Government College of Engineering, Karad

(An Autonomous Institute of Government of Maharashtra)

Academic Unit

GUIDELINES FOR CURRICULUM UNDER AUTONOMY

Following guidelines shall be strictly followed while designing the curriculum under Autonomy.

➢ Contact hours and credits for each semester

Semester	Contact Hours	Credits
I & II	60(30+30)	50(25+25)
III & IV	60(30+30)	50(25+25)
V & VI	60(30+30)	40(25+15)
Total Credits		140(75+65)

1 credit for Lecture/ Tutorial hour and 1 credit for 2 Practical hours per week.

➢ Theory & practical should be separated and made as Theory course & laboratory or Lab course separately.

➢ There will be max. 5 theory courses and max. 5 Laboratory courses per semester. Total courses (passing heads) in a semester should not be more than 10.

➢ Number of practical batches for each class should be as under-

Class	No. of Practical batches
1st Year Class	2
2nd and 3rd Year Class	2

➢ Laboratory courses (excluding seminar & other presentations) should essentially be in laboratory where performance is conducted. Exceptionally demonstration may also be considered for laboratory course. For theoretical subjects, such performance can be evaluated through assignments and quiz.

➢ Heads are requested not to keep laboratory courses for which laboratory is not available and the department is not likely to purchase required equipment in next three years. That can be considered only after procurement of equipment and establishment of laboratory. Same strategy should be applied for the list of experiments to be included in the syllabus in a particular laboratory.

➢ ESE for laboratory courses (excluding seminars & projects) should be kept only when performance based practical examination is possible. Under the circumstances, students should essentially be assessed based only on his practical performance during the examination.

➢ In view of AICTE guidelines, observations in different reports by NKC, NASSCOM, NSDM, FICCI etc., the curriculum shall consist of courses like Professional Practises (I Communication skills, II Soft skills, III Aptitude skills), industrial training, Mini Project, Minor Project, Project, Electives, self-study etc. In view of giving industry exposure, more thrust shall be given on expert lectures from industry, industrial visits, industry problem based/ sponsored projects, real life problem based mini projects etc.

➢ All laboratory courses including seminar & projects (excluding mini project) shall be assessed continuously based on continuous evaluation formats.

➢ At least one industrial visit in one of the appropriate laboratory courses in each of III, IV, V semester; it should be mentioned in the details of that course. It is mandatory; however, the department shall encourage more visits, if possible, in many courses at any level. The visit report should be included in the list of experiments and should be a part of journal/ term work to be submitted by students. Due weightage shall be given in CE & ESE of that lab course.

➢ The credits and the level at which few common courses shall be offered are given below:

Course	Semester/ Level	Contact Hours	Credits	Remarks
Soft Skills	II	2(T)+2(P)	3	
Business Communication	IV	2(T)+2(P)	3	
Professional Communication	V	3(L)	3	
Industrial Training/ Mini Project (Batch size 2 students)	During vacation After SY and credits in V	--	2	Mini project essentially based on industry or real life problem
Minor Project (Project Planning and Management Lab)	IV	5	3	At the most 2 students can do one minor project (Batch of 10 students per faculty)
Seminar	II	2	2	
Elective-I	IV	3	3	
Project Phase-I	V	6	4	At the most 5 students can do one major project (2 project batches per faculty)
Project Phase-II	VI	30	15	
Elective-II & III	V	6	6	

➢ The curriculum structure should essentially contain list of electives in concerned semester. The list though contain at least three courses, should not be too exhaustive.
➢ The curriculum structure & syllabus should be in the formats only.
➢ In order to enhance the self-learning ability of the student, the self-study modules needs to be separately specified in the contents of the syllabus for the subject. The student's ability to express his/her own thoughts will be tested by asking questions on self-study modules in ESE
➢ Text books, reference books, websites etc should be correctly mentioned with latest version. The Heads are requested to verify it personally on Internet at the time of mentioning in the curriculum.
➢ The courses for UG and PG need to be formulated with its Course Objectives, course outcomes, assessment rubrics, mapping of course objectives with programme outcomes etc.
In the structure all theory courses should appear first followed by laboratory courses

Government College of Engineering, Karad
Third Year M.C.A.
MC501 Cloud Computing

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	**CT1**	15
Tutorial:	1 Hr/Week	**CT2**	15
Total Credits	4	**TA**	10
		ESE	60

Course Objectives

1   To understand the concepts in the cloud computing technology.

2   To design and develop the best business applications using cloud.

3   To manage the cloud platforms and services.

Course Contents

		Hours
Unit I	**Introduction:**	8
	Defination, Cloud Features, Cloud Benefits, Types, Economics; Historical Development:Distributed Systems, Virtualization, Web 2.0, Service-Oriented Computing, Utility-Oriented Computing, Cloud Computing Environments	
Unit II	**Virtualisation:**	8
	Characteristics, Virtualization Techniques, Execution Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.	
Unit III	**Cloud Computing Architecture:**	6
	Cloud Reference Model, Infrastructure as a Service, Platform as a Service Software as a Service. Green Cloud Computing Architecture, Security issues associated with the cloud, Challenges.	
Unit IV	**Computing Platforms and Technologies:**	6
	Amazon Web Services, Google AppEngine, Microsoft Azure, Force.com and Salesforce.com, Aneka	
Unit V	**Monitoring and Management:**	6
	An Architecture for Federated Cloud Computing; SLA Management in Cloud Computing: AService Provider's Perspective; When You Shouldn't Use Cloud Computing, Legal Issues in Cloud Computing.	
Unit VI	**Cloud Applications:**	6
	Scientific, Business and Consumer Applications, Cloud for e-Governance, Future Research Directions, Case Studies.	

Tutorials:

10 Tutorials based on above syllabus to be performed and submitted.

Course Outcomes (CO)
1   Distinguish between different types of architectures and services in the cloud Computing.
2   Understanding management in cloud computing.
3   Applying the cloud technology in real life application development.
4   Analyze different security issues and challenges in cloud computing.

Text Books
1   Mastering Cloud Computing, RajkumarBuyya, Christian Vecchiola, S ThamaraiSelvi, McGraw Hill Publication, 1st Edition
2   Cloud Computing: Principles and Paradims, RajkumarBuyya, James Broberg, Andrzej Goscinski, Wiley Publication, 1st Edition

References
1   Cloud Computing Insight into New-Era Infrastructure, Dr. Kumar Saurabh,Wiley India Pvt. Ltd., 1st Edition
2   Cloud Computing: A Practical Approach, Anthony T. Velte, Tata McGraw Hill, 2009
3   Guide to Cloud Computing: Principals and Practices, Richard Hill, Laurie Hirsch, Peter Lake, SiavashMoshiri,Springer, 1st Edition
4   Enterprise Cloud Computing,Gautam Shroff, Cambridge, 1st Edition
5   Cloud Security and Privacy, Tim Mather, Subra K, Shahid L.,Oreilly, 1st Edition

Useful Links
1   http://nptel.ac.in/courses/106106129/28
2   https://cloudacademy.com/courses/
3   https://www.lynda.com/Cloud-Computing-training-tutorials/1385-0.html
4   http://scpd.stanford.edu/search/publicCourseSearchDetails.do?method=load&courseId=11815

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√				√	√		√	√	
CO2		√	√	√		√			√	
CO3	√			√	√		√	√		√
CO4	√		√			√		√	√	√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember				
Understand	02	02	02	10
Apply	05	05	03	20
Analyze	04	04	03	20
Evaluate	04	04	02	10
Total	15	15	10	60

Government College of Engineering Karad
Third Year M.C.A.
MC502: Network Technologies

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	**CT1**	15
Total Credits	3	**CT2**	15
		TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min

Course Objectives
1. To understand basic concepts of Network Technologies.
2. To learn mobile computing, pervasive computing and m-Commerce.
3. To apply knowledge of Network Technologies mobile software development.

Course Contents

		Hours
Unit I	**Introduction to Mobile Computing** Concept of Mobile Communication, Different generations of wireless technology, Basics of cell, cluster and frequency reuse concept, Noise and its effects on mobile, Understanding GSM and CDMA, Basics of GSM architecture and services like voice call, SMS, MMS, LBS, VAS, Different modes used for Mobile Communication, Architecture of Mobile Computing(3 tier),	4
Unit II	**Design mobile computing architecture**: Characteristics of Mobile Communication, Application of Mobile Communication, Security Concern Related to Mobile Computing, Middleware and Gateway required for mobile Computing, Making Existing Application Mobile Enable, Mobile IP, Basic Mobile Computing Protocol, Mobile Communication via Satellite • Low orbit satellite • Medium orbit satellite • Geo stationary satellite Satellite phones	4
Unit III	**Introduction to Android:** Overview of Android, What does Android run On – Android Internals?, Android for mobile apps development, Environment setup for Android apps Development, Framework - Android-SDK, Eclipse, Emulators – What is an Emulator / Android AVD? Android Emulation – Creation and set up, First Android Application	8
Unit IV	**Android Activities and GUI Design Concepts-** Design criteria for Android Application : Hardware Design Consideration, Design Demands For Android application, Intent, Activity, Activity Lifecycle and Manifest, Creating Application and new Activities, Simple UI -Layouts and Layout properties :Introduction to Android UI Design, Introducing Layouts, XML Introduction to GUI objects viz.: Push Button , Text / Labels , EditText, ToggleButton , Padding	8
Unit V	**M-Commerce** : Introduction to m-commerce :Emerging applications, different players in m-commerce, m-commerce life cycle Mobile financial services, mobile entertainment services, and proactive service management	8

Unit VI **Pervasive Computing**- Principles, Characteristics- interaction transparency, context aware, automated experience capture. Architecture for pervasive computing- Pervasive devices-embedded controls.- smart sensors and actuators -Context communication and access services, Examples in Smart Tokens, Heating Ventilation and Air Conditioning, Set Top Boxes, A   8

Course Outcomes (CO)
1. Students will be able to develop android applications for mobile devices.
2. Students will be able to develop applications based on m-Commerce such as online cart/ online purchasing.
3. Students will be able to build sensors centric system to improve quality of human life.

Text Books
1. Building Android Apps In Easy Steps, 1st Edition, McGraw-Hill Education
2. Mobile Computing (Technology, Applications and Service Creation) Asoke. K Talukder and Roopa R. Yavagal.TATAMcGRAW HILL, 2nd Edition
3. Frank Adelstein, Fundamentals of Mobile and Pervasive Computing, TATAMcGRAW HILL, 3rd Edition

References
1. Neil Smyth, 'Android Studio Development Essentials', 6th edition by Neil Smyth
2. Michael Owens, ' The Definitive Guide to SQL Lite' 2nd Apress Berkely, CA, USA ©2010
3. L Murphy , 'Beginning Android Mark',1st edition, Wiley India Pvt Ltd
4. Y Hashimi and Satya Komatineni, 'Pro Android Sayed,1st edition, Wiley India Pvt Ltd
5. Reto Meier, 'Professional Android to Application Development',2nd edition, Wiley India Pvt Ltd

Useful Links
http://www.tutorialspoint.com/android/
developer.android.com/training/basics/firstapp
http://pl.cs.jhu.edu/oose/resources/android/Android-Tutorial.pdf

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√			√	√	√		√		√
CO2		√			√		√		√	√
CO3	√	√	√	√		√				

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	05	05		10
Understand	05	05	02	10
Apply	05	05	03	20
Analyze				
Evaluate			02	20
Create			03	

Government College of Engineering Karad
Third Year M.C.A.
MC513: Artificial Intelligence

Teaching Scheme		**Examination Scheme**	
Lectures	3 Hrs/week	CT1	15
Total Credits	3	CT2	15
		TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min

Course Objectives:
1. To apply basic concepts of Artificial Intelligence
2. To learn various methods of solving problems using Artificial Intelligence
3. To develop ability to design various algorithms based the concepts of Expert Systems and machine learning.

Course Contents

		Hours
Unit I	**Introduction to Al And Production Systems:** Introduction to AI-Problem formulation, Problem Definition -Production systems, Problem characteristics, Production system characteristics	**4**
Unit II	**Problem solving methods:** Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction, Means Ends Analysis	**4**
Unit III	**Representation of Knowledge** Knowledge representation using Predicate Logic - representation function and Isa relationships, computable functions and predicates, Resolution, Knowledge representation using Rules- Procedural vs Declarative knowledge, Logic Programming, Forward vs backward reasoning, Matching	**8**
Unit IV	**Statistical Reasoning:** Probability and Bayes' Theorem, Rule value approach, Fuzzy reasoning Bayesian Theory-Bayesian Network, Dempster - Shafer theory	**8**
Unit V	**Planning And Machine Learning:** Planning – Classical planning problem, Components, Goal Stack, Nonlinear planning, Hierarchical Planning Machine Learning - Learning Process, Learning Methods, Feature extraction, clustering, Artificial Neural networks, Self Organization Map, Regression, Hidden Markov Models	**8**
Unit VI	**New trends in AI:** Architecture of expert systems, Roles of expert systems - Knowledge Acquisition, Typical expert systems – MYCIN & MOLE, Expert systems shells	**8**

Course Outcomes (CO)

1 Identify problems that are amenable to solution by AI methods.

2 Identify appropriate AI methods to solve a given problem.
3 Formalise a given problem in the language/framework of different AI methods.
4 Implement basic AI algorithms.

Text Books:

1 Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", Second Edition, Mc Graw Hill- 2008
2 Stuart Russel,PeterNorvig, "Artificial Intelligence – A Modern Approach", Second Edition, PHI/Pearson Education.

References:

1 Tom Mitchell, "Machine Learning", 2nd Edition, MGH
2 Simon Hhaykin, "Neural networks - A comprehensive foundations", Pearson Education 2nd Edition 2004.

Useful Links

1 https://www.youtube.com/watch?v=VqK8XxWImRs, Rule Based Expert System, IIT Kharagpur
2 http://iiscs.wssu.edu/drupal/node/3659, Artificial Intelligence: Video Lectures

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√			√	√			√	√	√
CO2		√	√	√	√		√		√	
CO3	√		√		√	√	√	√		√
CO4		√		√	√		√		√	

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyze	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
Total	15	15	10	60

Government College of Engineering, Karad
Third Year M.C.A.
MC523: Multimedia Systems

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	**CT1**	15
Total Credits	3	**CT2**	15
		TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min

Course Objectives:
1 To apply basic concepts of multimedia system.
2 To learn various methods of signal processing on multimedia systems.
3 To develop ability to design various digital multimedia systems.

Course Contents

		Hours
Unit I	**Overview:** **Uses of Multimedia Information:** Introduction, What is Multimedia**?** Early research**,** Multimedia Computing, On Map, Applications, Challenges. **The Convergence of Computers, Communications, and Entertainment Products:** Technology Trends, Hybrid Devices, De signer's view, Industry perspective, Forward view, key challenges	8
Unit II	**Architectures and Issues for Distributed Multimedia Systems:** Distributed Multimedia System, Synchronization, Role of standards, Framework **Digital Audio Representation and Processing:** Use, psychoacoustics, digital representation, transmission, signal processing, music making, speech recognition and generation, audio and computer.	8
Unit III	**Video Technology:** Raster scanning, sensors for TV cameras, color fundamentals, color video, performance measures, analog video artifacts, video equipments, worldwide television standards. **Digital Video and Image Compression: JPEG, MPEG, DVI** **Time-Based Media Representation and Delivery:** Introduction, Model of time, requirements	8
Unit IV	**Multimedia Information Systems:** 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.	6
Unit V	**Multimedia Communications Systems:** Multimedia Services over the Public Network: Requirements, Architectures, and Protocols, Multimedia Interchange, Multimedia Conferencing	5
Unit VI	**Future Directions:** High Definition Television and Desktop Computing, Knowledge-Based Multimedia Systems	5

Course Outcomes (CO)

1 Students must be able to describe different realisations of multimedia technologies and the way in which they are used.

2 Students must be able to analyse the structure of the technologies and the effects of scale.

3 Students must be able to compare and contrast different network protocols and to describe mechanisms for providing QoS guarantees in the network.

Text Books:

1 Multimedia Systems, ed. by John F. Koegel Buford, 13th edition (ACM Press/Addison-Wesley, 1994)

2 Fundamentals of Multimedia: Ze-Nian Li & Mark S. Drew, 2nd edition, Pearson Prentice Hall, 2004

References:

1 Digital Signal Processing: Steven W. Smith, 2nd edition, California Technical Publishing, 1999

2 Tharkar, Multimedia Systems Design, 1st edition, Prentice Hall India Learning Private Limited

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 CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√		√	√	√			√	√	√
CO2		√	√		√		√		√	
CO3	√			√	√	√	√	√		√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	2	20
Analyze	-	-	2	-
Evaluate	-	-	2	20
Create	-	-	2	-
Total	15	15	10	60

Government College of Engineering, Karad
Third Year M.C.A.
MC533: Elective-II Data Mining

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	**CT1**	15
Total Credits	3	**CT2**	15
		TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min

Course Objectives:

1 To apply basic concepts of Data Mining
2 To learn various tools of Data Mining and their techniques to solve the real time problems.
3 To develop ability to design various algorithms based on data mining tools.

Course Contents

		Hours
Unit I	**Introduction:** Introduction to data mining, patterns of Data mining, Technologies, Applications, Issues **Data Pre-processing** Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization	**8**
Unit II	**Data Warehousing and Online Analytical Processing:** Data Warehouse: Basic Concepts, Modeling: Data Cube and OLAP, Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction	**8**
Unit III	**Mining Frequent Patterns, Associations, and Correlations:** Basic Concepts, Frequent Item set Mining Methods, Pattern Evaluation Methods **Pattern Mining:** Pattern Mining in Multilevel, Multidimensional Space, Constraint-Based Frequent Pattern Mining	**8**
Unit IV	**Classification:** Basic Concepts, Decision Tree Induction, Bayes' Classification Methods, Rule-Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy **Cluster Analysis:** Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering	**8**
Unit V	**Outlier Detection:** Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches, Proximity-Based Approaches	**4**

Unit VI   Data Mining Trends and Research Frontiers: 4
Mining Complex Data Types, Other Methodologies of Data Mining, Data
Mining Applications

Course Outcomes (CO)
1. Describe the designing of Data Warehousing so that it can be able to solve the root problems.
2. To understand various tools of Data Mining and their techniques to solve the real time problems.
3. To develop ability to design various algorithms based on data mining tools.
4. To develop further interest in research and design of new Data Mining techniques.

Text Books:
1. Data mining - Concepts & Techniques, Jiawei Han, Micheline Kamber, Morgan Kaufmann ,2nd Ed.2006
2. Data Mining, Arun Pujari, Orient Longman, 2nd Ed, 2003

References:
1. Fundamentals of Database Systems, Navathe and Elmasry, 6th edition, Addison Wesley, 2000
2. Oracle 8i Data Warehousing, Michale Corey, Michale Abbey, 1st edition, 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 CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√			√	√			√	√	√
CO2		√		√	√		√		√	
CO3	√		√		√	√	√	√		√
CO4			√		√	√	√	√		√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	-	10
Understand	3	5	2	10
Apply	5	2	3	20
Analyze	2	-	-	-
Evaluate	-	3	2	20
Create	-	-	3	-
Total	15	15	10	60

Government College of Engineering, Karad
Third Year M.C.A.
MC514: Elective-III Bio Informatics

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	**CT1**	15
Total Credits	3	**CT2**	15
		TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min

Course Objectives:

1. To understand the basic rudiments of Bio Informatics. .
2. To understand the modelling aspects behind search engines, data mining, etc.
3. To understand the techniques of pattern matching and use it.

Course Contents

		Hours
Unit I	**Module I:** The Central Dogma – The Killer Application – Parallel Universes – Watson's Definition– Top Down Versus Bottom up – Information Flow – Convergence – Databases – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks – Geographical Scope – Communication Models – Transmissions Technology– Protocols – Bandwidth – Topology – Hardware – Contents – Security – Ownership –Implementation – Management.	8
Unit II	**Module II:** The search process – Search Engine Technology – Searching and Information Theory – Computational methods – Search Engines and Knowledge Management – Data Visualization – sequence visualization – structure visualization – user Interface –Animation Versus simulation – General Purpose Technologies	8
Unit III	**Module III:** Statistical concepts – Microarrays – Imperfect Data – Randomness – Variability –Approximation – Interface Noise – Assumptions – Sampling and Distributions –Hypothesis Testing – Quantifying Randomness – Data Analysis – Tool selection statistics of Alignment – Clustering and Classification –	8
Unit IV	**Module IV:** Data Mining – Methods – Selection and Sampling – Pre processing and Cleaning – Transformation and Reduction – Data Mining Methods – Evaluation – Visualization – Designing new queries – Pattern Recognition and Discovery – Machine Learning – Text Mining – Tools.	6
Unit V	**Module V:** Pair wise sequence alignment – Local versus global alignment –Multiple sequence alignment – Computational methods – Dot Matrix analysis – Substitution matrices –Dynamic Programming – Word methods – Bayesian methods – Multiple sequence alignment – Dynamic Programming –	5

Progressive strategies – Iterative strategies – Tools– Nucleotide Pattern Matching – Polypeptide pattern matching – Utilities

Unit VI **Module VI:**   5
Sequence Databases. Drug Discovery – components – process – Perspectives – Numeric considerations – Algorithms – Hardware – Issues – Protein structure – Ab Initio Methods– Heuristic methods – Systems Biology – Tools – Collaboration and Communications –standards - Issues – Security – Intellectual property.

Course Outcomes (CO)
1 Students must be able to interpret relationships among living things and analyze and solve biological problems.
2 Students must be able to create computer programs that facilitate bioinformatics.
3 Students must be able to use existing software effectively to extract information from large databases and to use this information in computer modelling.

Text Books:
1 Bryan Bergeron, "Bio Informatics Computing", Second Edition, Pearson Education, 2003.
2 D. E. Krane and M. L. Raymer, Fundamental Concepts of Bioinformatics, Pearson Education, 1st edition, 2003.

References:
1 T. K. Attwood and D. J. Parry-Smith, Introduction to Bioinformatics, 1st edition, Pearson Education, 2003.
2 J. H. Zar, Biostatistical Analysis, 4th edition, Pearson Education, 1999.

Useful Links
1 https://www.youtube.com/watch?v=eZfyWdHnzR0, Introduction to Bioinformatics Demonstration, METUOpenCourseWare
2 https://www.youtube.com/watch?v=liNblw4x50E,   Introduction to bioinformatics and the course, UC Davis Academics

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√		√	√	√			√	√	√
CO2		√		√	√		√		√	
CO3	√		√		√	√	√	√		√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	5	5	-	10
Understand	5	3	2	10
Apply	-	4	3	20
Analyze	-	-	-	-
Evaluate	5	3	2	20
Create	-	-	3	-

Government College of Engineering, Karad
Third Year M.C.A.
MC524: Elective-III Business Intelligence

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/week	**CT1**	15
Total Credits	3	**CT2**	15
		TA	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min

Course Objectives:

1. To understand the basic rudiments of business intelligence system.
2. To understand the modelling aspects behind Business Intelligence.
3. To understand of the business intelligence life cycle and the techniques used in it.

Course Contents

		Hours
Unit I	**Business Intelligence:** Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.	8
Unit II	**Knowledge Delivery:** The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications.	8
Unit III	**Visualization:** Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.	8
Unit IV	**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.	6
Unit V	**Business Intelligence Applications:** Marketing models – Logistic and Production models – Case studies.	5
Unit VI	**Future of Business Intelligence:** Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.	5

Course Outcomes (CO)

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

Text Books:

1. Efraim Turban, Ramesh Sharda, DursunDelen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.
2. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", 1st edition, Addison Wesley, 2003.

References:

1. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", 1st edition, Wiley Publications, 2009.
2. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager"s Guide", Second Edition, 2012.
3. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", 1st edition, McGraw-Hill, 2007

Useful Links

1. https://www.youtube.com/watch?v=-j5J7lXav7Y, Business Intelligence Demonstration, DarwinsHamster
2. http://www.kdnuggets.com/2014/09/most-viewed-data-mining-talks-videolectures.htmlData Mining, Grant Marshall, KDnuggest

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√		√			√	√	√	√	√
CO2		√	√		√		√			√
CO3	√		√	√	√	√		√	√	

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	-	10
Understand	4	4	2	10
Apply	5	5	3	20
Analyze	-	-	2	-
Evaluate	3	3	-	20
Create	-	-	3	-
Total	15	15	10	60

Government College of Engineering, Karad
Third Year M.C.A.
MC534: Elective-III Software Defined Network

Teaching Scheme		Examination Scheme	
Lectures	3 Hrs/Week	**CT1**	15
Tutorial	--	**CT2**	15
Total Credits	3	**TA**	10
		ESE	60
		Duration of ESE	2 Hrs 30 Min

Course Objectives

1   To understand the concepts of software defined network technology.

2   To design and develop the best business solutions using software defined network.

3   To manage the software defined network technology platforms and services.

Course Contents

		Hours
Unit I	**History and evolution of SDN:** Definition, SDN Features, Cloud Benefits, Types, Economics; Historical Development:Distributed Systems, Virtualization, Web 2.0, Service-Oriented Computing, Utility-Oriented Computing, Cloud Computing Environments	8
Unit II	**Control and data plane separation and SDN Control Plane:** Characteristics, Virtualization Techniques, Execution Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples.	8
Unit III	**Virtual networking:** Cloud Reference Model, Infrastructure as a Service, Platform as a Service Software as a Service. Green Cloud Computing Architecture, Security issues associated with the cloud, Challenges.	6
Unit IV	**Programmable Data Planes:** Amazon Web Services, Google AppEngine, Microsoft Azure, Force.com and Salesforce.com, Aneka	6
Unit V	**Programming SDNs** An Architecture for Federated Cloud Computing; SLA Management in Cloud Computing: AService Provider's Perspective; When You Shouldn't Use Cloud Computing, Legal Issues in Cloud Computing.	6
Unit VI	**Verification and Troubleshooting** Scientific, Business and Consumer Applications, Cloud for e-Governance, Future Research Directions, Case Studies.	6

Course Outcomes (CO)

1. Distinguish between different types of architectures and services in the SDN.
2. Understanding management in SDN.
3. Applying the SDN technology in real life application development.
4. Analyze different security issues and challenges in SDN.

Text Books

1. Software Defined Networks: A Comprehensive Approach Paperback – 2016 by Paul Goransson, Chuck Black, 2ndEdition,Elsevier Publication.
2. Software Defined Networking (Sdn): Anatomy of Openflow Volume I - 2015by Doug Marschke, Jeff Doyle, Lulu Publishing.

References

1. SDN: Software Defined Networks Paperback – 2013by Ken Gray (Author), 1st Edition, O'Reilly Media.
2. Software Defined Networking with OpenFlowPaperback – Import, 31 Oct 2013by SiamakAzodolmolky (Author), 1st Edition, PACKT Publishing.

Useful Links

1. http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7145320
2. http://www.cisco.com/c/en_in/solutions/software-defined-networking/overview.html
3. http://video.mit.edu/watch/tr10-software-defined-networking-541/
4. https://ee.stanford.edu/research/software-defined-networking

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√		√	√		√	√	√	√	√
CO2		√	√		√		√			√
CO3	√		√	√		√	√	√	√	√
CO4		√	√	√	√		√			√

Assessment Pattern

Knowledge Level	CT1	CT2	TA	ESE
Remember	3	3	2	10
Understand	3	4	2	10
Apply	4	4	2	20
Analyze	3	-	2	-
Evaluate	2	3	-	20
Create	-	-	2	-
Total	15	15	10	60

Government College of Engineering Karad
Third Year M.C.A.
MC505: Internet of Things Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	50
Tutorial	1		
Total Credits	2	**ESE**	50

Course Objectives:

1. Explain the definition and usage of the term "The Internet of Things" in different contexts.
2. Understand where the IoT concept fits within the broader ICT industry and possible future trends.
3. Appreciate the role of big data, cloud computing and data analytics in a typical IoT system.

Course Contents

Unit I — **Introduction to the Internet of Things:**
What is the IoT and why is it important? Elements of an IoT ecosystem. Technology drivers, Business drivers, Typical IoT applications, Trends and implications,

Unit II — **Sensors and sensor nodes:**
Sensing devices, Sensor modules, nodes and systems

Unit III — **Connectivity and networks:**
Wireless technologies for the IoT, Edge connectivity and protocols. Wireless sensor networks.

Unit IV — **Analytics and applications:**
Signal processing, real-time and local analytics, Databases, cloud analytics and applications.

Unit V — **Industry perspective:**
Business considerations, Legal challenges

Unit VI — **IOT lab exercises and mini-project:**
Local processing on the sensor nodes, Connecting devices at the edge and to the cloud, Processing data offline and in the cloud, Mini-project: Designing an IoTsystem(a group exercise. where, 2 members/group).

Experiment 1	Connect R PI to input output devices.
Experiment 2	Installation of Raspbian on R Pi SD Card.
Experiment 3	Interfacing LED on Raspberry GPIO and use timer.
Experiment 4	Interfacing multiple LED on Raspberry GPIO.
Experiment 5	Interfacing IR sensor on Raspberry GPIO.
Experiment 6	Interfacing motor drive on Raspberry GPIO.
Experiment 7	Installation and configuration of web server.
Experiment 8	Interfacing RELAY circuit on R Pi.
Experiment 9	Interfacing LED on Raspberry GPIO and use timer.
Experiment 10	Installation of vnc server on R Pi.

Course Outcomes:

1 Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.
2 Design a simple IoT system comprising sensors, edge devices, wireless network connections and data analytics capabilities.
3 Use the knowledge and skills acquired during the course to build and test a complete, working IoT system involving prototyping, programming and data analysis.

Text Books:

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

References:

1 Charles Bell, "Beginning Sensor Networks with Arduino and RaspberryPi", 1stedition,Apress, 2013.
2 Eben Upton, The Raspberry Pi User Guide, 2nd edition, Wiley, 2013

Useful Links:

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

List of Submission:

1 Minimum 10 experiments to be performed and submitted.

Tutorial:

8Tutorials problems based on above syllabus is to be performed and submitted.

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO1	PSO1	PSO2	PSO3
CO1	√	√							√		√
CO2					√	√		√			
CO3			√				√			√	√

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Project 1	Project 2	Avg
Task I	15	15	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	05	05	
CA													

Government College of Engineering Karad
Third Year M.C.A.
MC506: Network Technologies Lab

Laboratory Scheme		**Examination Scheme**	
Practical	2 Hrs/week	**CA**	25
Total Credits	1	**ESE**	50

Course Objectives

1	To understand basic conceptsof Android, pervasive computing.
2	To learn android app development and concepts in m-Commerce.
3	To apply knowledge in mobile software development.

Course Contents

Experiment 1	Developing Simple Applications for Android
Experiment 2	Creating Applications with Multiple Activities and a Simple Menu using ListView
Experiment 3	Writing Multi-Threaded Applications
Experiment 4	Using Audio Functions in Android
Experiment 5	Using WebView and Using the Network
Experiment 6	Graphics Support in Android
Experiment 7	Location Services and Google Maps in Android
Experiment 8	Study Of Middleware, Application Level, Network, System Software To design the software for mobile phones using J2ME•J2ME basics• User interface design• Control structures• Files and databases• Communication• Interoperability between Mobile phones
Experiment 9	**Study Experiment**: Pervasive Computing Architecture•To explore overall view about Communication protocols• Software infrastructure• Security mechanisms
Experiment 10	**Case Studies. Projects In Pervasive Computing** To explore wearable and handheld computing and their enabling technologies
Experiment 11	**Case Study**: Detailing of m-Commerce

List of Submission:

1	Minimum 10 experiments to be performed and submitted.

Course Outcomes (CO):

1	Students will be able to develop android applications for mobile devices.
2	Students will be able to develop applications based on m-Commerce such as online cart/ online purchasing.
3	Students will be able to build sensors centric system to improve quality of human life.

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√		√	√	√	√		√		√
CO2		√	√		√		√		√	√
CO3		√	√	√		√			√	

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Project 1	Project 2	Avg
Task I	15	15	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	05	05	
CA													

Government College of Engineering Karad
Third Year M.C.A.
MC507: Cyber Security Lab

Laboratory Scheme   **Examination Scheme**
Practical   2 Hrs/week   CA   50
Tutorial   1 Hrs/week
Total Credits   2

Course Objectives:
   1   Identify the key components of cybersecurity network architecture
   2   Apply cybersecurity architecture principles
   3   Identify security tools and hardening techniques
   4   Distinguish system and application security threats and vulnerabilities
   5   Access additional external resources to supplement knowledge of cybersecurity

Course Contents

Unit I   **Introduction to Information and Network Security:**

Overview of Networking Concepts, Information Security Concepts, Security Threats and Vulnerabilities, Cryptography / Encryption.

Unit II   **Security Management:**

Security Management Practices, Security Laws and Standards, Access Control and Intrusion Detection, Server Management and Firewalls, Security for VPN and Next Generation Technologies
Security Architectures and Models, System Security, OS Security

Unit III   **Network Defence tools:**

Firewalls and Packet Filters: Firewall Basics, Packet Filter Vs Firewall, How a Firewall Protects a Network, Packet Characteristic to Filter, Stateless Vs Stateful Firewalls, Network Address Translation (NAT) and Port Forwarding, the basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: Introduction Detection System.

Unit IV   **Web Application Tools:**

Scanning for web vulnerabilities tools: Nikto, W3af, HTTP utilities - Curl, OpenSSL and Stunnel, Application Inspection tools – Zed Attack Proxy, Sqlmap. DVWA, Webgoat, Password Cracking and Brute-Force Tools – John the Ripper, L0htcrack, Pwdump, HTC-HydraUNIT-V.

Unit V   **Wireless Network and Security:**

Components of wireless networks, Security issues in wireless

Unit VI   **Introduction to Cyber Crime and law and Cyber Crime Investigation:**

Cyber Crimes, Types of Cybercrime, Traditional Problems Associated with Computer Crime, Introduction to Incident Response, Digital Forensics, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Indian IT ACT 2000, Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks

Firewalls and Packet Filters, password Cracking, Keyloggers and Spyware, Virus and Warms, Trojan and backdoors, Steganography, DOS and DDOS attack, SQL injection, Buffer Overflow, Attack on wireless Networks

Sample List of Experiments:
Experiment1   TCP scanning using NMAP

Experiment 2   Port scanning using NMAP

Experiment 3   TCP / UDP connectivity using Netcat

Experiment 4   Network vulnerability using OpenVAS

Experiment 5   Web application testing using DVWA

Experiment 6   Manual SQL injection using DVWA

Experiment 7   XSS using DVWA

Experiment 8   Automated SQL injection with SqlMap

Experiment 9   Hiding of confidential information within Image

Experiment 10   Implementation in FOSS based security mechanisms'

List of Submission:
                    Minimum 10 experiments to be performed and submitted.

Tutorial:

Eight Tutorials based on above syllabus is to be performed and submitted.

Course Outcomes (CO):

1. Assess the current security landscape, including the nature of the threat, the general status of common vulnerabilities, and the likely consequences of security failures;

2. Critique and assess the strengths and weaknesses of general cybersecurity models, including the CIA triad;

3. Appraise the interrelationships among elements that comprise a modern security system, including hardware, software, policies, and people;

4. Assess how all domains of security interact to achieve effective system-wide security at the enterprise level.

Text Books:

1. Understanding Cryptography: A Textbook for Students and Practitioners: Christof paar, Jan Pelzl, Publication Springer, 1st Edition.

2. Live Hacking: The Ultimate Guide to Hacking Techniques & Countermeasures for Ethical Hackers & IT Security Experts Ali Jahangiri by **Paperback ISBN-10:** 0984271503.

3. Handbook of Digital and Multimedia Forensic Evidence [Paperback] John J. Barbara ISBN 978-1-59745-577-0.

4. Computer Forensics: Investigating Network Intrusions and Cyber Crime (EcCouncil Press Series: Computer Forensics) 1st Edition.

References:

1. Cyber Forensics: Understanding Information Security Investigations (Springer's Forensic Laboratory Science Series) by Jennifer Bayuk, ISBN 978-1-60761-772-3.

2. Information warfare : Information warfare and security: (ACM Press) by Dorothy Elizabeth Robling Denning, ACM Press, 1999 **ISBN** 0201433036.

3. Cyberwar and Information Warfare : Springer's by Daniel Ventre.

4. Computer forensics: computer crime scene investigation, Volume 1 (Charles River Media, 2008) By John R. Vacca, Second Edition **Paperback.**

5. William Stallings, Lawrie Brown, Computer Security - Principles and Practice , Addison Wesley Professional, 2008 Pearson 3rd Edition.

6. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill, **Edition:** 4,**ISBN:** 9789339212155.

7. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and SunitBelpure, Publication Wiley, **ISBN 13** 9788126521791

Useful Links:

1 http://nptel.ac.in/courses/106105031/40
2 http://nptel.ac.in/courses/106105031/39
3 http://nptel.ac.in/courses/106105031/38

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√		√	√	√	√		√		√
CO2		√	√		√		√		√	√
CO3		√	√	√		√			√	
CO4	√		√		√		√	√		√

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Project 1	Project 2	Avg
Task I	15	15	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	05	05	
CA													

Government College of Engineering, Karad
Third Year M.C.A.
MC508:Software Development Project Lab

Laboratory Scheme		**Examination Scheme**	
Practical	4 Hrs/Week	**CA**	25
Tutorial	2	**ESE**	50

Total Credits   4

Course Objectives:

1 Students will have good knowledge of the issues and challenges faced while doing the Software project Management.
2 Students will be able to understand why majority of the software projects fails and how that failure probability can be reduced effectively.
3 Students will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques.

Nature of Project

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.

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/

Tutorial:

Eight tutorials based on project is to be submitted.

Course Outcomes (CO):

1   Students will demonstrate knowledge of the distinction between critical and non-critical systems.
2   Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
3   Students will demonstrate proficiency in rapid software development techniques.
4   Students will be able to identify specific components of a software design that can be targeted for reuse.

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	√	√		√	√	√		√	√	√
CO2	√	√	√	√	√	√	√		√	√
CO3			√			√				
CO4	√	√		√	√		√	√	√	√

Assessment Pattern

Skill Level (as per CAS Sheet)	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp 9	Exp 10	Project 1	Project 2	Avg
Task I	15	15	15	15	15	15	15	15	15	15	15	15	
Task II	05	05	05	05	05	05	05	05	05	05	05	05	
Task III	05	05	05	05	05	05	05	05	05	05	05	05	
CA													

Government College of Engineering Karad
Third Year M.C.A.
MC509:Professional Communication

Laboratory Scheme		Examination Scheme	
Lecture	3 Hrs/week	**CA**	50
Practical	-	**Total Credits**	3

Course Objectives

1. To understand the different components of selection process i.e. written test, GD & PI.
2. To equip the students with the ability to clear NACTEC, AMCAT & ELITMUS.
3. To develop a thorough understanding of these components through strong conceptual understanding, logical approach with various short cuts & practical techniques for manage speed and accuracy to clear the written test & participation in GD & PI

Course Contents
Unit I   Duration – 6 hrs

The moduleCorporate Recruitment Traininghas four different topics that are**:**

- JAM
- Basics of Group Discussion
- Effective Resume' Writing
- Basics of Interview Skills

This capsule focuses on the following:

- To understand different components of campus recruitment drive.
- To effectively present oneself &ideas in JAM ,GD& interview
- To draft a resume effectively and practice the questions asked from resume'

Unit II   Aptitude Skills   Duration – 9 hrs

Basic concept 4

The modulebasic concept 4 has the following topic**:**

- Ratios & proportions
- Partnerships
- Problems on ages

This module focuses on the following:

- To understand how to calculate the ratio's
- To understand how to calculate the share's of the person's depending on their capital and time

Basic concept 4

The modulebasic concept 4 has two different topics that are:

- SI & CI
- Averages

This module focuses on the following:

- To understand how to calculate the simple interest and compound interest
- To understand how to calculate the average of the given numbers

Basic concept 4

The modulebasic concept 4 has the following topic:

- Clocks & Calendars

This module focuses on the following:

- To understand how to calculate the angle between minute hand & hour hand and mirror image
- To improve upon importance of time like when they coincide or right angle or opposite to each Other
- To understand how to calculate the day of the week
- To improve upon importance of leap year and non-leap year

Unit III

Logical Reasoning 1   Duration – 7 hrs

The modulereasoning 1 has the following topic:

- Venn diagrams

- Cubes

This module focuses on the following:

- To understand how many 1-face , 2-face and 3-face painted cubes will be there
- To understand how to paint cubes with different colours on different faces
- To understand how to Analyze the given information
- To understand how to start depending on the clues

Logical Reasoning 2

The modulelogical reasoning has the following topic:

- Logical deductions

This capsule focuses on the following:

- To understand how to deduct the conclusion from the given premises depending on the nature of the Statements

Reasoning 3

The modulereasoning 3 has the following topic**:**

- Letter series

- Number series

- Odd man out

This capsule focuses on the following:

- To understand how to pick right answer from the given information
- To understand how to start depending on the different series
- To understand how to calculate the series depending on the information

Unit IV **Basic concepts 5**   **Duration – 6 hrs**

The modulebasic concepts 5 has the following topic**:**

- Number system
- Mensurations

This capsule focuses on the following:

- To understand how to calculate the area and volume of 2D and 3D
- To understand how to calculate unit digit of any numbers and divisibility rules
- To improve upon importance of usage of the numbers

This module has the following topic**:**

- Probability
- Permutations & combinations

This capsule focuses on the following:

- To understand how to decide the favorable or unfavorable cases

To understand how to analyze whether it is an arrangement or selection

Unit V   **Duration – 6 hrs**

This unit has the following topic:

- Reasoning 3

This capsule focuses on the following:

- To analyze the given information

This modulehas the following topic:

- Reasoning 4

This capsule focuses on the following:

- To analyze the given information

This modulehas the following topic:

- Data interpretation

This capsule focuses on the following:

- To understand how to interpret the given data
- To improve upon importance of Bar Graphs Pie-Charts Tabular Table

This modulehas the following topic:

- Data sufficiency

This capsule focuses on the following:

- To understand how to analyze the given data is sufficient or not
- To improve upon importance of all the topics

Unit-VI Verbal Aptitude Skills   Duration – 6 hrs

The moduleverbal aptitudehas the following topics**:**

- Introduction to verbal aptitude & verbal pattern
- Synonyms & antonyms
- Spotting errors & Sentence correction
- Reading comprehension & sentence rearrangement

This capsule focuses on the following:

- To learn & practice different components of verbal topics
- To learn different methods in vocabulary building & contextually use them.
- To learn various bridges in analogies
- To learn different techniques & to spot the errors pertaining to various grammatical rules & structures.

Course Outcomes (CO):
After completing this course students will be able:

1. To produce various genres of discourses such as conversations, descriptions, narratives, reports, essays, letters, biographical sketches, news reports, etc. both orally and in writing.
2. To participate in debates, discussions, seminars and speak effectively, fluently and forcefully
3. To read critically different genres of written English
4. To understand the differences between positive and negative attitude
5. To learn scientific methods of developing positive attitude towards self & others
6. To develop positive thoughts, positive language and positive expressions

Government College of Engineering, Karad
Third Year M.C.A.
MC601:Industrial Project

Laboratory Scheme		Examination Scheme	
Contact Hours	30 Hrs/Week	**CA**	100
		ESE	100
Total Credits	15		

Course Objectives:

1. Students will have good knowledge of the issues and challenges faced while doing the Software project Management.
2. Students will be able to understand why majority of the software projects fails and how that failure probability can be reduced effectively.
3. Students will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques.

Nature of Project

The project work to be carried out individually commences in the Semester VI as per the project assigned to the each individual by the respective industry.It shall include the problem definition, literature survey, approaches for handling the problem, finalizing the methodology for the project work and system design etc. Term work submission should be done in the form of anindividual report. The term work assessment will be done jointly by teachers appointed by Head of the Department. The oral examination will be conducted by an internal and external examiner as appointed by the Institute.

1. Project work should be continually evaluated based on the contributions of the student, 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 30 to 40 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	5. http://www.geeksforgeeks.org/
	6. https://in.udacity.com/
	7. https://graphics.stanford.edu/~seander/bithacks.html
	8. https://www.youtube.com/results?search_query=mycodeschool
	5.https://www.hackerrank.com/

Course Outcomes (CO):

1	Students will demonstrate knowledge of the distinction between critical and non-critical systems.
2	Students will demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
3	Students will demonstrate proficiency in rapid software development techniques.
4	Students will be able to identify specific components of a software design that can be targeted for reuse.