGE Learning
4.	Principles of Computer Security: WM.Arthur Conklin, Greg White, TMH
5.	Handbook of Security of Networks, Yang Xiao, Frank H Li, Hui Chen, World Scientific, 2011.
6.	Cryptography and Network Security : AtulKahate, McGraw Hill, 2nd Edition

Useful Links

1.	http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/ Computer Systems Security by Prof.Nickolai Zeldo vich
2.	http://nptel.ac.in/courses/106106129/ Information Security by Professors at IIT Madras
3.	http://vlab.co.in/ba_labs_all.php?id=2 Information Security Virtual Labs by Professors at IIIT Hyderabad

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	3	1	1	0	0	0	0	0	0	1	2	3	1	2
CO 2	2	1	1	2	1	0	0	0	0	0	0	2	1	2	3
CO 3	1	2	1	2	1	0	0	0	0	0	0	1	2	1	2
CO 4	1	2	1	2	1	0	0	0	0	0	0	1	2	1	2

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	3	10
Understand	5	3	10
Apply	5	3	20
Analyse	5	4	-
Evaluate	-	4	20
Create	-	3	-
TOTAL	20	20	60

Government College of Engineering, Karad					
Second Year (Sem – III) M. C. A.					
MC3314: (Elective-II)Soft computing					

Teaching Scheme			Examination Scheme		
Lectures	03 Hrs/week		MSE	20	
Tutorials	00 Hrs/week		ISE	20	
Total Credits	03		ESE	60	
			Duration of ESE	02 Hrs 30 Min	

Prerequisite : Evolutionary Computing,Neural Networks & Fuzzy Logic

Course Outcomes (CO): Students will be able to

CO1	Develop the skills to gain a basic understanding of neural network theory and fuzzy logic theory.
CO2	Apply artificial neural networks and fuzzy theory from an engineering perspective.
CO3	Use the basics of an evolutionary computing paradigm known as genetic algorithms and its application to engineering optimization problems.
CO4	Generate the system using the knowledge of applications of Soft Computing Techniques.

Course Contents		CO	Hours
Unit 1	**Introduction:** Adaptive systems and Neural Networks, the nature of computation in human brain, a historical tour of brain science, inspiration of neural networks, classical AI and neural networks, difference between soft computing and hard computing.	CO1	(08)
Unit 2	**Artificial Neural Networks:** Introduction, Fundamental concept, Evolution of Neural Networks, Basic Models of Artificial Neural Networks, Important Terminologies of ANNs, McCulloch-Pitts Neuron, Linear Separability, Hebb Network. Supervised Learning Network: Perceptron Networks, Adaline, Multiple Adaptive Linear Neurons, Back-Propagation Network, And Radial Basis Function Network.	CO1, CO2	(08)
Unit 3	**Introduction to Fuzzy logic ,Classical sets and Fuzzy sets:** Introduction to fuzzy logic, Classical sets (operations, properties, function mapping), Fuzzy sets (operations, properties), fuzzy relations.	CO1, CO2	(08)
Unit 4	**Evolutionary Algorithms:** The hybrid way, Inspiration for evolutionary algorithms, Basic terminology from biology, Evolutionary algorithms: definition and streams, EA's solve optimization problems. **Swarm Intelligence:** Particle Search Optimization, Artificial Bee colony search, Ant colony optimization.	CO2, CO3	(08)
Unit 5	Genetic Algorithm: Introduction, Biological background, Traditional optimization and search techniques, Genetic Algorithm and search space, Genetic Algorithm vs Traditional Algorithms, Basic Terminologies Genetic Algorithm, Operations in Genetic Algorithm.	CO2, CO3	(04)
Unit 6	**Applications of Soft Computing:** A fusion approach of multispectral images with SAR (Synthetic Aperture Radar), GA Based Internet Search Technique; Soft Computing Based Hybrid Fuzzy Controllers.	CO1, CO3	(04)

Text Books

1.	Satish Kumar, Neural networks: A classroom approach, Tata McGraw Hill, 2011, ISBN-13: 978-1259006166.
2.	S. N. Sivanandam, S.N.Deepa "Principles of Soft Computing", Wiley Publication, 2nd edition, 2011. (Unit II, III, V, VI), ISBN-10. 9788126527410.

Reference Books

1.	David E. Goldberg, Genetic Algorithms in Search, Optimization, and Machine 30 Learning, Addison-Wesley, 1989, ISBN:978-0-201-15767-3.
2.	B. Yegnanarayana, Artificial Neural Networks, Prentice Hall India, 1999, ISBN-13. 978-8120312531.
3.	S.Rajasekaran, G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 1st edition, 2003, ISBN : 9788120353343.
4.	George Klir , Bo Yuan "Fuzzy sets and Fuzzy logic" PHI, 1st edition, ISBN: 8120311361.

Useful Links

1.		https://nptel.ac.in/courses/106/105/106105173/ Prof Debasis Samanta IIT Kharagpur
2.		https://nptel.ac.in/courses/127/105/127105006/ Prof. Manindra Agrawal. IIT Kanpur

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	0	2	1	1	1	1	1	1	1	0	1	1	1	0	1
CO 2	2	0	2	2	1	0	1	1	1	0	0	0	1	1	1
CO 3	3	2	3	2	2	0	2	1	1	2	1	1	0	2	2
CO 4	1	0	0	1	0	1	1	0	0	0	0	0	1	0	0

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	02	02	00
Understand	03	02	10
Apply	05	05	20
Analyse	05	05	20
Evaluate	05	06	10
TOTAL	20	20	60

Government College of Engineering, Karad				
Second Year (Sem – III) Master of Computer Applications				
MC 3324 (Elective-II) Business Process Management				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Process Modeling , Process Analysis and Improvement & Technology and Tools for BPM

Course Outcomes (CO): Students will be able to

1.	Understanding Business Process Management Fundamentals
2.	Proficiency in Process Identification and Modelling
3.	Competence in Process Discovery, Analysis, and Redesign
4.	Mastery in Process Automation, Monitoring, and Enhancement

	Course Contents	**CO**	**Hrs**
Unit 1	**Introduction to Business Process Management:** Processes Everywhere, Ingredients of a Business Process ,Origins and History of BPM - The Functional Organization, The Birth of Process Thinking, The Rise and Fall of BPR, The BPM Lifecycle.	**CO1**	**(5)**
Unit 2	**Process Identification:** Focusing on Key Processes- The Designation Phase, The Evaluation Phase, Designing a Process Architecture-- Identify Case Types, Identify Functions for Case Types, Construct Case/Function Matrices, Identify Processes, Complete the Process Architecture.	**CO2**	**(8)**
Unit 3	**Process Modelling:** Process Decomposition, Process Reuse, Handling Events, Handling Exceptions, Processes and Business Rules.	**CO2**	**(5)**
Unit 4	**Process Discovery and Process Analysis:** The Setting of Process Discovery, Discovery Methods, Process Modelling Method, Process Model Quality Assurance, Qualitative Process Analysis—Value-Added Analysis, Root Cause Analysis, Quantitative Process Analysis-- Performance Measures, Flow Analysis	**CO3**	**(8)**
Unit 5	**Process Redesign:** The Essence of Process Redesign, Heuristic Process Redesign, The Case of a Health are Institution, Product-Based Design.	**CO3**	**(6)**
Unit 6	**Process Automation and Monitoring:** Process Automation, Process Monitoring, Limitation of Process Modelling, Process Mining, event logs, extracting process models from events logs, control flow mining, alpha algorithm, process monitoring, conformance checking, organizational mining, process enhancement, Working with PROM.	**CO4**	**(8)**

Text Books

1.	Dumas, La Rosa, Mendling&Reijers: Fundamentals of Business Process Management, ISBN-13: 978-3662565087 ISBN-10: 3662565080 ... Springer. Publication date. 9 April 2018.

Reference Books

1.	Business Process Management: Concepts, Languages, Architectures" by Mathias Weske Hardcover ISBN 978-3-662-59431-5. eBook ISBN 978-3-662-59432-2. © Springer-Verlag Berlin Heidelberg 2019, Springer Link
2.	Handbook on Business Process Management 1: Introduction, Methods, and Information Systems edited by Jan vomBrocke and Michael RosemannISBN 978-3-642-45099-0 ISBN 978-3-642-45100-3 (eBook)

Useful Links

1.	www.udemy.com/course/new-bpm-approach-beginners-guide
2.	www.ocw.mit.edu

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	0	0	2	0	0	0	0	0	0	2	0	0
CO 2	3	1	2	0	0	0	0	0	0	0	0	0	1	2	0
CO 3	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0
CO4	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	5	12
Understand	3	3	12
Apply	4	5	12
Analyse	3	2	10
Evaluate	5	5	14
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad
First Year (Sem – III) Master of Computer Application
MC 3334 : (Elective-II) Multimedia System

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Digital Signal Processing Multimedia Compression and Coding & Multimedia Networking

Course Outcomes (CO): Students will be able to

CO1	To apply basic concepts of multimedia system.
CO2	Study various learn various methods of signal processing on multimedia systems and its design components.
CO3	Understand various digital multimedia systems and compression and decompression techniques and different image formats.
CO4	To develop ability to design various digital multimedia systems, Interpret storage and retrieval technologies, Project planning and costing.

	Course Contents		CO	Hours
Unit 1	**Introduction to Multimedia** Goals, objectives, and characteristics of multimedia, Multimedia building blocks, , Multimedia Applications Media Entertainment, Media consumption, web-based applications, e-learning and education Text and Image Processing:Text: Text file formats, Text compression, Image: Basic Image fundamentals, Image File formats Image processing Cycle- Image acquisition, storage ,Communication, and display, Image Enhancement, Image Compression		CO1, CO2, CO3	(08)
Unit 2	**Graphics, Audio AND Video** Introduction- Advantages of Graphics- Uses of Graphics- Components of a Graphics System- 2D Coordinate Systems- 2D Modeling- 3D Transformations- Projection- 3D Modeling- 3D Surface Characteristics and Lights- Audio- Introduction- Acoustics-Sound Waves-Types and Properties of Sounds- Musical Instrument Digital Interface- Digital Audio Processing- Audio-Processing SoftwareVideo- Introduction- Motion Video- Analog Video Camera- Digital Video- Video Recording and Storage Formats- Video-Processing Software		CO1, CO2, CO3	(08)
Unit 3	**Multimedia Architecture** Introduction- User Interface-OS multimedia support-Multimedia support-Multimedia Extensions Hardware support-Distributed multimedia Applications-Real time protocols-What is multimedia database-Content-based storage and retrieval-Designing a basic Multimedia Database-Audio and Video Features-classification of Data .Multimedia Document-Introduction-Document and Document Architecture-Hypermedia concepts and design-Digital rights and Library		CO1, CO2,	(08)
Unit 4	**Animation and Virtual Reality** Historical Background-Uses of Animation-Traditional Animation-Principles of Animation-Computer based Animation-Animation on the Web-3D Animation-Rendering Algorithm-Animation file formats Animation software. **Virtual Reality** Introduction-Forms of Virtual reality-AR Applications-Software requirements-Peripheral DevicesVirtual reality modelling Language		CO3, CO4	(08)
Unit 5	**Multimedia Information System:** Operating System Support for Continuous Media-Introduction, Limitations, Middleware System Services Architecture, Multimedia Devices, Presentation Services, and the User Interface, Multimedia File Systems and Information Models		CO1, CO2,	(04)
Unit 6	**Multimedia Communications Systems:** Multimedia Services over the Public Network: Requirements, Architectures, and Protocols, Multimedia Interchange, Multimedia Conferencing Future Directions**:** High Definition Television and Desktop Computing, Knowledge-Based Multimedia Systems		CO1, CO2	(04)

Text Books

1.	Multimedia Systems, ed. by John F. Koegel Buford, 13th edition (ACM Press/Addison- Wesley, 1994) **ISBN**-13. 978-0201532586
2.	Ranjan Parekh, "Principles of Multimedia" Tata McGraw Hill Education Private Limited,2nd Edition 2013 **ISBN-13**978-1259006500
3.	Fundamentals of Multimedia: Ze-Nian Li & Mark S. Drew, 2nd edition, Pearson Prentice Hall, 2004

	ISBN, 013127256X, 9780131272569
4.	Tay Vaughan - 1999– ''Multimedia: Making it work'' – Fourth Edition – Tata McGraw – Hill Edition **ISBN**: 007-463953-6

Reference Books

1.	Walterworth john A– 1991- "Multimedia Technologies and Application" - Ellis Horwood Ltd. – London **ISBN**-. 13:978-93-5260-157-8, **ISBN**-10:93-5260-157-2.
2.	John F koegel Buford – "Multimedia Systems" – Addison Wesley – First Indian Reprint. **ISBN**-13: 978-0072230000
3.	Digital Signal Processing: Steven W. Smith, 2nd edition, California Technical Publishing,1999 **ISBN** 0-9660176-7-6
4.	Tharkar, Multimedia Systems Design, 1st edition, Prentice Hall India Learning Private Limited **ISBN**-13. 978-8120321779
5.	Ashok Banerji, AnandaGhosh, "Multimedia Technologies", ISBN: 9780070669239

Useful Links

1.	http://nptel.ac.in/courses/117105083/1 , Multimedia Systems, IIT Kharagpur
2.	http://freevideolectures.com/Course/2652/CSE-40373-Multimedia-Systems , Video Lectures, Spring 2009 , Prof.Surendar Chandra

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 6	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	3	0	1	3	2	0	0	0	0	0	1	3	3	1
CO 2	3	3	0	2	3	2	0	0	0	0	0	1	3	1	1
CO 3	3	3	3	2	0	2	0	0	0	0	0	1	3	1	1
CO4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	2	1	12
Understand	3	2	12
Apply	5	3	12
Analyse	5	4	12
Evaluate	5	5	12
Create	-	5	-
TOTAL	20	20	60

Government College of Engineering, Karad
Second Year (Sem – III) Master of Computer Applications
MC3344 : (Elective II) Data Mining Warehousing

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Statistics and Probability , Machine Learning & Database Systems and SQL

Course Outcomes (CO): Students will be able to

CO1	Describe the designing of Data Warehousing so that it can be able to solve the root level problems
CO2	Understand various tools of Data Mining and their techniques to solve the real time problems.
CO3	Develop ability to design various algorithms based on data mining tools and design of new Data Mining techniques.

Course Contents		CO	Hours
Unit 1	**Introduction:** Classification, cluster analysis, outlier analysis, regression for predictive analysis, data mining applications.	CO2	(06)
Unit 2	**Data Pre-processing** Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.	CO2	(08)
Unit 3	**Data Warehousing and Online Analytical Processing:** Data Warehouse: Basic Concepts, Modeling: Data warehouse architecture, Data Cube and OLAP, Design and Usage, portioning strategies, data marting.	CO1	(08)
Unit 4	**Association:** Basic concepts, frequent item sets mining methods-Apriori algorithm, FP tree.	CO3	(04)
Unit 5	**Classification:** Basic Concepts, Decision Tree Induction, ID3, C4.5, SLIQ algorithms, Bayes' Classification Methods, Rule-Based Classification.	CO3	(06)
Unit 6	**Cluster Analysis and Outlier Detection:** Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering. Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches.	CO2, CO3	(08)

Text Books Author name, Book name, publisher, edition, isbn (Chapter no)

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

Useful Links

1.	http://nptel.ac.in/courses/106106093/35Data Mining, ShrinathShrinivasa IIT Madras
2.	http://www.kdnuggets.com/2014/09/most-viewed-data-mining-talks-videolectures.html Data Mining, Grant Marshall, Kdnuggest

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	0	0	1	1	1	0	1	0	1	1	0	1	1	0	1
CO 2	2	0	2	0	1	0	1	1	1	1	0	1	2	2	1
CO 3	0	2	3	2	2	0	1	2	1	0	3	2	1	1	2

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	4	4	12
Apply	4	4	12
Analyse	4	4	12
Evaluate	4	4	12
Create	-	-	-
TOTAL	20	20	60

Knowledge Level	MSE	ISE	ESE

Government College of Engineering, Karad				
Second Year (Sem – III) Master of Computer Applications				
MC3354 : (Elective II) Management Information System				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Information Systems Fundamentals, Business Process Analysis

Course Outcomes (CO): Students will be able to

CO1	Understand the foundational concepts and role of information systems in organizations.
CO2	Identify and analyze different types of information systems and their strategic importance in business operations.
CO3	Explore the decision-making processes within organizations and the role of information systems in facilitating decision support.
CO4	Acquire knowledge of system analysis and design methodologies and their application in developing effective information systems.

	Course Contents	CO	Hours
Unit 1	**Basic Concepts of Information System** Role of data and information, Organization structures, Business Process, Systems Approach and introduction to Information Systems.	CO1	**(06)**
Unit 2	**Types of IS** Resources and components of Information System, integration and automation of business functions and developing business models. Role and advantages of Transaction Processing System, Management Information System, Expert Systems and Artificial Intelligence, Executive Support Systems and Strategic Information Systems.	CO1,2	**(08)**
Unit 3	**Architecture & Design of IS** Architecture, development and maintenance of Information Systems, Centralized and Decentralized Information Systems, Factors of success and failure, value and risk of IS.	CO2	**(08)**
Unit 4	**Decision Making Process** Programmed and Non- Programmed decisions, Decision Support Systems, Models and approaches to DSS	CO3	**(04)**
Unit 5	**Introduction to Enterprise Management technologies** Business Process Reengineering, Total Quality Management and Enterprise Management System viz. ERP, SCM, CRM and Ecommerce	CO3	**(06)**
Unit 6	**Introduction to SAD** System Analysis and Design. Models and Approaches of Systems Development	CO4	**(08)**

Text Books Author name, Book name, publisher, edition, isbn (Chapter no)

1.	Effy Oz, Management Information Systems, Thomson Leaning/Vikas Publications, 5th edition, ISBN: 8131501744 (1,2,3)
2.	James A. O'Brein, Management Information Systems, Tata McGraw-Hill, 10th edition, ISBN: 125902671X (4,5,6)

Reference Books

1.	W.S Jawadekar, Management Information System, Tata Mc Graw Hill Publication, 10th edition, ISBN: 9389949343 (1,2)
2.	David Kroenke, Management Information System, Tata Mc Graw Hill Publication, 3rd edition, ISBN: 0071134220 (2,3)
3.	D.P. Goyal, MIS: Management Perspective, Macmillan Business Books, 4th edition, ISBN: 9325978601 (4)
4.	Raj K. Wadwha, Jimmy Dawar, P. Bhaskara Rao, MIS and Corporate Communications, Kanishka Publishers, 1st edition, ISBN: 817391849X(5)
5.	Kenneth C. Landon, Jane P. Landon, MIS: Managing the digital firm, Pearson Education, 12th edition, ISBN: 0-13-214285-6 (6)

Useful Links

1.	Swayam Course: https://onlinecourses.nptel.ac.in/noc22_mg100/preview
2.	Swayam Course: https://onlinecourses.nptel.ac.in/noc20_mg60/preview

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	0	0	1	1	1	0	1	0	1	1	0	1	1	0	1
CO 2	2	0	2	0	1	0	1	1	1	1	0	1	2	2	1
CO 3	0	2	3	2	2	0	1	2	1	0	3	2	1	1	2
CO 4	0	0	1	1	1	0	1	0	1	1	0	1	1	0	1

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	3	3	10
Understand	5	4	10
Apply	3	3	10
Analyse	4	4	10
Evaluate	4	3	10
Create	3	3	10
TOTAL	20	20	60

Government College of Engineering, Karad
Second Year (Sem – III) Master of Computer Applications
MC3315 : (Elective III) Machine Learning

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Statistics and Probability Linear Algebra & Machine Learning Algorithms

Course Outcomes (CO): Students will be able to

CO1	Introduce machine learning techniques.
CO2	Become aware of various parametric and non-parametric methods in machine learning.
CO3	Understand a wide variety of learning algorithms.
CO4	Design and implement various machine learning algorithms in a range of real-world applications

	Course Contents	CO	Hrs
Unit 1	**Introduction to Machine Learning**: Different types of Learning: Supervised, Unsupervised, Semi Supervised, Hypothesis space. Machine Learning Models: Geometric, Logical and probabilistic. Features: Types and Selection Methods.	CO2	(06)
Unit 2	**Regression and Classification:** Regression: Simple Linear Regression, Multiple Linear Regression, Other Considerations in the Regression Model. Classification: Logistic Regression: The Logistic Model, Estimating the Regression Coefficients, Making Predictions, Multiple Logistic Regression. Performance Evaluation: Error, Accuracy, Precision, Recall. Sampling Methods: Train/Test Sets, Cross Validation, Difficulties in evaluating hypothesis, Sample Error, True Error. What to measure: Precision and Recall, accuracy, AUC, ROC, How to measure: Cross Validation, how to interpret	CO2	(07)
Unit 3	**Linear and Probabilistic Models:** Linear Model: Least Square Method, Multivariate Linear regression, least square regression for classification, Support Vector Machine. Probabilistic Model: Normal Distribution and its geometric interpretation, Naïve Bayes model for classification.	CO1	(07)
Unit 4	**Model Ensembles:** Bagging and Random Forest, Boosting: Boosted Rule Learning, Mapping the ensemble landscape: Bias, Variance and Margins.	CO3	(06)
Unit 5	**Introduction to Deep Learning:** The Neural Network: The Neuron, Feed-forward neural networks, Linear neurons and their limitations, Sigmoid, Activation Functions: Tanh and ReLU Networks, Softmax output layers. Training Feed-forward neural networks: Gradient Descent, Learning Rates, Gradient Descent with Sigmoid neurons, The Back Propagation algorithm, Test sets, Validation Sets and over fitting, preventing over fitting in Deep Neural Networks.	CO3	(06)
Unit 6	**Convolutional Neural Networks:** Architectural Description of Convolution Networks, Filters and Feature Maps, Back propagation in CNN	CO2, CO3	(08)

Text Books Author name, Book name, publisher, edition, isbn (Chapter no)

1.	Peter Flach, "Machine Learning: The Art and Science of Algorithms that Make Sense of Data", Cambridge University Press Edition 2012. (Unit: 1, 2)
2.	Hastie, Tibshirani, Friedman, "Introduction to Statistical Machine Learning with Applications in R", Springer, 2nd Edition, 2012. (Unit: 3,4,5,6)

Reference Books

1.	Nikhil Buduma, "Fundamentals of Deep Learning, O"Reilly", 1st Edition, ISBN NO. 978-14-919-2561-4.
2.	EthemAlpaydin, "Introduction to Machine Learning", PHI, 2nd Edition, 2013.
3.	C. M. Bishop, "Pattern Recognition and Machine Learning", Springer 1stEdition, 2013.
4.	Tom Mitchell, "Machine Learning, Mcgraw-Hill", 1

Useful Links

1.	https://nptel.ac.in/courses/106/106/106106139/ Prof.BalaramanRavindran, IIT Madras.
2.	https://nptel.ac.in/courses/106/105/106105152/ Prof.Sudeshna Sarkar, IIT Kharagpur.
3.	https://nptel.ac.in/courses/106/106/106106202/ Prof. Carl GustafJansson, KTH.

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	0	3	0	2	0	1	0	1	1	0	1	1	0	1
CO 2	0	3	1	0	0	0	1	1	1	1	0	1	2	2	1
CO 3	0	0	3	0	0	0	1	2	1	0	3	2	1	1	2
CO 4	0	1	2	0	0	0	0	0	0	0	0	0	1	0	1

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	4	4	12
Apply	4	4	12
Analyse	4	4	12
Evaluate	4	4	12
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad
Second Year (Sem – III) Master of Computer Applications
MC3325: (Elective III)Business Intelligence

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Data Warehousing , Data Visualization & Business Analytics

Course Outcomes (CO): Students will be able to

CO1	Understand Business Intelligence Fundamentals
CO2	Get proficiency in Knowledge Delivery and Visualization
CO3	Do efficiency Analysis and Mathematical Modeling
CO4	Acquire knowledge of Business Intelligence methodologies and their application in developing effective information systems.

	Course Contents	CO	Hours
Unit1	**Business Intelligence:** Effective and timely decisions–Data,information and knowledge – Role of mathematical models–Business intelligence architectures: Cycle of a business intelligence analysis–Enablingfactorsinbusinessintelligenceprojects–Developmentofabusiness Intelligence system–Ethics and business intelligence	CO1	(08)
Unit2	**Knowledge Delivery:** The business intelligence user types, Standardreports, Interactive Analysis andAdHocQuerying,ParameterizedReportsandSelf-ServiceReporting,Visualization:Charts,Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization	CO2	(06)
Unit3	**Efficiency:** 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	CO3	(06)
Unit4	**Mathematical models for decision making:** Structure of mathematical models, Development of a model, Classes of models ,Notes and readings.	CO3	(06)
Unit5	**M-Commerce**:Introductiontom-commerce:Emergingapplications,differentplayersinm-Commerce, m-commerce life cycle Mobile financial services, mobile entertainment services, and Proactive service management	CO4	(06)
Unit6	**Business Intelligence Applications:** Marketing models–Logistic and Production models–Case studies.	CO4	(08)

Text Books

1.	Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", 1st edition, Wiley Publications, 2009.*ISBN*-13: 978-0470511398
2.	Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", 1stedition, Addison Wesley, 2003ISBN-10 : 0201784203 ISBN-13 : 978-0201784206

Reference Books

1.	David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager's Guide", Second Edition, 2012 ISBN-10 **0123858895 I**SBN-13 **978-0123858894**
2.	Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", 1st edition, McGrawHill,2007ISBN-10**0071498516** ISBN-13 **978-0071498517**

Useful Links

	www.coursera.org/courses?query=business%20intelligence

Mapping of COs and POs

PO / PSO →	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	0	0	2	0	0	0	0	0	0	2	0	0
CO 2	3	1	2	0	0	-	0	0	0	0	0	0	1	2	0
CO 3	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0
CO 4	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	5	5	10
Understand	3	3	10
Apply	4	5	14
Analyse	3	2	12
Evaluate	5	5	14
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad
First Year (Sem – III) Master of Computer Application
MC3335:(Elective-III) Digital forensics.

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Cyber security Fundamentals , Network & Computer Forensics

Course Outcomes (CO): Students will be able to

CO1	Understand concepts and comprehension of digital forensic as a profession
CO2	Apply the technical tools and techniques used in the field of digital forensics to evaluate an emerging issue in Computer and cyber forensics.
CO3	Analyze the position or arguments around the issue, and present his/her knowledge in a written logical professional Manner.
CO4	Acquire knowledge of Digital forensics methodologies and their application

	Course Contents	CO	Hours
Unit 1	**Introduction of Cyber Crime:** 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.	CO1	(06)
Unit 2	**Digital Evidences:** 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.	CO1,CO2	(08)
Unit 3	**Data Collection:** 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	CO1,CO2	(08)
Unit 4	**Network Forensics:** 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.	CO1, CO2, CO3	(08)
Unit 5	**Data Analysis:** Data Analysis Techniques, Forensic Analysis of File Systems **Report Writing:** Goals of Report, Investigative Report Layout, Guidelines for Report Writing.	CO2, CO3	(04)
Unit 6	**Cyber Law:** 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, Honey pots, The Indian Penal Code (IPC) 1860, Mapping of Cybercrime with IT Act, Technology and Students: Indian Scenario	CO2, CO3	(06)

Text Books

1.	Digital Forensic: The Fascinating World of Digital Evidences by Dr.Nilakshi Jain, Dr.Dhananjay R. Kalbande, Wiley 2016, ISBN: 978-8126565740
2.	Digital Forensics with Open Source Tools by Cory Altheide and Harlan Carvey, Syngress, April 2011, ISBN: 978-1597495868

Reference Books

1.	Digital Evidence and Computer Crime: Forensic Science, Computers and the Internet by Eoghan Casey, Academic Press; 3rd edition ISBN: 978-0123742681
2.	Computer Forensics: Investigating Data and Image Files by EC-Council Press, Cengage Learning; 1 edition

	ISBN: 978-1435483514
3.	Guide to Computer Forensics and Investigations by Bill Nelson, Amelia Phillips, Christopher Steuart, Cengage; 5 edition (January 15, 2015), ISBN: 978-1285060033
4.	Mobile Forensic Investigations: A Guide to Evidence Collection, Analysis and Presentationby Lee Reiber, McGraw-Hill Education (16 December 2015), ISBN: 978-0071843638
5.	Digital Forensics with Kali Linux by Shiva V.N. Parasram, Packt Publishing Limited (19 December 2017), ISBN-13: 978-1788625005
Useful Links	
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/
11.	Journal of Digital Forensic Practice https://www.tandfonline.com/loi/udfp20
12.	Electronic Crime Scene Investigation: A Guide for First Responders –https://www.ncjrs.gov
13.	CERIAS Forensics Research (http://www.cerias.purdue.edu/research/forensics
14.	Scientific Working Group on Digital Evidence (https://www.swgde.org/)

Mapping of Cos and Pos

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2	1	1	2	2	2	3	0	2	0	2	3	1	2
CO 2	2	2	3	2	2	2	3	1	0	0	0	1	1	3	1
CO 3	2	2	3	2	2	2	3	1	0	1	0	3	2	2	2
CO 4	3	1	2	2	3	2	1	3	0	1	0	2	1	2	3

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern(with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	2	1	12
Understand	2	3	12
Apply	5	4	12
Analyse	5	4	12
Evaluate	6	4	12
Create	-	4	-
TOTAL	20	20	60

Government College of Engineering, Karad				
Second Year (Sem –III) Master of Computer Applications				
MC3345 : (Elective III) Big Data Analytics				
Teaching Scheme			**Examination Scheme**	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite : Data Management and Processing Data Visualization

Course Outcomes (CO): Students will be able to

CO1	Understand the Big Data challenges.
CO2	Gain conceptual understanding of NOSQL Database, map and reduce and functional programming
CO3	Apply concepts of Hadoop Distributed File System.

	Course Contents		CO	Hours
Unit 1	**"Big Data" in the Enterprise** 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		CO1	(08)
Unit 2	**Data Modelling Approaches for Big data And Analytics Solution** Understanding data integration Pattern Big Data Workload Design Approaches Map-Reduce patterns, Algorithms and Use Cases		CO1	(05)
Unit 3	**NOSQL Data Modelling Technique** 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)		CO2	(07)
Unit 4	**Hadoop Framework** 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		CO3	(08)
Unit 5	**Big Data Analytics Methodology** 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		CO3	(07)
Unit 6	**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		CO2, CO3	(05)

Text Books

1.	MadhuJagadeesh, SoumendraMohanty, Harsha Srivatsa, "Big Data Imperatives: Enterprise Big Data Warehouse, BI Implementations and Analytics", 1st Edition, A press (2013)
2.	Frank J. Ohlhorst, "Big Data Analytics: Turning Big Data into Big Money", Wiley Publishers (2012)
3.	Cristian Molaro, Surekha Parekh, Terry Purcell, "DB2 11: The Database for Big Data &Analytics",MC Press, (2013)

Reference Books

1.	Tom White, "Hadoop –The Definitive Guide, Storage and analysis at internet scale",SPD,O'Really
2.	DT Editorial Services, "Big Data, Black Book-Covers Hadoop2, MapReduce, Hive, YARN, Pig, R and Data Visualization" Dreamtech Press, (2015).

Useful Links

1.	https://onlinecourses.nptel.ac.in/noc20_cs92/preview By Prof. Rajiv Misra	IIT Patna

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	0	0	1	1	1	0	1	0	1	1	0	1	1	-	1
CO 2	2	0	2	0	1	0	1	1	1	1	0	1	2	2	1
CO 3	0	2	3	2	2	0	1	2	1	0	3	2	1	1	2

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	4	4	12
Understand	4	4	12
Apply	4	4	12
Analyse	4	4	12
Evaluate	4	4	12
Create	-	-	-
TOTAL	20	20	60

Government College of Engineering, Karad
Second Year (Sem – III) Master of Computer Applications
MC3355 : (Elective III) Intellectual Property Rights and Patents

Teaching Scheme			Examination Scheme	
Lectures	03 Hrs/week		MSE	20
Tutorials	00 Hrs/week		ISE	20
Total Credits	03		ESE	60
			Duration of ESE	02 Hrs 30 Min

Prerequisite :Intellectual Property Management, Patent Law and Practice & Intellectual Property Law

Course Outcomes (CO): Students will be able to

CO1	Comprehend the fundamental concepts and categories of Intellectual Property Rights (IPR) and their significance in the global context.
CO2	Analyze the legal frameworks and procedures associated with patent rights, copyright, and trademark registration and protection.
CO3	Evaluate the challenges and legal issues related to intellectual property infringement, piracy, and cybercrimes.
CO4	Understand the legal provisions and regulations governing intellectual property rights in the digital age, including aspects of e-commerce, e-governance, and cyber law.

	Course Contents	CO	Hours
Unit 1	**INTRODUCTION TO IPR:** Meaning of property, Origin, Nature, Meaning of Intellectual Property Rights Introduction to TRIPS and WTO. Kinds of Intellectual property rights—Copy Right, Patent, Trade Mark, Trade Secret and trade dress, Design, Layout Design, Geographical Indication, Plant Varieties and Traditional Knowledge.	CO1	(08)
Unit 2	**PATENT RIGHTS AND COPY RIGHTS**— Origin, Meaning of Patent, Types, Inventions which are not patentable, Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties.	CO2	(05)
Unit 3	**COPY RIGHT**—Origin, Definition &Types of Copy Right, Registration procedure, Assignment & licence, Terms of Copy Right, Piracy, Infringement, Remedies, Copy rights with special reference to software	CO2	(07)
Unit 4	**TRADE MARKS**— Origin, Meaning & Nature of Trade Marks, Types, Registration of Trade Marks, Infringement & Remedies, Offences relating to Trade Marks, Passing Off, Penalties. Domain Names on cyber space	CO2, CO3	(08)
Unit 5	**DESIGN-** Meaning, Definition, Object, Registration of Design, Cancellation of Registration, International convention on design, functions of Design. Semiconductor Integrated circuits and layout design Act-2000.	CO4	(07)
Unit 6	**BASIC TENENTS OF INFORMATION TECHNOLOGY ACT-2000** – IT Act - Introduction E-Commerce and legal provisions E- Governance and legal provisions Digital signature and Electronic Signature. Cybercrimes	CO3, CO4	(05)

Text Books

1.	Dr. G.B. Reddy, Intellectual Property Rights and the Law, Gogia Law Agency, 11th edition, ISBN: 9788194227281, (1,2,3)
2.	Dr.B.L.Wadehra. Law relating to Intellectual Property, Universal Law Publishing Co, 5th edition, ISBN: 9350350300 (4,5,6)

Reference Books

1.	P. Narayanan, IPR, Eastern Law House, 3rd edition, ISBN: 8171773516 (1,2,3)
2.	Dr.S.R. Myneni, Law of Intellectual Property, Asian Law House, 11th edition, ISBN: 9789394739321 (4,5,6)

Useful Links

1.	Swayam Course: https://onlinecourses.swayam2.ac.in/aic21_ge20/preview
2.	Swayam Course: https://onlinecourses.nptel.ac.in/noc21_mg96/preview

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	0	0	1	1	1	0	1	0	1	1	0	1	1	0	1
CO 2	2	0	2	0	1	0	1	1	1	1	0	1	2	2	1
CO 3	0	2	3	2	2	0	1	2	1	0	3	2	1	1	2
CO 4	2	0	2	0	1	0	1	1	1	1	0	1	2	2	1

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	MSE	ISE	ESE
Remember	3	3	10
Understand	5	4	10
Apply	3	3	10
Analyse	4	4	10
Evaluate	4	3	10
Create	3	3	10
TOTAL	20	20	60

<table>
<tr><td colspan="5" align="center">**Government College of Engineering, Karad**</td></tr>
<tr><td colspan="5" align="center">**Second Year (Sem – III) M. C. A.**</td></tr>
<tr><td colspan="5" align="center">**MC3306: Data Science Lab**</td></tr>
<tr><td colspan="2">**Teaching Scheme**</td><td></td><td colspan="2">**Examination Scheme**</td></tr>
<tr><td>Practical</td><td>02 Hrs/week</td><td></td><td>ISE</td><td>50</td></tr>
<tr><td>Tutorials</td><td>00 Hrs/week</td><td></td><td></td><td></td></tr>
<tr><td>Total Credits</td><td>01</td><td></td><td></td><td></td></tr>
<tr><td colspan="5">**Prerequisite :**Programming and Scripting, Data Wrangling and Cleaning & Exploratory Data Analysis (EDA)</td></tr>
<tr><td colspan="5">**Course Outcomes (CO):** Students will be able to</td></tr>
<tr><td>**1.**</td><td colspan="4">Learn Data Science for and the skill set needed to be a Data Scientist</td></tr>
<tr><td>**2.**</td><td colspan="4">Evaluate different tools for Data Science and create effective visualization of given data.</td></tr>
<tr><td>**3.**</td><td colspan="4">Apply basic machine learning algorithms for predictive modelling.</td></tr>
</table>

	Course Contents	**CO**
Experiment 1	Data Science Overview	**CO1**
Experiment 2	Statistical Analysis and Business Applications	**CO1**
Experiment 3	Python/R Environment Setup and Essentials	**CO1, CO2**
Experiment 4	Mathematical Computing with Python/R	**CO1, CO2**
Experiment 5	Scientific computing with Python/R	**CO1, CO3**
Experiment 6	Data Manipulation with Pandas/R	**CO1, CO2**
Experiment 7	Machine Learning with Scikit–Learn/CARET	**CO1, CO2, CO3**
Experiment 8	Natural Language Processing with Scikit-Learn/EDA	**CO1, CO3**
Experiment 9	Data Visualization in Python/R	**CO1, CO2**
Experiment 10	Web Scraping with Python/R	**CO2, CO3**
Experiment 11	Python/R integration with Hadoop MapReduce and Spark	**CO2, CO3**
List of Submission:		
	Minimum 10 experiments to be performed and evaluated Journal	

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	3	2	3	1	1	0	1	2	0	2	3	2	1	2
CO 2	2	1	2	2	2	1	0	2	2	0	2	2	3	2	3
CO 3	2	2	3	2	2	2	0	2	2	1	2	2	1	1	2

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE
Remember	5
Understand	7
Apply	8
Analyse	10
Evaluate	10
Create	10
TOTAL	50

Government College of Engineering, Karad				
Second Year (Sem – III) Master of Computer Applications				
MC3307: Mobile Technology Lab				
Laboratory Scheme			**Examination Scheme**	
Practical	02 Hrs/week		ISE	50
Tutorials	00 Hrs/week		ESE	--
Total Credits	01			

Prerequisite : Mobile Application Development,User Interface (UI) Design & Mobile Device Testing and Debugging

Course Outcomes (CO): Students will be able to

1.	Setting up Android Development Environment.
2.	Creating a new Android project.
3.	Building IOS and a simple cross-platform application.

	List of Experiments	**CO**
Experiment 1	Demonstrate the process of setting up the Android development environment on a computer, including installing Android Studio and configuring the SDK.	**CO1**
Experiment 2	Create a new Android project in Android Studio and name it "MyFirstApp".	**CO2**
Experiment 3	Implement event handling in an Android app to respond to user interactions, such as button clicks or text input.	**CO3**
Experiment 4	Design a login screen for a mobile app using Linear Layout and Relative Layout. Include Edit Text fields for username and password, and a Button for the login action.	**CO2**
Experiment 5	Override the onCreate, onStart, onResume, onPause, onStop, and onDestroy methods in an activity class. Log a message in each method to track the activity lifecycle.	**CO3**
Experiment 6	Design a modular UI using fragments in an Android app, demonstrating how fragments can be reused across multiple activities.	**CO3**
Experiment 7	Create a dynamic list in an Android app using RecyclerView and populate it with data retrieved from a SQLite database.	**CO3**
Experiment 8	Design a user interface for an iOS app using Interface Builder, including adding and configuring UI elements such as labels, buttons, and text fields.	**CO2**
Experiment 9	Create a table view or collection view in an iOS app to display data in a scrollable list or grid format.	**CO3**
Experiment 10	Build a simple cross-platform app using a chosen framework, demonstrating basic functionality such as navigation, user input, and data display.	**CO3**

List of Submission

Total number of experiment based on syllabus: 10

Text Books

1.	Eric Matthes ,"Python Crash Course" (2nd Edition)ISBN: 9781593279288
2.	Mark Lutz , "Learning Python" (5th Edition) ISBN: 9781449355739
3.	Al Sweigart , "Automate the Boring Stuff with Python" (2nd Edition)*ISBN*: 9781593279929.
4.	John Zelle, "Python Programming: An Introduction to Computer Science" (3rd Edition) ISBN-10 1590282752

Reference Books

1.	Luciano Ramalho , "Fluent Python" (1st Edition) ISBN-10 1491946008
2.	David Beazley and Brian K. Jones , "Python Cookbook" (3rd Edition)*ISBN*: 9781449357351.

Useful Links

1.	https://onlinecourses.swayam2.ac.in/cec22_cs20/preview
2.	https://www.youtube.com/watch?v=eWRfhZUzrAc

Mapping of COs and POs

PO / PSO →	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	3	2	1	0	0	2	0	0	0	0	0	0	2	0	0
CO 2	3	1	2	0	0	0	0	0	0	0	0	0	1	2	0
CO 3	1	2	3	0	0	2	0	0	0	0	0	0	1	2	0

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	0	0
Understand	5	5
Apply	5	5
Analyze	5	5
Evaluate	5	5
Create	5	5
TOTAL	25	25

Government College of Engineering, Karad				
Second Year (Sem – III) M.C.A				
MC3308: Internet of Things Lab				
Teaching Scheme			**Examination Scheme**	
Practical	02Hrs/week		ISE	25
Tutorials	01Hr/week		ESE	25
Total Credits	03			

Prerequisite : Embedded Systems, Communication Protocols &Data Analytics and Visualization

Course Outcomes (CO): Students will be able to

CO1	Explain the usage of the term "The Internet of Things" in different contexts.
CO2	Understand where the IOT concept fits within the broader ICT industry and possible future trends.
CO3	Appreciate the role of big data cloud computing and data analytics in a typical IOT system.

	Course Contents	CO	Hours
Unit 1	**Introduction to Internet of Things (IoT):** Definition and scope of IoT, Evolution of IoT, Components of IoT ecosystem (devices, sensors, actuators, connectivity, cloud services), Applications and impact of IoT in various industries, Overview of IoT platforms and protocols	CO1	(08)
Unit 2	**Microcontrollers and Embedded Systems:** Introduction to microcontrollers and their role in IoT, Basic architecture of microcontrollers, Programming microcontrollers for IoT applications (Arduino, STM, Raspberry Pi) , Interfacing sensors and actuators with microcontrollers, Real-time operating systems (RTOS) for IoT devices	CO1, CO2	(05)
Unit 3	**Sensors and Actuators:** Types of sensors (temperature, humidity, motion, light, etc.) and actuators used in IoT, Working principles of sensors and actuators, Characteristics and selection criteria for sensors and actuators, Signal conditioning and sensor data acquisition techniques	CO1, CO2	(07)
Unit 4	**Communication Protocols for IoT:** Wired and wireless communication protocols used in IoT (Wi-Fi, Bluetooth, Zigbee, LoRa, MQTT, CoAP, etc.), IoT network architectures (star, mesh, ad-hoc), IoT security protocols and challenges (authentication, encryption, privacy)	CO2, CO3	(06)
Unit 5	**Data Processing and Analytics in IoT:** Data collection, storage, and preprocessing in IoT systems, Edge computing vs cloud computing in IoT, Data analytics techniques for extracting insights from IoTdata,Machine learning and artificial intelligence in IoT applications	CO1, CO2	(05)
Unit 6	**IoT Applications and Case Studies:** Smart cities: IoT applications in urban planning, transportation, and energy management Industrial IoT (IIoT): Applications in manufacturing, predictive maintenance, and supply chain management Healthcare IoT: Remote patient monitoring, wearable devices, and telemedicine Environmental monitoring: IoT applications for pollution control, agriculture, and wildlife conservation	CO1, CO2, CO3	(08)

Tutorials

A set of Tutorial/ problems based on above syllabus is to be submitted

Sample List of Experiments:

Exteriment No	Experiment Title	CO
Experiment 1	Study of IOT (Microcontroller) Arduino/ STM and R'pi.	CO1
Experiment 2	Study of different types of sensors, actuators, transducers	CO1,2
Experiment 3	Experiment based on IR sensor. Write an application to detect obstacle and notify user using LED	CO1,2
Experiment 4	Experiment based on FIRE sensor. Write an application to detect Fire and notify users using LED.	CO2
Experiment 5	Experiment based on Ultrasonic sensor. Write an application to find out distance between obstacles.	CO2
Experiment 6	Experiment based on DHT11 (Temperature and humidity) sensor. Write an application to find out the temperature and humidity.	CO2
Experiment 7	Experiment based on interfacing to control the operation of stepper motor remotely	CO1,2,3

Experiment 8	Create a simple web interface to control the connected LEDs remotely through the interface	CO2,3
Experiment 9	Control the operation of elevator operations.	CO3
Experiment 10	Study and implement clustering and configuring devices using MPI library	CO3
List of Submission:		
	Total number of Experiments: 10	

Text Books

| 1. | J. Biron and J. Follett, "Foundational Elements of an IoT Solution", 1st edition, O'Reilly Media,2016 |
| 2. | CunoPfister, Getting Started with the Internet of Things, 1st edition O'RELLY Media,2011 |

Reference Books

| 1. | Charles Bell, "Beginning Sensor Networks with Arduino and Raspberry", 1stedition, A press, 2013. |
| 2. | EbenUpton,TheRaspberryPiUserGuide,2ndedition,Wiley,2013 |

Useful Links

| 1. | Introduction to Internet of Things, KnoesisCenter https://www.youtube.com/watch?v=9ZUFYyXhQm8 |
| 2. | Introduction to Internet of Things: Course homepage: http://www.knoesis.org/cs4800-6800-sp...Dr.Alexandru |

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	2	1	1	1	1	0	1	2	0	2	3	2	1	2
CO 2	3	2	2	2	3	0	0	2	2	0	2	2	3	2	3
CO 3	2	3	3	2	3	0	0	2	2	1	2	2	1	1	2

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	4	5
Understand	4	3
Apply	4	5
Analyse	4	4
Evaluate	4	3
Create	5	5
TOTAL	25	25

Government College of Engineering, Karad		
Second Year (Sem – III) Master of Computer Applications		
MC3309 : Major Project		

<table>
<tr><td colspan="2">Teaching Scheme</td><td></td><td colspan="2">Examination Scheme</td></tr>
<tr><td>Practical</td><td>02 Hrs/week</td><td></td><td>ISE</td><td>50</td></tr>
<tr><td>Tutorial</td><td>00 Hrs/week</td><td></td><td>ESE</td><td>50</td></tr>
<tr><td>Total Credits</td><td>01</td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Prerequisite : Project Management, Research Methodology &Domain Knowledge

Course Outcomes (CO): Students will be able to

CO1	Apply the knowledge of the distinction between critical and noncritical systems.
CO2	Develop the System that have ability to manage a project including planning, scheduling and risk assessment/management.
CO3	Analyse the proficiency in rapid software development techniques.

Nature of Project		CO
	The project batches of 2-3 students should be formed, which will work on the project allocated by the department. The batch must complete it during first semester only. Term work submission should be done in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the University.	CO1,CO2,CO3
1	Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.	
2	Two mid-term evaluations should be done, which includes presentations and demos of the work done.	
Project Report Format:	Project report should be of 15 to 20 pages (typed on A4 size sheets). For standardization of the project reports the following format should be strictly followed.	
	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:

1	http://www.geeksforgeeks.org/	
2	https://in.udacity.com/	
3	https://graphics.stanford.edu/~seander/bithacks.html	
4	https://www.youtube.com/results?search_query=mycodeschool	
5	https://www.hackerrank.com/	

Tutorials:

	Eight tutorials based on project is to be submitted.

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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CO 2	3	2	3	1	3	0	3	0	0	3	3	2	3	2	3
CO 3	3	1	3	2	0	0	2	2	0	2	3	3	3	1	3

1: Slight(Low)   2: Moderate(Medium)   3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	0	0
Understand	5	5
Apply	10	10
Analyse	10	10
Evaluate	5	5
Create	20	20
TOTAL	50	50

Government College of Engineering, Karad		
Second Year (Sem – IV) Master of Computer Applications		
MC3401 : Industrial Project		

Teaching Scheme			Examination Scheme	
Practical	04 Hrs/week		ISE	100
Tutorial	00 Hrs/week		ESE	100
Total Credits	02			

Prerequisite : Project Management, Industrial Processes and Operations & Problem Solving and Innovation

Course Outcomes (CO): Students will be able to

CO1	Apply knowledge of the distinction between critical and non critical systems.
CO2	Attain an exposure to real life organizational and environmental situations & technical skills as per the requirements of the domain
CO3	Articulate SDLC phases in developing software project and Identify specific components of software design that can be targeted for reuse.

	Nature of Project	CO
	The project batches of 2-3 students should be formed, which will work on the project allocated by the department. The batch must complete it during first semester only. Term work submission should be done in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the University.	**CO1,CO2,CO3**
1	Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.	
2	Two mid-term evaluations should be done, which includes presentations and demos of the work done.	
Project Report Format:	Project report should be of 15 to 20 pages (typed on A4 size sheets). For standardization of the project reports the following format should be strictly followed.	
	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:

1	http://www.geeksforgeeks.org/	
2	https://in.udacity.com/	
3	https://graphics.stanford.edu/~seander/bithacks.html	
4	https://www.youtube.com/results?search_query=mycodeschool	
5	https://www.hackerrank.com/	

Tutorials:

| | | | | | | | | | | | | | | | Eight tutorials based on project is to be submitted. | | |

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	3	3	3	-	-	-	-	-	-	-	1	3	1	2
CO 2	3	2	3	1	3	-	3	-	-	3	3	2	3	2	3
CO 3	3	1	3	2	-	-	2	2	-	2	3	3	3	1	3

1: Slight(Low)　　　　2: Moderate(Medium)　　　　3: Substantial(High)

Assessment Pattern (with revised Bloom's Taxonomy)

Knowledge Level	ISE	ESE
Remember	10	10
Understand	15	15
Apply	15	15
Analyse	15	15
Evaluate	20	20
Create	25	25
TOTAL	100	100