Government College of Engineering, Karad

SCHEME OF INSTRUCTION & SYLLABI

Programme: Master of Computer Applications

Scheme of Instructions: Third Year MCA

Semester - V

Sr.	Course	Course	Course Title	L	Т	P	Contact	Course		EX	AM SCH	EME	
No.	Categor	Code					Hrs/Wk	Credits	CT-1	СТ-2	TA/CA	ESE	TOTAL
	У												
1	PCC	MC1501	Cloud Computing	3	-	-	3	3	15	15	10	60	100
2	PCC	MC1502	Data Science	3	-	-	3	3	15	15	10	60	100
3	PEC	MC15*3	Elective-II	3	-	-	3	3	15	15	10	60	100
4	PEC	MC15*4	Elective-III	3	-	-	3	3	15	15	10	60	100
5	ESC	MC1505	Internet of Things Lab		2	2	4	3	-	-	50	-	50
6	PCC	MC1506	Data Science Lab	-	-	2	2	1	-	-	50	-	50
7	PCC	MC1507	Scripting Language Lab	-	2	4	6	4	-	-	50	50	100
8	P/S	MC1508	Software Development	-	2	4	6	4	-	-	100	50	150
			Project Lab										
			Total	12	06	12	30	24	60	60	290	340	750

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

.

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum.,	BSC	ESC	PCC (Programme	PEC (Programme	OEC (Open	MCC (Mandatory	Project / Seminar /
	Soc. Sc, Mgmt.)	(Basic Sc.)	(Engg. Sc.)	Core courses)	Elective courses)	Elective courses	Courses)	Industrial Training
						from other		
						discipline)		
Credits			03	11	06			04
Cumulative Sum	12		23	72	09		Yes	08

PROGRESSIVE TOTAL CREDITS :100+24= 124

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Programme: Master of Computer Applications

Scheme of Instructions: Third Year MCA

Semester – VI

Sr.	Course	Course	Course Title	L	Т	Р	Contact	Course	EXAM SCHEME				
No.	Category	Code					Hrs / Wk	Credits	CT-1	CT-2	TA/CA	ESE	TOTAL
1	PCC	MC1601	Industrial Project	-	-	-	30	15	-	-	100	100	200
			Total	-	-	-	30	15	-	-	100	100	200

L- Lecture

T-Tutorial

P-Practical

CT1- Class Test 1

TA/CA- Teacher Assessment/Continuous Assessment

CT2- Class Test 2

ESE- End Semester Examination (For Laboratory End Semester performance)

Course Category	HSMC (Hum.,	BSC	ESC	PCC (Programme	PEC (Programme	OEC (Open	MCC (Mandatory	Project / Seminar /
	Soc. Sc, Mgmt.)	(Basic Sc.)	(Engg. Sc.)	Core courses)	Elective courses)	Elective courses	Courses)	Industrial Training
						from other		
						discipline)		
Credits	00				00			15
Cumulative Sum	12		23	72	09			23

PROGRESSIVE TOTAL CREDITS :124+15=139

E	lective – I	Ele	ctive – II	Elective – III			
MC1303	Digital Forensics	MC1503	Artificial Intelligence	MC1504	Multimedia Systems		
MC1313	Embedded Systems	MC1513	Soft computing	MC1514	Mobile Technologies		
MC1323	Distributed Systems	MC1523	Business Intelligence	MC1524	Software Defined Networks		
MC1333	Object oriented modelling and design	MC1533	Optimization Techniques	MC1534	Applied Algorithms		

COMMON INSTRUCTIONs

Departments shall suggest& execute

- 1. <u>Bridge courses</u> for the students who may be <u>admitted in Autonomous mode from University mode</u>.
- 2. <u>MOOCs</u> for students adapting <u>Industry Mode</u>to fulfil the credit requirements. Copy of certificates / grade card shall be submitted to Controller of Examinations, GCE Karad through Program Coordinator prior to ESE.

			Government Colleg	ge of Engineering, Kara	d		
			Third Year (Sem – V) M. C. A.			
			MC1501: 0	Cloud Computing			
Tea	ching	g Scheme			Examination Scher	ne	
Lect	tures	03 Hrs/week			CT – 1	15	
					CT – 2	15	
Tota	al Cre	dits 03			TA	10	
					ESE	60	
					Duration of ESE	02 Hrs 30	Min
Cou	irse C	Dutcomes (CO)					
1.	Disti	nguish between differe	ent types of architectures	and services in the cloud			
	Com	puting.					
2.	Unde	rstanding managemer	t in cloud computing.				
3.	Appl	ying the cloud technol	ogy in real life applicatio	n development.			
4.	Anal	yze different security i	issues and challenges in c	loud computing.			
			Cour	se Contents		H	ours
Uni	it 1	Basics of Cloud Comp	outing:			((08)
		Overview, Application	ns, Intranets and the Clou	id. Your Organization and C	Cloud Computing- Ber	nefits,	
		Limitations, Security	Concerns. Software as a S	ervice (SaaS)- Understandi	ng the Multitenant N	ature	
		of SaaS Solutions, l	Jnderstanding SOA. Pla	tform as a Service (PaaS)-IT Evolution Leadi	ng to	
		theCloud, Benefits	of Paas Solutions, Disa	dvantages of PaaS Solut	ions. Infrastructure	as a	
		Service(laaS)-Underst	tanding laaS, Improving	Performance through Loa	ad Balancing, Systen	n and	
		StorageRedundancy,	Utilizing Cloud-Based NA	S Devices, Advantages, Ser	ver Types.		
Uni	it 2	Data Storage and Sec	curity in Cloud:			((08)
		Cloud file systems: G	FS and HDFS, BigTable, H	Base and Dynamo Cloud	data stores: Datastor	e and	
		Simple DB, Cloud Sto	rage-Overview, Cloud Sto	prage Providers. Securing t	he Cloud- General Se	ecurity	
		Advantages of Cloud	d-Based Solutions, Intro	ducing Business Continuit	y and Disaster Reco	overy.	
		Disaster Recovery- U	nderstanding the Threats	•			
Uni	it 3	Virtualization:				((06)
		Implementation Leve	els of Virtualization, Virtu	alization Structures/Tools	and Mechanisms, Ty	pes of	
		Hypervisors, Virtuali	zation of CPU, Memory	, and I/O Devices, Virtu	al Clusters and Res	source	
		Management, Virtua	lization for Data-Center	Automation. Common St	andards: The Open	Cloud	
		Consortium, Open Vi	rtualization Format, Stan	dards for Application Devel	opers: Browsers (Aja	x),	
		Data (XML, JSON), So	olution Stacks (LAMP and	LAPP),Syndication (Atom,	Atom Publishing Pro	otocol,	
		and RSS), Standards f	or Security.				
Uni	it 4	Cloud Service Provid	ers:			((06)
		Amazon Web Service	es-Elastic Compute Clou	d (EC2), Simple Storage S	ervice (S3), Simple (Queue	
		Service (SQS), Elasti	c Block Storage (EBS),	Elastic Load Balancing (E	LB), SimpleDB, Rela	itional	
		Database Service (R	DS), Virtual Amazon Clo	oud, Google- AppEngine,	Google Storage, Wir	ndows	
		Azure, Rackspace Clo	ud				
Uni	it 5	Cloud Applications:				((06)
		Business and Consu	mer Applications- CRM	1 & ERP, Productivity, S	Social Networking, 1	Media	
		Applications, Multip	layer Online Gaming, E-	Commerce Applications,	, Cloud for e-Goverr	nance,	
		Scientific Application	ns- Healthcare, Biology, C	Beoscience etc.			
Uni	it 6	Future of Cloud Com	puting:			((06)
		How the Cloud Will	Change Operating Syste	ms, Location-Aware Applic	cations, Intelligent Fa	abrics,	
		Paints, and More, Th	ne Future of Cloud TV, F	uture of Cloud-Based Sma	rt Devices, Faster Ti	me to	
		Market for Software	Applications, Home-Base	ed Cloud Computing, Mobi	le Cloud, Autonomic	Cloud	
		Engine, Multimedia	Cloud, Energy Aware Clo	oud Computing, Jungle Co	mputing. Future Res	search	
L		Directions and Challe	nges in Cloud Computing	, Case Studies.			
Tex	t Boo	ks					
1.	Dr. I 470-	Kris Jamsa, " Cloud Co 97389-9	omputing: SaaS, PaaS, Iaa	aS, Virtualization and more	", Wiley Publication	s, ISBN: 97	78-0-
2.	Clou	d Computing: Princip	es and Paradims. Raikum	arBuyya, James Broberg, A	ndrzej Goscinski. Wil	lev Publica	ation.
	1st F	Edition	·····	,, , , , , , , , , , , , , , , , , , , ,	, , 	, , , , , , , , , , , , , , , , , , , ,	,
3.	Mas	tering Cloud Computi	ng, RajkumarBuvva. Chris	tian Vecchiola. S Thamarai	Selvi, McGraw Hill Pu	b., 1 e/d	
4.	Gau	tam Shrof. "ENTERPR	ISE CLOUD COMPUTING	Technology Architecture	Applications. Cambri	idge Unive	ersitv
	Pres	s, ISBN: 97805117784	76	<u>,</u>		5	,

Ref	erence Books							
1.	Cloud Computing Insight into New-Era Infrastructure, Dr. Kumar S	aurabh,Wile	y India					
	Pvt. Ltd., 1st Edition		,					
2.	Cloud Computing: A Practical Approach, Anthony T. Velte, Tata Me	cGraw Hill, 2	2009					
3.	Guide to Cloud Computing: Principals and Practices, Richard Hill, L	aurie Hirsch	ı, 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						
Use	ful 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							

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2		\checkmark	\checkmark	\checkmark		\checkmark				
CO 3										\checkmark
CO 4	\checkmark									

Knowledge Level	CT 1	CT 2	TA	ESE
Remember				
Understand	02	02	02	10
Apply	05	05	03	20
Analyse	04	04	03	20
Evaluate	04	04	02	10
TOTAL	15	15	10	60

Third Year (Sen – V) M. C. A. MC1502: Data Science Examination Scheme Lectures 03 Hrs/weck CT – 1 15 Total Credits 03 TA 10 Total Credits 03 FX 10 Course Outcomes (CO) FXR 60 60 1. Understanding of Data Science for and the skillset needed to be a Data Scientist 7 7 2. Understanding different tools for Data Science. 7 7 7 3. To Apply basis machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. 8 10 10 Unit 1 Introduction: What is Data Science? Bio Data Aciance of prepactives - Skiil sets needed, Statistical Inference - Populations and Sand Data Science Process - Gase Study: RealDirect (online real estate firm) (08) Unit 1 Introduction: What is Data Science? Bio Data Science Process - Case Study: RealDirect (online real estate firm) (07) Inear, Dee Basic Machine Learning Algorithms - Linear Regression and K-NN are poor choices for Filtering Span - Navia Bayes and Why Linear Regression and Science Shift Science Shift Regression and Science Process - Case Study: RealDirect tools for scrapping the Web Unit 3 <td< th=""><th></th><th></th><th></th><th>Govern</th><th>nent College o</th><th>f Engineerin</th><th>ig, Karad</th><th></th><th></th><th></th></td<>				Govern	nent College o	f Engineerin	ig, Karad			
MC1502: Data Science Fxamination Scheme Lectures 03 Ilns/week CT - 1 I5 Total Credits 03 TA 10 Total Credits 03 TA 10 Course Outcomes (CO) ESE 60 1. Understanding of Data Science for and the skillset needed to be a Data Scientist 10 2. Understanding different tools for Data Science. 3 3. To Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Baye) for predictive modeling. Hours 1. Introduction: What is Data Science? Big Data and Data Science hype – and getting past the hype – Why now? – Datalfication - Current landscape of perspectives - Skill sets needed, Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model - Intro to R (05) 1. Three Basic Machine Learning Algorithms - Linear Regression - k-Nearest Neighbors (k-NN) - k- garapis and summary application: Filtering Spam - Why Linear Regression and k-NN are poor choices for Filtering Spam - Why Linear Regression and k-NN are poor choices for Siltering Spam - Why Linear Regression and k-NN are poor choices for Siltering Spam - Why Linear Regression and k-NN are poor choices for Siltering Spam - Why Linear Regression - k-Nearest Neighbors (k-NN) - k- Naive Bayes and why it works for Filtering Spam - Why Linear Regression - K-Nearest Neighbors (k-NN				T	nird Year (Ser	n – V) M. C.	A.			
Lectures D3 Hayweek CT - 1 15 Lectures 03 Hayweek CT - 2 15 Total Credits 03 TA 10 Esse 60 Duration of ESE 02 Hrs 30 Min Course Outcomes (CO) Duration of ESE 02 Hrs 30 Min Course Outcomes (CO) Duration of ESE 02 Hrs 30 Min 1 Understanding different tools for Data Science. 3. 3 To Apple basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. Hours 1 To Create effective visualization of given data (to communicate or persuade). Hours Unit 1 Introduction: What is Data Science. Bata Science Process - Sasit stools (plots, graphs and summy (05) statistical Inference - Populations and samples - Statistical modeling, probability distributions, iftiting a model - intro to R (07) unit 3 Engloratory Data Analysis and the Data Science Process - Sasit ctools (plots, graphs and summy (05) (07) istatistical Inference - Populations and I-NN are poor choics for Filtering Spam - Why Linear Regression - k-Nearest Neighbors (k-NN) - k-means, One More Machine Learning Algorithm and Usage in Applications - Moriovating application: Iterearegreartion and Feature Selec		~ •			MC1502: D	ata Science				
Lectures U3 Insweek CT = 2 15 Total Credits 03 TA 10 Total Credits 03 TA 10 Course Outcomes (CO) FSR 60 Course Outcomes (CO) Duration of ESE 02 Hrs 30 Min Course Outcomes (CO) Course Outcomes (CO) Course Outcomes (KNN), k-means, Naive Bayes) for predictive modeling. 1. Understanding different tools for Data Science. To Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. Course	Teachir	ig Schei	me					Examination Sch	eme	
Coll Credits 03 TA 10 Total Credits 03 TA 10 Course Outcomes (CO) Duration of ESE 02 Ins 30 Min Course Outcomes (CO) Duration of ESE 02 Ins 30 Min I. Understanding different tools for Data Science.	Lecture	S	03 Hrs/week				($\frac{CT-1}{CT}$	15	
Total Credits US IA IO Course Outcomes (CO) ESE 60 Duration of ESE 02 IIrs 30 Min Course Outcomes (CO) Course Outcomes (CO) Image: Course C	Tatal C	un dita	02					$\frac{21-2}{54}$	15	
Course Outcomes (CO) Duration of ESE 00 OU His 30 Min Course Outcomes (CO) Duration of ESE 02 His 30 Min I. Understanding of Data Science for and the skillset needed to be a Data Scientist Inderstanding different tools for Data Science. Inderstanding different tools for Data Science. Inderstanding different tools for Data Science. Intervention Interventerventententetee Interventintetetee	Total Ci	realts	03						10	
Course Outcomes (CO) Inderstanding of Data Science for and the skillset needed to be a Data Scientist I. Understanding different tools for Data Science. To Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. Introduction: What is Data Science? 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 modeling, probability distributions, fitting a model - intro to R Hours Unit 1 Introduction: Current landscape of perspectives - Skill sets needed, Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model - intro to R (08) Unit 2 Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary istatistics) of EDA - Philosophy of EDA - The Data Science Process - Case Study: RealDirect (online real estate firm) (07) Unit 3 Three Basic Machine Learning Algorithms - Linear Regression - k-Nearest Neighbors (k-NN) - k istatistics) of EDA - Philosophy of Science Process - Data Wrangling: APIs and other tools for scrapping the Web (07) Unit 4 Feature Generation and Feature Selection (Barinstorming, role of domain expertise, and place for imagination) - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Generation data science - Neutrise Gropaths -							1	25E	00 Um	20 Min
1. Understanding off Data Science for and the skillset needed to be a Data Scientist 2. Understanding different tools for Data Science. 3. To Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. 4. To Create effective visualization of given data (to communicate or persuade). Course Contents 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 modeling, probability distributions, fitting a model - Intro to R (05) 10nit 2 Exploratory Data Analysis and the Data Science Process - Case Study: RealDirect (online real estate firm) (07) 3 Three Basic Machine Learning Algorithms - Linear Regression - k-Nearest Neighbors (k-NN) - k- means, One More Machine Learning Algorithm and Usage in Applications - Motivating application: ser (customer) retention - Feature Generation (firinsforming, role of domain expertise, and place for imagination) - Feature Selection algorithms - Filters; Wrappers; Decision Trees; Random Forests (07) 10nit 1 Feature Generation Systems: Building a User-Facing Data Product - Algorithmic ingredients of Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredients of Recommendation Systems: Building a User-Facing Data Product - Algorithmic Earnipal Component Analysis - Exercise: usetily dour own recommendation system Mining	Course	Outoor					1	Juration of ESE	02 HIS	50 MIII
I. Understanding of Data Science for and the skillset needed to be a Data Scientist 2. Understanding different tools for Data Science. 3. To Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. 4. To Create effective visualization of given data (to communicate or persuade). Course Contents 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. (68) Statistical Inference - Populations and samples - Statistical modeling, probability distributions, fitting a model - Intro to R (07) 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 - Case Study: RealDirect (online reai estate firm) (07) unit 3 Three Basic Machine Learning Algorithms - Linear Regression and k-NA are poor choices for Filtering Spam - Naive Bayes and why it works for Filtering Spam - Naive Bayes and why it works for Filtering Spam - Naive Bayes and why it works for Filtering Spam - Naive Bayes Sond means ystems: Building a User-Facing Data Product - Algorithmic ingredients of a Recommendation System: Suiding a User-Facing Data Product - Algorithmic ingredients of a Recommendation System: Suiding a User-Facing Data Product - Algorithmic graphes - Nexity and Science - Next-generation data sciencits: Unit 5 (08) Unit 4 Feature Generation	Course	Outcon								
 2. Understanding different tools for Data Science. 3. To Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. 4. To Create effective visualization of given data (to communicate or persuade). Course Contents 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 modeling, probability distributions, fitting a model - Intro to R 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 - Case Study: RealDirect (online real estate firm) Unit 3. Three Basic Machine Learning Algorithms - Linear Regression - k-Nearest Neighbors (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 Unit 4. Recur Generation and Feature Selection (Extracting Meaning From Data) - Motivating application: user (customer) retention - Feature Generation ligorithms - Pilters; Wrappers; Decision Trees; Random Forests Unit 5. Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredines of a Recommendation System: Building a User-Facing Data Product - Algorithmic ingredines of a Recommendation Engine - Dimensionality Reduction - Singular Value Decomposition - Principal Component Analysis - Exercise: create your own visualization - Examples of inspiring (Industry) projects - Exercise: create your own visualization - Examples of inspiring (Industry) projects - Exercise: create your own visu	1. Und	derstand	ling of Data Scie	nce for and	he skillset need	ed to be a Data	a Scientist			
 3. To Apply basic machine learning algorithms (Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes) for predictive modeling. 4. To Create effective visualization of given data (to communicate or persuade). Course Contents Unit 1 Introduction: What is Data Science 7- 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 modeling, probability distributions, fitting a model - Intro to R 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 - Case Study: RealDirect (online real estate firm) 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 Unit 4 Feature Generation and Feature Selection (Extracting Meaning From Data) - Motivating application: succ (customer) retention - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Generation algorithms – Filters; Wrappers; Decision Trees; Random Forests Unit 5 Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredients of a Recommendation systems: Building a User facing of graphs - Direct discovery of communities in graphs - Distering of graphs - Partitioning of graphs - Neighborhood properties in graphs Unit 6 Data Visualization - Basic principles, ideas and tools for data visualization - Examples of inspiring (industry) project - Exercise: reate your own visualization of a complex dataset Data Science and Ethical Issues - Discussions on privacy, security, ethics - A look back at Data Science	2. Und	derstand	ling different too	ols for Data S	cience.					
4. To Create effective visualization of given data (to communicate or persuade). Course Contents Ilours 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 modeling, probability distributions, fitting a model - Intro to R (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 - Case Study: RealDirect (online eal estate firm) (07) Unit 3 Three Basic Machine Learning Algorithms - Linear Regression - k-Nearest Neighbors (k-NN) - k (07) 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 (07) Unit 4 Feature Generation and Feature Selection (Extracting Meaning From Data) - Motivating application: user (customer) retention - Feature Generation algorithms - Filters; Wrappers; Decision Trees; Random Forests (08) Unit 5 Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredients of a Recommendation time throw ras agraphs - Clustering of graphs - Direct discovery of communities in graphs - Partitioning of graphs - Neighborhood properties in graphs (05) Unit 6 Data Vi	3. To / k-m	Apply ba leans, N	isic machine leai aive Bayes) for p	rning algorit predictive mo	nms (Linear Reg odeling.	ression, k-Near	rest Neighl	oors (k-NN),		
Course Contents 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 modeling, probability distributions, fitting a model - Intro to R (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 - Case Study: RealDirect (online real estate firm) (07) Unit 3 Three Basic Machine Learning Algorithms - Linear Regression - k-Nearest Neighbors (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 (07) Unit 4 Feature Generation and Feature Selection (Extracting Meaning From Data) - Motivating application: user (customer) retention - Feature Generation (brainstorming, role of domain expertise, and place for imagination) - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests (08) Unit 5 Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredients of a Recommendation Systems: Building a User-Facing Data Product - Algorithmic Social-Network Graphs - Social networks as graphs - Clustering of graphs - Direct discovery of communities in graphs - Partitioning of graphs - Neighborhood properties in graphs (05)	4. To (Create e	ffective visualiza	ation of give	n data (to comm	unicate or per	rsuade).			
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 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. 6. Mohammed J. ZakiandWagnerMiera Jr. Data Mining and Analysis: Fundamental Concepts and Algorithms. Cambridge University Press. 2014. 7. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques. Third 	Unit 6 Text Bo 1. Ca O'f Referent 1. Jun Ca 2. Ket	Recor Recor Comp Graph graph Data (indus Ethica gener ooks thy O'Ne Reilly. 20 re Lesko mbridge vin P. M	Random Forest mendation Sys onent Analysis - is - Social netwo s - Partitioning of Visualization - E try) projects - E il Issues - Discu ation data scient cil and Rachel Sco 014. ks vek, AnandRajar university Pres urphy. Machine	stems: Buildi gine - Dimens Exercise: bu orks as graph of graphs - N Basic princip xercise: crea ussions on p tists chutt. Doing raman and Je s. 2014. (free Learning: A	ng a User-Facing sionality Reducti ild your own red s - Clustering of eighborhood pro les, ideas and to te your own vis privacy, security Data Science, Sti grey Ullman. M e online)	g Data Product fon - Singular V commendation graphs - Direct operties in grap pols for data v ualization of a a, ethics - A la raight Talk From	Algorithr /alue Deco n system M t discovery phs /isualizatio complex o look back m The Fror we Datasets	nic ingredients of mposition - Princi lining Social-Netv of communities i n - Examples of i dataset Data Science at Data Science ntline.	f a ipal vork in nspiring nce and - Next-	(08)
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Edition ISBN 0123814790 2011	Unit 6 Text Bo 1. Ca O'f Referen 1. Jun Ca O'f Referen 1. Jun Ca O'f Referen 5. Av 6. Mo ann 7. Lico	Recor Recor Comp Graph graph Data (indus Ethica gener Doks thy O'Na Reilly. 20 re Lesko mbridge vin P. M ster Pro- ta Minir evor Has cond Ed rim Blur phamme d Algorit	Random Forest mendation Sys onent Analysis - is - Social netwo s - Partitioning of Visualization - E try) projects - E il Issues - Discu ation data scient eil and Rachel So 014. (S) vek, AnandRajar vek, AnandRajar university Pres urphy. Machine vost and Tom Fa ag and Data-ana tie, Robert Tibsl ition. ISBN 0387 n, John Hopcroff ed J. ZakiandWag hms. Cambridge	stems: Buildi gine - Dimen: Exercise: bu orks as graph of graphs - N Basic princip xercise: crea ussions on p tists chutt. Doing raman and Je s. 2014. (free Learning: A wcett. Data lytic Thinking hirani and Je 952845. 200 t and Ravind gnerMiera Jr e University	ng a User-Facing sionality Reducti ild your own red s - Clustering of eighborhood pro les, ideas and to te your own vis privacy, security Data Science, Str rey Ullman. M e online) Probabilistic Per Science for Busi g. ISBN 1449361 rome Friedman. 9. (free online) ran Kannan. Fou Data Mining ar Press. 2014.	g Data Product on - Singular V commendation graphs - Direct operties in grap pols for data v ualization of a v, ethics - A le raight Talk From ining of Massiv rspective. ISBN ness: What You 323. 2013. Elements of Sandations of Da and Analysis: Fun	Algorithr /alue Deco n system M t discovery phs visualizatio complex o look back m The From ve Datasets 102620180 u Need to tatistical Lo ata Science ndamental	nic ingredients of mposition - Princi lining Social-Netv of communities i n - Examples of i dataset Data Science at Data Science ntline. 5. v2.1, 20. 2013. Know about earning, 	f a ipal work in nspiring nce and - Next-	(08)

Use	ful Links		
1.	https://machinelearningmastery.com/		

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2		V								
CO 3										
CO 4										

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

		Government College of Engi	neering, Kara	ad					
		Third Year (Sem – V)	M. C. A.						
		MC1503: Elective-II Artifici	al Intelligence	1					
Teachin	g Scheme			Examination Sch	eme				
Lectures	03 Hrs/week			CT – 1	15				
				CT-2	15				
Total Cr	edits 03			TA	10				
				ESE	60	2025			
0				Duration of ESE	02 Hrs	30 M1n			
Course	Outcomes (CO)								
1 Idam	tify problems that are a	manable to solution by AI methods							
1. Iden	tify appropriate AI met	hads to solve a given problem							
3 Form	nalise a given problem	in the language/framework of differ	ent AI methods						
4 Imn	lement basic AI algorit	m the language/ name work of united	cht Al methous	•					
4. mp		Course Conten	ts			Hours			
Unit 1	Introduction to ALA	nd Production Systems:				(04)			
	Introduction to AI-	Problem formulation. Problem D	efinition -Pro	duction systems. I	Problem	(01)			
	characteristics. Produ	ction system characteristics							
Unit 2	Problem solving met	hods:				(04)			
	Problem graphs, Mat	ching, Indexing and Heuristic function	ons -Hill Clim	bing-Depth first and	l Breath				
	first, Constraints satisfaction, Means Ends Analysis								
Unit 3	Unit 3 Representation of Knowledge (
	Knowledge represent	ation using Predicate Logic - repre-	esentation fun	ction and Isa relation	onships,				
	computable functions	and predicates, Resolution, Knowle	dge representat	ion using Rules- Pro	ocedural				
	vs Declarative knowle	edge, Logic Programming, Forward	vs backward rea	asoning, Matching					
Unit 4	Statistical Reasoning					(08)			
	Probability and Baye	s' Theorem, Rule value approach, F	uzzy reasoning	Bayesian Theory-B	ayesian				
T T • / #	Network, Dempster -	Shafer theory				(00)			
Unit 5	Planning And Mach	ine Learning:	1.04 1.01 1	· 1 · TT'	1 • 1	(08)			
	Planning – Classical	planning problem, Components, Go	al Stack, Nonli	inear planning, Hier	archical				
	Machine Learning	arring Process Learning Method	c Fantura avtr	action clustering A	rtificial				
	Neural networks Self	Organization Man Regression Hid	den Markov M	odels	litiliciai				
Unit 6	New trends in AI.	organization wap, regression, ma		04015		(08)			
Cint 0	Architecture of exper	t systems. Roles of expert systems	- Knowledge	Acquisition. Typica	l expert	(00)			
	systems – MYCIN &	MOLE. Expert systems shells	1110 110 080	,					
Text Bo	oks								
1. Kev	vin Night and Elaine Ric	n, Nair B., "Artificial Intelligence (SIE)", Second Edit	ion, Mc Graw Hill- 2	008				
2. Stu	art Russel, PeterNorvig,	"Artificial Intelligence – A Modern	Approach", Sec	ond Edition, PHI/Pea	arson Edu	ucation.			
Referen	ce Books	<u> </u>							
1. Tor	n Mitchell, "Machine L	earning", 2nd Edition, MGH							
2. Sim	on Hhaykin, "Neural n	etworks - A comprehensive foundati	ons", Pearson						
Edu	ucation 2nd Edition 200	4.							
Useful I	links								
1. http	os://www.youtube.com/	watch?v=VqK8XxWImRs, Rule Ba	sed Expert Syst	tem, IIT Kharagpur		<u>. </u>			
2. http	o://iiscs.wssu.edu/drupa	l/node/3659, Artificial Intelligence:	Video Lectures						

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2										
CO 3										
CO 4										

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

				Government Col	lege of Enginee	ering, Kara	ıd		
				Third Yea	r (Sem – V) M.	C. A.			
				MC1513: El	ective-II Soft con	mputing	1		
Tea	iching	g Schei	me				Examination S	cheme	
Lec	tures		03 Hrs/week				CT – 1	15	
							CT – 2	15	
Tot	al Cre	edits	03				TA	10	
							ESE	60	
			(22)				Duration of ES	E 02 Hrs	30 Min
Cou	urse (Jutcon	nes (CO)						
1		1 11			<u> </u>		с <u>і і і</u>		
1.	Deve	elop the	e skills to gain a	basic understanding c	t neural network	theory and	fuzzy logic theory	/.	
2.	Unde	erstand	artificial neural	networks and fuzzy t	heory from an en	gineering pe	erspective.		
3.	lou	ndersta	and the basics o	r an evolutionary com	iputing paradigm	known as g	enetic algorithms	and its app	lication
	to er	ngineer	ing optimization	problems.	<u> </u>				**
TT	• •	T 4	1	C	ourse Contents				Hours
Un	IT I	Intro	auction:	NT				1	(08)
		Adapt	ive systems and	neural Networks, th	e nature of comp	utation in nu	iman brain,a hist	difference	
		betwe	ann science, ms	piration of neural in	etworks, classica	I AI and II	eurar networks,	difference	
Un	it 2	Artifi	cial Neural Net	ig and naid computing	5·				(08)
	n 2	Introd	uction Fundam	ental concept Evolu	ition of Neural	Networks I	Basic Models of	Artificial	(00)
		Neura	l Networks. Imr	ortant Terminologies	of ANNs. McCu	lloch-Pitts N	Jeuron. Linear Se	parability.	
		Hebb	Network. Supe	rvised Learning Netw	ork: Perceptron	Networks. A	Adaline. Multiple	Adaptive	
		Linea	r Neurons, Back	-Propagation Network	, And Radial Bas	is Function	Network.		
Un	it 3	Intro	duction to Fuzz	y logic, Classical sets	and Fuzzy sets:				(08)
		Introd	uction to fuzzy	logic, Classicalsets	(operations, pro	perties, fun	ction mapping),	Fuzzysets	` ,
		(opera	tions, properties), fuzzy relations.				•	
Un	it 4	Evolu	tionary Algorit	hms:					(08)
		The 1	hybrid way, Ir	spiration for evolut	ionary algorithm	is, Basic te	erminology from	n biology,	
		Evolu	tionary algorith	ns: definition and stre	ams, EA's solve o	optimization	problems.		
		Swar	m Intelligence:			. 1			
TT	• -	Partic	le Search Optim	ization, Artificial Bee	colony search, A	nt colony op	timization.		(0.1)
Un	it 5	Genet	ic Algorithm:	- 1 1 - 1 1 T	1:4:14::			Contin	(04)
		Algor	ithm and sooral	cal background, Ira	ditional optimiza	ation and s	thma Pagia Torr	s, Genetic	
		Genet	ic Algorithm O	erations in Genetic Alg	Jaorithm	onal Algori	ulins, Dasic Ten	mnologies	
Un	it 6	Annli	cations of Soft	Computing:	ngomunn.				(04)
	no	A fusi	on approach of	multispectral images y	with SAR (Synthe	tic Anerture	Radar) GA Base	ed Internet	(04)
		Search	h Technique: So	ft Computing Based H	Ivbrid Fuzzy Con	trollers.	Rudui), Ori Dus		
Tex	t Boo	oks	I /	1 0	5				
1.	Sati	sh Kun	nar, Neural netw	orks: A classroom ap	proach, Tata McG	raw Hill, 20			
2.	S. N	I. Sivaı	nandam, S.N.De	epa "Principles of Sof	t Computing", W	iley Publica	tion, 2 nd edition	, 2011. (Uni	it II, III,
	V, V	/I)				•			
Ref	ferenc	e Bool	ks						
1.	Dav	rid E. (Goldberg , Gene	etic Algorithms in Se	arch, Optimizatio	on, and Mac	hine 30 Learning	g, Addison-	Wesley,
	198	9							
2.	B. Y	legnan	arayana, Artifici	al Neural Networks, I	Printice Hall India	, 1999.			
3.	S.R	ajaseka	ran, G.A.V.Pai,	"Neural Networks, Fu	zzy Logic and G	enetic Algor	ithms", PHI, 1 st	edition, 200)3
4.	Geo	rge Kl	ir, Bo Yuan "Fu	zzy sets and Fuzzy log	gic" PHI, 1st edition	on	1		
Use	eful L	inks							
1.	<u> </u>								
2.									
5.									

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2										
CO 3										

Knowledge Level	CT 1	CT 2	TA	ESE
Remember				
Understand				
Apply				
Analyse				
Evaluate				
Create				
TOTAL				

			Government Co	ollege of Enginee	ring, Kara	ıd				
			Third Ye	ear (Sem – V) M.	C. A .					
			MC1523: Elec	ctive-II Business I	ntelligence					
Teachi	ng Sche	me				Examination Sch	eme			
Lecture	s	03 Hrs/week				CT – 1	15			
						CT – 2	15			
Total C	redits	03				ТА	10			
						ESE	60			
						Duration of ESE	02 Hrs	30 Min		
Course	Outcor	nes (CO)								
1. Use	e BI syste	ems and technol	ogy to support decis	sionmaking						
2. Des	sign and	build BI applica	tions based on users	needs.						
3. Iden	ntify bu	siness and techni	ical requirements for	a BI solution.						
			(Course Contents				Hours		
Unit 1	Busin	ess Intelligence	: Effective and time	ly decisions – Da	ta, informa	tion and knowledge	e – Role	(08)		
	of ma	athematical mo	dels – Business in	telligence architec	tures: Cycle	of a business inte	lligence			
	analy	sis – Enabling	factors in busines	s intelligence pro	jects – De	velopment of a b	ousiness			
	intelli	gence system –	Ethics and business i	intelligence						
Unit 2	Know	ledge Delivery:	The business intelli	gence user types,	Standard re	eports, Interactive	Analysis	(08)		
	and Ad Hoc Querying, Parameterized Reports and Self-Service Reporting, Visualization:Charts,									
	Graph	Graphs, Widgets, ScorecardsandDashboards, Geographic Visualization								
Unit 3	Efficie	Efficiency: Efficiency measures – The CCR model: Definition of target objectives- Peer groups – (08)								
	Identi	fication of good	l operating practices	s; cross efficiency a	analysis – vi	rtual inputs and ou	Itputs –	, í		
	Other	models. Patterr	n matching – cluster	analysis, outlier and	alysis	•	•			
Unit 4	Math	ematical model	s for decision maki	ng: Structure of ma	athematical	models, Developme	ent of a	(05)		
	mode	l, Classes of mod	dels, Notes and read	ings.		· · ·		, í		
Unit 5	M-Co	mmerce : Intro	duction to m-com	merce :Emerging	applications	s, different players	in m-	(06)		
	comn	nerce, m-comme	erce life cycle Mobi	le financial service	s, mobile e	ntertainment servic	es, and	, í		
	proac	tive service man	agement		,		,			
Unit 6	Busin	ess Intelligence	Applications: Marl	keting models – Lo	ogistic and	Production models	– Case	(05)		
	studie	es.		0	0			()		
Text Bo	ooks							[]		
1. Ca	rlo Vero	ellis. "Business	Intelligence: Data N	Aining and Optimiz	zation for D	ecision Making". 1	st editior	ı. Wilev		
Pu	blicatio	ns.2009.	0	0		0,		, -,		
2. La	rissa T.	Moss. S. Atre. "I	Business Intelligence	e Roadmap: The Co	omplete Pr	oiect Lifecvcle of D	ecision N	laking".		
1st	tedition	. Addison Wesley	v.2003.	· · · · · · · · ·	- 1	-,				
Referer	ice Boo	ks	//							
1. Da	vid Losh	nin Morgan. Kaut	fman. "Business Inte	lligence: The Savvv	Manager ^w s	Guide". Second Edi	tion.2012			
2. Cir	ndi How	son. "Successfu	l Business Intelligen	ice: Secrets to Ma	aking BI a	Killer App". 1st e	dition. N	lcGraw-		
Hil	1.2007	,					,			
Useful	Links									
1. htt	ps://ww	w.youtube.com/	watch?v=-i5J7lXav7	Y.BusinessIntellige	ence Demon	stration,				
Da	rwins H	lamster	joo/mm//	, <u>-</u>		,				
2. htt	p://www	v.kdnuggets.com	/2014/09/most-view	ed-data-mining-tall	ks-videolect	ures.htmlData M	fining,	Grant		
Ma	arshall.k	Dnuggest		<u>_</u>						

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2										
CO 3										

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	3	3	-	10
Understand	4	4	2	10
Apply	5	5	3	20
Analyse	-	-	2	-
Evaluate	3	3	-	20
Create	-	-	3	-
TOTAL	15	15	10	60

			Government Colle	ege of Enginee	ring, Kara	d		
			Third Year	(Sem – V) M.	C. A.			
			MC1533 : Elective-l	II Optimizatio	n Techniq	ues		
Teach	ning Sche	me				Examination Sch	eme	
Lectu	res	03 Hrs/week				CT – 1	15	
						CT – 2	15	
Total	Credits	03				ТА	10	
						ESE	60	
						Duration of ESE	02 Hrs	30 Min
Cours	se Outcon	nes (CO)						
1. S [*]	tudent sho	ould be able to a	pply optimization techn	iques to get bet	ter outcome	es.		
2. S	tudent sh	ould be able to	apply optimization tech	niques for the o	organization	al business activitie	s.	
3. B	e familiar	with various typ	pes optimization technic	ques.				
			Cou	irse Contents				Hours
Unit	1 Linea	r Programmin	g problem: Mathematic	al formulation, a	ssumptions	in linear programm	ing,	(06)
	graph	ical method of s	olution, simplex method	l, Big-M method	and Two pl	hase method, Dual s	simplex	
	metho	od.						
Unit	2 Integ	er Programmin	ig: Introduction, Gomo	ry's cutting plan	e method, F	ractional cut metho	od-	(06)
	Mixed	l integer and bra	anch and bound techniq	ues.				
Unit	3 Trans	portation Probl	em: General transportation	tion problem, Fi	nding an init	tial basic feasible so	lution,	(07)
	Loops	in transportatio	on tables, Degeneracy, C	Optimality metho	od-MODI me	ethod.		
	Assignment Problem: Hungarian Method, Traveling salesman problem.							
Unit	4 Game	theory: Introd	uction, two-person zero	-sum games, so	me basic ter	ms, the max mini n	ninimax	(07)
	princi	ple, games with	out saddle points-Mixed	d Strategies, grap	ohic solutior	n of 2 * n and m*2 g	games,	
	domir	nance property.						
	Simul	ation: Introduct	ion, Definition of Monte	e-Carlo Simulatio	on			
Unit	5 Dynai	mic Programmir	ng Introduction, The Rec	cursive equation	approach, /	Algorithm, Solution	of a	(08)
	L.P.P	by Dynamic Prog	gramming.					
	Seque	encing Models:	Processing n jobs throug	gh 2 machines, n	jobs throug	gh 3 machines, two	jobs	
	throu	gh m machines.						
	Netw	orking Analysis:	CPM & PERT – Networ	k minimization,	shortest rou	ite problem, maxim	al-flow	
	proble	em, Project sche	eduling, critical path calc	culations, PERT c	alculation.			
Unit	6 Queu	ing Theory: Intr	roduction, Queuing syste	em, Elements of	Queuing sy	stem, Characteristic	cs of	(06)
	Queu	ing system, Clas	sification of Queuing Mo	odels, Poisson Q	ueuing syste	ems -Model I (M/M	/1):	
	(∞:FII	FO)-Characterist	ics of Model1 and waiti	ng time characte	eristics. Cha	racteristics of		
	(M/M	/1):(N/FIFO), (N	1/M/C):(∞ /FIFIO), (M/N	Л/С):(N/FIFO)-al	l without de	rivation		
Text]	Books							
1. 1	. Operatio	on Research-An	introduction by Hamdy	A Taha, Prentice	e Hall.			
Reference Books								
1.	ntroductio	on to Manageme	ent Science, Anderson, 1	Thomson Learnir	ng, 11Edn.			
2. 0	Operation	Research Applic	cations and Algorithms,	Winston, Thoms	on Learning	, 4Edn.		
3.	ntroductio	on to Operation	Research by Hiller/Lieb	erman. McGraw	Hill.			
4. 0	Operation	Research by Dr.	Kalavathy. S. Vikas Pub	lishing				
Usefu	l Links	<u> </u>						
1. ľ	https://np	tel.ac.in/syllabu	s/111105039.pdf Prof.	A. Goswami, IIT	Kharagpur			
2.	nttps://np	tel.ac.in/course.	.php 106108101 Dr. Jov	deep Dutta ,IIT I	Kanpur			
2		mit edu						

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2			\checkmark							
CO 3										

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

			Gover	mment Co	ollege of	Enginee	ring, Kara	ıd		
			MC14	Third Yes	ear (Sem	(-V) M.	C. A.			
Teachir	g Sche	me		504 : Elect	uve-III	viuitimeo	ila System	Examination Sch	eme	
Lectures	s sener	03 Hrs/week						CT – 1	15	
								CT – 2	15	
Total Cı	redits	03						TA	10	
								ESE	60	
	0							Duration of ESE	02 Hrs	30 Min
Course	Outcon	nes (CO)								
1 To :	annly ha	sic concents of	multimedi	ia system						
2. To 1	earn va	rious methods of	f signal pr	ocessing or	n multim	edia syster	ns.			
3. To a	levelop	ability to design	n various d	ligital multi	imedia sy	/stems.				
				C	Course C	ontents				Hours
Unit 1	Intro	duction to Mult	timedia							(08)
	Goals	, objectives, ar	nd charac	teristics of	f multim	edia, Mul	timedia bu	ilding blocks, Mu	ltimedia	
	archit	ecture, Multim	edia App	lications N	viedia E	ntertainme	ent, Media	consumption, we	eb-based	
Unit 2	Text	and Image Pro	cessing:	cation						(08)
	Text:	Text file format	ts: TXT, D	OC; RTF, I	PDF, PS					(00)
	Text	compression: H	luffman co	oding, LZ &	& LZW					
	Imag	e: Basic Image	fundamen	tals, Image	File form	nats - (BM	P, TIFF, JP	EG,		
	GIF) I	mage processin	g cycle- Ir	mage acquis	sition, sto	orage				
	,Comi	munication, and	display, In	nage Enhan	ncement,					
	Image Compression: Types of Compression: Lossless & Lossy Lossless: RLE_Shannon - Fano algorithm_Arithmetic coding_Lossy: Vector									
RLE, Shannon - Fano algorithm, Arithmetic coding. Lossy: Vector quantization, Fractal Compression Technique, Transform coding and Hybrid:										
	JPEG	DCT	1	1	1		8 1			
Unit 3	Audio	o and Video Pro	ocessing:							(06)
	AUDI	O: Nature of s	ound wav	ves, charact	teristics of	of sound v	waves, psyc	cho-acoustic, MIDI	, digital	
	audio,	, CD formats.		E VOC A	VI MDE	G Audio I	File formate	DME WMA		
	Audi	o compression to	echniques:	: DM. ADP	PCM and	MPEG	The formats			
	Video	: Video signal	formats,	Video tra	nsmissio	n standard	ls: EDTV,	CCIR, CIF, SIF,	HDTV,	
	digitiz	zation of video,								
	Video	file formats: 1	MOV, Rea	al Video, H	Н-261, Н	-263, Cine	epack, Nerc	odigtal,Video editin	g, DVD	
Unit 4	Iorma Multi	ts, MPEG. modio Informo	tion Syste							(08)
Unit 4	Opera	ting System Sur	oport for C	Continuous]	Media-In	troduction	. Limitation	ns. Middleware		(00)
	Syster	n Services Arch	nitecture,	Multimedi	ia Device	es, Present	ation Servie	ces, and the User In	nterface,	
	Multi	media File Syste	ems and In	formation l	Models.					
Unit 5	Multi	media Commu	nications	Systems:	1 D	•		1.0.1		(06)
	Multi	media Services (over the Pi	ublic Netwo	ork: Requ	urements,	Architectur	es, and Protocols,		
Unit 6										(06)
	Futur	e Directions: H	ligh Defin	ition Televi	ision and	Desktop (Computing,	Knowledge-Based		(00)
Multimedia Systems										
1. Mu	ltimedi	a Systems, ed. b	v John F.	Koegel Buf	ford, 13tł	edition (A	ACM Press/	Addison- Wesley.		
199	94)		<i>j</i>	8	,	(-		<i>j</i> ,		
2. Fu	ndamen	tals of Multimed	dia: Ze-Nia	an Li & Ma	ark S. Dre	ew, 2nd ed	ition, Pears	on Prentice Hall, 20	004	
Referen	ce Boo	ks								
1. Dig	gital Sig	nal Processing:	Steven W	. Smith, 2nd	d edition	, California	a Technical	Publishing, 1999		
2. Th	arkar, M	Iultimedia Syste	ms Design	n, 1st editio	on, Prenti	ce Hall Inc	tia Learning	g Private Limited		
J. As	nok Bar	ierji, AnandaGh	osh, "Mul	timedia Tec	chnologie	es″, ISBN:	9/800/066	9239.		
1 http	JIIIKS	ac in/courses/1	17105082	/1 Multim	edia Sve	teme IIT L	Charagour	1		
$\frac{1}{2}$, $\frac{1}{100}$	<u>;//freev</u>	videolectures cor	$\frac{1}{100000}$ m/Course/	/2652/CSF-	40373-M	ultimedia.	<u>Systems</u> V	Video Lectures		
<u>Spi</u>	ring 200	9, Prof.Surenda	ar Chandra	<u>a</u>		<u>uu</u>	~ jocenio , '			

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2										
CO 3										

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

Third Year (Sem – V) M. C. A. MC1514: Elective-III Mobile Technologies Teaching Scheme Lectures 03 Hrs/week CT 1 15 Total Credits 03 TA 10 15 Total Credits 03 TA 10 10 ESE 60 Duration of ESE 02 Hrs 30 Min Course Outcomes (CO) Course Outcomes (CO) Course Outcomes 1 1. Student should aware of understanding of design issues associated with operating systems. 2 2. Student should aware of understanding of design issues associated with operating systems. 3 Be familiae with various types of operating systems including Unix. Hours Unit 1 Introduction to Mobile Computing Concept of Mobile Communication, Application Mobile Computing, Mading Existing Application Mobile Computing, Middleware and Gateway required for mobile computing, Mading Existing Application Mobile Computing, Middleware and Gateway required for mobile computing, Mading Existing Application Mobile Computing, Middleware and Gateway required for mobile computing, Middleware and Gateway required for mobile computing, Mading Existing Application Mobile Computing, Middleware and Gateway required fo				Government College of Engineer	ring, Karad					
MC1514: Elective-III Mobile Technologies Lectures 03 Ins/week CT - 1 15 Total Credits 03 CT - 2 15 Total Credits 03 TA 10 Course Outcomes (CO) Duration of ESE 02 Hrs 30 Min Course Outcomes (CO) Duration of ESE 02 Hrs 30 Min Course Outcomes (CO) Duration of ESE 02 Hrs 30 Min Student should aware of concepts of memory management including virtual memory. 3. Be familiar with various types of operating systems including Unix. Unit 1 Introduction to Mobile Computing Concept of Mobile Communication, Architecture on mobile, Understanding GSM and CDMA, Basics of GSM architecture and services like volce call, SMS, MMS, LBS, VAS, Different modes used for Mobile Communication of the Mobile Communication the Mobile Adroid from mobile the Able Mobile Adres Adres Adres				Third Year (Sem – V) M.	C. A.					
Teaching Scheme Framination Scheme Lectures 03 Hrs/week CT - 1 15 Total Credits 03 TA 10 Total Credits 03 TA 10 Course Outcomes (CO) ESE 60 Image: Student should aware of understanding of design issues associated with operating systems. Image: Student should aware of concepts of memory management including virtual memory. 3. Be familiar with various types of operating systems including Unix. Image: Student should aware of concept of Mobile Communication, Different generations of mobile, Understanding GSM and CDMA, Basics of GSM architecture and services like voice call, SMS, MMS, LBS, VAS, Different medes used for Mobile Communication, Architecture of Mobile Computing Students, SMS, MMS, LBS, VAS, Different medes used for Mobile Communication, Architecture of Mobile Computing, Brobile computing architecture: Characteristics of Mobile Communication, Application of Mobile Computing, Making Existing Application Mobile Enderway required for mobile apps development, Environment setup for Android ADD? Android Computing Android: Overview of Android, What dees Android run On – Android Internals, Android for mobile apps development, Environment setup for Android ADD? Android Emulator / Android ADD? Android Emulator, Android SN, Kcilkes, Emulators - What is an Emulator / Android ADD? Android Emulator, Sudo S Video, Accessing Maps in Applications, File Handling, Nutlications, Location Unit 3 <td< td=""><td></td><td></td><td></td><td>MC1514: Elective-III Mobile Te</td><td>chnologies</td><td></td><td></td><td></td></td<>				MC1514: Elective-III Mobile Te	chnologies					
Lectures 03 Hns/week CT 15 Total Credits 03 TA 10 Total Credits 03 TA 10 Course Outcomes (CO) Duration of ESE 02 Hrs 30 Min Course Outcomes (CO) Duration of ESE 02 Hrs 30 Min Course Course outcomes (CO) Course Contents House 1. Student should aware of understanding of design issues associated with operating systems. Course Contents Unit 1 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 COMA, Basics of GSM architecture and services like voice call, SMS, MMS, LBS, VAS, Different modes used for Mobile Communication, Application of Mobile Computing 3 tell, Masing Existing Application Mobile Enable, Mobile P, Basic Mobile Computing Terotocol, Mobile Communication via Statellite + Low orbit satellite + Medium orbit satellite: 4 Geo stationary statellite Stellite phones. (08) Unit 3 Introduction to Android: Overview of Android, What does Android run On – Android Internals, GS and Chicetture: Framework - Android SDK, Eclipse, Emulators – What is an Emulator / Android ADP? Android Enable, Mobile Enable, Mobile Conduction to 105: OS Architecture, Environment Steup, Delegates, UI Controls, UI Wars, UI Bars, Graphics, Audi & AVideo, Accessing Maps in Applications, Air Interface dy, ardit interface dy, arist Android	Teaching	g Scher	ne		Ex	amination Sch	eme			
Cotal Credits 03 TA 10 Total Credits 03 TA 10 Course Outcomes (CO) ESE 60 1. Student should aware of onderstanding of design issues associated with operating systems. 2. 2. Student should aware of concepts of memory management including Unix. Ifferent generations of the system including Unix. 0. Be familiar with various types of operating systems including Unix. (08) 1. Be familiar with various types of operating systems including Unix. (08) 1. 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 voices like voice all, SMS, MMS, LBS, VAS, Different modes used for Mobile Computing, Middleware and Gateway required for mobile Computing architecture: Characteristics of Mobile Computing, Middleware and Gateway required for mobile Computing. Making Existing Application Mobile Enable, Mobile 1P, Basic Mobile Computing Protocol, Mobile Communication via Satellite + Lew orbit satellite + Medium orbit satellite + Geo stationary satellite Satellite setul: Environment setup, for Android Application (08) Unit 3 Introduction to Android: Overview of Android, What does Android run On – Android ADP Android Emalustor / Android ADP Android Emalu	Lectures		03 Hrs/week		CT	$\frac{1}{2}$	15			
Ioid Credits 03 IA 10 ESE 60 ESE 60 Ourration of ESE 02 Ths 30 Min Course Outcomes (CO) 0 11. Student should aware of understanding of design issues associated with operating systems. 2. Student should aware of concepts of memory management including virtual memory. 3. Be familiar with various types of operating systems including virtual memory. 3. Be familiar with various types of operating systems 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/31 etc), Sacrify Concern Related to Mobile Communication, Application of Mobile Communication, Security Concern Related to Mobile Communication, Application of Mobile Communication, Application of Mobile Communication, Application of Mobile Computing, Making Existing Application Mobile Enable, Mobile P, Basis Mobile Computing, Making Existing Application Mobile Enable, Mobile P, Basis Mobile Computing, Variang S, Edipse, Emulators – What is an Emulator / Android AppS evelopment, Frianework - Android SNC, Eclipse, Emulators – What is an Emulator / Android AppS evelopment, Frianework - Android SNC, Eclipse, Emulators – What is an Emulator / Android NAPP Android Mobile Communication, and set up, First Android Applications, Surtic Mamanala & Gas, Gas, Gi Ci (M4) Unit 4 Introduction to Mabile Networks (Telecone Thumamentals & Ga, Ga, Gi Ci Concesing, LTig hybeed Packet Access (HSDPA, HSUPA) (M4)	T (10	1.	02			-2	15			
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Course Outcomes (CO) 1. 1. Student should aware of understanding of design issues associated with operating systems. 2. Student should aware of concepts of memory management including virtual memory. 3. Be familiar with various types of operating systems including virtual memory. 3. Be familiar with various types of operating systems including virtual memory. 3. Be familiar with various types of operating systems including virtual memory. 3. Be familiar with various types of operating systems including virtual memory. 3. Be familiar with various types of operating systems including virtual memory. 4. Introduction to Mobile Computing Concept of Mobile Communication, Different generations of 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 Communication, Security Concern Related to Mobile Communication, Architecture and Gateway required for mobile Computing, Making Eakiting Application Mobile Enable, Mobile IP, Basic Mobile Computing Protocol, Mobile Communication via Statellite + Low orbit satellite + Medium orbit satellite + Goe stationary satellite Statellite phones. (08) Unit 3 Introduction to Android: Overview of Android, What does Android and NP Android Emulation - Creation and set up, First Android Applications. Location (08) Unit 4 Introduction to Mobile Networks (Telecom Fundamentals & 2G, 3G): Telecom Basis & Cellula					ES	E notion of ESE	00 02 Uma (20 Min		
1. Student should aware of understanding of design issues associated with operating systems. 2. Student should aware of concepts of memory management including virtual memory. 3. Be familiar with various types of operating systems including Unix. Unit 1 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, Application of Mobile Communication, Security Concern Related to Mobile Computing, Middleware and Gateway required for mobile Computing architecture: Characteristics of Mobile Computing, Middleware and Gateway required for mobile Computing valeilite Satellite a Low orbit satellite • Medium orbit satellite • Geo stationary satellite Satellite phones. (08) Unit 3 Introduction to Android: Overview of Android, What does Android run On – Android Internals, Android for mobile apps development, Environment setup for Android AVD? Android Emulation – Creation and set up, First Android Applications, File Handling, Notifications, Location (08) Unit 4 Introduction to Mobile Networks (Telecom Fundamentals & 2G, 3G): Telenom Saud Video, Accessing Maps in Applications, File Handling, Notifications, Location (04) Unit 4 Introduction to Mobile Networks (Telecom Fundamentals & 2G, 3G): Telenom Saud Video, Accessing Mapis napplications, Air Interface dynamics and various Concepts, G	Course	Outcom			Du	ration of ESE	02 HIS.	50 IVIIII		
1. Student should aware of understanding of design issues associated with operating systems. 2. Student should aware of concepts of memory management including virtual memory. 3. Be familiar with various types of operating systems including Unix. Course Contents Hourse Contents Unit 1 Introduction to Mobile Computing, Management including Unix. Student should aware of concept of Mobile Communication, Different generations of mobile, Understanding GSM and CDMA, Basics of GSM architecture and services like voice call, SMK, MS, LBS, VAS, Different modes used for Mobile Communication, Achitecture of Mobile Computing (3 tier). Unit 2 Design mobile computing architecture: Characteristics of Mobile Communication, Application of Mobile Communication, Security Concern Related to Mobile Computing, Middleware and Gateway required for mobile apps development, Environment setup for Android apps Development, Framework - Android Dverview of Android, What does Android run On – Android Internals, Android for mobile apps development, Environment setup, Delegates, Ul Controls, Ul Views, Ul Bars, Graphics, Audio & Video, Accessing Maps in Application. (08) Unit 4 Introduction to Mobile Networks (Telecom Fundamentals & 2G, 3G) : Telecom Basics & Cellular principles, Analog & digital modulations and multiple access Techniques, GSM(2G), GSM Air interface & Channel structure, Protocol Basics, Call Processing: Massage and signaling flows, Handover Sceanarios, ITE Architecture, LTE Arributecture, SLE All	Course	Juicon								
2. Studen should aware of concepts of memory management including virtual memory. 3. Be familiar with various types of operating systems including virtual memory. 3. Be familiar with various types of operating systems including virtual memory. 3. Be familiar with various types of operating systems including Unix. Vinit 1 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 Computing, Middleware and Gateway required for mobile Computing Anking Existing Application Mobile Table, Mobile P, Basic Mobile Computing Protocol, Mobile Communication via Satellite • Low orbit satellite • Medium orbit satellite • Geo stationary satellite Satellite phones. (08) Unit 3 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 - AndroidSNE, Eclipse, Environment Setup, Delegates, Ul Controls, Ul Views, Ul Bars, Graphics, Audio & Video, Accessing Maps in Applicaitons, File Handling, Notifications, Location (08) Unit 4 Introduction to Mobile Networks (Telecom Fundamentals & 2G, 3G): Telecom Basics, Call Processing: Migration from 2G to 3G, UTA rshritecture, IF protocol architecture, services and applications, LTE Interfaces, LTE Air Interface dynamics and various Concepts, Call Processing, High Speed Packet Access (HSDPA, HSUPA) (04) <td>1 Stud</td> <td>ent sho</td> <td>uld aware of un</td> <td>lerstanding of design issues associated v</td> <td>with operating sy</td> <td>vstems</td> <td></td> <td></td>	1 Stud	ent sho	uld aware of un	lerstanding of design issues associated v	with operating sy	vstems				
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$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2			\checkmark							
CO 3										

Knowladge Level	СТ 1	CT 2	Т۸	ESE
Kilowledge Level			IA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	_	3	_
TOTAL	15	15	10	60

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			Third Yea	ar (Sem – V) M.	C. A.			
		Ι	MC1524: Elective-	III Software Def	ined Netw	orks		
Tea	ching Sch	eme				Examination Sch	eme	
Lect	tures	03 Hrs/week				CT – 1	15	
						CT – 2	15	
Tota	al Credits	03				ТА	10	
						ESE	60	
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Cou	rse Outco	mes (CO)	·			·		
1.	To unders	tand the concepts	of software defined i	network technology	у.			
2.	To design	and develop the	pest business solution	s using software de	efined netwo	ork.		
3.	To manag	ge the software de	fined network techno	logy platforms and	l services.			
	Cou	rse Contents						Hours
Uni	it 1 Hist	ory and evolutio	n of SDN:					(8)
	Defi	nition, SDN Feat	ures, Cloud Benefits,	Types, Economics	;			
	Hist	orical Developme	nt:Distributed System	ns, Virtualization,	Web 2.0,			
	Serv	ice-Oriented Con	nputing, Utility-Orien	ted Computing, Cl	loud Compu	ting		
	Env	ronments			-			
Uni	it 2 Con	trol and data pla	ne separation and S	DN Control Plan	e:			(8)
	Cha	acteristics, Virtu	alization Techniques,	Execution Virtuali	ization,			
	Virt	ualization and Clo	oud Computing, Pros	and Cons of Virtua	alization,			
	Tecl	nology Example	5.					
Uni	it 3 🛛 Virt	ual networking:						(6)
	Clou	d Reference Mod	lel, Infrastructure as a	Service, Platform	as a Service	e		
	Soft	ware as a Service	. Green Cloud Compu	uting Architecture,	Security iss	sues		
	asso	ciated with the cl	oud, Challenges.					
Uni	it 4 🛛 Prog	grammable Data	Planes:					(6)
	Ama	zon Web Service	s, Google AppEngine	e, Microsoft Azure	, Force.com	and		
	Sale	sforce.com, Anek	a					
Uni	it 5 Prog	gramming SDNs						(6)
	An A	Architecture for F	ederated Cloud Comp	outing; SLA Manag	gement in C	loud		
	Con	puting: AService	Provider's Perspecti	ve; When You Sho	ouldn't Use			
	Clou	id Computing, Le	gal Issues in Cloud C	computing.				
Uni	<u>it 6</u> Ver	fication and Tro	ubleshooting					(6)
	Scie	ntific, Business a	nd Consumer Applica	ations, Cloud for e-	Governance	е,		
	Futu	re Research Dire	ctions, Case Studies.		1			
Text	t Books							
1.	Software	Defined Network	s: A Comprehensive	Approach Paperba	ick – 2016 b	oy Paul		
	Goransso	n, Chuck Black,	2ndEdition,Elsevier F	ublication.				
2.	Software Marschke	e Defined Networ e, Jeff Doyle, Lul	king (Sdn): Anatomy u Publishing.	of Openflow Volu	ime I - 2015	by Doug		
Refe	erence Bo	oks						
1.	SDN: So	ftware Defined N	etworks Paperback –	2013by Ken Gray	(Author), 1s	st Edition,		
-	O'Reilly	Media.	· · · · · · · · · · · · · · · · · · ·	1 1 7	21.0.1			
2.	Software	Defined Network	ang with OpenFlowP	aperback– Import,	31 Oct			
TT -	2013by S	iamakAzodolmo	ky (Author), 1st Edit	ion, PACKT Publi	sning.		1	
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1.	http://iee	explore.ieee.org/s	tamp/stamp.jsp?arnu	mber=7145320	• , ·	1.1		
2.	http://ww	w.cisco.com/c/er	in/solutions/softwar	e-defined-network	ing/overvie	w.html		
3.	http://vio	leo.mit.edu/watcl	/tr10-software-define	ed-networking-541	/			
4.	https://ee	e.stanford.edu/res	earch/software-define	ed-networking				

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2										
CO 3										

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	3	3	2	10
Understand	3	4	2	10
Apply	4	4	2	20
Analyse	3	-	2	-
Evaluate	2	3		20
Create	-	-	2	-
TOTAL	15	15	10	60

			Government College of Enginee	ring, Kara	d					
			Third Year (Sem – V) M.	C. A.						
			MC1534 : Elective-III Applied	Algorithm	S					
Teachin	g Sche	me			Examination Sch	eme				
Lectures		03 Hrs/week			CT – 1	15				
					CT – 2	15				
Total Cr	edits	03			TA	10				
					ESE	60				
~	-				Duration of ESE	02 Hrs .	30 Min			
Course	Outcon	nes (CO)								
1 0	1	11 0					1			
I. Stuc	lent sho	ould aware of a	gorithms that have applications in are	eas like geor	netric modeling, gr	aphics, ro	obotics,			
VISIC	on, com	puter animation		1						
2. Stuc	lent sho	ould acquire prol	plem formulation and problem solving s	SKIIIS.						
3. Be f	amiliar	with balance be	tween programming and analytical pro	blem solvin	5					
TT •4 1			<u>Course Contents</u>	• • • •	1 •	1 1	Hours			
Unit I	Analy	SIS OF Algorith	ms Review of algorithmic strategies,	Asymptotic	analysis: upper and	l lower	(06)			
	little	Ω omega and	theta notations. Standard complexity	age and wo	nu case Dellaviors.	Dig U,				
	perfor	mance Time	and space trade-offs in algorithms	Analyzing r	ecursive algorithm	using				
	recurr	ence relations.	and space trade-ons in argonums. T	maryzing i	ceursive argorithm	s using				
Unit 2	Fund	amental Com	outing Algorithms Numerical algorithms	thms. Sequ	ential and binary	search	(08)			
	algori	thms. Quadratic	sorting algorithms and O (n log n) sor	rting algorit	nms. Algorithms on	graphs	(00)			
	and their complexities using Greedy Approach for Prim's and Krushkal's Algorithm for									
	minimum spanning tree, Single source shortest path Algorithm, all pair shortest paths in Graph									
Unit 3	Unit 3 Approximation Algorithms Introduction, Absolute approximation, Epsilon approximation, (06)									
	Polynomial time Approximation schemes, probabilistically good algorithms.									
Unit 4	Geom	etric Algorithi	ns Prerequisites – Basic properties of l	line, interse	ction of line, line se	egment,	(08)			
	polyg	on etc. Line seg	ment properties, detaining segment inte	ersection in	time complexity (n	log n),				
	Conve	ex full problem	- formulation, solving by Graham sc	an algorithr	n, Jarvis march alg	orithm;				
TT • / #	closes	t pair of points -	- problem formulation, solving by divide	e & conquer	method.		(0.6)			
Unit 5		r Programmin	g Standard and Slack forms, formula	ition of pro	blems as linear pro	ograms,	(06)			
	simple	ex algorithm, di	ality, initial basic feasible solution. Pr	Vrancal	ulation for – single	source				
Unit 6	Brobe	si pain, maximu	m now problem, vertex cover problem,	, Knapsack j Iomonto Ex	productions of funct	ions of	(06)			
Unit	more	than one rand	maysis Expectations. Introduction, w	nents and t	ansforms of distril	nutions	(00)			
	comp	utation of mean	time to failure inequalities and limit the	orems		Jutions,				
Text Bo	oks	didition of mean	time to fundre, mequanties and finite the							
1. "In	troduct	tion to Algorithr	ns (3rd Edition). Cormen. Leiserson. Riv	vest. and Ste	in MIT press. 2009:					
2. "Th	e Desig	n and Analysis o	of Computer Algorithms". Aho. Hopcraf	t. Ullman. A	ddison Wesley					
Referen	ce Bool	ks		<i>, .</i> , .						
1. "Pr	obabilit	v & Statistics wi	th Reliability. Queing, and Computer Sc	ience Applic	ations". Kishore S. 1	rivedi. Pl	HI			
2. "Fu	ndame	ntals of Algorith	ms", Bressard, PHI	1-1	,	, -				
3. "Al	gorithm	ns". Cormen. Lei	serson. Rivest. PHI							
4. "Ar	t of Pro	gramming". Knu	ith, Addison Wesley							
5. "Co	mpute	r Algorithms: Int	roduction to Design and Analysis" S. B	Baase, S and	A. Van Gelder. 3rd	edition. A	Addison			
We	slev.20	00								
6. "Co	ombina	torial Optimizat	on". C Papadimitriou and K Steiglitz PH	41						
Useful I	inks									
1. http	os://nn	tel.ac.in/course	/106106131 Prof. Madhavan Mukund	. Channai Ma	athematical Institute	e				
2. http	os://oc	w.mit.edu/cours	es/electrical-engineering-and-compute	r-science/6	854i-advanced-algo	- orithms				
			concerning and compute		ss ij aavaneca alge					

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2										
CO 3	\checkmark									

Knowledge Level	CT 1	CT 2	TA	ESE
Remember	5	5	-	10
Understand	5	5	2	10
Apply	5	5	3	20
Analyse	-	-	-	-
Evaluate	-	-	2	20
Create	-	-	3	-
TOTAL	15	15	10	60

Government College of Engineering, Karad Third Year (Sem – V) M. C. A										
			1 N	hird MC150	Year (Sen 5: Interne	1 — V) M et of Thin	. C. A. gs Lab			
Teaching Sc	heme		1				5 110	Examination S	cheme	
Practical			02 Hrs/week					CA	50	
Tutorial			02 Hrs/week							
Total Credits	5		03							
Course Outo	comes (CC))								
1	Different	intal	hatryaan tha lay	ala of	the IoT sta	als and ha	familian with	the last technolog	rice and a	matacala
1.	omployed	late	between the lev	els ol	ine for sta	ck and be	laminar with	the key technolog	gies and p	protocols
2	Design a	sim	nle IoT system	comp	rising sens	ors edge	devices wir	eless network con	nections	and data
2.	analytics	capa	bilities.	comp	lising sens	ors, eage	devices, wii	cless network com	lections	und data
3.	Use the	knov	vledge and skil	lls acq	uired durir	ng the cou	urse to build	and test a compl	ete, wor	king IoT
	system ir	nvolv	ing prototyping	, progr	amming ar	nd data and	alysis.	1	,	0
4.	Students	will	be able to devel	lop and	roid applic	ations for	mobile devie	ces.		
					Co	urse Con	tents			Hours
Unit	1	Intr	oduction to the	Intern	et of Thing	s:				(08)
		Wha	at is the IoT	and v	vhy is it	importar	it? Elements	s of an IoT eco	system.	
		Tecl	hnology drive	rs, Bu	siness dri	vers, Ty	pical IoT a	pplications, Tren	ds and	
U	.	1mp	lications	C offerer						(00)
	2	Sens	ing devices Sen	sor mo	are dules node	es and syste	ems			(08)
Unit	3	IOT	technologies a	nd prot	tocols	is and syst				(08)
NFC and RFID, Protocols- ZigBee, Z-Wave,								(00)		
Unit 4	4	Ana	lytics and appli	cations	s:					(04)
Signal processing, real-time and local analytics, Databases, cloud analytics and							ud analytics and			
II:4	5	appl	ications.	ЮТ						(0.4)
	5	Imp	duction to Ardu	ino Pro	orammino	Implemen	utation of IoT	with Raspherry Pi4		(04)
Unit	6	And	roid Activity ar	nd GUI	Design Co	ncepts		with Raspoenty 114		(08)
	-	Over	Overview of Android, What does Android run On – Android Internals? Android							
		for n	nobile apps deve	elopmei	nt, Environi	ment setup	for Android	apps		
		Deve	elopment, Frame	work –	- Android S	DK, Eclip	se, Emulators	. Design criteria		
		Ior And	Android Application	lion : H Intent	ardware De	esign Cons	facuale and M	sign Demands For		
		Ann	lication and new	Activi	ties Simple	e UI -Lavo	uts and Lavo	it properties		
		:Intr	oduction to And	roid UI	Design, In	troducing	Layouts, XM	L Introduction to		
		GUI	objects viz.: Pus	sh Butt	on , Text / I	Labels , Ed	litText, Toggl	eButton, Padding		
Tutorials										
		A se	t of Tutorial/ pr	oblem	s based on	above syl	labus is to be	submitted		
Sample List	of Experi	men	ts:							
Experim	ent 1	Con	inect R PI to inp	out out	out devices	~ .				
Experim	ent 2	Inst	allation of Rasp	bian of	n R Pi SD (Card.				
Experim	ent 3	Inte	rfacing LED on	Raspt	erry GPIO	and use t	imer.	4 •		
Experim	ent 4	Stuc	dy and Install II	DE of A	Arduino and	d different	Types of Ar	duino		
Experim	ent 5	Inte	rfacing IR sense	or on R	Laspberry C	jPIO.				
Experim	ent 6	Inte	rfacing Relay c	$\frac{1}{1}$	n R pi.					
Experim	ent 7	Intr	oduction to And	$\frac{1}{1}$	perating S	ystem	1 • • • •	C		
Experim	ent 8	Dev	velop an Androi	d appli	cation for t	ouilding u	ser login inte	rface		
Experiment 9 Develop an Android application for use of internet resources, use of graphical images										
Fynerime	ont 10	Dev	ges. velop an Androi	d annli	cation with	the helm	of table fram	ne calendar		
Experime		cam	erop an Andron	u appii		i ule lleip		ie, calendal,		
Experime	ent 11	Ider	ntify the real tim	ne proh	lem and de	evelop An	droid applica	tion	+	
List of Subn	nission:			r-00					_1	
		Tota	al number of Ex	perime	ents: 10				1	
Text Books				•						
1.	J. Bir	on ai	nd J. Follett, "Fo	oundati	ional Elem	ents of an	IoTSolution'	', 1st edition, O'Rei	illy Medi	a,2016
2.	Cuno	Pfist	er, Getting Star	ted wit	h the Interr	net of Thin	ngs, 1st editio	on O'RELLY Medi	a,2011	_

Reference Books		
1.	Charles Bell, "Beginning Sensor Networks with Arduino and RaspberryPi", 1 st edition, A press, 2013.	
2.	Eben Upton, The Raspberry Pi User Guide, 2 nd edition, Wiley, 2013	
Useful Links		
1.	https://www.youtube.com/watch?v=9ZUFYyXhQm8, Introduction to Internet of Thing KnoesisCenter	gs,
2.	Introduction to Internet of Things: Course homepage: <u>http://www.knoesis.org/cs4800-6800-</u> <u>spDr.Alexandru</u>	-

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2				\checkmark						
CO 3										
CO 4										

Skill Level (as perCAS 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, Kai	rad						
		Third Year (Second Second Seco	em – V) M. C. A.							
		MC1506: Da	ta Science Lab							
Teaching Sche	me			Examinatio	on Scheme					
Practical	02 Hrs/week			CA	50					
Total Credits	01									
Caura Outaar										
Course Outcon	nes (CO)									
1 Undorstand	ling of Data Scio	nco for and the skillset nor	dad to bo a Data Scien	tict						
1. Understand	ling different to	als for Data Science		list						
3 To Apply be	ning unterent too	rning algorithms (Lingar Po	grossion k Noarost No	ighbors (k NN)						
5. TO Apply Da	aive Bayes) for r	rining algorithms (Linear Re predictive modeling	glession, k-medlest me	ignoors (k-inin),	•					
4 To Create e	ffective visualiza	ation of given data (to com	municate or persuade)							
			ourse Contents	•		Т				
Experiment 1	Data Science (Overview	ourse contents							
Experiment 2	Statistical Ana	alvsis and Business Applica	tions							
Experiment 3	Python/R Env	ironment Setup and Essenti	als							
Experiment 4	Mathematical	Computing with Python/R								
Experiment 5	Scientific com	puting with Python/R				1				
Experiment 6	Data Manipula	ation with Pandas/R				1				
Experiment 7	Machine Lear	ning with Scikit–Learn/CA	RET			1				
Experiment 8	Natural Langu	age Processing with Scikit	-Learn/EDA			1				
Experiment 9	Data Visualiza	ation in Python/R				1				
Experiment						1				
10	Web Scraping	with Python/R								
Experiment										
11 Python/R integration with Hadoop MapReduce and Spark										
List of Submiss	List of Submission:									
	Minimum 10 e	experiments to be performe	d and evaluated Journal	l						

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2										
CO 3										
CO 4										

					5)						
Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp9	Exp10	CA
Assembling			\checkmark	\checkmark		\checkmark					
Testing			\checkmark					\checkmark			
Observing			\checkmark	\checkmark	\checkmark		\checkmark			\checkmark	
Analyzing			\checkmark		\checkmark		\checkmark				
Interpreting											
Designing				\checkmark	\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	
Creating				\checkmark	\checkmark		\checkmark			\checkmark	
Deducing conclusions	\checkmark		\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	

			Government Coll	ege of Engine	ering, Kar	ad					
			Second Yea	<u>r (Sem – V) N</u>	<u>1. C. A.</u>						
Teachin	g Sche	eme	WIC 1507 : SC		lage Lab	Examination	Scheme				
Practical	Sound	04 Hrs/week				CA	50				
Tutorials		02 Hrs/week				ESE	50				
Total Cr	edits	04									
Course	Outoo										
Course	Juico										
1. Imp	lement	client side script	ing languages such as .	JavaScript and J	Ouery.						
2. Imp	lement	server side script	ting language such as F	Php.							
3. Imp	lement	I/O operations us	sing Python.								
TT 1 1	.		Cou	rse Contents				Hours			
Unit I	Intro	duction to Scrip	ting Languages:	naa hatwaan S	orinting I on	guages and Proc	rommina	(04)			
	Lang	uages Advantage	es and Disadvantages of	of Scripting Lan	giages Use	of Scripting Lan	gianning				
Unit 2	Java	Script:	is and Disad anages o	r senping Lun	514505, 050		Buugesi	(06)			
	Intro	duction to JavaSc	ript, Variables, Arrays	, Loops, Condit	ional Staten	nents, Functions,	Cookies,				
	DOM	I, Events, Object	Oriented JavaScript, Ir	nternal & Extern	nal JavaScrij	ot.					
Unit 3	JQue	ery:	waa Ohiaata Awaaya	Eurotiana Ar	commente C	aana Duilt in I		(06)			
	Selec	tors use of S	electors DOM Attr	ibutes DOM	Traversing	CSS Method	s DOM				
	Mani	pulation Methods	s, Effects		riuversnig,		5, Dom				
Unit 4	AJA	X:	,					(06)			
	Ajax	Ajax Basics, Ajax Components, DOM, Passing Data, Server Side Code, API, Ajax Applications,									
TT •4 6	Ajax	ix/Javascript Frameworks, Ajax Applications.									
Unit 5	РНР РНР	: Basic syntax PH	P data Types PHP Va	riables PHP Co	nstants PH	P Expressions P	НР	(10)			
	Oper	ators. PHP Control	ol Structures, PHP Loo	ps. PHP Enume	erated Arrav	s. PHP Associati	ve				
	Array	s, Array Iteration	n, PHP Multi-Dimensio	onal Arrays, Arr	ay Function	s, PHP Function	s,				
	Synta	ax, Arguments, V	ariables, References, P	ass by Value &	Pass by refe	erences, Return V	Values,				
	Varia	ble Scope, PHP i	nclude(), PHP require(), PHP Form ha	indling, PHI	P GET, PHP POS	ST, PHP				
	Form	Nalidation, PHP	Form Sanitization, PH	and Patterns M	atching Fri	tracting Searchi	PHP				
	Repla	acing, Formatting				indeting, Searen	115				
Unit 6	Pyth	on:						(08)			
	Varia	ble and Data Ty	bes, Operator, Conditio	onal Statements	, Looping, C	Control Statemen	ts, String				
	Manı from	pulation, Lists, 1	uple, Dictionaries, Fu	inctions, Modul	les, Printing	on screen, Rea	ding data				
Tutorial	s	keyboard, Openi	ing and closing me, ite			eption Handling					
A	set of	Tutorial/ problem	ns based on above syll	abus is to be sul	bmitted						
Sample	List of	Experiments:									
Experin	nent	Introduction to V	arious Scripting Langa	uges.							
l Evnerin	ont	Progem to a Java	Script program to displ	law information	box as soon	as page loads					
2 Experim		i iogaili to a sava	Seript program to disp	ay mormation	001 as 5001	as page loads.					
Experim	ient	Create a form, pu	t validation checks on	values entered	by the user 1	using JavaScript	(such as ag	ge			
3		should be a value	between 1 and 150, M	landatory fields	, Input Num	bers only).					
Experin	nent	Highlight table ro	ow record on hover wit	h jQuery.							
4 Exnerin	ent	Event Handling r	sing Jauery								
5		Lvent Handling t	using squery.								
Experin	nent	To create a text b	ox and submit button o	of event handlin	g submit for	rm () using AJA2	X.				
6											
Experin	ient	Develop a dynam	iic webpage demonstra	ting the use of A	AJAX and A	APIs.					
/ Evnerin	nent	Program to DUD	Fnumerated Arrays	PHP Association	ve Arrave	Array Iteration	PHP Mult	i-			
8		Dimensional Arra	ays, Array Functions.		, o 1111ayo, 1	initity noration,	1111 191010				
Experim	nent	String Handling i	n PHP.								
9											

Exper	iment	Program to PHP Form handling, PHP GET, PHP PC	OST, PHP	Form Validation, PHP Form	n						
1	0	Sanitization.									
Exper	iment	Develop a program demonstrating the use of Variables,	strings, and	l Numbers in Python							
1	1										
Exper	iment	t Use Python to demonstrate Input-Output, Printing on screen, Reading data from keyboard,									
1	2	Opening and closing file, Reading and writing files.									
List of	f Subm	ission:									
		Minimum 10 experiments to be performed and evaluate	d Journal.								
Text l	Books										
1.	Web I	Design with HTML, CSS, JavaScript and jQuery Set by Jo	on Duckett								
2.	Head	First PHP and MySQL by Lynn Beighley and Michael M	orrison								
3.	Python	n Crash Course by Eric Matthews									
Refer	ence Bo	ooks									
1.	HTM	L 5 Black Book (Covers CSS3, JavaScript, XML, XHTM	IL, AJAX,	PHP, jQuery) 2Ed. By DT	Editorial						
	Servic	es									
2.	The Jo	by of PHP: A Beginner's Guide by Alan Forbes									
3.	Head-	First Python by Paul Barry									
Usefu	l Links										
1.	https:/	/nptel.ac.in/courses/106105084/25									
2.	https:/	/nptel.ac.in/courses/106105084/13									
3.	https:/	/nptel.ac.in/courses/117106113/34									

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1		\checkmark	\checkmark			\checkmark	\checkmark		\checkmark	
CO 2							\checkmark		\checkmark	
CO 3										

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp9	Exp10	CA
Assembling		\checkmark	\checkmark	\checkmark		\checkmark					\checkmark
Testing											
Observing	\checkmark	\checkmark			\checkmark		\checkmark			\checkmark	
Analyzing		\checkmark								\checkmark	
Interpreting							\checkmark				
Designing											
Creating		\checkmark					\checkmark	\checkmark		\checkmark	
Deducing conclusions	\checkmark		\checkmark		\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	

		Government Co	llege of Engineer	ing, Karad						
		Third Ye	ar (Sem – V) M. (C. A.						
		MC1508: Softwa	are Development P	roject Lab						
I eaching Sche Prostical	me 04 Hrs/wool				100 Internation					
Tutorial	02 Hrs/week			ESE	50					
Total Credits	04									
Course Outcon	nes (CO)									
1 Students w	ill domonstrato	knowladza of the dis	tinction botwoon or	itical and poperitical	Loustome					
2 Students w	ill demonstrate	the ability to manage	a project including	nlanning schedulin	g and risk					
assessmen	t/management.	the ability to manage		planning, senedalin	g and risk					
3. Students w	ill demonstrate	proficiency in rapid so	oftware developme	nt techniques.						
4 Students w	ill be able to ide	ntify specific compor	ents of a software	design that can be ta	argeted for reuse.					
	1	N	ature of Project							
	The project ba	tches of 2-3 students	s should be formed,	which will work on	the project allocated					
	by the depart	nent. The batch mus	t complete it during	first semester only.	Term work					
	submission sn	ould be done in the f	orm of a joint repor	t. The term work as itution. The oral over	sessment will be					
	conducted by	an internal and exter	nal examiner as an	nointed by the Unive	arsity					
1	Project work s	hould be continually	evaluated based or	the contributions of	of the group					
	members, orig	, ginality of the work, in	nnovations brought	in, research and dev	velopmental efforts,					
	depth and app	licability, etc.								
2	Two mid-term	evaluations should b	e done, which inclu	ides presentations a	ind demos of the					
	work done.	1 111 015 00			1 1 0.1					
Project	Project report	should be of 15 to 20 the fellowing format	pages (typed on A4	size sheets). For sta	andardization of the					
Format:	project reports	the following format	should be strictly I	ollowed.						
	1. Page Size:	rimmed A4								
	2. Top Margin	: 1.00 Inch								
	3. Bottom Ma	rgin: 1.32 Inches								
	4. Left Margin	: 1.5 Inches								
	5. Right Marg	i n: 1.0 inch Timos Now Poman 12	Doint Font							
	7. Line Spacin	g: 1.5 lines	Font Font							
	8. Page Numb	ers: Right Aligned at	Footer. Font 12 Poi	nt. Times New Roma	an					
	9. Headings: 1	imes New Roman, 14	Point Bold Face							
	10. Certificate	: All students should	attach standard for	mat of Certificate as	s described by the					
	department. (Certificate should be a	warded to batch a	nd not to individual	student. Certificate					
	should have s	gnatures of Guide, H	ead of Department	and Principal/ Direc	tor.					
	a Title Shee	eport: +								
	b. Certificate									
	c. Acknowle	dgement								
	d. Table of C	ontents								
	e. List of Fig	ures								
	f. List of Tables									
	LZ. Keterence	s: References should	nave the following	iormat						
	For Paners: "T	itle of Paner" Author	, Fublisher, Eultion	nce Details Year						
			s, sournar, comerci							
Useful Links:										
1	http://www.g	eeksforgeeks.org/								
2	https://in.uda	acity.com/								
3	https://graph	ics.stanford.edu/~sea	ander/bithacks.htm	<u>l</u>						
4	https://www	youtube.com/results	<pre>?search_query=my</pre>	<u>codeschool</u>						
5	https://www.	hackerrank.com/								

Tutorials:		
	Eight tutorials based on project is to be submitted.	

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2			\checkmark	\checkmark		\checkmark				
CO 3										
CO 4	\checkmark									

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp9	Exp10	Project I	Project II	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 Co	llege of Engineerin	ig, Karad						
		Third Yes	ar (Sem – V) M. C.	A.						
Teaching Sche	me	MC160	1: Industrial Project	Examina	ation Scheme					
Contact Hours	30 Hrs/week			CA	100					
	ESE 100									
Total Credits	15									
Course Outcou	nes (CO)									
1. Students w	ill demonstrate	knowledge of the dis	inction between criti	cal and noncritical	systems.					
2. Students w	ill demonstrate	the ability to manage	a project including p	lanning, scheduling	and risk					
assessmen	t/management.									
3. Students w	ill demonstrate	proficiency in rapid so	oftware development	techniques.						
4 Students w	ill be able to ide	ntify specific compon	ents of a software de	sign that can be tai	rgeted for reuse.					
	The project w	ork to be carried out	individually commence	res in the Semester	VI as ner the					
	project assign	ed to the each individ	lual by the respective	industry.It shall inc	clude the problem					
	definition, lite	rature survey, approa	iches for handling the	, problem, finalizing	, the methodology					
	for the project	t work and system de	sign etc. Term work s	ubmission should b	e done in the form					
	of anindividua	l report. The term wo	ork assessment will be	e done jointly by tea	achers appointed by					
	Head of the D	epartment. The oral e	examination will be co	onducted by an inte	ernal and external					
1	Project work s	ppointed by the institute	ute.	ha contributions of	the group					
1	members, orig	inality of the work, in	novations brought in	research and dev	elopmental efforts.					
	depth and app	licability, etc.								
2	Two mid-term	evaluations should b	e done, which includ	es presentations ar	nd demos of the					
	work done.									
Project	Project report	should be of 15 to 20	pages (typed on A4 s	ize sheets). For star	ndardization of the					
Report Format:	project reports	the following format	should be strictly fol	lowed.						
Tormat.	1. Page Size: 1	rimmed A4								
	2. Top Margin	: 1.00 Inch								
	3. Bottom Ma	rgin: 1.32 Inches								
	4. Left Margin	: 1.5 Inches								
	5. Right Marg	in: 1.0 Inch	Deint Feat							
	6. Para Text:	Imes New Roman 12	Point Font							
	8. Page Numb	ers: Right Aligned at	Footer. Font 12 Point	. Times New Romai	n					
	9. Headings: T	imes New Roman, 14	Point Bold Face							
	10. Certificate	: All students should	attach standard form	at of Certificate as	described by the					
	department. C	Certificate should be a	warded to batch and	not to individual st	tudent. Certificate					
	should have si	gnatures of Guide, H	ead of Department ar	nd Principal/ Directo	or.					
	a Title Shoo	eport: +								
	b. Certificate									
	c. Acknowled	dgement								
	d. Table of C	ontents								
	e. List of Fig	ures								
	t. List of Tab	les • Defensions de la	have the falls to f							
	For Books "Ti	s: Reierences should	nave the following fo	rmat						
	For Papers: "T	itle of Paper". Author	rs, Journal/Conference	e Details. Year						
			,	,						
Useful Links:										
1	http://www.g	eeksforgeeks.org/				<u> </u>				
2	https://in.uda	city.com/				-				
3	https://graph	ics.stanford.edu/~sea	ander/bithacks.html							

4	https://www.youtube.com/results?search_query=mycodeschool	
5	https://www.hackerrank.com/	

$PO \rightarrow$	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO 2	PSO 3
CO↓										
CO 1										
CO 2										
CO 3										
CO 4										

Skill Level	Exp 1	Exp 2	Exp 3	Exp 4	Exp 5	Exp 6	Exp 7	Exp 8	Exp9	Exp10	Project I	Project II	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	
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