



**Annasaheb Dange College of Engineering and
Technology, Ashta
An Autonomous Institute**

Curriculum Structure

B. Tech. Computer Science and Engineering
(Internet of Things and Cyber Security including
Blockchain Technology)

SEMESTER I- VIII

Academic Year 2021-22 (Updated)

Teaching and Evaluation Scheme
F.Y.B.Tech : Semester-I

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
01CBS101	Applied Mathematics - I	3	1	..	4	ISE I	10	20	..	..
						MSE	30		..	..
						ISE II	10		..	..
						ESE	50		..	..
01CES102	Basic Electrical Engineering	3	..	..	3	ISE I	10	20	..	..
						MSE	30		..	..
						ISE II	10		..	..
						ESE	50		..	..
01CES103	Engineering Graphics	2	..	..	2	ISE I	10	20	..	..
						MSE	30		..	..
						ISE II	10		..	..
						ESE	50		..	..
01CES104	Analog Electronics	2	..	..	2	ISE I	10	20	..	..
						MSE	30		..	..
						ISE II	10		..	..
						ESE	50		..	..
01CES151	Problem Solving Using C	1	..	4	3	ISE	..	..	50	20
01CHS152	Professional Communication Skills	..	..	4	2	ISE	..	..	50	20
01CES153	Engineering Graphics laboratory	..	..	2	1	ISE	..	..	50	20
01CES501	Design Thinking Laboratory	1	..	2	1	ISE	..	..	50	20
VAC-I	Value Added Course-I	2	..	..	..	Audit				
Total		16	1	12	18	Total	400		200	..
Total Contact Hours/Week: 29 hrs.						Total Marks=400+200 = 600				
Course Category		HS	BS	ES		PC	PE	OE	PR	
Credits		02	04	12		00	00	00	00	
Cumulative Sum		02	04	12		00	00	00	00	


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Teaching and Evaluation Scheme
F. Y. B. Tech.: Semester-II

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)		
							Max.	Min. for Passing	Max.	Min. for Passing	
01CBS105	Applied Mathematics - II	3	1	—	4	ISE I	10	40			
						MSE	30				
						ISE II	10				
						ESE	50	20			
01CES106	Digital Electronics	3	—	—	3	ISE I	10	40			
						MSE	30				
						ISE II	10				
						ESE	50	20			
01CBS107	Engineering Physics and Chemistry	4	—	—	4	ISE I	10	40			
						MSE	30				
						ISE II	10				
						ESE	50	20			
01CPC108	Computer Networks	3	—	—	3	ISE I	10	40			
						MSE	30				
						ISE II	10				
						ESE	50	20			
01CES154	Object Oriented Programming	2	—	2	2	ISE	—		50	20	
01CES155	Digital Electronics Laboratory	—	—	2	1	ISE	—		50	20	
01CES156	Engineering Physics and Chemistry Laboratory	—	—	2	1	ISE	—		50	20	
01CPC157	Computer Networks Laboratory	—	—	2	1	ISE	—		50	20	
						ESE	POE		50	20	
VAC-2	Value Added Course-2	2	—	—	—	Audit					
Total		17	1	8	19	Total	400		250		
Total Contact Hours/Week: 24 hrs.						Total=400+250=650					
Course Category		HS	BS	ES		PC	PE	OE	PR		
Credits		00	09	06		04	00	00	00		
Cumulative Sum		02	13	18		04	00	00	00		


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Teaching and Evaluation Scheme
S. Y. B. Tech.: Semester-III

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)		
							Max.	Min. for Passing	Max.	Min. for Passing	
01CPC201	Discrete Mathematics and Theory of Computation	3	1	--	4	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50	20	--	--	
01CPC202	Data Structures	3	--	--	3	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50	20	--	--	
01CPC203	Operating System	3	--	--	3	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50	20	--	--	
01CPC204	Smart Sensors and Actuators	3	--	--	3	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50	20	--	--	
00CHS502	Psychology	2	--	--	2	ISE I	25	10	--	--	
						ISE II	25	10	--	--	
01CPC251	Data Structures Laboratory	--	--	2	1	ISE	--	--	50	20	
01CPC252	Operating System Laboratory	--	--	2	1	ESE	--	POE	50	20	
01CES253	Programming Laboratory- I	2	--	2	3	ISE	--	--	50	20	
						ESE	--	POE	50	20	
00CMC503	Environment Studies	2	--	--	--	Audit					
VAC-3	Value Added Course-3	2	--	--	--	Audit					
Total		20	1	6	20	Total	450		300		
Total Contact Hours/Week: 27 hrs.						Total=450+300=750					
Course Category	TPS	BS	ES	PC	PE	OE	PR				
Credits	02	00	03	15	00	00	00				
Cumulative Sum	04	13	21	19	00	00	00				


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Teaching and Evaluation Scheme
S. Y. B. Tech.: Semester- IV

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
01CBS205	Statistics, Probability and Fuzzy Logic	3	1	--	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC206	Database Management System	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC207	Microprocessor and Microcontroller	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPE2**	Professional Elective-I	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CHS504	Universal Human Values-I	2	--	--	2	ISE I	25	20	--	--
						ISE II	25		--	--
									--	--
									--	--
01CPL254	Database Management System Laboratory	--	--	2	1	ISE	--	--	25	10
						ESE	--	POE	50	20
01CPC255	Microprocessor and Microcontroller Laboratory	--	--	2	1	ISE	--	--	25	10
						ESE	--	POE	50	20
01CPC256	Web Technology	2	--	2	2	ISE	--	--	25	10
						ESE	--	POE	50	20
01CPR257	Innovation/Prototype	--	--	2	1	ESE	--	PR	25	10
01CMC505	Constitution of India	1	--	--	--	Audit				
VAC-4	Value Added Course-4	2	--	--	--	Audit				
Total		19	1	08	20	Total	450		250	
Total Contact Hours/Week: 18 hrs.						Total = 450 + 250 = 700				
Course Category	HS	BS	ES	PC	PE	OE	PR			
Credits	02	04	00	10	03	00	01			
Cumulative Sum	06	17	21	29	07	00	01			


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01CPE2**- Professional Elective-I	
01CPE208	Concepts of Virtual and Augmented Reality
01CPE209	Object Oriented Modelling and Design
01CPE210	Computer Organization and Architecture


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Teaching and Evaluation Scheme
T.Y.B. Tech: Semester-V

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)		
							Max.	Min. for Passing	Max.	Min. for Passing	
01COE3**	Open Elective-I	3	-	-	3	ISE I	10	40	..	..	
						MSE	30		..	..	
						ISE II	10		..	..	
						ESE	50	20	..	..	
01CPC303	Design and Analysis of Algorithms	3	-	-	3	ISE I	10	40	..	..	
						MSE	30		..	..	
						ISE II	10		..	..	
						ENR	50	20	..	..	
01CPC304	Information Theory for Cyber Security	3	-	-	3	ISE I	10	40	..	..	
						MSE	30		..	..	
						ISE II	10		..	..	
						ESE	50	20	..	..	
01CPC305	Block Chain Technology	3	..	-	3	ISE I	10	40	..	..	
						MSE	30		..	..	
						ISE II	10		..	..	
						ENR	50	20	..	..	
01CHS306	Entrepreneurship	..	-	2	1	ISE I	25	20	..	..	
						ISE II	25		..	..	
01CPC351	Design and Analysis of Algorithms Laboratory	..	-	2	1	ISE	..	..	25	10	
						ESE	..	POE	50	20	
01CPE3**	Professional Elective-II Laboratory	2	-	2	3	ISE	..	..	25	10	
						ENR	..	POE	50	20	
01CPC355	Block Chain Technology Laboratory	..	..	2	1	ISE	..	..	25	10	
						ESE	..	POE	50	20	
01CPC356	Programming Laboratory-II	2	-	2	3	ISE	..	-	50	20	
01CPR357	Industrial Training/Internship)	..	-	..	1	ESE	..	PR	50	20	
VAC-5	Value Added Course-5	2	-	-	-	Audit					
Total		14	0	10	22	Total	450		325		
Total Contact Hour/Week: 28 hrs.		Total=450+325=775									
Course Category	HS	HS	ES	PC	PE	OE	PR				
Credits	01	00	00	14	03	03	01				
Cumulative Sum	07	17	21	43	06	03	02				

01COE3**- Open Elective-I		01COE3**- Professional Elective-II Laboratory	
01COE301	Ethical Hacking and Tools	01CPC352	Data Analytics
01COE302	Smart Sensors and Actuators	01CPC353	IOT Platforms and System Design
		01CPC354	Multimedia and Social Media Security


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Teaching and Evaluation Scheme
T.Y.B. Tech: Semester-VI

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)		
							Max.	Min. for Passing	Max.	Min. for Passing	
01COE3**	Open Elective-II	3	--	--	3	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50		--	--	
01CPC308	Data Encryption, Steganography and Digital Watermarking	3	--	--	3	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50		--	--	
01CPC309	Embedded System for IoT	3	--	--	3	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50		--	--	
01CPC310	Software Engineering	3	1	--	4	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50		--	--	
01CPE3**	Professional Elective-III	3	--	--	3	ISE I	10	40	--	--	
						MSE	30		--	--	
						ISE II	10		--	--	
						ESE	50		--	--	
00CIS507	Universal Human Values-2	2	--	--	2	ISE I	25	20	--	--	
						ISE-II	25		--	--	
01CPC358	Data Encryption, Steganography and Digital Watermarking Laboratory	--	--	2	1	ISE	--	--	25	10	
						ESE	--	POE	50	10	
						ISE	--	--	25	10	
						ESE	--	POE	50	10	
01CPE3**	Professional Elective-III Laboratory	--	--	2	1	ISE	--	--	50	20	
01CPC362	Embedded System for IoT Laboratory	--	--	2	1	ISE	--	--	50	20	
						ESE	--	OE	50	20	
01CPR363	Minor Project	--	--	2	1	ISE	--	--	25	10	
						ESE	--	PR	50	20	
VAC-6	Value Added Course-6	2	--	--	--	Audit					
Total		19	1	08	22	Total	550		375		
Total Contact Hours/Week: 28 hrs.						Total=550+375=925					
Course Category	HS	BS	ES	PC	PE	OE	PH				
Credits	02	00	00	12	04	03	01				
Cumulative Sum	09	17	21	55	10	06	03				


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OICOE3** - Open Elective-II	
OICOE306	Introduction to Blockchain
OICOE307	Cyber Crimes and Security

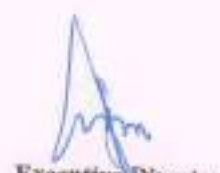
OICOE3** - Professional Elective-III	
OICPE311	Wireless Sensor Networks
OICPE312	Database Security
OICPE313	Smart Contracts and Solidity

OICOE3** - Professional Elective-III Laboratory	
OICPE359	Wireless Sensor Networks Laboratory
OICPE360	Database Security Laboratory
OICPE361	Smart Contracts and Solidity Laboratory


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Teaching and Evaluation Scheme
B. Tech: Semester-VII

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
01COE4**	Open Elective-III	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC403	Cloud Computing	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC404	Machine Learning	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPE4**	Professional Elective-IV	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC408	Blockchain Security and Performance	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPE4**	Professional Elective-IV Laboratory	--	--	2	1	ISE	--	--	25	10
						ESE	--	POE	50	10
01CPC454	Cloud Computing Laboratory	--	--	2	1	ISE	--	--	25	10
						ESE	--	POE	50	10
01CPC455	Machine Learning Laboratory	--	--	2	1	ISE	--	--	25	10
						ESE	--	POE	50	10
01CHS409	Project Management and Finance	2	--	--	2	ISE-I	25	10	--	--
						ISE-II	25	10	--	--
01CPR456	In-Plant Training	--	--	--	1	ESE	--	PR	50	20
01CPR457	Project (Phase-I)	--	--	4	2	ISE	--	--	50	20
						ESE	--	PR	100	40
VAC-7	Value Added Course-7	2	--	--	--	Audit				
Total		19	0	108	23	Total	550		425	
Total Contact Hours/Week: 27 hrs.						Total=550+425=975				
Course Category	HS	DS	ES	PC	PE	OE	PR			
Credits	02	00	00	11	04	03	03			
Cumulative Sum	11	17	21	66	14	09	06			


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OICOE4**- Open Elective-III	
OICOE401	Ubiquitous Computing
OICOE402	Smart Contracts and Solidity

OICOE4**- Professional Elective-IV	
OICPE405	Ubiquitous Computing
OICPE406	Security Assessment and Disaster Recovery
OICPE407	Blockchain Platforms and Use cases

OICOE4**- Professional Elective-IV Laboratory	
OICPE451	Ubiquitous Computing
OICPE452	Security Assessment and Disaster Recovery
OICPE453	Blockchain Platforms and Use cases


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Teaching and Evaluation Scheme
B. Tech : Semester-VIII

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
01COE410	Open Elective-IV (MOOC)	3	-	-	3	ISE I	10	20		
						MSE	30			
						ISE II	10			
						ESE	50		20	
01CPE4**	Professional Elective-V (MOOC)	3	-	-	3	ISE I	10	20		
						MSE	30			
						ISE II	10			
						ESE	50		20	
01CPR458	Internship / Project (Phase-II)	..	..	20	10	ISE		-	100	40
						ESE	..	-	200	80
Total		06	-	20	16	Total	200		300	
Total Contact Hours/Week: 26 hrs						Total=200+300=500				
Course Category	HS	BS	FS		PC	PE	OE	PR	Total	
Credits	00	00	00		00	03	03	10	16	
Cumulative Sum	11	17	21		66	17	12	16	160	
Credits (AICTE)	12	25	24		48	18	18	15	160	

01COE4**- Open Elective-IV		01COE4**- Professional Elective-V	
01COE410	MOOC	01CPR411	Industrial IoT
		01CPR412	TC/P/P Network Security
		01CPR413	Blockchain and FinTech


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**Annasaheb Dange College of Engineering and
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Curriculum Structure

B. Tech. Computer Science and Engineering
(Internet of Things and Cyber Security including
Blockchain Technology)

SEMESTER IV

**Academic Year 2021-22
(Updated)**



Teaching and Evaluation Scheme
S. Y. B. Tech.- Semester- IV

Course Code	Course	Teaching Scheme				Evaluation Scheme					
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)		
							Max.	Min. for Passing	Max.	Min. for Passing	
01CBS205	Statistics, Probability and Fuzzy Logic	3	1	..	4	ISE I	10	40	—	—	
						MSE	30		—	..	
						ISE II	10		—	—	
						ESE	50		20	..	—
01CPC206	Database Management Systems	3	—	—	3	ISE I	10	40	—	—	
						MSE	30		..	—	
						ISE II	10		—	—	
						ESE	50		20	..	..
01CPC207	Microprocessor and Microcontroller	3	..	..	3	ISE I	10	40	—	—	
						MSE	30		—	..	
						ISE II	10		—	—	
						ESE	50		20	..	..
01CPE2..	Professional Elective-I	3	—	—	3	ISE I	10	40	—	—	
						MSE	30		..	..	
						ISE II	10		..	..	
						ESE	50		20	—	—
01CHS404	Universal Human Values-I	2	—	—	2	ISE I	25	20	—	..	
						ISE II	25		10	—	—
						ISE	—		—	25	10
						ESE	..		POE	50	20
01CPC254	Database Management System Laboratory	—	—	2	1	ISE	—	—	25	10	
						ESE	..	POE	50	20	
						ISE	—	—	25	10	
						ESE	..	POE	50	20	
01CPC255	Microprocessor and Microcontroller Laboratory	—	—	2	1	ISE	—	—	25	10	
						ESE	..	POE	50	20	
						ISE	—	—	25	10	
						ESE	..	POE	50	20	
01CPC256	Web Technology	2	—	2	2	ISE	—	—	25	10	
						ESE	..	POE	50	20	
						ISE	—	—	25	10	
						ESE	..	PR	25	10	
01CPR257	Innovation/Prototype	—	—	2	1	ISE	—	—	25	10	
						ESE	..	PR	25	10	
						ISE	—	—	25	10	
						ESE	..	PR	25	10	
01CPC505	Constitution of India	1	—	—	—	Audit					
						Audit					
						Audit					
						Audit					
VAC-4		Value Added Course-4		2	..	—	..				
Total		19	1	08	20	Total	450		250		
Total Contact Hours/Week: 28 hrs.						Total -450+250=700					
Course Category		HS	BS	ES	PC	PE	UF	PH			
Credits		02	04	00	10	03	00	01			
Cumulative Sum		06	17	21	29	03	00	01			

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01CPE2** - Professional Elective-I	
01CPE208	Concepts of Virtual and Augmented Reality
01CPE209	Object Oriented Modelling and Design
01CPE210	Computer Organization and Architecture


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Course Details:

Class	B. Tech., Sem. IV
Course Code and Course Title	01CBS205- Statistics, Probability and Fuzzy Logic
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	3/1/0
Credits	4
Evaluation Scheme: ISE /LMSE/ ISE. II /ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CBS205_1	Apply statistical techniques to interpret the given data.
01CBS205_2	Solve problems in probability theory using distributions and test of hypothesis.
01CBS205_3	Construct different fuzzy sets using basic definitions of fuzzy sets.
01CBS205_4	Use the extension principle on fuzzy numbers/sets to develop arithmetic operations.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Measures of Central Tendency: 1.1 Arithmetic Mean 1.2 Geometric Mean 1.3 Harmonic Mean 1.4 Median 1.5 Mode 1.6 Partition values: Quartiles, Deciles and Percentiles	6
Unit 2	Measures of Dispersion: 2.1 Concept of dispersion 2.2 Range 2.3 Quartile Deviation 2.4 Mean Deviation 2.5 Mean Square Deviation 2.6 Variance and Standard Deviation 2.7 Moments 2.8 Skewness by Karl Pearson's method 2.9 Kurtosis	8


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Unit 3	Probability Distribution 3.1 Random variable 3.2 Binomial Distribution 3.3 Poisson Distribution 3.4 Normal Distribution.	8
Unit 4	Statistical Interference- Test of Hypothesis 4.1 Sampling distributions 4.2 Testing of Hypothesis 4.3 Level of Significance 4.4 Testing of Significance for large sample 4.5 Testing of Significance for small sample: Students t-distribution and Chi-Square Test	5
Unit 5	Introduction to Fuzzy sets. 5.1 Basic concepts of Fuzzy Sets 5.2 Crisp Set and Fuzzy Set 5.3 Membership Functions 5.4 Basic operations on fuzzy sets 5.5 Properties of fuzzy sets.	8
Unit 6	Fuzzy Arithmetic 6.1 Fuzzy Numbers 6.2 Fuzzy Cardinality 6.3 Operations on Fuzzy Numbers 6.4 Fuzzy Equations of Type $A + X = B$ and $A.X = B$.	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Higher Engineering Mathematics	Dr. B. S Grewal	Khanna Publishers	44 th	2018
2	A Text Book of Engineering Mathematics (For Unit 1)	N. P. Bali, Manish Goyal	Laxmi Publications(P) Ltd	8 th	2011
3	Advanced Engineering Mathematics	H. K. Dass	S. Chand	22 nd	2018
4	Fuzzy Sets & Fuzzy Logic Theory and Applications (For Unit 2 & 3)	George J. Klir and Bo Yuan	PHI Learning Private Limited	-	2013


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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Probability and Statistics for Computer Science	James L. Johnson	Wiley	1 st	2008
2	Probability and Statistics for Engineers	Dr. J. Ravichandran	Wiley	1 st	2012
3	Advanced Engineering Mathematics	Erwin Kreyszig	Wiley Publishers	9 th	2013
4	Fuzzy Logic with Engineering Applications	Timothy J. Ross	Wiley	3 rd	2013


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Course Details:

Class	B. Tech. Sem.-IV
Course Code and Course Title	OICPC206- Database Management System
Prerequisite/s	Data Structures
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme: ISE-I/MSE/TSE-II/ESE	10/30/10/50

Course Outcomes (COs):

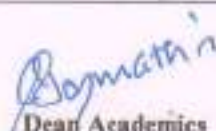
Upon successful completion of this course, the student will be able to:

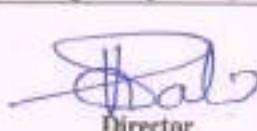
OICPC206_1	Explain concepts of database, database design, relational algebraic SQL operations and normalization techniques.
OICPC206_2	Design ER model and prepare relational database schema for the given enterprise using integrity constraints and validate the design by applying different normalization techniques.
OICPC206_3	Summarize SQL queries in pure languages and extract required information from the database.
OICPC206_4	Comprehend file organization concepts of indexing for efficient system performance, transaction management and concurrency control.
OICPC206_5	Use concepts of indexing, concurrency protocols, security techniques and different recovery algorithms with real-world examples.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction to databases and ER Model Introduction: Introduction to database, advantages and applications, Database View - Levels of data abstraction, Data models, Database languages, Database System Architecture, Database users ER Model: Entity concept, Entity set and its types, attributes. Relationship sets, Relationship types, Keys- primary key, super key, foreign key, Features of ER Model -Generalization, Specialization, aggregation	6
Unit 2	Relational Model and SQL Relational Model: Relational model concept, Relational Database structure, Conversion of ER model into Relational schemas, Schema-instance distinction, Referential integrity and foreign keys, Relational algebra example queries SQL: Introduction to SQL, Data definition statements with constraints, Insert, Update and Delete, Set operations, Group by and having aggregate functions, clauses, Nested Queries, Views, Complex Queries, Joins.	8


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Unit 3	Functional Dependency and Normalization Importance of a good schema, Motivation for normalization forms, Atomic domains and 1NF, Dependency- functional dependencies, closure of a set of FD's, Concepts of 2NF, 3NF and BCNF and 4NF. Decomposition algorithms and desirable properties of decomposition, Multivalued dependencies, Join dependencies, Temporal Functional Dependencies.	7
Unit 4	Data Storage & Indexing Data storage, types of data storage, file organization, organization of records into files, Data Dictionary, Database Buffer Indexing: Concept, Ordered Indices-Primary, Secondary, Multilevel, B+ Tree Index, hashing, Hash Indices, Dynamic hashing, Bitmap Indices	6
Unit 5	Transaction Management & Concurrency Control Transaction Processing: Transaction processing concept, ACID properties, Transaction states, Implementation of atomicity, isolation and durability, Serializability, Serializability testing. Concurrency Control: Lock-based protocols, Timestamp - based Protocols, Validation -based Protocols, B+ tree protocols, Deadlock handling.	8
Unit 6	Recovery System and Database Security Recovery System Failure classification, Storage structure, Implementation of stable and Atomicity, Log based recovery. Checkpoints, Shadow paging, crash recovery. Database Security Security issues, Security methods and techniques, Security analysis tools	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	McGraw Hill Education	6 th	2011
2	Database Systems - Design, Implementation and Management	Rob & Coronel	Thomson Course Technology	5 th	2008
3	Database Systems- A practical approach to Design, Implementation	Thomas Connolly, Carolyn Begg	Pearson Education	4 th	2009


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database Systems: Design, Implementation and Management	Peter Ror'. Carlos Coronel	Cengage Learning	7 th	2014
2	Fundamentals of Database Systems	Ramez Elmasri and Shamkant Navathe	Pearson Education	4 th	2007
3	Principles of Database System	J. D. Ullman	Galgotia Publications	1 st	2011


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Course Details:

Class	B. Tech, Sem-IV
Course Code and Course Title	01CPC207- Microprocessor and Microcontroller
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	1/0/0
Credits:	3
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to.

01CPC207_1	Explain the architecture of 8085, 8051 and PIC16f877 to understand PIN configuration of each processor.
01CPC207_2	Compare microprocessor and microcontrollers for analyzing interfacing between peripheral devices.
01CPC207_3	Design Pin description of 8051 microcontroller to understand the internal design and features of 8051 microcontroller by using advanced simulator.
01CPC207_4	Interface stepper motor, DC motor and on board peripheral to communicate with 8051 and PIC using trainer kit.
01CPC207_5	Write programs over 8085 microprocessor, 8051 and PIC microcontroller in assembly and C using instruction set

Course Contents:

Sr. No.	Unit Name	Contact Hours
Unit 1	Microprocessor Architecture and Microcomputer System Microprocessor Architecture and its operation- Microprocessor initiated operations, internal operation, and Peripheral operation. Memory- Flip-flop or latch as storage element, memory map and addresses, memory and Instruction fetch, memory classification, Input and output devices.	6
Unit 2	8085 Microprocessor Architecture The 8085 MPU, Microprocessor communication and bus timing, De-multiplexing address and Data bus, Generating control signals, The 8085 Architecture, and 8085 based microcomputer-machine cycles and bus timing, op-code fetch machine cycle, memory read and write machine cycle.	7
Unit 3	8085 assembly language programming The 8085 programming model, instruction classification, instruction and data format, Writing and execution of assembly language program. The 8085 instruction-data transfer operations, addressing modes, Arithmetic operation, Flag concept and cautions, Logic operations, Branch operations. Introduction to 8086 microprocessor.	8


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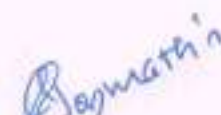

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Unit 4	Introduction to 8 Bit Microcontroller 8051 Difference between general purpose microprocessor and microcontrollers, Introduction to MCS51 family, Architecture of 8051, Functional pin out diagram of 8051, Reset circuit, Machine cycle, oscillator circuit, programming model, memory organization, instruction set, addressing modes, assembly language programming, Boolean instructions.	7
Unit 5	Architecture of PIC microcontroller & instruction set CPU architecture: Harvard architecture & pipelining, program memory considerations, register file structure, instruction set, addressing modes: immediate, direct, Indirect CPU registers: status word, FSR, INDF, PCLATH, PCL, assembly language programming, Pin diagram of 16f8xx, features of PIC	6
Unit 6	Embedded 'C' Programming for 8051 & Case Studies Introduction to compiler, assembler, debugger, interpreter, C data types, I/O programming, programming for LCD, LED, DC motor, stepper motor using embedded 'C'. Case Studies: Bluetooth controlled home automation system using 8051, traffic light controller using 8051, industrial automation using 8051 microcontroller.	8

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Microprocessor Architecture – programming and applications with 8085	Ramesh Gaonkar	Penram International	4 th	2007
2	The INTEL Microprocessors - Architecture, Programming and Interfacing	Barry B. Brey S	PHI Ltd	8 th	2010
3	The 8051 Microcontroller and Embedded systems using assembly and C	Mazidi & D Mackinlay	Pearson Education	2 nd	2011
4	Design with PIC microcontrollers	John B Peatman	Pearson Education	1 st	2012


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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Microprocessors and Microcontrollers	N. Senth Kumar, M. Saravanan and S. Jeevananthan	Oxford University Press	2 nd	2001
2	Microprocessor 8086 : Architecture, Programming and Interfacing	Mathur Sunil	PHI Publication	4 th	2011
3	8051 Microcontroller	Subrata Ghoshal	Pearson Education	1 st	2010
4	8051 microcontroller	Kenneth J Ayala	Cengage Learning	3 rd	2012


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Course Details:

Class	B. Tech, Sem- IV
Course Code and Course Title	OICPE208- Concepts of Virtual and Augmented Reality
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE I /MSE /ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OICPE208_1	Understanding the basics of Virtual Reality using fundamental concepts
OICPE208_2	Illustrate Virtual Reality models for given problem using Unity software
OICPE208_3	Understanding the basics of Augmented Reality using fundamental concepts
OICPE208_4	Illustrate Augmented Reality models for given problem using Vuforia software
OICPE208_5	Demonstrate real time applications using Virtual Reality and Augmented Reality concepts

Course Contents:

Unit No.	Unit Name	Contact Hrs
Unit 1	Introduction of Virtual Reality: Historical development of VR, Fundamental Concept and Components of Virtual Reality, Requirements for VR, benefits of virtual reality Primary Features and Present Development on Virtual Reality. Comparison between different VR headsets.	7
Unit 2	VR Hardware & Software VR Hardware: Hardware technologies for 3D user interfaces: visual displays, auditory displays, haptic displays, choosing output devices for 3D user interfaces. VR Software : Basics of software, basics of tools, Uses of commands ,Google VR software development tool kit, available software in the market	8
Unit 3	Unity Overview of Unity software, Importing Google VR SDK to unity, introduction to android studio, Linking unity with android studio demonstrating the virtual reality game.	6


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Unit 4	Introduction to Augmented Reality Introduction, What is augmented reality. Difference between AR and VR, Historical development of AR, Fundamental Concept and Components of Augmented Reality	6
Unit 5	AR application Augmented Reality publications in engineering, architecture, education, medicine, and science, ARONE APP introduction, Image handling in Vuforia, Projecting Barbarian 3D Model on Image Target	7
Unit 6	Application of VR Virtual reality applications in engineering, architecture, education, medicine and science, VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR. Introduction to MR and XR.	8

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Augmented Reality: Principles and Practice	Dieter Schmalstieg, Tobias Hollerer	Addison-Wesley	1 st	2016
2	Virtual Reality Technology	Burdea, G. C. and P. Coffet.	Wiley-IEEE Press	2 nd	2003/2006
3	Understanding Augmented Reality, Concepts and Applications	Alan B. Craig	Morgan Kaufmann	--	2013
4	Developing Virtual Reality Applications, Foundations of Effective Design	Alan Craig, William Sherman and Jeffrey Will	Morgan Kaufmann	--	2009

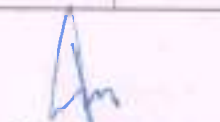
Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR	Steve Ankstakalnis	Addison-Wesley	1 st	2016
2	Paul Mealy, Virtual & Augmented Reality for Dummies	Doug A Bowman, Ernest Kuijff, Joseph J LaViola	John Wiley & Sons	1 st	--
3	"3D User Interfaces, Theory and Practice". Addison Wesley, USA	Tony Parisi	Shroff/O'Reilly	1 st	2015


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Course Details:

Class	B. Tech, Sem. IV
Course Code and Course Title	0ICPE209- Object Oriented Modelling and Design
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE I /MSE /ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICPE209_1	Apply object oriented modelling and design concepts to solve given problem using Rational Rose design tool.
0ICPE209_2	Design different data flow diagrams for given problem statement by using Rational Rose design tool.
0ICPE209_3	Sketch System design for given real time system using designing object oriented concepts.
0ICPE209_4	Design different UML diagrams for given problem statement by using STAR UML design tool.
0ICPE209_5	Follow professional and ethical principles during laboratory work in a team for laboratory activities.

Course Contents:

Unit No.	Unit Name	Contact Hrs
Unit 1	Introduction: Modeling as a design technique, Objects, classes, links and associations, generalization and Inheritance, Aggregation, abstract classes, generalization as extension and restriction. and multiple inheritances.	5
Unit 2	Dynamic & Functional Modeling: Events and states, operations, nested state diagrams, concurrency advanced dynamic modeling concepts, relation of object and dynamic models, Data Flow Diagrams, relation of functional to object and dynamic models	8
Unit 3	Design Methodology: OMT methodology , Impact of an object oriented approach, Analysis Overview, System design with examples, Object Design, combining the three models, designing Algorithms, design association and physical packaging ,design Optimization, implementation of Controls, design association	8



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Unit 4	Structural Modeling using UML: Classes, Relationships, Common mechanisms, Diagrams, Class Diagrams, Interfaces, Types and Roles, Packages, Instances and Object Diagram.	5
Unit 5	Behavioral Modeling using UML: Interactions, Use cases, Use case diagram, Interaction Diagrams and Activity diagrams, Events and signals, State Machines, Process and Threads, Time & Space, State chart diagrams.	8 Hrs
Unit 6	Architectural Modeling: Components, Deployment, Collaboration, Patterns& frameworks Component Diagrams, Deployment Diagrams.	8 Hrs

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Object-orientated Modeling & Design	James Rumbaugh, Michael Blaha, William Premerlani, Frederick Eddy, William Lorenson	Prentice Hall of India(PHI)	2 nd	2005
2	The Unified Modeling Language User Guide	Grady Booch, James Rumbaugh, Ivar Jacobson.	Pearson	2 nd	2008
3	Object Oriented Modeling and Design with UML2.0	James Rumbaugh, Michael Blaha	Pearson	2 nd	2001
4	Software Modeling & Design	Hassan Gomaa	Cambridge University Press	3 rd	2004

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Threat first Object oriented analysis & design	Brett McLaughlin, Garry Polite & Devide West.	OREILLY	1 st	2006
2	Object Oriented Analysis & design	Kahate	Tata McGrawHill	1 st	2007
3	Object oriented analysis & design using UML	H. Srimathi, H Srimam, A.Krishnamoorthy	SCITECH PUBLICATION	2 nd	2009
4	Object-Oriented Analysis & design understanding system development with UML 2.0	Mike O'Docherty	John Wiley & Sons	3 rd	2004


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Course Details:

Class	B. Tech, Sem-IV
Course Code and Course Title	01CPE210- Computer Organization and Architecture
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE I / MSE / ISE II / ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPE210_1	Explain the overall organization and architectures based on single core microprocessor or parallel microprocessor used for general and specific purposes.
01CPE210_2	Solve the different arithmetic operations with the help of basic algorithms using standard IEEE floating point representations.
01CPE210_3	Illustrate the designs of control and memory units based on different types of microprocessor architectures used for general and specific purposes.
01CPE210_4	Explain concepts of advanced microprocessors based on parallel processing and vector processing used for high performance computing.
01CPE210_5	Classify the particular microprocessor architecture suitable for a given application from the available products in the market at present.

Course Contents:

Unit No.	Unit Name	Contact Hrs
Unit 1	Basic Computer Organization Evolutions of computers- Mechanical era, Electronic computers. CPU organization, Data representations, Instruction Sets- RISC & CISC, definition, comparison and Examples	6
Unit 2	Computer Arithmetic: Number representation : Signed Integers, Fixed point numbers, Floating point numbers Multipliers and Dividers, Floating point arithmetic's: Rounding Modes, special value and Exceptions, floating point addition, other Floating point operations, Booth's Algorithm, IEEE Standards for Floating point representations(Single Precision Format)	10
Unit 3	Control Design and memory organization: Basic concepts, Hardwired control Unit, Micro programmed control unit, Memory technology, Memory Systems, Caches: Main features	5


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Unit 4	Introduction to Parallel Processing : Introduction, architectural classification schemes. Evolution of parallel processors, current & future trends towards parallel processors, Principles of pipelining and array processing, Scalar and vector pipelines, Classification of pipelined processors, Performance evaluation factors. Vector processing concepts Systolic arrays and their applications	8
Unit 5	Different parallel processing architectures : Introduction to Associative memory processors, Principles of multithreading, Latency Hiding techniques.	6
Unit 6	Distributed Memory Architecture : Loosely coupled and tightly coupled architectures, Cluster computing as an Application of loosely coupled architecture. Examples CM* Dataflow Architectures: Concepts of data flow computing, static and dynamic Dataflow architectures.	7

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Computer Architecture and Organization (Unit 1,2,3)	John P Hayes	VcGrawill	3 rd	—
2	Computer Architecture and parallel processing (Unit 4, 5,6)	D M Dhamdhare	Tata McGraw-Hill	2 nd	—
3	Compilers - Principles, Techniques and Tools	A.V. Aho, R. Sethi and J.D. Ullman	Pearson Education	1 st	—

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Computer Systems Organizations and Architecture	John D. Carpinelli	PEARSON Education	3 rd	2008
2	Parallel Computer Architecture	David E. Culler	Morgan Kaufmann	1 st	2000
3	Advanced Computer Architecture: A Design Space Approach	DezsoSima, Terence Foundation, Peter karsuk	Pearson	..	..
4	Computer Architecture: A Quantitative Approach	John L. Hennessy & David A. Patterson	Morgan Kaufmann Publishers	3 rd	2003
5	Computer Organization	Carl Hamacher, Zvonko Vranesic, SafwatZaky	McGraw-Hill	5 th	2002


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Course Details:

Class	B. Tech. Sem. IV
Course Code and Course Title	00CHS504- Universal Human Values-I
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial/Practical	2/0/0
Credits	2
Evaluation Scheme: ISE I / ISE II	25/25

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

00CHS504_1	Integrate the process of self-exploration to achieve Harmony in the human being's based on Holistic perspective of value education.
00CHS504_2	Understanding Harmony in human being, family, society and nature 'existence, based on methods to fulfill human aspiration.
00CHS504_3	Apply the human values for maintaining the relationships with oneself and others using the principals of harmony.
00CHS504_4	Adopt the methods of maintaining harmony with the society, nature, and its existence by utilizing the human order systems.

Course Contents:

Sr. No.	Unit Name	Contact Hours
Unit 1	Introduction to Value Education Introduction , Need, Purpose and motivation for the course, recapitulation from Universal Human Values-I Self-Exploration —what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation - as the process for self-exploration. Continuous Happiness and Prosperity - A look at basic Human Aspirations, Right understanding , Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority.	4
Unit 2	Understanding Happiness and Prosperity Understanding Happiness and Prosperity correctly, Prevailing sources of happiness, Prosperity and its implications Method to fulfil the human aspirations: understanding and living in harmony at various levels.	4


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Unit 3	Understanding Harmony in the Human Being - Harmony in Myself Understanding human being as a co-existence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' - happiness and physical facility Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail, Programs to ensure Sanyam and Health.	6
Unit 4	Understanding Harmony in the Family - Harmony in Human-Human Relationship Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship Understanding the meaning of Trust; Difference between intention and competence Understanding the meaning of Respect, Difference between respect and differentiation; Peer Pressure the Concerns and its Resolution the other salient values in relationship.	7
Unit 5	Understanding Harmony in the Society Understanding the harmony in society: Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals Human order systems and dimensions	4
Unit 6	Understanding Harmony in the Nature and Existence Understanding the harmony in the Nature, Inter-connectedness and mutual fulfilment among the four orders of nature, recyclability and self-regulation in nature	3

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Understanding Human Being, Nature and Existence Comprehensively	UHV Team	UHV	1 st	2022


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2	A Foundation Course in Human Values and Professional Ethics	R. R. Gaur, R. Asthana, G P Bagaria	Excel Books	2 nd	2019
3	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics	R. R. Gaur, R. Asthana, G P Bagaria	Excel Books	2 nd	2019
4	Human Values	A.N Tripathy	New Age International	2 nd	2006

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	A Foundation Course in Human Values and Professional Ethics	R.R. Gaur, R. Sangal, G.P. Bagaria	Excel Books	3 rd	2010
2	Indian Ethos and Modern Management: Amalgam of the Best of the Ideas from the East and the West	B.J., Bajpai	New Royal Book	1 st	2004
3	Small Is Beautiful	E. F. Schumacher.	Hartley & Marks	1 st	1999
4	An Introduction to Ethics	William Lilly	Allied	1 st	1967


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Course Details:

Class	B. Tech, Sem, IV
Course Code and Course Title	OICPC254- Database Management System Laboratory
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE	25/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OICPC254_1	Interpret the problem statement of a given system, identify need, analyze the problem and design ER model for the the system as well as prepare the relational database schema for the system by identifying integrity constraints.
OICPC254_2	Demonstrate installation and configuration of Oracle /MySQL / SQL Server etc.
OICPC254_3	Apply the SQL queries for database definition and manipulation, use PL/SQL constructs.
OICPC254_4	Experiment with indexing, hashing techniques, transaction processing, concurrency control and security techniques.
OICPC254_5	Follow professional and ethical principles during laboratory work in a team during performing laboratory activities.

Exp. No.	Title of Experiment
1.	Drawing an E-R Diagram for any organization.
2.	Converting E-R diagram into Relational Tables.
3.	Installation and Demonstration of DBMS Oracle / MySQL / SQL Server / PostgreSQL etc.
4.	Study and Implementation of Data Definition Language (DDL) Queries (e.g. create, alter and drop tables).
5.	Study and Implementation of Data Manipulation Language (DML) Queries (e.g. insert, delete, update and select statements).
6.	Study and Implementation of Basic SQL SELECT statement for displaying / extracting data from single table or multiple tables.
7.	Study and implementation of SQL constructs for aggregating data, use of group by, having clauses.


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8.	Study and implementation of nested sub-queries, complex queries, views and Joins.
9.	Study and Implementation of Triggers.
10.	Study and Implementation of Functions and Stored Procedures.
11.	Implementation of Database connectivity with object oriented language (Java).
12.	Few aspects of authorization such as creating and managing users, roles, granting and revoking of privileges etc.
13.	Creating Indices for the tables, implementing static hashing.
14.	Study of Transaction processing and concurrency control techniques.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	McGraw Hill Education	6 th	2011
2	Database Systems- A practical approach to Design, Implementation and Management	Thomas Connolly, Carolyn Begg	Pearson Education.	4 th	2009
3	Database Systems – Design, Implementation and Management	Rob & Corneil	Thomson Course Technology	5 th	2008
4	Database Management Systems	Raghu Ram Krishnan	McGraw Hill	3 rd	2002

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Fundamentals of Database Systems	Ramez Elmasri and Shamkant Navathe	Pearson Education	5 th	2007
2	Database Systems: Design, Implementation and management	Peter Rof. Carlos Coronel	Cengage Learning	7 th	2014
3	Principles of Database Systems	J. D. Ullaman	Galgotia publications	1 st	2011
4	SQL: A Complete Reference	Alexis Leon, Mathews Leon	McGraw Hill Education	1 st	2002


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Course Details:

Class	B. Tech, Sem. IV
Course Code and Course Title	OICPC255- Microprocessor and Microcontroller Laboratory
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE,	25/ 50

Course Outcomes (COs):

Upon successful completion of laboratory practice, the student will be able to:

OICPC255_1	Identify the basic elements and functions of Microprocessors to understand basic concepts of microprocessor.
OICPC255_2	Design flowchart and Data flow diagrams for 8085 and 8051 assembly language program for microprocessor system using advanced simulator and trainer kit respectively.
OICPC255_3	Apply programming skills to write programs over 8085, 8051 and PIC in assembly and C by using simulator.
OICPC255_4	Interface peripherals like LED, LCD, and stepper motor to communicate 8051 microcontroller using Trainer Kit.
OICPC255_5	Use on chip peripheral to generate square wave by using different timers.

Exp. No.	Title of Experiment
1.	Develop Program for Addition Operation of two 16 bit Numbers using 8085 Simulator tool
2.	Develop Program for Subtraction Operation of two 16 bit Numbers using 8085 simulator tool
3.	Develop Program that is based on Branching Operations using 8085 simulator tool
4.	Develop Program to perform one byte BCD addition using 8085 simulator tool
5.	Develop Program to move a string of data Words from one offset address to another offset address using 8085 simulator tool.
6.	Develop program for arithmetic operation like addition, subtraction, multiplication and division for 8051 and simulate using Keil software
7.	Develop program for addition of two 8 bit numbers in 16f877 and simulate using MPLAB.
8.	Develop a program to generate square wave using watch dog timer in PIC 16f877 and implement on hardware kit.


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9.	Develop program for LED interfacing in embedded C and implement on hardware kit P89v51RD2
10.	Develop program for LCD interfacing in embedded C and implement on hardware kit P89v51RD2
11.	Develop program for DC motor in embedded C and implement on hardware Kit
12.	Develop program for Stepper motor in embedded C and implement on hardware Kit

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Microprocessor Architecture –programming and applications with 8085	Ramesh Gaonkar	Penram International	4 th	2007
2	The 8051 Microcontroller and Embedded systems using assembly and C	Mazidi & D Mackinlay	Pearson Education	2 nd	2011
3	Design with PIC microcontrollers	John B Peatman	Pearson Education	1 st	2012
4	The INTEL Microprocessors - Architecture, Programming and Interfacing	Barry B. Brey S	PHI Ltd	8 th	2010

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Microprocessor 8086 : Architecture, Programming and Interfacing	Mathur Sunil	PHI Publication	4 th	2011
2	Microprocessors and Microcontrollers	N. Senthil Kumar, M. Saravanan and S. Jeevananthan	Oxford University Press	2 nd	2001
3	Introduction to Microprocessors and Microcontrollers	John Crisp	ELSEVIER	2 nd	1998


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Course Details:

Class	B. Tech. Sem IV
Course Code and Course Title	01CPC256- Web Technology
Prerequisite/s	01CPC108 – Computer Networks 01CES253 – Java Programming
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	2
Evaluation Scheme: ISE / ESE	25 / 50

Course Outcomes (COs)

Upon successful completion of the course students will be able to:

01CPC256_1	Construct a basic website using HTML and CSS.
01CPC256_2	Design a web application for different sized screens using Bootstrap, Javascript and ReactJS
01CPC256_3	Develop a web application for given problem statement using NodeJS, ExpressJS and MongoDB.
01CPC256_4	Plan, develop, debug, and implement interactive client-side and server-side web applications for real time problems using client side and server side web techniques.
01CPC256_5	Construct a basic website using HTML and CSS.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Responsive web design with HTML5 HTML5 Basics, Tables, Lists, Working with Link, Image Handling, Frames, iFrame, HTML Forms for user Input, New Form Elements, HTML5 Client-Side Storage	4
Unit 2	CSS3 CSS-Introduction, CSS-Syntax, CSS-Text Fonts, CSS-Lists Tables, CSS-Box Model, CSS-Display Positioning, CSS-Floats, Color, Gradients, Background Images, and Masks, Border and Box Effects, Working with Colors, Layout, Columns, Flex Box, Implementing CSS3, Transforms, Transitions, and animations	4
Unit 3	Bootstrap and JavaScript Introduction to Bootstrap, Bootstrap Grid, Bootstrap, Components, Bootstrap Plugins, JavaScript Fundamentals BOM (Browser Object Model), DOM (Document Object Model), AJAX Development, Typescript, MotionUI.	6


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Unit 4	ReactJS React Introduction, React Essential Features and Syntax, React Components, Props and State, Styling Components, Debugging React Apps, React Component lifecycle, React Component in Details, HTTP Requests/AJAX Calls, React Routing, React Forms and Form Validation, Deploying React App to the Web, Testing React apps with JEST	4
Unit 5	NodeJS Introduction to NodeJS, Setup Dev Environment, Event Loop, Node JS Modules, Node Package Manager, Creating Web server, File System, Debugging Node JS Application Events. ExpressJS , Routing, Template engines, Middleware, Web Application components, Error handling, Testing application Express application.	6
Unit 6	MongoDB MongoDB – Overview, CRUD Operations, Basic Operations, Aggregations, Indexing, Replication and Sharding	4

Exp. No.	Title of Experiment
1	Programs based on newly introduced elements of HTML5.
2	Programs based on Typography and background properties of CSS3, animation effect by using the transition feature of CSS.
3	Programs based on Javascript, operators, functions and Motion UI.
4	Programs based on Bootstrap grid and Bootstrap Plugins.
5	Design a web page using basics of ReactJS
6	Design a web page to design and validate React Forms.
7	Design a web page to test react page.
8	Design a web application using NodeJS
9	Design a web application using ExpressJS
10	Design a web application to perform CRUD operations on database.
11	Program for replication and sharding in MongoDB.


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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Advanced Internet Technology	Deven Shah	Dreamtech Press	1 st	2015
2	HTML To React: The Ultimate Guide	Steepleasyogi	Ngninja Academy	1 st	2020
3	Web Technologies: Black book	Kogent Learning Solutions Inc.	Dreamtech Press	1 st	2009
4	Getting MEAN with Mongo, Express, Angular, and Node	Simon Holmes	Manning Publishing	2 nd	2015

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Bootstrap 4 Quick Start: A Beginner's Guide to Building Responsive Layouts with Bootstrap 4.1	Jacob D Lett	Bootstrap Creative	1 st	2018
2	Full Stack JavaScript Development with MEAN	Colin J. Ibrig,	Site point publishing	—	2015

Web Resources:

1. https://www.w3schools.com/bootstrap4/bootstrap_get_started.asp
2. <https://nodejs.org>
3. <https://www.w3schools.com/nodejs/default.asp>
4. <https://expressjs.com/>
5. <https://www.mongodb.com/>


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Course Details:

Class	B. Tech. Sem. IV
Course Code and Course Title	0ICPR257- Innovation/Prototype
Prerequisite/s	0ICES154- Design Thinking
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE/ESE	0/25

Course Outcomes (COs)

Upon successful completion of the course students will be able to:

0ICPR257_1	Proficiently Apply the innovative thinking techniques to empathize the customer through arranging survey and/or interview
0ICPR257_2	Accurately Identify and Formulate the solution for real world problem using innovative technique
0ICPR257_3	Proficiently Create and Exhibit Prototype, for defined real world problem using innovative approach
0ICPR257_4	Accurately Comply & Test developed prototype for defined real world problem to meet user's requirements
0ICPR257_5	Routinely Adapt professional skills and ethical practices to provide a reliable solution for defined real world problem through participating in team activities

Unit No.	Unit Name
Unit 1	Design thinking for innovation Introduction of design thinking process, innovation and their role, Process of thinking in right direction, Incubation, Final ideation, Brain Storming, Psychological aspect of creativity.
Unit 2	Human and Culture Centered Design Design for Society, Better existing design, Design for change Cultural change, social change, Life style change
Unit 3	Visual communication and sketching Anyone can sketch, expression of thinking and problem solving through sketch and graphic design.
Unit 4	Prototyping & Fabrication Process of Prototype design, Problems of different stages in prototype design, refines Prototype, Finalize Prototype


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Unit 5	Engineering aspect of design Electrical, Mechanical, Design, Material, Aspect, Safety and Reliability aspect
Unit 6	Introduction of Startup with entrepreneurship approach: What is entrepreneurship, being an entrepreneurship, Challenges and possibilities of Entrepreneurship? How to Start up, Start-up Fundamental, Being Successful.

Experiments:

8-10 experiments based on above topics will be conducted

Text Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Understanding Design Thinking, Lean, and Agile	Jonny Schneider	O'Reilly	—	2017
2	Engineering Design	John R. Karsnitz, Stephen O'Brien and John P. Hutchinson	Cengage learning	2 nd	2013
3	Design for How People Think	John Whalen	O'Reilly	--	2019

Reference Books:					
Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Creative Confidence: Unleashing the Creative Potential Within Us All	Kelley, D. & Kelley, T	New York: William Collins	--	2014
2	The Design of Business: Why Design Thinking is the Next Competitive Advantage	Roger Martin	Harvard Business Press	--	2009
3	Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School	Idris Moolce	John Wiley & Sons	--	2013


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Course Details:

Class	B. Tech. Sem. IV
Course Code and Course Title	OCCMC505 - Constitution of India
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial	02/00
Credits	--
Evaluation Scheme: ISE	Audit

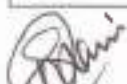
Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OCCMC505_1	Explore the basic features and modalities about Indian constitution.
OCCMC505_2	Differentiate the functioning of Indian parliamentary system at the center and state level.
OCCMC505_3	Explain different aspects of Indian Legal System and its related bodies.
OCCMC505_4	Identify different laws and regulations related to engineering practices.
OCCMC505_5	Correlate role of engineers with different organizations and governance models.

Course Contents:

Unit 1	Constitution Structure and Principles Meaning of the constitution law and constitutionalism, Historical Background of the Constituent Assembly, Government of India Act of 1935 and Indian Independence Act of 1947.	2
Unit 2	Making of Indian Constitution Enforcement of the Constitution, Meaning and importance of Constitution Making of Indian Constitution – Sources, Salient features of Indian Constitution, Preamble.	2
Unit 3	Fundamental Rights Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies.	2
Unit 4	Fundamental Duties Directive Principles-Definition, State to secure a social order for the promotion of welfare of the people, Certain principles of policy to be followed by the State, Equal justice and free legal aid, Right to work, to education and to public assistance in certain cases	2
Unit 5	Regulation to Information Introduction, Right to Information Act, 2005, Information Technology Act, 2000, Electronic Governance, Secure Electronic Records and Digital Signatures, Digital Signature Certificates, Cyber Regulations Appellate Tribunal, Offences, Limitations of the Information Technology Act	3
Unit 6	Business Organizations and E-Governance Sole Traders, Partnerships Companies. The Company's Act: Introduction, Formation of a Company, Memorandum of Association, Articles of Association, Prospectus, Shares, Directors, Auditor, Winding up E-Governance and role of engineers in E-Governance, Role of I.T. professionals in Judiciary	3


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	The Constitution of India	Dr. B. R. Ambedkar	Law literature Publications	—	2020
2	Introduction to the Constitution of India	Durga Das Basu	Gurgaon; Lexis Nexis	23 rd	2018
3	Governance in India	M. Laxmikanth	Mc Graw Hill Publications Delhi	3 rd	2021
4	The Constitution of India	P.M. Bakshi	Lexis Nexis	—	2019

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Introduction to the Constitution of India	Durga Das Basu	Gurgaon; LexisNexis	23 rd	2018
2	The Constitutional Law of India,	J.N. Pandey	Allahabad; Central Law Agency	55 th	2018
3	Constitution of India (Full Text)	India.gov.in	National Portal of India	--	--
4	India's Constitution	M.V.Pylee	S. Chand Publications New Delhi	16 th	2017


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**Annasaheb Dange College of Engineering and
Technology, Ashta
An Autonomous Institute**

Curriculum Structure

**B. Tech. Computer Science and Engineering
(Internet of Things and Cyber Security including
Blockchain Technology)**

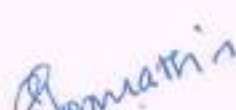
SEMESTER III

**Academic Year 2021-22
(Updated)**

Teaching and Evaluation Scheme
S. Y. B. Tech.: Semester-III

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
01CPC201	Discrete Mathematics and Theory of Computation	3	1	--	4	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC202	Data Structures	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC203	Operating System	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC204	Smart Sensors and Actuators	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CHS502	Psychology	2	--	--	2	ISE I	25	20	--	--
						ISE II	25		--	--
01CPC251	Data Structures Laboratory	--	--	2	1	ISE	--	--	50	20
						ESE	--	POE	50	20
01CPC252	Operating System Laboratory	--	--	2	1	ISE	--	--	50	20
						ESE	--	POE	50	20
01CES253	Programming Laboratory-I	2	--	2	3	ISE	--	--	50	20
						ESE	--	POE	50	20
0CCMC503	Environment Studies	2	--	--	--	Audit				
VAC-3	Value Added Course-3	2	--	--	--	Audit				
Total		20	1	6	20	Total	450		300	
Total Contact Hours/Week: 27 hrs.						Total=450+300=750				
Course Category	HS	BS	ES	PC	PE	OE	PR			
Credits	02	00	03	15	00	00	00			
Cumulative Sum	04	13	21	19	00	00	00			


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Class	B. Tech, Sem-III
Course Code and Course Title	0ICPC201 - Discrete Mathematics and Theory of Computation
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/1/0
Credits:	4
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

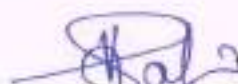
0ICPC201_1	Proficiently calculate permutations and combinations to solve given problems using appropriate formulas.
0ICPC201_2	Proficiently solve problems of mathematical logic and set theory using appropriate formulas/laws.
0ICPC201_3	Accurately Build finite state machines for regular language or regular expression over a given alphabet and convert one form of finite state machine to another form by using appropriate conversion method.
0ICPC201_4	Proficiently Construct grammars (context free/ regular) for given language (context free/regular) over a given alphabet and convert given context free grammar in CNF Form by using conversion method.
0ICPC201_5	Accurately Build deterministic and non-deterministic pushdown automata for given language or grammar over a given alphabet and stack symbols.
0ICPC201_6	Proficiently Construct Turing Machines for given language, function over a given alphabet and tape symbols.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Permutations, Combinations and Discrete Probability: Permutations and Combinations: rule of sum and product, Permutations, Combinations, Discrete Probability, Conditional Probability, Bayes' Theorem	6
Unit 2	Mathematical logic: Introduction, statements and notations, connectives - negation, Conjunction, disjunction, conditional, bi-conditional, Statement formulas and truth tables, well formed formulas, Tautologies, Equivalence of formulas, Duality law, Tautological implications, functionally complete sets of connectives, other connectives, Normal and principal normal forms.	7


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Unit 3	Set theory and Algebraic systems: Basic concepts of set theory, operations on sets, ordered pairs, Cartesian Product, relation, properties of binary relations, graph theory terminologies, matrix and graph representation of binary relations, partition and covering of set, equivalence relation, composition of relations, POSET and Hasse diagram, Function – definition, types Algebraic Systems, homomorphism, Semigroups and Monoids, properties and examples, Groups: Definition and examples.	9
Unit 4	Mathematical Induction, Regular Languages & Finite Automata Regular expressions and corresponding regular languages, examples and applications, Finite automata-definition and representation, Non-deterministic F.A.NFA with null transitions, Equivalence of FA's, NFA's and NFA's with null transitions.	8
Unit 5	Grammars and Languages Types of Languages, Derivation and ambiguity, Union, Concatenation and *'s of CFLs, Eliminating production & unit productions from CFG, Eliminating useless variables from a context Free Grammar. CNF Notation.	6
Unit 6	Push Down Automata and Turing Machines PDA Definition, Deterministic PDA & types of acceptance, Equivalence of CFG's & PDA's. TM- Models of computation, definition of Turing Machine as Language acceptors, combining Turing Machines, Computing a function with a TM.	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Discrete Mathematical Structures with application to Computer Science (Unit 2,3)	J. P. Tremblay & R. Manohar	Tata MGH International	.	2007
2	Elements of Discrete Mathematics (Unit 1)	C. L. Liu and D. P. Mohapatra	SiE Edition, TataMcGraw- Hill	4 th	2013
3	Introduction to languages & theory of computations (Unit 4,5,6)	John C. Martin	Tata McGraw Hill Edition	3 rd	2007
4	Introduction to Automata Theory, Languages and computation	John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman	Pearson Edition	3 rd	2006


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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Discrete Mathematics and its Applications	Kenneth H. Rosen (AT&T Bell Labs) (mhhe.com/rosen)	Tata Mc Graw Hill	7 th	2012
2	Discrete Mathematics, Schaum's outlines.	SemyourLipschutz, MarcLipson	Tata Mc Graw Hill	3 rd	2012
3	Introduction to theory of computations	Michael Sipser	Cengage Learning	3 rd	2012
4	Theory of Computation- A problem solving Approach	Kavi Mahesh	Wiley India	1 st	2005



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Course Details:

Class	S Y B. Tech , Sem-III
Course Code & Course Title	0ICPC202- Data Structures
Prerequisite/s	0ICES151-Problem Solving Using C
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs) :

Upon successful completion of this course, the student will be able to:

0ICPC202_1	Describe the fundamentals concepts of complexity, recursion, and data structures using programming language concepts.
0ICPC202_2	Explain the fundamental concepts of structuring, managing and organizing the data using linear data structures with ADTs.
0ICPC202_3	Apply solution to solve the problem using linear data structure.
0ICPC202_4	Explain the fundamental concepts of structuring, managing and organizing the data using nonlinear data structures with ADTs.
0ICPC202_5	Apply solution to solve the problem using nonlinear data structure.
0ICPC202_6	Compare and analyze different data structure algorithms and searching, sorting methods using concepts like complexity.

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	Basics of Data Structures: Algorithm, ADT, Space and Time Complexity, Direct and Indirect recursion, analysis of recursive functions e.g. Towers of Hanoi	4
Unit 2	Lists Definition, representation, operations, implementation and applications of singly, doubly and circular linked lists.	9
Unit 3	Stack and Queue Stacks as ADT, operations, representation using static and dynamic structures, applications of stack Queue as ADT, operations, representation using static and dynamic structures, circular queue, priority queue, double ended queue.	8


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Unit 4	Searching and Sorting Techniques Linear search, binary search, Internal and External Sorts, bubble sort, selection sort, insertion sort, merge sort, quick sort, radix sort, heap sort. Hashing – Definition, hash functions, overflow, collision, Collision resolution techniques, Open addressing, Chaining.	9
Unit 5	Trees Basic terminology, representation, binary tree, traversal methods, binary search tree, AVL search tree, Heaps- Operations and their applications, Introduction to M-way trees.	7
Unit 6	Graphs Basic concept of graph theory, storage representation, adjacency matrix, adjacency list, adjacency multi-lists, graph traversal techniques- BFS and DFS	5

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structures- A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzan	Cengage Learning	2 nd	2004
2	Data Structures with C Schaum's Outlines Series	S. Lipschutz	Tata McGraw-Hill	-	2017
3	Data Structure using C	Reema Thareja	Oxford	2 nd	2014

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structure using C	A. M. Tanenbaum, Y. Langsam, M. J. Augenstein	Prentice-Hall Of India Pvt. Limited	-	2003
2	Understanding Pointers in C	Yashavant Kanetkar	BPB Publication	1 st	2009
3	C and Data Structures	N. B. Venkateshwarlu, E. V. Prasad	S. Chand and Company	-	2010
4	Let Us C	Yashavant Kanetkar	BPB Publication	15 th	2016


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Annasaheb Dange College of Engineering and Technology, Ashia
(An Autonomous Institute)

Department of Computer Science & Engineering
(Internet of Things and Cyber security including Blockchain Technology)

Course Details:

Class	B. Tech ,Sem-III
Course Code and Course Title	01CPC203- Operating System
Prerequisite/s	01CES151-Problem Solving Using C
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPC203_1	Analyze basic concepts of operating system and their structures to compare various operating systems using various OS parameters.
01CPC203_2	Analyze issues related to inter process communication, process scheduling and resource management with the help of different scheduling algorithm.
01CPC203_3	Develop appropriate solution to solve critical section problem by using accurate operating system algorithm.
01CPC203_4	Use deadlock avoidance and Memory management techniques with suitable algorithm to handle a deadlock situation and memory management in OS.
01CPC203_5	Synthesize the concepts of I/O management, file system implementation and Problems related to security and protection using appropriate security parameters.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Overview Introduction to Operating Systems, what operating systems do, Computer System organization, Operating System Architecture, Operating System Structure, Operating System operations, Types of Operating Systems, Operating System Services, User - Operating System interface, System calls, Types of system Calls, System programs, Kernel, Types of kernel.	6
Unit 2	Process Management Process concept: Process scheduling, Operations on processes, Inter-process communication, Multi-Threaded Programming: Overview, Multi-Threaded Models, Process Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple-Processor scheduling.	9


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SY_CSE(IOT/CSBT)_07/23

Unit 3	Process Synchronization Background, the critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of Synchronization.	6
Unit 4	Deadlock System model, deadlock characterization, methods for handling deadlocks, deadlock preventions, deadlock avoidance, deadlock detection, deadlock recovery.	6
Unit 5	Memory Management Memory Management Strategies: Background, swapping, contiguous memory allocation, paging, structure of the page table, Segmentation. Virtual Memory Management: Background, demand paging, copy-on-write, page replacement	7
Unit 6	Storage Management & I/O Subsystem File System: Access methods, directory and disk structure, file sharing, Overview of I/O system, I/O hardware, Application I/O interface, Kernel I/O subsystem. System Protection: Goals, Principles, Domain of protection, Access matrix, System security: Security problem, Program threats, Cryptography as security tool.	8

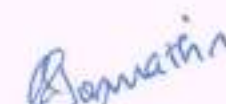
Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Operating System Concepts [Unit 1-6]	Silberschatz, Galvin,	John Wiley	8 th	2009
2	Operating systems concepts and design [Unit 1]	Dhananjay M Dhamdhare	Tata McGraw Hill	2 nd	2006
3	Operating Systems - A Concept Based approach	Dhananjay M Dhamdhare	Tata McGraw Hill	3 rd	2007
4	Understanding Operating System	Understanding Operating System	Ann McHoes & Ida M. Lynn, (Thomson)	6 th	2014

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Operating System A Design Oriented Approach	Charles Crowley	Tata McGraw Hill	1 st	2001
2	Operating System with Case Studies in Unix, Netware and Windows NT	Achyut S. Godbole	Tata McGraw Hill	5 th	2007
3	Operating Systems: Internals and Design Principles	William Stallings	Pearson Education International	8 th	2014


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Course Details:

Class	B. Tech, Sem-III
Course Code and Course Title	01CPC204- Smart Sensors and Actuators
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE I/ MSE/ ISE II/ ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPC204_1	Identify sensors, actuators, Micro sensors and Micro actuators to solve a problem using Sensor fundamentals and its characteristics.
01CPC204_2	Use Microsensors and Microactuators to solve the problems in different scenarios using Arduino IDE.
01CPC204_3	Design a solution for given problem using sensors and ESP32 with Arduino IDE.
01CPC204_4	Design sensor system for real world applications using Raspberry Pi.
01CPC204_5	Connect sensors and actuators with ESP32 to solve a problem using pin description of ESP32 microcontroller.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Sensor fundamentals and Characteristics Introduction, Basic principles of sensor, sensor classification, Understanding various sensors, sensor selection and characteristics: Range, resolution, sensitivity, error, precision, repeatability, linearity and accuracy, impedance response time and backlash, Performance measures of sensors.	6
Unit 2	Types of sensors and their applications Temperature sensor, Proximity sensors, Infrared sensor, Ultrasonic sensor, Light sensor, Smoke and Gas sensor, Alcohol sensor, Humidity sensor, automobile sensor, home appliance sensors. Real time application of sensors, Technologies related to sensors: Metal detector, Global Positioning system, Blood Glucose monitoring, Photoelectric sensor.	7


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Unit 3	Actuators Definition, types and selection of Actuators, Working principle of actuators, sensor calibration, Linear actuators, Rotary actuators, Logical and continuous actuators, Pneumatic actuator, Hydraulic actuators- control valves, Electrical actuating system: solid state switched, solenoids, electric motors- principle of operation and its application, DC motors, AC motors, Synchronous motors, Stepper motors. Introduction to controllers, Types of controllers: Proportional, Proportional-Integral (PI), Proportional-Derivative (PD), Proportional - Integral-Derivative (PID)	8
Unit 4	Micro Sensors and Micro Actuators Micro Sensors: Principles and examples, Force and pressure micro sensors, position and speed micro sensors, acceleration micro sensors, chemical sensors, biosensors, temperature micro sensors and flow micro sensors. Micro Actuators: Actuation principle, shape memory effects-one way, two way and pseudo elasticity. Types of micro actuators- Electrostatic, Magnetic, Fluidic, Inverse piezo effect, other principles.	8
Unit 5	Introduction to ESP32 and Raspberry Pi Overview of ESP32 and its features, Block diagram of ESP32, Specifications, Layout, Pin description for ESP32, Understanding concepts of Arduino, Setting up an ESP32 with Arduino IDE, Introduction to Raspberry Pi.	7
Unit 6	Case Studies Sensors and actuators in Smart cities, Agriculture, Health Care, Activity Monitoring, Weather monitoring system, Forest fire detection, Smart sensors in Artificial Intelligence and Automation.	6

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Sensors and Actuators in Mechatronics, Design and Applications	Andrzej M. Pawlak	CRC Press, Taylor & Francis group	1 st	2007
2	Hand Book of Modern Sensors: Physics, Designs and Application	Jacob Fraden	Springer	5 th	2016
3	Sensors and Transducers	Patranabis.D	Wheeler publisher	4 th	1994


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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mechatronic systems, Sensors and Actuators Fundamentals and Modelling	Robert H. Bishop	Taylor & Francis Group	1 st	2006
2	Micro actuators Electrical, Magnetic, thermal, optical, mechanical, chemical and smart structures	Massood Tabib and Azar	Kluwer academic publishers, Springer	1 st	1997
3	Microsystem Technology and Microbotics	Sergej Fatikow and Ulrich Rembold	Springer	1 st	1997
4	ESP32 web server with Arduino IDE, step -by- step project guide	Rui Santos and Sara Santos	.	-	-


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Department of Computer Science & Engineering
(Internet of Things and Cyber security including Blockchain Technology)

Course Details:

Class	B. Tech, Sem-III
Course Code and Course Title	0CCHS502- Psychology
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/0
Credits	2
Evaluation Scheme: ISE I/ ISE II	25/25

Course Outcomes (COs):

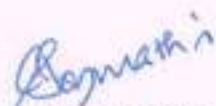
Upon successful completion of this course, the student will be able to

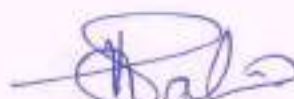
0CCHS502_1	Explain using psychology theories, the necessity and significance of various parts of psychology.
0CCHS502_2	Describe importance of psychology in the organization and human nature that takes place in a group or individually within an organization.
0CCHS502_3	Apply emotional intelligence, time management, and stress management techniques in their daily activities.
0CCHS502_4	Analyze different case studies that use different leadership styles and approaches.

Course Contents:

Unit No.	Unit Name	Contact Hrs
Unit 1	Psychology – Introduction and Need of psychology in the organization, What is Organizational Behavior	2
Unit 2	Emotional Intelligence (EI) – Definition of EI, components of EI, Activities	6
Unit 3	Time Management – Need and importance of Time management for an individual, Effective steps of Time Management, role of procrastination in Time management, Types of Procrastination, Effects of Procrastination, Techniques to stop procrastination, activities	6
Unit 4	Leadership – importance of leadership, styles of leadership, The Leader Trait Approach, The Behavior Approach, Path-Goal Theory: How Leaders Motivate Followers, Leader and Mood, Gender and Leadership, Ethical Leadership	6


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Unit 5	Attitude and Job Satisfaction – Components of Attitude, Relationship between Attitude and Behavior, Job attitude, Causes of Job satisfaction, outcomes of Job satisfaction, Impact of Job dissatisfaction, activities	2
Unit 6	Stress Management – meaning of stress, sources and consequences of stress nature of stressors, Stress Management Techniques, activities.	6

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Organizational Behavior- An Evidence-Based Approach	Fred Luthan	McGraw-Hill/Irwin	12 th	2011
2	Essentials of Organizational Behavior	Stephen P. Robbins Timothy A. Judge Katherine E. Breward	Pearson	-	2018
3	Essentials of organizational Behavior	Stephen P. Robbins	Prentice Hall	7 th	2002
4	Understanding and Managing Organizational Behavior	Jennifer M. George Gareth R. Jones	Pearson	6 th	2012
5	Emotional Intelligence at Work A Professional Guide	Dalip Singh	Response Books A division of Sage Publications	3 rd	2006

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Emotional Intelligence at Work A Professional Guide	Dalip Singh	Response Books A division of Sage Publications	3 rd	2006
2	Positive Psychology Applications in Work, Health and Well-being	Updesh Kumar Archana Vijay Parkash	Pearson India Education	-	2016


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Course Details:

Class	B. Tech. Sem- III
Course Code and Course Title	0ICPC251- Data Structures Laboratory
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE	50/ 50

Course Outcomes (COs):

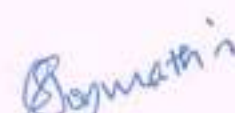
Upon successful completion of this course, the student will be able to:

0ICPC251_1	Demonstrate fundamentals in data structures using programming language
0ICPC251_2	Apply appropriate algorithm to solve problems using linear and nonlinear data structures like stack, queue, trees, graphs
0ICPC251_3	Analyze searching and sorting techniques to solve problems using complexity
0ICPC251_4	Develop a solution to solve case study based problems using data structure concepts.

Course Contents:

Expt. No.	Title of Experiment
1	Programs based on array, function, pointer, structures
2	Singly Linked List
3	Doubly Linked List
4	Circular Linked List
5	Stack ADT – Static and Dynamic
6	Queue ADT – Static and Dynamic
7	Stack application, circular and double ended queue
8	Searching – Linear, Binary and Hashing
9	Sorting – Bubble, Selection, Insertion,
10	Sorting – Merge and Quick
11	Binary Search Tree, Traversal of Trees
12	Graph using adjacency list and traversal


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structures- A Pseudocode Approach with C	Richard F. Gilberg and Behrouz A. Forouzan	PWS Publishing Company	2 nd	2004
2	Data Structures with C Schaum's Outlines Series	S. Lipschutz	Tata McGraw-Hill	-	2017
3	Data Structure using C	Reema Thareja	Oxford	2 nd	2014

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Data Structure using C	A. M. Tanenbaum, Y. Langsam, M. J. Augenstein	Prentice-Hall (of India Pvt. Limited	-	2003
2	Understanding Pointers in C	Yashavant Kanetkar	BPB Publication	1 st	2009
3	C and Data Structures	N. B. Venkateshwarlu, E. V. Prasad	S. Chand and Company	-	2010
4	Let Us C	Yashavant Kanetkar	BPB Publication	15 th	2016


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Course Details:

Class	B. Tech, Sem-III
Course Code and Course Title	0ICES253- Programming Laboratory - I
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	3
Evaluation Scheme: ISE / ESE	50/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICES253_1	Apply various object oriented features like inheritance, data abstraction, encapsulation and polymorphism accurately to solve specified mathematical Problems using Java IDE.
0ICES253_2	Proficiently Apply the concept of multithreading, I/O operations, exception handling and networking to execute and handle multiple programs by using java IDE.
0ICES253_3	Design Errorless GUI application, database connectivity for web application by using the concept of Swing and Applet.
0ICES253_4	Determine the compile time and run time error for java program by using appropriate syntax.
0ICES253_5	Develop and Exhibit micro project to solve real world problems by using a visual aids and presentations.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Fundamental Programming in Java Object-Oriented Programming Concepts, JVM, JIT Compiler, Byte Code., A Simple Java Program, Source File Declaration Rules, Comments, Data Types, Variables, Operators, Strings, Input and Output, Arrays- Jagged Array. Objects and Classes: Declaring Classes, Declaring Member Variables. Defining Methods, Constructor, Passing Information to a Method or a Constructor, Creating and using objects, Access Modifiers, Static Fields and Methods, this keyword.	4


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Unit 2	Inheritance, Interface and Packaging Inheritance: Definition, Types of Inheritance, Polymorphism, Overriding and Hiding Methods, Super keyword, Final Classes and Methods, Abstract Classes and Methods, casting, finalization and garbage collection. Interfaces: Defining an Interface, Implementing an Interface, Using an Interface as a Type. Packages: Class importing, Creating a Package, Naming a Package, Using Package Members, Developing and deploying (executable) Jar File.	5
Unit 3	Exception and I/O Streams Exception: Definition, Dealing with Errors, The Classification of Exceptions, Declaring Checked Exceptions, Throw an Exception, Creating Exception Classes, Catching Exceptions, finally clause, I/O Streams: Byte Stream – Input Stream, Output Stream, Data Input Stream, Data Output Stream, File Input Stream, File Output Stream, Character Streams, Buffered Stream, File, Random Access File.	5
Unit 4	Graphical User Interfaces using Swing: Introduction to the Swing, Swing features, Swing Top Level Containers-Creating a Frame, Positioning a Frame, Displaying Information in a Panel, The Model-View-Controller Design Pattern, The JComponent Class – JLabel, JTextField, JButton etc. Layout Management: Border Layout, Flow Layout, Grid Layout Event Handling: Basics of Event Handling, The AWT Event Hierarchy, Key Events, Mouse Events, Introduction to JApplet.	4
Unit 5	Networking and Multithreading Multithreading: Processes and Threads, Runnable Interface and Thread Class , Defining and Starting a Thread, Thread States, Thread Properties, Networking: Overview of Networking, Networking Basics, Reading from and Writing to a URL Connection, Sockets, Reading from and Writing to a Socket, Writing a Datagram Client and Server.	4
Unit 6	Collection and Hibernate Collections: Collection Interfaces, Concrete Collections- List, Queue, Set, Map, the Collections Framework. Introduction to Hibernate, Exploring Architecture of Hibernate. Object Relation Mapping(ORM) with Hibernate, Hibernate Query Language (HQL), CRUD Operation using Hibernate API.	6


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Exp. No.	Title of Experiment
1	Program based on fundamental concepts of java.
2	Program based on concept of Class and Object.
3	Program based on concept of Inheritance like single inheritance, multilevel inheritance, hierarchical inheritance Multiple inheritances using Interface.
4	Program based on concept of Polymorphism and overloading.
5	Program based on concept of Package and sub packages.
6	Program based on concept of Exception and custom exception
7	Program based on file read write.
8	Program to develop GUI using AWT and Swing.
9	Program based on concept of Key and mouse event.
10	Program based on Distributed Algorithms using multithreading.
11	Program based on collections in java.
12	Program based Object Relation Mapping (ORM) with Hibernate.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Core Java- Volume I and II Fundamentals	Cay Horstmann	Pearson	8 th	2011
2	Let Us Java	Yashavant Kanetkar	BPB Publication	3 rd	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Java 2 Complete Reference	Herbert Schildt	TMGH	9 th	2014
2	JAVA HOW TO PROGRAM	Deitel Paul , Deitel Harvey	PHI Learning	10 th	2016
3	Thinking in Java	Bruce Eckel	Prentice Hall	4 th	2006
4	A Programmer's guide to JAVA SCJP Certification	Khalced Mughal and Rolf W. Rasmussen	Addison Wesley	3 rd	2008


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Course Details:

Class	B. Tech, Sem. III
Course Code and Course Title	01CPC252- Operating System Laboratory
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE	50/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPC252_1	Demonstrate the installation and various features of operating systems.
01CPC252_2	Implement programs related to the process Scheduling, memory allocation techniques for the given problem
01CPC252_3	Develop appropriate solution to solve critical section problem by using accurate operating system algorithm,
01CPC252_4	Design solution to solve memory allocation related problems using Contiguous and Non- Contiguous memory allocation techniques.
01CPC252_5	Identify appropriate commands to perform given task using various standard libraries in the operating system.

Exp. No.	Title of Experiment
1	Installation of Multiple Operating System.
2	Study and demonstration of basics of Linux/UNIX commands.
3	Program based on CPU Scheduling Algorithms.
4	Program to demonstrate critical section and mutual exclusion.
5	Program based on Bankers algorithm for Deadlock Avoidance.
6	Program based on Bankers Algorithm for Deadlock Prevention.
7	Program based on Page Replacement Policies.
8	Program to simulate Paging technique of memory management.
9	Program based on various I/O System calls of UNIX operating System.
10	Program to simulate producer-consumer problem using semaphores.


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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	The design of Unix Operating System	Maurice J. Bach	(PHI)	1 st	2006
2	A practical Guide to Linux commands, Editors and shell programming	Mark G. Sobell	Pearson Education India	3 rd	2013
3	Operating Systems concepts and design	Milan Milenkovic	TMGH	2 nd	2001

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Linux System Programming	Robert Love	SPD, O' REILLY	2 nd	2007
2	Unix concepts and administration	Sumitabha Das	TMGH	4 th	2006
3	A practical Guide to Unix system V	Mark G. Sobell	Benjamin cummings Pub.	2 ^{ed}	2005


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Course Details:

Class	B. Tech, Sem. III
Course Code and Course Title	OCCMC503- Environment Studies
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial/Practical	2/0/0
Credits	0
Evaluation Scheme: ISE	(Audit)

Course Outcomes:

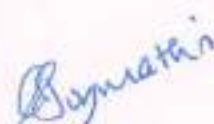
Upon successful completion of this course, the student will be able to:

OCCMC503_1	Examine multidisciplinary nature of environmental science to showcase correlation with other fields with the help of case studies.
OCCMC503_2	Choose best alternatives for natural resources to exhibit its importance for future depending on criteria like availability, price and advantages.
OCCMC503_3	Select proper methods of ecosystem conservation to protect threatened species of plants and animals taking into consideration criterion like its advantages, effects.
OCCMC503_4	Analyze remedies to control types of pollution for minimizing effects of pollution on human and environments with the help of its effectiveness, suitability and case studies.
OCCMC503_5	Compare environmental protection acts for understanding its importance based on its silent features.
OCCMC503_6	Prepare a technical report to highlight importance of environment in human life by using techniques like survey, case studies, mini project.

Course Contents:

Unit No.	Unit name	Contact Hrs.
Unit 1	Nature of Environmental Studies Definition, scope and importance. Multidisciplinary nature of environmental studies, Need for public awareness.	2


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Unit 2	Natural Resources and Associated Problems a) Forest resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people, b) Water resources: Use and over-utilization of surface and groundwater, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Usage and exploitation. Environmental effects of extracting and using mineral resources. d) Food resources: World food problem, changes caused by agriculture effect of modern agriculture, fertilizer-pesticide problems. e) Energy resources: Growing energy needs, renewable and non-renewable energy resources, use of alternate energy sources. Solar energy, Biomass energy, Nuclear energy. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources.	4
Unit 3	Ecosystems Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Introduction, types, characteristics features, structure and function of the following ecosystem:- a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem, d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	4
Unit 4	Biodiversity and its conservation Introduction- Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. India as a mega- diversity nation. Western Ghats as a biodiversity region. Hot-spots of biodiversity. Threats to biodiversity habitat loss, poaching of wildlife, man- wild life conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.	5
Unit 5	Environmental Pollution Definition: Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards. Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.	4


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Unit 6	Social Issues and the Environment Disaster management: floods, earthquake, cyclone, tsunami and landslides Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issue and possible solutions. Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Wasteland reclamation. Consumerism and waste products.	3
Unit 7	Environmental Protection From Unsustainable to Sustainable development Environmental Protection Act, Air (Prevention and Control of Pollution) Act Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Population Growth and Human Health, Human Rights	6

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Environmental Studies	Dr. B. S. Chapman	University Science Press, New Delhi	1 st	2008
2	Environmental Studies	Dr. P. D. Raut	S. U. Kolhapur	3 rd	2011
3	Environmental Studies	Anindita Basak	PEARSON	1 st	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Principals of Environmental Science and Engineering	Raman Sivakumar	Cengage learning Singapore	2 nd	2005
2	Elements of Environmental Science and Engineering	P. Meenakshi	Prentice Hall of India Private Limited, New Delhi	-	2006
3	Environmental Science – working with the Earth	G. Tyler Miller Jr	Thomson Brooks /Cole	11 th	2006


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**ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY
ASHTA**

(An Autonomous Institute with NAAC A++ Grade)

Department of Computer Science and Engineering

(Internet of Things and Cyber Security Including Blockchain Technology)



**Annasaheb Dange College of Engineering and
Technology, Ashta
An Autonomous Institute**

Curriculum Structure

B. Tech. Computer Science and Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

SEMESTER V

**Academic Year 2023-24
(Updated)**

Teaching and Evaluation Scheme



ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY ASHTA

(An Autonomous Institute with NAAC A++ Grade)

Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)

Teaching and Evaluation Scheme **T.Y.B. Tech: Semester-V**

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		J	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
OICOE3**	Open Elective-1	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
OICPC303	Design and Analysis of Algorithms	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
OICPC304	Information Theory for Cyber Security	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
OICPC305	Block Chain Technology	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
OICHS306	Entrepreneurship	--	--	2	1	ISE I	25	20	--	--
						ISE II	25		--	--
OICPC351	Design and Analysis of Algorithms Laboratory	--	--	2	1	ISE	--	--	25	10
OICPE3**	Professional Elective-II Laboratory	2	--	2	3	ESE	--	POE	50	20
						ISE	--	--	25	10
OICPC355	Block Chain Technology Laboratory	--	--	2	1	ESE	--	POE	50	20
						ISE	--	--	25	10
OICPC356	Programming Laboratory-II	2	--	2	3	ESE	--	POE	50	20
						ISE	--	--	25	10
OICPR357	Industrial Training/Internship	--	--	--	1	ESE	--	PR	50	20
						ISE	--	--	50	20
VAC-5	Value Added Course-5	2	--	--	--	Audit				
Total		18	0	10	22	Total	450		325	
Total Contact Hours/Week: 28 hrs.		Total=450+325=775								
Course Category	HS	BS	ES	PC	PE	OE	PR			
Credits	01	00	01	14	03	03	00			
Cumulative Sum	07	17	22	43	06	03	01			

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01COE3**- Open Elective-I		01CPE3**- Professional Elective-II Laboratory	
01COE301	Ethical Hacking and Tools	01CPE352	Data Analytics
01COE302	Smart Sensors and Actuators	01CPE353	IOT Platforms and System Design
		01CPE354	Multimedia and Social Media Security

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Curriculum Structure

**B. Tech. Computer Science and Engineering
(Internet of Things and Cyber Security including
Blockchain Technology)**

SEMESTER VI

Academic Year 2023-24

**Teaching and Evaluation Scheme
T.Y.B. Tech: Semester-VI**

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
01COH3**	Open Elective-II	3	--	--	3	ISE I	10	20	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC309	Data Encryption, Steganography and Digital Watermarking	3	--	--	3	ISE I	10	20	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC310	Embedded System for IoT	3	--	--	3	ISE I	10	20	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPC311	Software Engineering	3	1	--	4	ISE I	10	20	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CPE3**	Professional Elective-III	3	--	--	3	ISE I	10	20	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		--	--
01CHS315	Universal Human Values-2	2	--	--	2	ISE I	25	10	--	--
						ISE-II	25		--	--
01CPC358	Data Encryption, Steganography and Digital Watermarking Laboratory	--	--	2	1	ISE	--	--	25	10
01CPE3**	Professional Elective-III Laboratory	--	--	2	1	ESE	--	POE	50	20
01CPC362	Embedded System for IoT Laboratory	--	--	2	1	ISE	--	--	50	20
01CPR363	Minor Project	--	--	2	1	ISE	--	--	25	10
VAC-6	Value Added Course-6	2	--	--	--	ESE	--	POE	50	20
Total						ISE	--	--	25	10
Total Contact Hours/Week: 25 hrs.						ESE	--	POE	50	20
Course Category						ISE	--	--	25	10
Credits						ESE	--	POE	50	20
Cumulative Sum						ISE	--	--	25	10
						ESE	--	PR	50	20
						Audit				
						Total	550		275	
						Total=550+275=825				
						PC	PE	OE	PR	
						12	04	03	01	
						55	10	06	02	


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TY-ToT- ST- 03/04

01COE3**- Open Elective-II	
01COE307	Introduction to Blockchain
01COE308	Cyber Crimes and Security

01CPE3**- Professional Elective-III	
01CPE312	Wireless Sensor Networks
01CPE313	Database Security
01CPE314	Smart Contracts and Solidity

01CPE3**- Professional Elective-III Laboratory	
01CPE359	Wireless Sensor Networks Laboratory
01CPE360	Database Security Laboratory
01CPE361	Smart Contracts and Solidity Laboratory


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**Department of Computer Science and Engineering
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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	01COE301- Ethical Hacking and Tools
Prerequisite/s	01CPC108 - Computer Networks 01CPC203 - Operating System
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme : ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01COE301_1	Express knowledge on basics of computer based vulnerabilities
01COE301_2	Gain understanding on different foot printing, reconnaissance and scanning methods.
01COE301_3	Gain knowledge on hacking options available in Web and wireless applications.
01COE301_4	Demonstrate the enumeration and vulnerability analysis methods.
01COE301_5	Use tools to perform ethical hacking to expose the vulnerabilities.

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction Introduction to ethical hacking. Fundamentals of computer networking. TCP/IP protocol stack. IP addressing and routing. TCP and UDP, IP subsets. Routing protocols. IP version 6.	6
Unit 2	Basic Tools Installation of attacker and victim system. Information gathering using advanced google search, archive.org, netcraft, whois, host, dig, dnsenum and NMAP tool.	7


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Unit 3	Vulnerability Analysis and System Hacking Vulnerability scanning using NMAP and Nessus. Creating a secure hacking environment. System Hacking: password cracking, privilege escalation, application execution. Malware and Virus. ARP spoofing and MAC attack.	8
Unit 4	Cryptography and Steganography Introduction to cryptography, private-key encryption, public-key encryption, Cryptographic hash functions, digital signature and certificate, applications. Steganography, biometric authentication, network-based attacks, DNS and Email security.	6
Unit 5	Cyber Attacks Packet sniffing using Wireshark and Burp Suite, password attack using Burp Suite. Social engineering attacks and Denial of service attacks. Elements of hardware security: side-channel attacks, physical ineliminable functions, hardware trojans.	7
Unit 6	Hacking and Countermeasures Different types of attacks using Metasploit framework: password cracking, privilege escalation, remote code execution, etc. Attack on web servers: password attack, SQL injection, cross site scripting. Case studies: various attack scenarios and their remedies.	8

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Introduction to Computer Networks and Cybersecurity	C.H. Wu and J. D. Irwin	CRC Press	-	2015
2	Cryptography and Network Security: Principles and Practice	W. R. Stallings	Pearson	7th	2018
3	The Web Application Hacker's Handbook: Finding and Exploiting Security Flaws,	Dafydd Stuttard and Marcus Pinto.	-	-	2011


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	The Basics of Hacking and Penetration Testing	Patrick Egebretonson,	SYNGRESS, Elsevier	—	2013
2	TCP/IP Protocol Suite	B. A. Forouzan	Mc Graw Hill	4th	2010
3	UNIX Network Programming	W Richard Steven	Pearson Education	3rd	2004


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**ANNASAIJEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY
ASHTA**

(An Autonomous Institute with NAAC A++ Grade)

**Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)**

Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	01COE302- Smart Sensors and Actuators
Prerequisite/s	01CES104 - Analog Electronics 01CES106 - Digital Electronics
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme : ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01COE302_1	Identify different types sensors, actuators, Microsensors and Microactuators to solve a problem using Sensor fundamentals and its characteristics. (K2)
01COE302_2	Use Microsensors and Microactuators to solve the problems in different scenarios using Arduino IDE. (K2)
01COE302_3	Design a solution for a given problem using sensors and ESP32 with Arduino IDE. (K3)
01COE302_4	Design sensor system for real world applications using Raspberry Pi (K4)
01COE302_5	Connect sensors and actuators with ESP32 to solve a problem using pin description of ESP32 microcontroller. (K5)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Sensor fundamentals and Characteristics Introduction, Basic principles of sensor, sensor classification, Understanding various sensors, sensor selection and characteristics: Range, resolution, sensitivity, error, precision, repeatability, linearity and accuracy, impedance response time and backlash, Performance measures of sensors.	6
Unit 2	Types of sensors and their applications Temperature sensor, Proximity sensor, Infrared sensor, Ultrasonic sensor, Light sensor, Smoke and Gas sensor, Alcohol sensor, Humidity sensor,	7

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	automobile sensor, home appliance sensors. Real time application of sensors, Technologies related to sensors: Metal detector, Global Positioning system, Blood Glucose monitoring, Photoelectric sensor.	
Unit 3	Actuators Definition, types and selection of Actuators, Working principle of actuators, sensor calibration, Linear actuators, Rotary actuators, Logical and continuous actuators, Pneumatic actuator, Hydraulic actuators- control valves, Electrical actuating system: solid state switched, solenoids, electric motors- principle of operation and its application, DC motors, AC motors, Synchronous motors, Stepper motors. Introduction to controllers, Types of controllers: Proportional, Proportional-Integral (PI), Proportional-Derivative (PD), Proportional – Integral-Derivative (PID)	8
Unit 4	Micro Sensors and Micro Actuators Micro Sensors: Principles and examples, Force and pressure micro sensors, position and speed micro sensors, acceleration micro sensors, chemical sensors, biosensors, temperature micro sensors and flow micro sensors. Micro Actuators: Actuation principle, shape memory effects-one way, two way and pseudo elasticity. Types of micro actuators- Electrostatic, Magnetic, Fluidic, Inverse piezo effect, other principles.	8
Unit 5	Introduction to ESP32 and Raspberry Pi Overview of ESP32 and its features, Block diagram of ESP32, Specifications, Layout, Pin description for ESP32, Understanding concepts of Arduino, Setting up an ESP32 with Arduino IDE, Introduction to Raspberry Pi.	7
Unit 6	Case Studies Sensors and actuators in Smart cities, Agriculture, Health Care, Activity Monitoring, Weather monitoring system, Forest fire detection. Smart sensors in Artificial Intelligence and Automation.	6

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Sensors and Actuators in Mechatronics, Design and Applications	Andrzej M. Pawlak	CRC Press, Taylor & Francis group	1 st	2007


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2	Hand Book of Modern Sensors: Physics, Designs and Application	Jacob Fraden	Springer	5 th	2016
3	Sensors and Transducers	Patranabis.D	Wheeler publisher	4 th	1994

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mechatronic systems, Sensors and Actuators Fundamentals and Modelling	Robert H. Bishop	Taylor & Francis Group	1 st	2006
2	Micro actuators Electrical, Magnetic, thermal, optical, mechanical, chemical and smart structures	Massood Tabib and Azar	Kluwer academic publishers, Springer	1 st	1997
3	Microsystem Technology and Microbotics	Sergej Fatikow and Ulrich Rembold	Springer	1 st	1997
4	ESP32 web server with Arduino IDE, step-by-step project guide	Rui Santos and Sara Santos	-	-	-


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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	0ICPC303-Design and Analysis of Algorithms
Prerequisite/s	0ICPC202 - Data Structures
Teaching Scheme: Lecture/Tutorial /Practical	3/0/0
Credits	3
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICPC303_1	Explain different design methods of algorithm (K2).
0ICPC303_2	Explain complexity of different algorithm designs (K2)
0ICPC303_3	Apply effectively and work in a team for laboratory activities (K3)
0ICPC303_4	Apply rules to provide the solution for designing algorithms (K3)
0ICPC303_5	Analyze professional and ethical principles during laboratory (K4)

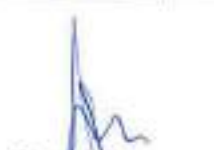
Course Contents

Unit-1	Divide and Conquer Method: Recurrence Equations and their solution, Randomized Algorithms. The general method Binary search, Finding the maximum and minimum, Merge sort, Quick sort, Selection, Convex Hull	6
Unit-2	The Greedy Method: The general method, Knapsack problem, Job sequencing with deadlines, minimum-Cost spanning trees-Prim's and Kruskal's, Optimal storage on tapes, Graph coloring problem, Single source shortest path	8
Unit-3	Dynamic Programming: The general method, Multistage graphs, All pair shortest paths, Optimal binary search tree, 0/1 knapsack, Reliability design, Traveling Sales person problem.	7


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Unit-4	Basic Traversal and Search Techniques: Techniques for Graphs, AND/OR Graphs, Connected components and Spanning Trees, Reconnected components and Depth first search.	7
Unit-5	Backtracking and Infeasibility: Backtracking The general method, 8-queen problem, sum of subsets, Hamiltonian Cycle, Graph Coloring. Infeasibility: P and NP-classes, NP-hard Problems	8
Unit-6	Parallel Computational methods: PRAM, MESH, HYPERCUBE- Fundamental Algorithms	6

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Fundamental of Computer Algorithms	Ellis Horowitz, Satraj Sahani, SagathevarRajasekaran	Universities Press	2	2008
02	Introduction to Algorithms	Thomas Cormen, Charles Leiserson, Ronald Rivest, Clifford Stein	PHI	3	2009
03	Algorithms in a Nutshell	G T Heineman, G Pulice, S Selkow	O'Reilly	1	2008
04	Fundamental of Algorithms	G. Brassard, P. Bratelly	Pearson Education	1	2015

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Design and Analysis of Algorithms	Aho, Hopcroft and Ullman	Pearson Education	1	2000
02	Algorithms	Kenneth Berman, Jerome Paul	CENAGE Learning	1	2010


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Department of Computer Science and Engineering
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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
03	Algorithms	Robert S., Kevin W	Person Education	4	2014
04	Introduction to Design and Analysis of Algorithms	AnanyLevitin		1	2008


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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	01CPC304 –Information Theory for Cyber Security
Prerequisite/s	01CPC108 - Computer Networks
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE-L/MSE/ISE-IL/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPC304_1	Understand the principles and applications of information theory (K2)
01CPC304_2	Describe information security measures. (K2)
01CPC304_3	Illustrate different secrecy metrics and security techniques. (K3)
01CPC304_4	Apply coding schemes and error correcting codes. (K3)
01CPC304_5	Compare different secrecy metrics and security techniques. (K4)

Course Contents:

Unit 1	Shannon's foundation of Information theory, Random variables, Probability distribution factors, Uncertainty/entropy information measures. Leakage, Quantifying Leakage and Partitions, Lower bounds on key size: secrecy, authentication and secret sharing, provable security, computationally-secure, symmetric cipher	8
Unit 2	Secrecy, Authentication, Secret sharing, Optimistic results on perfect secrecy, Secret key agreement, Unconditional Security, Quantum Cryptography, Randomized Ciphers, Types of codes, block codes, Hamming and Lee metrics, description of linear block codes, parity check Codes, cyclic code, Masking techniques	7
Unit 3	Information-theoretic security and cryptography, basic introduction to Diffie-Hellman, AES, and side-channel attacks	6


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Unit 4	Secrecy metrics: strong, weak, semantic security, partial secrecy, Secure source coding rate-distortion theory for secrecy systems, side information at receivers. Differential privacy, Distributed channel synthesis	7
Unit 5	Digital and network forensics, Public Key Infrastructure, Lightweight cryptography, Elliptic Curve Cryptography and applications.	7
Unit 6	Case Study: Secure software development infrastructure, Health care and forensic analysis. SOC-as-a-platform (SOCaaS), Cyber Security Threat Hunting.	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Information Theory and Coding,	Muralidhar Kulkarni, K S Shivaprakasha,	John Wiley & Sons	-	2015
02	Communication Systems: Analog and digital	Singh and Sapre	Tata McGraw Hill	2nd	2009
03	Fundamentals in information theory and coding	Monica Burda	Springer	-	2011

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Information Theory, Coding and Cryptography.	R Bose	Tata McGraw Hill	2nd	2002
02	Multi-media System Design,	Prabhat K Andleigh and Kiran Thakrar.	Pearson education	1st	2015


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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	0ICPC305- Blockchain Technology
Prerequisite/s	0ICPC202 - Data Structure
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme: ISE-IMSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICPC305_1	Explain the basic concepts of Blockchain Technology (K1)
0ICPC305_2	Use Bitcoin and Ethereum protocol – to lay down the foundation for developing distributed applications and smart contracts (K2)
0ICPC305_3	Apply immutable distributed ledger and trust model for real time applications (K3)
0ICPC305_4	Evaluate the different types of consensus algorithms (K5)
0ICPC305_5	Build and deploy block chain application for on premise and cloud based architecture (K6)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction: Overview of Block chain, Public Ledgers, Bitcoin, Smart Contracts, Block in a Block chain. Transactions, Distributed Consensus, Public vs Private Block chain, Understanding Crypto currency to Block chain, Permissioned Model of Block chain, Overview of Security aspects of Block chain Basic Crypto Primitives: Cryptographic Hash Function, Properties of a hash function, Hash pointer and Merkle tree, Digital Signature, Public Key Cryptography, A basic cryptocurrency.	7


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Unit 2	Understanding Block chain with Crypto currency: Bitcoin and Block chain: Creation of coins, Payments and double spending, Bitcoin Scripts, Bitcoin P2P Network, Transaction in Bitcoin Network, Block Mining, Block propagation and block relay	8
Unit 3	Working with Consensus in Bitcoin: Distributed consensus in open environments, Consensus in a Bitcoin network, Proof of Work (PoW) – basic introduction, Hashcash PoW, Bitcoin PoW, Attacks on PoW and the monopoly problem, Proof of Stake, Proof of Burn and Proof of Elapsed Time, The life of a Bitcoin Miner, Mining Difficulty, Mining Pool.	8
Unit 4	Understanding Block chain for Enterprises Permissioned Block chain: Permissioned model and use cases, Design issues for Permissioned block chains, Execute contracts, State machine replication, Overview of Consensus models for permissioned block chain- Distributed consensus in closed environment, Paxos, RAFT Consensus, Byzantine general problem, Byzantine fault tolerant system, Lamport-Shostak-Pease BFT Algorithm, BFT over Asynchronous systems.	8
Unit 5	Understanding Block chain for Enterprises Enterprise application of Block chain: Cross border payments, Know Your Customer (KYC), Food Security, Mortgage over Block chain, Block chain enabled Trade, We Trade – Trade Finance Network, Supply Chain Financing, Identity on Block chain	6
Unit 6	Block chain application development: Hyperledger Fabric- Architecture, Identities and Policies, Membership and Access Control, Channels, Transaction Validation, Writing smart contract using Hyperledger Fabric, Writing smart contract using Ethereum, Overview of Ripple and Corda	5

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks	Imran Bashir	Packt Publishing	-	2017


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2	Essentials of Bitcoin and Blockchain	Kiran kalyan Kulkarni	Packt Publishing.	-	-
3	Blockchain: Ultimate guide to understanding Blockchain, bitcoin, cryptocurrencies, smart contracts and the future of money	Mark Gates	Create Space Independent Publishing Platform		

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain for Dummies	Tiana Laurence	John Wiley & Sons.	2nd	2019
2	Blockchain. Blueprint for a New Economy	Melanie Swan	Shroff Publisher O'Reilly Publisher Media	1 st	2015
3	Mastering Bitcoin Programming the Open Blockchain	Andreas Antonopoulos.	-	-	-
4	Block Chain & Crypto Currencies	Anshul Kaushik	Khanna Publishing House	-	-


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**Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)**

Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	0CCHS506- Entrepreneurship
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial /Practical	0/0/2
Credits	1
Evaluation Scheme: ISE-I / ISE-II	25/25

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0CCHS506_1	Understanding of the scope of an entrepreneur (K2).
0CCHS506_2	Explain areas of development, financial assistance by the institutions (K4)
0CCHS506_3	Apply To Learn methods of taxation and tax benefits,etc (K3)
0CCHS506_4	Develop systematic process to select and screen a business idea (K5)
0CCHS506_5	Design strategies for successful implementation of ideas (K5)

Course Contents

Unit-1	ENTREPRENEURSHIP Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur – Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.	2
Unit-2	MOTIVATION Major Motives Influencing an Entrepreneur – Achievement Motivation Training, self Rating, Business Game, Thematic Apperception Test – Stress management, Entrepreneurship Development Programs – Need, Objectives	2
Unit-3	BUSINESS Small Enterprises – Definition, Classification – Characteristics, Ownership Structures –Project Formulation – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies	3


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Unit-4	FINANCING AND ACCOUNTING Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, management of working Capital, Costing, Break Even Analysis, Network Analysis Techniques of PERT/CPM – Taxation – Income Tax, Excise Duty – Sales Tax.	3
Unit-5	V SUPPORT TO ENTREPRENEURS Sickness in small Business – Concept, Magnitude, causes and consequences, Corrective Measures – Government Policy for Small Scale Enterprises Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting	2
Unit-6	Parallel Computational methods: PRAM, MESH, HYPERCUBE- Fundamental Algorithms	2

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	"Entrepreneurial Development"	S.S Khaoka	S.Chand & Co. Ltd. Ram Nagar NewDelhi	2	1999.
2	Entrepreneurship – Theory, process and practices	Kuratko & Hodgeltz	Thomson learning	6	2009

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Entrepreneurship	Hisrich R D and Peters M P	Tata McGraw-Hill	5	2012
2	Entrepreneurship theory at cross roads: paradigms and praxis	Mathew J Manimala	Dream tech	2	2006
3	Entrepreneurship and innovation	Rabindra N. Kanungo	Sage Publications	—	1998


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**Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)**

Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	OICPC351 Design and Analysis of Algorithms Laboratory
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial /Practical	0/0/2
Credits	1
Evaluation Scheme: INE / ESE	25/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OICPC351_1	Understand the different design methods of algorithm (K2)
OICPC351_2	Apply important algorithmic design paradigms and methods of analysis
OICPC351_3	Analyze Time and Space complexity of different algorithm designs (K4)
OICPC351_4	Differentiate the different backtracking methods (K5)
OICPC351_5	Develop a real time application using dynamic programming concepts (K6)

Expt No.	Experiment List
1	Programs based on finding the maximum and minimum using iterative version and divide & conquer method. Compare the time complexity of both
2	Program based on convex Hull
3	Program based on general method of Greedy method
4	Program based on Greedy method
5	Program based on minimum-cost spanning trees
6	Program based on general method of Greedy Dynamic Programming.
7	Program based on Dynamic Programming.


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8	Program based on general method of backtracking.
9	Program based on backtracking.
10	Program based on AND/OR graph
11	Using OpenMP, implement a parallelized Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Let Us C	Yashwant Kanetkar	BPS	3	2011
2	Fundamentals of computer algorithms	Ellis Horowitz, Satraj Sahni and Rajasekaran	Universities Press	2	2008
3	Data Structure-A Pseudocode Approach with C	Richard F. Gilbert and Behrouz A. Forouzan	PWS Publishing Company	2	2004
4	Introduction to algorithm	Thomas Cormen, Charles Leiserson, Ronald Rivest, Clifford Stein	PHI	3	2009

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	PHI	3rd Edition	2010
2	Design and Analysis of Algorithms	S. Sridhar	Oxford (Higher Education)	Higher Education	2009


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**Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)**

Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	01CPE352- Professional Elective Laboratory – II (Data Analytics)
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	3
Evaluation Scheme: ISE / ESE	25/ 50

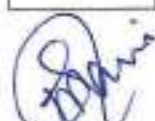
Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPE352_1	Explain how data is collected, managed and stored for data science.(K1)
01CPE352_2	Understand the key concepts in data science, including their real-world applications.(K2)
01CPE352_3	Apply data visualization concepts for a complex Data Sets. (K3)
01CPE352_4	Analyze the different key concepts in data science, including the toolkit used by data scientists.(K4)
01CPE352_5	Implement data collection and management scripts using MongoDB. (K5)

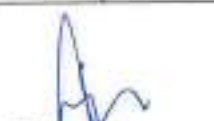
Course Content:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction Introduction to Data Science, Different Sectors using Data science, Purpose and Components of Python in Data Science.	4
Unit 2	Data Analysis Types Data Analytics Process, Knowledge Check, Exploratory Data Analysis (EDA), EDA Quantitative technique, EDA- Graphical Technique, Data Analytics Conclusion and Predictions.	4
Unit 3	Feature Selection	6


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	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.	
Unit 4	Data Visualization Basic principles, ideas and tools for data visualization, Examples of inspiring (industry) projects- Exercise: create your own visualization of a complex dataset.	4
Unit 5	Applications Applications of Data Science, Data Science and Ethical Issues - Discussions on privacy, security, ethics- A look back at Data Science- Next-generation data scientists.	4
Unit 6	Case Study Web Analytics-Basics ,URLS-Cookies. Search Analytics –Internal search ,SEO and PPC Healthcare Analytics –Advanced Data Analytics for health care, computer assisted medical image analysis system, Mobile Imaging and analytics for biomedical data	6

Exp. No.	Experiment List
1	Write a program to handle missing data by imputation or removal
2	Write a program to identify correlations between variables.
3	Perform t-tests to compare sample means.
4	Conduct an experiment to perform chi-squared tests for categorical data analysis.
5	Perform linear regression to model relationships between variables
6	Implement logistic regression for binary classification.
7	Visualize clusters with scatter plots and dendrogram.
8	Implement k-means clustering to group similar data points
9	Implement Principal Component Analysis (PCA) for feature reduction
10	Perform text preprocessing (tokenization, stemming, stop-word removal).
11	Write a program to detect anomalies in data using techniques like Isolation Forests or Autoencoders.


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Handbook of Data Visualization	Chun-hou Chen, Wolfgang Härdle, Antony Unwin	Springer	-	
2	Visualizing Data	Ben Fry Beijing	O'Reilly Media	-	
3	Python for Data Analysis: Data Wrangling with Pandas, NumPy and IPython	McKinney W,	O'Reilly Media	2nd edition	2017
4	Doing Data Science: Straight Talk from the Frontline	O'Neil, C., & Schurt, R	O'Reilly Media	-	2013

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
	Data Analysis Using Regression and Multilevel/Hierarchical Models	Gelman, Andrew, and Jennifer Hill	UK: Cambridge University Press	1st edition	2006


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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	01CPE353- Professional Elective Laboratory – II (IOT Platforms and System Design)
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	3
Evaluation Scheme: ISE / ESE	25/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPE353_1	Explain the fundamentals principles of IoT system design. (K2)
01CPE353_2	Apply edge computing concepts to design an IoT solution for real-time data processing.(K3)
01CPE353_3	Analyze various prototypes and provide IoT solutions using hardware and software components (K4)
01CPE353_4	Compare and contrast different IoT platforms and select the most suitable one for specific IoT applications. (K5)
01CPE353_5	Develop a complete IoT solution that addresses a specific problem or use case.(K6)

Course Content:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction to IoT Platforms Understanding the Internet of Things (IoT) and its significance, Overview of IoT platforms and their role in IoT applications, Types of IoT platforms: cloud-based, edge-based, and hybrid, Examples of popular IoT platforms in the industry	5
Unit 2	IoT Platforms Understanding IoT platforms, Comparison of popular IoT platforms (e.g., AWS IoT, Azure IoT, Google Cloud IoT),Selecting the right IoT platform for a project.	4


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Unit 3	IoT Data Management Data collection and processing in IoT systems, Big data and analytics for IoT, Edge computing and data processing at the edge	4
Unit 4	IoT System Design Overview of IoT system design principles, Importance of system design in IoT, Design principles for IoT systems, Components of an IoT system (sensors, actuators, gateways, cloud), Prototyping and testing IoT solutions	6
Unit 5	IoT Security in System Design Security threats and challenges in IoT, Secure device onboarding and authentication, Data encryption and secure communication	4
Unit 6	IoT Applications and Case Studies Real-world IoT applications across various industries (e.g., healthcare, smart cities, agriculture, Future trends and challenges in IoT	4

Exp. No.	Experiment List
1.	Understand the basics of Internet of Things: Sensors, Actuators, IoT architecture and Gateway
2.	Study of IoT Networking: Connectivity technologies, Protocols and Interoperability in IoT.
3.	Develop a program to blink LED using Arduino Board.
4.	Develop a program to ON and OFF bulb based on LDR using Arduino Board.
5.	Temperature and Humidity monitoring using Arduino Board
6.	Interfacing and programming of actuators.
7.	To detect occupancy of an area using PIR sensors
8.	Implement the weather station using Cloud
9.	Connect the temperature sensor to the Arduino, and send temperature data to the IoT platform at regular intervals.
10.	Implement Vehicle tracking using Global Positioning System (GPS).


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things	David Warren	Cisco Press	2017	1st
2	Designing IoT Devices	Adrian Molwen and Hakim Cassimally	O'Reilly Media	2018	1st
3	Internet of Things: Architecture, Design Principles And Applications	Rajkamal	McGraw Hill Higher Education	-	-
4	Arduino for Dummies	John Nussey	Dummies Publishing	2018	2nd

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Internet of Things (IoT): A Hands-On Approach	Arshdeep Bahga and Vijay Madisetti	Universities Press	1st	2015
2	IoT System Design: From Sensors to Cloud	Vlasios Tsiatsis, Stefan Avesand, Stamatios Karamouskos, David Boyle, and Stamatios Koubias	Academic Press	1st	2020
3	Designing for the Internet of Things	Juha Säskki and Pär J. Agerfalk	Springer	1st	2017


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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	OICPE354- Professional Elective Laboratory – II (Multimedia and Social Media Security)
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial/Practical	2/0/2
Credits	3
Evaluation Scheme: ISE / ESE	25/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OICPE354_1	Understand the basic concepts of Multimedia and Social Media Security(K1)
OICPE354_2	Explain the main properties and classifications of different digital watermarking systems (K2)
OICPE354_3	Develop applications showcasing the implementation of digital watermarking techniques. (K3)
OICPE354_4	Assess the vulnerabilities related to privacy and security in the context of social networking (K4)
OICPE354_5	Formulate comprehensive strategies for enhancing privacy and security in social networking platforms (K5)

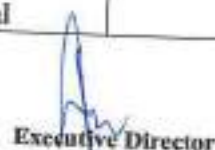
Course Content:

Unit No.	Unit Name	Contact Hours
Unit 1	Overview of Multimedia Systems, Secured Multimedia, Digital Rights Management Systems, Multimedia Content Security, Multimedia Encryption, Multimedia Authentication, Multimedia Forensics.	4
Unit 2	Overview of Digital Watermarking, Types of Digital Watermarking, KL Transform, Discrete Cosine Transform based Watermarking, Discrete Wavelet Transform based Watermarking, and Fractional Fourier Transform based Watermarking.	5
Unit 3	Reference Watermarking, Singular Value Decomposition in Watermarking: Introduction, Eigen values and Eigenvectors, Singular Value Decomposition, Singular Vectors in watermarking, principal	5


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	component in watermarking, Hybrid Watermarking, Problem with Hybrid Watermarking, Adaptive Watermarking.	
Unit 4	Voice over IP security: Internet Protocol (IP), User Datagram Protocol (UDP), Real-Time Transport Protocol (RTP), RTP Payload, Packet Analysis, Network Security Issues and Solutions privacy and security concerns (spam, phishing, fraud nodes, identity theft) on Online Social Media	6
Unit 5	Collecting data from Online Social Media. Trust, credibility, and reputations in social systems, Trust, credibility, and reputations in social systems	4
Unit 6	Online social Media and Policing, Information privacy disclosure, revelation and its effects in OSM and online social networks, Phishing in OSM & Identifying fraudulent entities in online social networks	4

Exp. No.	Experiment List
1.	Study of different wireless network components and features of any one of the Mobile Security Apps.
2.	Study of the features of firewall in providing network security and to set Firewall Security in windows.
3.	Steps to ensure Security of any one web browser (Mozilla Firefox/Google Chrome)
4.	Study of different types of vulnerabilities for hacking a websites / Web Applications.
5.	Analysis the Security Vulnerabilities of E-commerce services.
6.	Analysis the security vulnerabilities of E-Mail Application
7.	Implementing Web Data Extractor and Web site watcher.
8.	Firewalls, Packet Analyzers, Filtering methods.

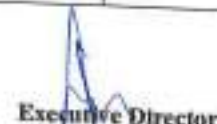
Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Digital watermarking and steganography: fundamentals and techniques	Shih, F. Y	CRC press	-	2017


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2	Embedded Multimedia Security Systems,	Pande, Amit, Zambreno, Joseph	Springer	-	2013
3	Handbook of Multimedia Information Security: Techniques and Applications	Singh, Amit Kumar, Mohan, Anand	Springer	-	2019

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Digital watermarking and steganography.	Cox, I., Miller, M., Bloom, J., Fridrich, J., Kalker, T	Morgan kaufmann	5 th	2007
2	Homomorphic Encryption and Applications, Springer, Security and Cryptology	Yi, Xun, Paulet, Russell, Bertino, Elisa	--	--	2014


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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	0ICPC355- Block Chain Technology Laboratory
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE	25/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICPC355_1	Understand the basic concepts of Blockchain Technology (K1)
0ICPC355_2	Develop distributed applications and smart contracts using Bitcoin and Ethereum protocol tools (K2)
0ICPC355_3	Apply immutable distributed ledger and trust model for building real time applications (K3)
0ICPC355_4	Demonstrate the different types of consensus algorithms (K5)
0ICPC355_5	Develop Blockchain applications with IoT, AI and Cyber Security use cases (K6)

Exp. No.	Experiment List
1.	Install and understand Docker container, Node.js, Java and Hyperledger Fabric, Ethereum and perform necessary software installation on local machine/create instance on Cloud to run
2.	Create and deploy a block chain network using Hyperledger Fabric SDK for Java Set up and initialize the channel, install and instantiate chaincode, and perform invoke and query on your block chain network
3.	Interact with a block chain network. Execute transactions and requests against a block chain network by creating an app to test the network and its rules
4.	Deploy an asset-transfer app using block chain. Learn app development within a


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	Hyperledger Fabric network
5.	Use block chain to track fitness club rewards Build a web app that uses Hyperledger Fabric to track and trace member rewards
6.	Car auction network: A Hello World example with Hyperledger Fabric Node SDK and IBM Block chain Starter Plan. Use Hyperledger Fabric to invoke chaincode while storing results and data in the starter plan.
7.	Develop an IoT asset tracking app using Block chain. Use an IoT asset tracking device to improve a supply chain by using Block chain, IoT devices, and Node-RED
8.	Secure art using block chain digital certificates. Node.js-based auction application can help democratize the art market

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Block Chain: Blueprint for a New Economy	Melanie Swan	O'Reilly	-	2015
2	Block Chain: The Block Chain for Beginners- Guide to Block chain Technology and Leveraging Block Chain Programming	Josh Thompsons	Createspace Independent Pub	-	2017
3	Block Chain and Crypto Currencies	Anshul Kaushik	Khanqa Publishing House	1st	2018


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ANNASAJEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY
ASHTA

(An Autonomous Institute with NAAC A++ Grade)

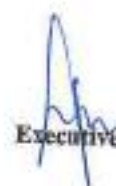
Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Block Chain Basics	Daniel Drescher	Apress	1st	2017
2	Mastering Block Chain: Distributed Ledger Technology, Decentralization and Smart Contracts Explained	Irran Bashir	Packt Publishing	2nd	2018


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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	01CPC356- Programming Laboratory-II
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial /Practical	2/0/2
Credits	3
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPC356_1	Knowledge: students are able to create python programming to solve real world problems by using IDLE. (K2)
01CPC356_2	Apply: Implement OOPs concepts in python programming to solve various real world scenarios using Python IDE. (K3)
01CPC356_3	Apply: Create an application with the support of graphics in Python. (K3)
01CPC356_4	Analyze: the data using different in-built functions of Pandas by using IDE. (K4)
01CPC356_5	Design: and develop micro projects to solve real world problems by using python programming. (K5)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Basics of Python Introduction to Python - Why Python? - Essential Python Libraries - Python Introduction- Features, Identifiers, Reserved words, Indentation, Comments, Built-in Data types and their Methods: Strings, List, Tuples, Dictionary, Set - Type Conversion- Operators. Decision Control Statement: if statement, if, elif else statement Repetitive Control Statement: While loop, for loop, The range statement Selection Control Statement: Break & continue, Else clause	4


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Unit 2	Modular Programming: Object Oriented Programming: Concept of class, object and instances, Constructor, class attributes and destructors, Real time use of class in live projects, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes Function: What is function, Define a function, Pass arguments, Arguments with default values, Arbitrary arguments, Local and global variables, Return a value from function, Mathematical functions, Random number functions, Mathematical constants, Recursive functions	6
Unit 3	Exception Handling, File Handling Errors, Exception handling with try, handling multiple exceptions, writing your own exception File Handling: File handling modes, reading files, writing and spending to files, Handling file exceptions, The with statement.	4
Unit 4	Introduction To Numpy and scikit learn: NumPy Basics: Arrays and Vectorized Computation- The NumPy ndarray- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing - Boolean Indexing-Transposing Arrays and Swapping Axes. Universal Functions: Fast Element-Wise Array Functions- Mathematical and Statistical Methods-Sorting. Introduction scikit learn libraries.	4
Unit 5	Data Manipulation with Pandas: Introduction to pandas Data Structures: Series, DataFrame, Essential Functionality: Dropping Entries- Indexing, Selection, and Filtering- Function Application and Mapping- Sorting and Ranking. Summarizing and Computing Descriptive Statistics- Unique Values, Value Counts, and Membership. Reading and Writing Data in Text Format.	4
Unit 6	Data Cleaning, Preparation and Visualization Data Cleaning and Preparation: Handling Missing Data - Data Transformation: Removing Duplicates, Transforming Data Using a Function or Mapping, Replacing Values, Detecting and Filtering Outliers- String Manipulation: Vectorized String Functions in pandas. Plotting with pandas: Line Plots, Bar Plots, Histograms and Density Plots, Scatter or Point Plots.	6


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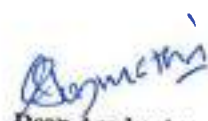

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Experiments List:

1.	Implement basic Python programs to demonstrate fundamental concepts by reading input from console.
2.	Implement Python programs to demonstrate decision control and looping statements.
3.	Apply Python built-in data types: Strings, List, Tuples, Dictionary, Set and their methods to solve any given problem
4.	Implement OOP concepts like Data hiding and Data Abstraction.
5.	Create user-defined functions with different types of function arguments
6.	Perform File manipulations operations- open, close, read, write, append and copy from one file to another.
7.	Handle Exceptions using Python Built-in Exceptions
8.	Implement various in built functions of NumPy library.
9.	Create Pandas Series and DataFrame from various inputs.
10.	Import any CSV file to Pandas DataFrame and perform the following: (a) Visualize the first and last 10 records (b) Get the shape, index and column details (c) Select/Delete the records(rows)/columns based on conditions. (d) Perform ranking and sorting operations. (e) Do required statistical operations on the given columns. (f) Find the count and uniqueness of the given categorical values. (g) Rename single/multiple columns.
11.	Import any CSV file to Pandas DataFrame and perform the following: (a) Handle missing data by detecting and dropping/ filling missing values. (b) Transform data using apply() and map() method. (c) Detect and filter outliers. (d) Perform Vectorized String operations on Pandas Series. (e) Visualize data using Line Plots, Bar Plots, Histograms, Density Plots and Scatter Plots.


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
01	Introduction to computing and Problem Solving with Python	Jeeva Jose and Sojanlal	Khanna Book Publishing Co. (P) Ltd	1	2016
02	Programming Python	Mark Lutz	O'reilly	2	2001
03	Introduction to Programming using Python	Y. Daniel Liang	Pearson	--	2012
04	Python Data Science Handbook: Essential Tools for Working with Data	Jake VanderPlas	O'Reilly	--	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Core Python Programming	Wesley J. Chun	Prentice Hall	--	2006
2	Learning Python	Mark Lutz	O'reilly	4 th	2009


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ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY
ASHTA

(An Autonomous Institute with NAAC A++ Grade)

Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)

Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code and Course Title	0ICPR357- Industrial Training/Internship
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial/Practical	0/0/0
Credits	1
Evaluation Scheme: ESE	50

Activity:

Students should undergo industrial/ Internship activity in the 4th semester vacation period
The assessment will be carried out during the 5th semester


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Course Details:

Class	T.Y, B. Tech, Sem - V
Course Code & Course Title	Value Added Course 5
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial /Practical	0:0:2
Credit	1
Evaluation Scheme:	Audit

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

VAC_1	Solve problems based on Vedic Mathematics, Calendar, Average, Age
VAC_2	Solve problems based on Speed Time distance and equations
VAC_3	Solve problems based on Blood Relations, Directions, Time Rate Work, Pipes and Tanks, Percentage, Profit and Loss
VAC_4	Solve Problems based on Spot the Error and Jumbled Para

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	Vedic Mathematics, Calendar national problem, agriculture, traffic, social perspective, disaster recovery, innovative center for cross multi	2
Unit 2	Average, Ages	2
Unit 3	Speed Time Distance, Equations	2
Unit 4	Blood Relations, Directions, Time Rate Work, Pipes and Tanks	3
Unit 5	Percentage, Profit and Loss	2
Unit 6	Spot the Error, Jumbled Para	2
	Self-Study Module	


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	R.S. Agarwal (Quantitative aptitude)	R.S. Agarwal	S Chand	-	2019
2	R.S. Agarwal (Verbal & Non-verbal Reasoning)	R.S. Agarwal	S Chand	-	2010
3	Wren & Martin (Verbal, Grammar)	P.C. Wren	S Chand	-	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	APTIPEDIA (Quantitative, Logical, Verbal Aptitude)	Face	Wiley	-	2017
2	Wiley (Quantitative Aptitude)	P.A. Anand	Maestro	-	2015
3	Arun Sharma (Verbal Ability)	Meenakshi Upadhyay	McGraw Hill	-	2020


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	01COE307- Introduction to Blockchain
Prerequisite/s	---
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

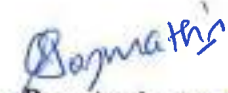
Upon successful completion of this course, the student will be able to:

01COE307_1	Explain the basic concepts of Blockchain Technology (K1)
01COE307_2	Use Bitcoin and Ethereum protocol – to lay down the foundation for developing distributed applications and smart contracts (K2)
01COE307_3	Apply immutable distributed ledger and trust model for real time applications (K3)
01COE307_4	Illustrate the essential components of a Blockchain platform (K4)
01COE307_5	Evaluate the different types of consensus algorithms (K5)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction to DLT and Blockchain Distributed Ledger Technologies (DLTs) Introduction, Types of Blockchains, Blockchain: Origin, Phases, Components, Block in a Blockchain: Structure of a Block, Block, Header Hash and Block Height, The Genesis Block, Linking Blocks in the Blockchain, Merkle Tree.	6
Unit 2	Consensus and Mining What is Bitcoin and the history of Bitcoin, Bitcoin Transactions, Bitcoin Concepts: keys, addresses and wallets, Bitcoin Transactions, validation of transactions, PoW consensus Bitcoin Network: Peer-to-Peer Network Architecture, Node Types and Roles, Incentive based Engineering, The Extended Bitcoin Network, Bitcoin Relay Networks, Network Discovery, Full Nodes, Exchanging "Inventory", Simplified Payment Verification (SPV) Nodes, SPV Nodes and Privacy, Transaction Pools, Blockchain Forks.	8


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TY - IoT - 38/73

Unit 3	Permissionless Blockchain: Ethereum Components, Architecture of Ethereum, Miner and mining node, Ethereum virtual machine, Ether, Gas, Transactions, Accounts, Patricia Merkle Tree, Swarm, Whisper and IPFS, Ethash, End to end transaction in Ethereum, Smart Contracts: Smart Contract programming using solidity, Metamask (Ethereum Wallet), Setting up development environment, Use cases of Smart Contract, Smart Contracts: Opportunities and Risk. Smart Contract Deployment: Introduction to Truffle, Use of Remix and test networks for deployment	7
Unit 4	Permissioned Blockchain :Hyperledger Fabric Introduction to Framework, Tools and Architecture of Hyperledger Fabric Blockchain. Components: Certificate Authority, Nodes, Chain codes, Channels, Consensus: Solo, Kafka, RAFT.Designing Hyperledger Blockchain.	8
Unit 5	Crypto assets and Cryptocurrencies ERC20 and ERC721 Tokens, comparison between ERC20 & ERC721, ICO, STO, Different Crypto currencies	6
Unit 6	Blockchain Applications & case studies Blockchain in IoT, AI , Cyber Security, Applications of Blockchain in various domains Education, Energy, Healthcare, realstate, logistics, supply chain	7

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Bitcoin, PROGRAMMING THE OPEN BLOCKCHAIN	Andreas M. Antonopoulos	O'Reilly Media, Inc	2nd	2017
2	Mastering Ethereum, Building Smart Contract and Dapp	Andreas M. Antonopoulos Dr. Gavin Wood	O'Reilly Media, Inc	--	--
3	Blockchain Technology	Chandramouli Subramanian, Asha A George, Abhikash K. A and Meena Karthikeyan	Universities press	--	--


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4	Hyperledger Fabric In-Depth: Learn, Build and Deploy Blockchain Applications Using Hyperledger Fabric	Ashwani Kumar	BPB publications	--	--
5	Solidity Programming Essentials	Ritesh Modi,	Packet publication	--	--
6	Cryptoassets. The Innovative Investor's Guide to Bitcoin and Beyond	Chris Burniske & Jack Tatar	--	--	--

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Blockchain	Imran Bashir	Packt Publishing	--	--
2	Mastering Bitcoin Unlocking Digital Cryptocurrencies,	Andreas M. Antonopoulos,	O'Reilly Media	--	--
3	Blockchain Technology: Concepts and Applications	Kumar Saurabh and Ashutosh Saxena	Wiley	--	--
4	Mastering Bitcoin Unlocking Digital Cryptocurrencies	Andreas M. Antonopoulos	O'Reilly Media	--	--


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	01COE308- Cyber Crimes and Security
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme: ISE-I/MSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01COE308_1	Understand the knowledge to implement various security attacks. (K1)
01COE308_2	Explore the ideas in various ways to trace an attacker. (K2)
01COE308_3	Enhance the practical exposure to forensic tools. (K3)
01COE308_4	Distinguish the various forensics principles and methods (K4)
01COE308_5	Design and develop the enterprise level security system for computer networks. (K5)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction to IT laws & Cyber Crimes Internet, Hacking, Cracking, Viruses, Virus Attacks, Pornography, Software Piracy, Intellectual property, Legal System of Information Technology, Social Engineering, Mail Bombs, Bug Exploits, and Cyber Security	7
Unit 2	Legal and Ethical Principles Introduction to Forensics – The Investigative Process – Code of Ethics, Ethics of Investigations, Evidence Management – Collection, Transport, Storage, access control, disposition	6
Unit 3	Forensic Science Principles and Methods – Scientific approach to Forensics, Identification and Classification of Evidence, Location of Evidence, Recovering Data, Media File Forensic Steps, Forensic Analysis – Planning, Case Notes and Reports, Quality Control.	8
Unit 4	Digital Forensics Hardware Forensics – Hidden File and Anti- forensics - Network Forensics – Virtual Systems - Mobile Forensics Digital Watermarking Protocols: A Buyer-Seller Watermarking Protocol, an Efficient and Anonymous Buyer-	8


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	Seller Watermarking Protocol, Extensions of Watermarking Protocols, Protocols for Secure Computation	
Unit 5	Application Forensics, Tools and Report Writing Application Forensics, Email and Social Media Investigations, Cloud Forensics, Current Digital Forensic Tools, Report Writing for Investigations	6
Unit 6	Security in Evolving Technology Biometrics, Mobile Computing and Hardening on android and ios, IoT Security, Web server configuration and Security, Basic security for HTTP Applications and Services, Basic Security for Web services like SOAP, REST etc. Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Computer Forensics and Investigations	Bill Nelson, Christopher Stuart, Amelia Philips	Delmar Cengage Learning	5 th	2015
2	Certified Cyber Forensics Professional Certification	Chuck Easton	McGraw Hill	--	2017
3	Computer Forensics: Computer Crime Scene Investigation	John R. Vacca	Laxmi Publications	--	2015

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Computer Forensics and Cyber Crime: An Introduction	Marjie T. Britz	Prentice Hall	3rd	2013
2	Digital Forensics for Network, Internet, and Cloud Computing A forensic evidence guide for moving targets and data	Clint P Garrison	Syngress Publishing, Inc	--	2010


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	0ICPC309- Data Encryption, Steganography and Digital Watermarking
Prerequisite/s	0ICPC304 - Information Theory for Cyber Security
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme: ISE-IMSE/ISE-II/ESE	10/30/10/50

Course Outcomes (COs):

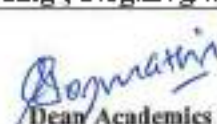
Upon successful completion of this course, the student will be able to:

0ICPC309_1	Explain the various cryptography algorithms with different key distribution methods (K1)
0ICPC309_2	Understand the concept of information hiding (K2)
0ICPC309_3	Survey the current techniques of steganography and learn how to detect and extract hidden information (K3)
0ICPC309_4	Implement the different information hiding techniques (K4)
0ICPC309_5	Demonstrate the watermarking techniques through examples (K5)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction – Applications and Properties: Applications – Properties – Evaluating watermarking systems, Models of Watermarking: Communication based watermarking – Geometric models of watermarking – Modelling watermarks detection by correlation, Watermarking with side information: Informed embedding – informed coding – dirty paper codes,	7
Unit 2	Properties of Watermarking and Steganography Properties of Watermarking Systems, Embedding Effectiveness, Fidelity, Data Payload, Blind or Informed Detection, False Positive Rate, Robustness, Security, Cipher and Watermark Keys, Modification and Multiple Watermarks, Cost, Evaluating Watermarking Systems, The Notion of “Best”, Benchmarking, Scope of Testing. Properties of Steganographic and Steganalysis Systems: Embedding , Steganographic Capacity, Embedding Capacity, Embedding	7


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	Efficiency, and Data Payload, Blind or Informed Extraction, Blind or Targeted Steganalysis, Statistical Undetectability, False Alarm Rate, Robustness, Security, StegoKey, Evaluating and Testing Steganographic Systems.	
Unit 3	Models of Watermarking: Notation, Communications, Components of Communications Systems, Classes of Transmission Channels, Secure Transmission, Communication-Based Models of Watermarking, Basic Model, Watermarking as Communications with Side Information at the Transmitter, Watermarking as Multiplexed Communications, Geometric Models of Watermarking, Distributions and Regions in Media Space, Marking Spaces, Modeling Watermark Detection by Correlation, Linear Correlation, Normalized Correlation, Correlation Coefficient	7
Unit 4	Steganography: Steganographic Communication, The Channel, The Building Blocks, Notation and Terminology, Information-Theoretic Foundations of Steganography, Cachin's Definition of Steganographic Security, Practical Steganographic Methods, Statistics Preserving Steganography, Model-Based Steganography, Masking Embedding as Natural Processing, Minimizing the Embedding Impact, Matrix Embedding, Nonshared Selection Rule	8
Unit 5	Steganalysis : Steganalysis Scenarios, Detection, Forensic Steganalysis, The Influence of the Cover Work on Steganalysis, Some Significant Steganalysis Algorithms, LSB Embedding and the Histogram Attack, Sample Pairs Analysis, Blind Steganalysis of JPEG Images Using Calibration, Blind Steganalysis in the Spatial Domain	6
Unit 6	Applications : Applications of Watermarking, Broadcast Monitoring, Owner Identification, Proof of Ownership, Transaction Tracking, Content Authentication, Copy Control, Device Control, Legacy Enhancement, Applications of Steganography, Steganography for Dissidents, Steganography for Criminals	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Digital Watermarking: Principles and Practice	Ingenar Cox, Matthew Miller, Jeffrey Bloom, Mathew Miller	Morgan Kaufmann Series in Multimedia Information and Systems	—	2008


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2	Digital Watermarking and Steganography	Ingemar J. Cox, Matthew L. Miller, Jeffrey A. Bloom, Jessica Fridrich, and Ton Kalker	Morgan Kaufmann Publishers	2nd	2008
3	Digital Watermarking and Steganography: Fundamentals and Techniques	Frank Y. Shih	CRC Press, USA	--	2007

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Digital Watermarking and Steganography: Fundamentals and Techniques	Juergen Seitz	Pearson Education	—	2007
2	Digital Watermarking for Digital Media	Juergen Seitz	KIT Global	--	2005


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	01CPC310 - Embedded System for IoT
Prerequisite/s	01CPC207 - Microprocessor and Microcontroller
Teaching Scheme: Lecture/Tutorial /Practical	3/0/0
Credits	3
Evaluation Scheme: ISE-I /MSE/ISE-II/ ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPC310_1	Understand basic components and building blocks of Internet of Things (K2)
01CPC310_2	Explain the real time embedded system and its components (K2)
01CPC310_3	Apply skills to conduct interfacing of embedded boards with components, actuators and sensors. (K3)
01CPC310_4	Analyze the real-world signals and perform remote process monitoring utilizing the concept of IoT (K4)
01CPC310_5	Design and implement IoT enabled embedded control strategy for a given application. (K5)

Course Contents

Unit No.	Unit Name	Contact Hours
Unit-1	Introduction : Purpose and requirement specification, IoT level specification, Functional view specification, Operational view specification, Device and component integration, Pillars of Embedded IoT and Physical Devices: The internet of devices.	7
Unit-2	Design of Embedded Systems: Common Sensors, Actuators, Embedded Processors, Memory Architectures, Software architecture.	6
Unit-3	Inputs and Outputs: Digital Inputs and Outputs, Digital Inputs, Digital Outputs, BusIn, BusOut, and BusInOut, Analog Inputs and Outputs, Analog Inputs, Analog Outputs, Pulse Width Modulation (PWM), Accelerometer and Magnetometer, SD Card	8


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Unit-4	IoT Enabling Technologies: Communications, RFID and NFC (Near-Field Communication), Bluetooth Low Energy (BLE), LiFi, 6LowPAN, ZigBee, Z-Wave, LoRa, Protocols, HTTP, WebSocket, MQTT, CoAP, XMPP, Node-RED, Platforms.	8
Unit-5	Web of Things : Web of Things versus Internet of Things, Two Pillars of the Web, Architecture Standardization for WoT, Platform Middleware for WoT.	6
Unit-6	Cloud Offerings and IoT Case Studies: Cloud of Things, IoT Physical Servers, Cloud Offerings and IoT Case Studies: Introduction to Cloud Storage Models, Communication API.	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Internet of Things	RMD Sundaram Shriram K Vasudevan, Abhishek S Nagarajan	John Wiley and Sons	-	-
2	Embedded Software for the IoT	Klaus Elk	-	-	-
3	Designing Embedded Systems and the Internet of Things (IoT) with the ARM Mbed	Perry Xiao	-	-	-
4	Designing Connected Products	Elizabeth Gootman et. al	Shroff Publisher/O'Reilly	-	-

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Embedded Systems Architecture	Tammy Noergaard	Elsevier	1	2016
2	Embedded system Design using C8051	Hau-Way Huang	CENAGE Learning	1	2019
3	Real-Time systems Theory and Practice	Rajib Mall	Person Education	2	2007
4	Industrial Internet of Things: Cybermanufacturing Systems	Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat	Springer,	1	2017


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	01CPC311 - Software Engineering
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial /Practical	3/1/0
Credits	4
Evaluation Scheme: ISE I/ MSE/ ISE II/ ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPC311_1	Identify appropriate standards for a given process to maintain software reliability and quality using quality standards like ISO 9000, CMM etc. (K2)
01CPC311_2	Test the functioning of a given program to check correctness of code using test cases. (K3)
01CPC311_3	Design a solution to solve a given problem using software engineering models. (K4)
01CPC311_4	Develop a software system design to solve a given problem using structured or function-oriented design methodology. (K4)
01CPC311_5	Build software requirement specifications and project plan to solve a given problem through analyzing the problem statement. (K5)

Course Contents:

Unit No.	Unit Name	Contact Hrs
Unit 1	Software Processes and Agile Methodology Software Process, Software Development Process Models, Agile software development - Agile methods, Plan-driven and agile development, Extreme programming, Scaling agile methods	8
Unit 2	Software Requirements Analysis and Specification Software Requirement, Problem Analysis, Requirements Specification, Functional Specification with Use Cases, validation.	6


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Unit 3	Planning a Software Project Process Planning, Effort Estimation, Project Scheduling and Staffing, Software Configuration Management Plan, Quality Plan, Risk Analysis & Management.	7
Unit 4	Function Oriented Design Design Principles, Module-Level Concepts, Design Notation and Specification, Structured Design Methodology	7
Unit 5	Coding and Testing Programming Principles and Guidelines, Coding Process, Testing Fundamentals, Black-Box Testing, White-Box Testing.	7
Unit 6	Software Reliability and Quality Management Software Reliability, Software Quality, Software Quality Management System, ISO 9000, SEI CMM	7

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	An integrated approach to S/W engineering	Pankaj Jalote	Narosa Publishers	3rd	2011
2	Fundamentals of Software Engineering	Rajib Mall	PHI	3rd	2009
3	Software Engineering	Jawadekar W.S.	TMGH	7th	2007

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Software Engineering	Ian Sommerville	Pearson	10th	2016
2	Software Engineering: Practitioner's Approach	Roger S. Pressman	McGraw Hill	7th	2010
3	Software Engineering principles and practices	Robit Khuran	Vikas Publishing House Pvt. Ltd	2nd	2010


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Course Details:

Class	T.Y. B. Tech, Sem - VI
Course Code and Course Title	01CPE312- Professional Elective – III (Wireless Sensor Networks Laboratory)
Prerequisite/s	01CPC108 - Computer Networks
Teaching Scheme: Lecture/Tutorial /Practical	3/0/0
Credits	3
Evaluation Scheme: ISE-I /MSE/ISE-II/ ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPE312_1	Understand: The architecture challenges and technologies for wireless networks. (K2)
01CPE312_2	Explain: Describe the overview of wireless sensor networks and enabling technologies for wireless sensor networks (K3)
01CPE312_3	Apply: the design principles of WSN architectures and operating systems for simulating environment situations. (K3)
01CPE312_4	Analysis: Technical knowledge about how to build and deploying a WSN with various critical parameters (K4)
01CPE312_5	Demonstrate: the concept of programming in the WSN environment. (K5)

Course Contents

Unit No.	Unit Name	Contact Hrs
Unit-1	Introduction: Fundamentals of wireless communication technology, the electromagnetic spectrum radio propagation, characteristics of wireless channels, modulation techniques, multiple access techniques, wireless LANs, PANs, WANs, and MANs, Wireless Internet.	8
Unit-2	Adhoc/sensor networks: Key definitions of adhoc/ sensor networks, unique constraints and challenges, advantages of ad-hoc/sensor network, driving applications, issues in adhoc wireless networks, issues in design of sensor network, sensor network architecture, data dissemination and gathering.	7
Unit-3	MAC Protocols : Issues in designing MAC protocols for adhoc wireless networks, design goals, classification of MAC protocols, MAC protocols for sensor network, location discovery, quality, other issues, S-MAC, IEEE 802.15.4.	6


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Unit-4	Routing Protocols: Issues in designing a routing protocol, classification of routing protocols, table-driven, on-demand, hybrid, flooding, hierarchical, and power aware routing protocols.	7
Unit-5	QoS and Energy Management : Issues and Challenges in providing QoS, classifications, MAC, network layer solutions. QoS frameworks, need for energy management, classification. battery, transmission power, and system power management schemes.	6
Unit-6	Sensor Network Platforms and Tools: Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node -level software platforms, Node- level Simulators, State- centric programming.	8

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Protocols And Architectures for Wireless Sensor Networks	Holger Karl & Andreas Willig	John Wiley	2	2005
2	Wireless Sensor Networks An Information Processing Approach	Feng Zhao & Leonidas J Guibas	Elsevier	3	2007
3	Fundamentals of Wireless Sensor Networks Theory and Practice	Waltenegus Dargie . Christian Poellnhauer	John Wiley & Sons Publications	2	2011
4	AdHoc Wireless networks	C. Siva Ram Murthy, and B. S. Manoj,	Pearson Education	1	2008

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Wireless sensor networks	Feng Zhao and Leonides Guibas	Elsevier publication	1	2004
2	Jochen Schiller	Mobile Communications	Pearson Education	2	2003
3	Wireless Communications and Networks	William Stallings	Pearson Education	2	2004


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	0ICPE313 - Professional Elective – III (Database Security)
Prerequisite/s	~
Teaching Scheme: Lecture/Tutorial /Practical	3/0/0
Credits	3
Evaluation Scheme: ISE-I /MSE/ISE-II/ ESE	10/30/10/50

Course Outcomes (COs):

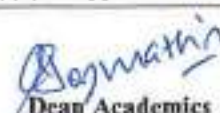
Upon successful completion of this course, the student will be able to:

0ICPE313_1	Identify security threats in database systems. (K2)
0ICPE313_2	Avoid unauthorized data observation and modification. (K3)
0ICPE313_3	Ensure data confidentiality and prove that the data integrity is preserved & only authorized user has access to the data. (K3)
0ICPE313_4	Solve Complex Problems in a Team of database works. (K3)
0ICPE313_5	Design and Implement secure database systems. (K4)

Course Contents

Unit No.	Unit Name	Contact Hrs
Unit-1	Database Security Introduction to database security - Security in Information Technology - importance of data – database review - identity theft – Levels of security -Human level: Corrupt/careless User, Network/User Interface, Database application program, Database system, Operating System, Physical level	8
Unit-2	Authentication and Authorization Passwords, Profiles, Privileges and Roles - Authentication – operating system authentication, database authentication, Network or third-party authentication, Database vector password policies - Authorization – User Account authorization, - Database/Application Security - Limitations of SQL Authorization Access Control in Application Layer - Oracle Virtual Private Database – Privacy.	7
Unit-3	Application Vulnerabilities Application Vulnerabilities - Application Security - OWASP Top 10 Web Security Vulnerabilities – Un validated input, Broken access control, Broken account/session	6


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	management, Cross-site scripting (XSS) flaws, Buffer overflows- SQL Injection flaws, Improper error handling, Insecure storage, Denial-of-service, Insecure configuration management.	
Unit-4	Securing Database to Database Communications Monitor and limit outbound communications – secure database links – protect link usernames and passwords – monitor usage of database links – secure replication mechanisms - map and secure all data sources and sinks. Trojans – four types of database Trojans.	7
Unit-5	Encrypting and Auditing the Data Encrypting data in transit – encrypting data at rest – auditing architectures – audit trail – architectures of external audit systems - archive auditing information – secure auditing information – audit the audit system.	6
Unit-6	Security Software Design: Methodological approach to Security software design, Secure operating system design, Secure DBMS design security, Packages database security design, Statistical database protection & Intrusion detection systems	8

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database Security and Auditing	Hassan A. Afyouni	India Edition	2	2009
2	Database Security	Castano	Pearson Education	2	2012
3	Database Security	Silvana Castano	Addison-Wesley	3	2010
4	Database System Concepts	Silberschatz, Korth and Sudarshan	PHI	6	2010

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database security	Alfred basta, Melissa zgola	CENGAGE learning	1	2008
2	Database Security	Alfred Basta, Melissa Zgola, Dana Bullaboy, Thomas L. Witlock SR	google books	--	2011


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Course Details:

Class	T.Y. B. Tech, Sem - VI
Course Code and Course Title	01CPE314 - Professional Elective - III (Smart Contracts and Solidity)
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial /Practical	3/0/0
Credits	3
Evaluation Scheme: ISE-I /MSE/ISE-II/ ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPE314_1	Understand the working and importance of smart contracts (K1)
01CPE314_2	Learn the solidity language required for coding Ethereum smart contracts (K2)
01CPE314_3	Apply various Ethereum protocols for real time applications (K3)
01CPE314_4	Analyze the various smart contracts development environments (K4)
01CPE314_5	Create and deploy a DApp on a Ethereum test network (K6)

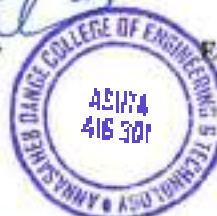
Course Contents

Unit No.	Unit Name	Contact Hours
Unit-1	Introduction to Ethereum , concepts of Smart Contracts, Dapps, And DAOs, What is Ethereum Virtual Machine (EVM), Ethereum Technology Overview, Architectural Overview, Ethereum Block chain Platform, Current and Potential Uses of Ethereum.	8
Unit-2	Introduction to Programming Smart Contracts , A Simple Smart Contract, Account Types, Gas, and Transactions, Accessing Contracts and Transactions, Mix, Dapps, Developer Tools, Ethereum Tests, Web3 Base Layer Services, Installing, Building, Testing, & Deploying Ethereum nodes.	7
Unit-3	Introduction to Solidity Programming , Layout of a Solidity Source File, Structure of a Contract, Types, Units and Globally Available Variables, Input Parameters and Output Parameters, Control Structures, Function Calls, Creating Contracts via new, Order of Evaluation of Expressions, Assignment, Scoping and Declarations, Error handling: Assert, Require, Revert and Exceptions.	6


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Unit-4	Solidity Programming –Contracts, Creating Contracts, Visibility and Getters, Function Modifiers, Constant State Variables, Functions, Inheritance, Abstract Contracts, Interfaces, Libraries.	7
Unit-5	Introduction to Decentralized Apps (Dapps),Decentralized Application Architecture, Connecting to the Block chain and Smart Contract, Decentralized Apps – Coding Details, Voting Contract and App.	7
Unit-6	Blind Auction Contract and App, Coding Style Guide, Design Patterns, Coding Style Guide, Code Layout, Naming Conventions, Common Design Patterns, Withdrawal from Contracts, State Machine	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Ethereum” O’Reilly	Andreas M. Antonopoulos, Dr.Gavin wood	Media Inc	2	2019
2	Blockchain Technology: Cryptocurrency and Applications	S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan	Oxford University Press	1	2019
3	The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming	Josh Thompson	Create Space Independent Publishing Platform	1	2017

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain Technology: Cryptocurrency and Applications	S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan	Oxford University Press	1	2019
2	The Blockchain for Beginnings, Guild to Blockchain	Josh Thompson	Create Space Independent	1	2017


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**ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY
ASHTA**

(An Autonomous Institute with NAAC A++ Grade)

**Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)**

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
	Technology and Blockchain Programming		Publishing Platform		


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	01CHS315- Universal Human Values-II
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial /Practical	2/0/0
Credits	2
Evaluation Scheme: ISE I/ ISE II	25/25

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CHS315_1	Explore holistic vision of life - themselves and their surroundings
01CHS315_2	Develop competence and capabilities for maintaining Health and Hygiene.
01CHS315_3	Analyze various problems in life, family, Society and in handling problems with Sustainable Solutions.
01CHS315_4	Apply values to their own self in different day-to-day settings in real life and in handling problems with sustainable solutions.
01CHS315_5	Adopt the value of appreciation and aspiration for excellence and gratitude for all.

Course Contents:

Unit No.	Unit Name	Contact Hrs
Unit 1	Introduction to Human Value; Right Understanding; Relationship and Physical Facility; Understanding Value Education; Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity -the Basic Human Aspiration-Current Scenario and Method to Fulfill the Basic Human Aspirations	5
Unit 2	Harmony in the Human Being: Understanding Human being as the Co-existence of the Self and the Body, distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health.	5


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Unit 3	Harmony in the Family and Society and Nature: Harmony in the Family – the Basic Unit of Human Interaction; 'Trust' – the Foundational Value in Relationship; 'Respect' – as the Right Evaluation; Other Feelings, Justice in Human-to-Human Relationship;	4
Unit 4	Understanding Harmony in the Society: Vision for the Universal Human Order; Understanding Harmony in the Nature; Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature.	5
Unit 5	Implications of the Holistic Understanding – a Look at Professional Ethics Definitiveness of (Ethical) Human Conduct; A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order;	5
Unit 6	Competence in Professional Ethics; Holistic Technologies, Production Systems and Management Models; Strategies for Transition towards Value-based Life and Profession	4

Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	A Foundation Course in Human Values and Professional Ethics	R R Gaur, R Asthana, G P Bagaria	Excel Books	1	2019
2	A Foundation Course in Human Values and Professional Ethics	RRGaur, R Asthana, G P Bagaria	Excel Books	1	2019
3	Human Values	A.N Tripathy	New Age International	2 nd	2006

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Indian Ethos and Modern Management: Amalgam of the Best of the Ideas from the East and the West	B.L. Bajpai	New Royal Book	1 st	2004


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**ANNASAHIB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY
ASHTA**

(An Autonomous Institute with NAAC A++ Grade)

**Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)**

2	A Foundation Course in Human Values and Professional Ethics	R.R. Gair, R. Sangal, G.P. Bagaria	Excel Books	3 rd	2010
3	An Introduction to Ethics	William Lilly	Allied	1 st	1967
4	Small Is Beautiful	E. F. Schumacher	Hartley & Marks	1 st	1999


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	01CPC358- Data Encryption, Steganography and Digital Watermarking Laboratory
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE	25/ 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

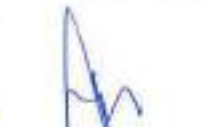
01CPC358_1	Describe watermarking and steganography fundamental concepts and principles (K2)
01CPC358_2	Identify and assess different types of data hiding techniques in various image formats like GIF, BMP etc., and various data hiding methods like LSB, EzStego, OutGuess, and F5 (K3)
01CPC358_3	Analyze the block codes and its various usage for covert communication (K4)
01CPC358_4	Demonstrate the use of watermarking for copyright protection and steganography for secret communication in various digital media (K5)
01CPC358_5	Design and implement efficient data hiding methods (K6)

Exp. No.	Experiment List
1.	Conceal the data that is compressed and hidden within another file
2.	Conceal raw files within BMP, GIF and WAV files using S tools
3.	Hide multiple files in one container using S tools
4.	Produce some discernible change in the file size, statistics or bot using steganographic techniques
5.	Discovering and rendering covert messages using Steganalysis
6.	Create a digital watermarking on an image and audio clip.
7.	Develop a broadcast system for identifying data that is added to the video/audio signal prior to transmission.
8.	Demonstrate content authentication using Digital water marking technique
9.	Detect and extract watermark from an image using M-Sequence Generator Technique
10.	Decode the watermarked image using DWT (Discrete Wavelet Transform)


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Digital Watermarking: Principles and Practice	Ingemar Cox, Matthew Miller, Jeffrey Bloom, Mathew Miller	Morgan Kaufmann Series in Multimedia Information and Systems	--	2008
2	Digital Watermarking and Steganography	Ingemar J. Cox, Matthew L. Miller, Jeffrey A. Bloom, Jessica Fridrich, and Ton Kalker	Morgan Kaufmann Publishers	2nd	2008
3	Digital Watermarking and Steganography: Fundamentals and Techniques	Frank Y. Shih	CRC Press, USA	--	2007

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Digital Watermarking and Steganography: Fundamentals and Techniques	Juergen Seitz	Pearson Education	--	2007
2	Digital Watermarking for Digital Media	Juergen Seitz	IGI Global	--	2005


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	01CPE359- Professional Elective Laboratory -III (Wireless Sensor Networks Laboratory)
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPE359_1	Understand: The architecture challenges and technologies for wireless networks. (K ²)
01CPE359_2	Explain: Describe the overview of wireless sensor networks and enabling technologies for wireless sensor networks (K ³)
01CPE359_3	Apply: the design principles of WSN architectures and operating systems for simulating environment situations. (K ³)
01CPE359_4	Analysis: Technical knowledge about how to build and deploying a WSN with various critical parameters (K ⁴)
01CPE359_5	Demonstrate: the concept of programming in the WSN environment (K ²)

Exp. No.	Experiment List
Implement Experiment No: 1 to 5 using NS2/NS3 Simulation Tool. Implement Experiment No: 6 to 8 using MATLAB Tool	
1.	Create a sample wireless topology using Simulation Tool
2.	Create a mobile Ad-hoc network using a Simulation Tool.
3.	Implement an Ad-hoc On-demand Distance Vector protocol using Simulation Tool
4.	Implement a Transmission Control Protocol using Simulation Tool
5.	Implement a Low Energy Adaptive Hierarchy protocol using Simulation Tool
6.	Implement a Power Efficient Gathering in Sensor Information System using a Simulation Tool.
7.	Implement a Sensor Protocol for Information via Negotiation (SPIN) using Simulation Tool
8.	Implement a Power Efficient and Delay Aware MAC protocol using a Simulation Tool.
9.	Implement a Predictive Wake-up MAC protocol using a Simulation Tool.
10.	Implement a Scheduling based protocol for WSNs using Simulation Tool


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Advanced Network Simulation	Dr. Anil kumar	Packt	2	2023
2	Wireless Sensor Networks An Information Processing Approach	Feng Zhao & Lennidas J.Guibas	Elsevier	3	2007
3	Fundamentals of Wireless Sensor Networks Theory and Practice	Waltenegus Dargie , Christian Poellabauer	John Wiley & Sons Publications	2	2011
4	AdHoc Wireless networks	C Siva Ravi Murthy, and B. S Manoj,	Pearson Education	1	2008

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Network Simulation	Richard M. Fujumoto , George F. Riley , Kalyan S. Perumalla	Elsevier publication	3	2018
2	Jochen Schiller	Mobile Communications	Pearson Education	2	2003
3	Wireless Communications and Networks	William Stallings	Pearson Education	2	2004


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	OICPE360- Professional Elective Laboratory -III (Database Security Laboratory)
Prerequisite/s	OICPC206 -Database Management System
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OICPE360_1	Identify security threats in database systems. (K2)
OICPE360_2	Avoid unauthorized data observation and modification. (K3)
OICPE360_3	Ensure data confidentiality and prove that the data integrity is preserved & only authorized user has access to the data. (K3)
OICPE360_4	Solve Complex Problems in a Team of database works. (K3)
OICPE360_5	Design and Implement secure database systems. (K4)

Exp. No.	Experiment List
1.	Study of Security Concepts Discussion & Security Architecture.
2.	Application of User Creation and Authentication
3.	Administration of Profiles, Passwords, Privileges, and Roles
4.	Study of Security Models for Database Applications
5.	Implementation of Virtual Private Databases
6.	Study and Implementation of Database Auditing Models
7.	Demonstration of Application and Data Auditing
8.	Security and Auditing Project Cases

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database Security and Auditing	Hassan A. Afyouni	CENGAGE Learning	--	2009


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ANNASAHB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY
ASHTA

(An Autonomous Institute with NAAC A++ Grade)

Department of Computer Science and Engineering
(Internet of Things and Cyber Security including Blockchain Technology)

2	Database Security	Castano	Pearson Edition	2nd	--
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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database security	alfred basta, melissa zegala	CENGAGE Learning	Indian Edition	--

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TY - IoT - 65/73

Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	0ICPE361- Professional Elective Laboratory -III (Smart Contracts and Solidity Laboratory)
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE	50

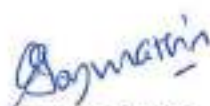
Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICPE361_1	Understand the working and importance of smart contracts(K1)
0ICPE361_2	Learn the solidity language required for coding Ethereum smart contracts(K2)
0ICPE361_3	Deploy Truffle and Ganache framework for project creation and compilation(K4)
0ICPE361_4	Evaluate the different Ethereum protocols for real time applications(K5)
0ICPE361_5	Create and deploy a DApp on a Ethereum test network (K6)

Exp. No.	Experiment List
1.	Study of bitcoin and P2P Payment gateway.
2.	Study of Hyperledger Architecture and its features.
3.	Create a simple Ethereum network model.
4.	Write a simple chaincode API model
5.	Generate the crypto material for the various participants in the bootstrapping network
6.	Generate the genesis block for the Orderer node and start ordering service (solo node) in the bootstrapping network
7.	Generated the configuration transaction block to create a new channel in the bootstrapping network.
8.	Sign the configuration block and create the new channel
9.	Make peers of all the organizations join the channel that we created in the bootstrapping network
10.	Study of Hyperledger Explorer and Hyperledger Composer Solution


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Ethereum™ O'Reilly	Andreas M. Antonopoulos, Dr. Gavin Wood	Media Inc	2	2019
2	Blockchain Technology: Cryptocurrency and Applications	S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan	Oxford University Press	1	2019
3	The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming	Josh Thompson	Create Space Independent Publishing Platform	1	2017

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain Technology: Cryptocurrency and Applications	S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan	Oxford University Press	1	2019
2	The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming	Josh Thompson	Create Space Independent Publishing Platform	1	2017


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Course Details:

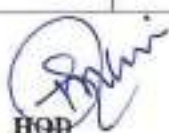
Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	01CPC362- Embedded System for IoT Laboratory
Prerequisite/s	01CPC207 - Microprocessor and Microcontroller
Teaching Scheme: Lecture/Tutorial /Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE	50/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01CPC362_1	Understand basic components and building blocks of Internet of Things (K2)
01CPC362_2	Explain the real time embedded system and its components (K2)
01CPC362_3	Apply skills to conduct interfacing of embedded boards with components, actuators and sensors. (K3)
01CPC362_4	Analyze the real world signals and perform remote process monitoring utilizing the concept of IoT (K4)
01CPC362_5	Design and Implement IoT enabled embedded control strategy for a given application. (K5)

Exp.No.	Experiment List
1	Installation of IoT Tool Chain.
2	Study and Develop a program based on interfacing with temperature sensor.
3	Study and Develop a program based on interfacing with Ultrasonic sensor.
4	Study and Develop a program based on interfacing with Optical sensor.
5	Study and Develop a program based on interfacing with PIR sensor.
6	Study and Develop a program based on interfacing with Output Peripheral such as LED's.
7	Study and Develop a program based on interfacing with Output Peripheral such as 7-segment Display
8	Study and develop a program based on interfacing with actuator such as stepper motor.
9	Study and develop a program based on interfacing with actuator such as DC motor.
10	Implementation of Inbuilt Touch Sensing, Blue tooth, and Wi-Fi communication


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Embedded system- Architecture, Programming, Design	Rajkamat	TataMcgraw Hill	2	2011.
2	Embedded System Design	Peckol	John Wiley	3	2010
3	Embedded System Foundations of Cyber Physical Systems.	Peter Mardwel	Springer	2	2008
4	The Internet of Things Enabling Technologies	Pethuru Raj and Anupama C. Raman	CRC Press	1	2015

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Embedded Systems Architecture	Tammy Noergaard	Elsevier	1	2006
2	Embedded system Design using C8051	Han-Way Huang	CENAGE Learning	1	2009
3	Real-Time systems Theory and Practice	Rajib Mall	Person Education	2	2007
4	Industrial Internet of Things: Cybermanufacturing Systems	Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat	Springer,	1	2017


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Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code and Course Title	OICPR363- Minor Project
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: ISE / ESE	25 / 50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OICPR363_1	Interpret the problem statement of a given system, identify need, analyze the problem and design ER model for the the system as well as prepare the relational database schema for the system by identifying integrity constraints.
OICPR363_2	Demonstrate installation and configuration of Oracle /MySQL / SQL Server etc.
OICPR363_3	Apply the SQL queries for database definition and manipulation, use PL/SQL constructs.
OICPR363_4	Experiment with indexing, hashing techniques, transaction processing, concurrency control and security techniques.
OICPR363_5	Follow professional and ethical principles during laboratory work in a team during performing laboratory activities.

Exp. No.	Experiment List
1.	Drawing an E-R Diagram for any organization.
2.	Converting E-R diagram into Relational Tables.
3.	Installation and Demonstration of DBMS Oracle / MySQL / SQL Server / PostgreSQL etc.
4.	Study and Implementation of Data Definition Language (DDL) Queries (e.g. create, alter and drop tables).
5.	Study and Implementation of Data Manipulation Language (DML) Queries (e.g. insert, delete, update and select statements).
6.	Study and Implementation of Basic SQL SELECT statement for displaying / extracting data from single table or multiple tables.
7.	Study and implementation of SQL constructs for aggregating data. use of group by, having clauses.
8.	Study and implementation of nested sub-queries, complex queries, views and Joins.
9.	Study and Implementation of Triggers.
10.	Study and Implementation of Functions and Stored Procedures.


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11.	Implementation of Database connectivity with object oriented language (Java).
12.	Few aspects of authorization such as creating and managing users, roles, granting and revoking of privileges etc.
13.	Creating Indices for the tables, implementing static hashing.
14.	Study of Transaction processing and concurrency control techniques.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Database system concepts	A. Silberschatz, H.F. Korth, S. Sudarshan	McGraw Hill Education	6 th	2011
2	Database Systems- A practical approach to Design, Implementation and Management	Thomas Connolly, Carolyn Begg	Pearson Education.	4 th	2009
3	Database Systems – Design, Implementation and Management	Rob & Coronel	Thomson Course Technology	5 th	2008
4	Database Management Systems	Raghu Ram Krishnan	McGraw Hill	3 rd	2002

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Fundamentals of Database Systems	Ramez Elmasri and Shamkant Navathe	Pearson Education	5 th	2007
2	Database Systems: Design, Implementation and management	Peter Rof, Carlos Coronel	Cengage Learning	7 th	2014
3	Principles of Database Systems	J. D. Ullaman	Galgolia publications	1 st	2011
4	SQL. A Complete Reference	Alexis Leon, Mathews Leon	McGraw Hill Education	1 st	2002


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Department of Computer Science and Engineering
(Internet of Things and Cyber Security Including Blockchain Technology)

Course Details:

Class	T.Y, B. Tech, Sem - VI
Course Code & Course Title	Value Added Course 6
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial /Practical	0/0/2
Credits	1
Evaluation Scheme:	Audit

Course Outcomes (COs) : The students will be able to:

VAC6_1	Solve problems based on HCF, LCM, Interest, Clock, Cubes and Puzzles.
VAC6_2	Solve problems based on Coding and Decoding, Seating Arrangements and Venn diagrams.
VAC6_3	Solve problems based on Ratio Proportion, Partnership, Allegation, Divisibility and Number Theory
VAC6_4	Demonstrate presentations using concepts delivered on confidence building and time management skills.

Course Contents:

Unit No	Unit Name	Contact Hours
Unit 1	HCF LCM, Simple Interest, Compound Interest	4
Unit 2	Coding- Decoding, Seating Arrangement Venn Diagrams	6
Unit 3	Clocks, Cubes, Puzzles,	4
Unit 4	Ratio Proportion, Partnership	4
Unit 5	Confidence Building, Time Management	5
Unit 6	Allegation, Divisibility and Number Theory	5
	Self-Study Module	


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	R.S. Agarwal (Quantitative aptitude)	R.S.Agarwal	S Chand	-	2019
2	R.S. Agarwal (Verbal & Non-verbal Reasoning)	R.S.Agarwal	S Chand	-	2010
3	Wren & Martin (Verbal, Grammar)	P.C.Wren	S Chand	-	2017

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	APTIPEDIA (Quantitative, Logical, Verbal Aptitude)	Face	Wiley	-	2017
2	Wiley (Quantitative Aptitude)	P.A.Anand	Maestro	-	2015
3	Arun Sharma (Verbal Ability)	Meenakshi Upadhyay	McGraw Hill	-	2020


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Teaching and Evaluation Scheme
B. Tech: Semester-VII

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
0ICOE4**	Open Elective-III	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
0ICPC403	Cloud Computing	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
0ICPC404	Machine Learning	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
0ICPE4**	Professional Elective-IV	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
0ICPC408	Blockchain Security and Performance	3	--	--	3	ISE I	10	40	--	--
						MSE	30		--	--
						ISE II	10		--	--
						ESE	50		20	--
0ICH409	Project Management and Finance	--	--	2	1	ISE-I	25	10	--	--
						ISE-II	25	10	--	--
0ICPE4**	Professional Elective-IV Laboratory	--	--	2	1	ISE	--	--	25	10
						ESE	--	POE	50	10
0ICPC454	Cloud Computing Laboratory	--	--	2	1	ISE	--	--	25	10
						ESE	--	POE	50	10
0ICPC455	Machine Learning Laboratory	--	--	2	1	ISE	--	--	25	10
						ESE	--	POE	50	10
0ICPR456	In-Plant Training	--	--	--	1	ESE	--	PR	50	20
0ICPR457	Project (Phase-I)	--	--	4	2	ISE	--	--	50	20
						ESE	--	PR	100	40
						Audit				
Total		19	0	08	23	Total	550		425	
Total Contact Hours/Week: 27 hrs.						Total=550+425=975				
Course Category		HS	BS		ES	PC	PE		OE	PR
Credits		02	00		00	11	04		03	03
Cumulative Sum		11	17		22	66	14		09	05


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.0ICOE4- Open Elective-III**

0ICOE401	Ubiquitous Computing
0ICOE402	Smart Contracts and Solidity

0ICOE4- Professional Elective-IV**

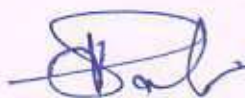
0ICPE405	Ubiquitous Computing
0ICPE406	Security Assessment and Disaster Recovery
0ICPE407	Blockchain Platforms and Use cases

0ICOE4- Professional Elective-IV Laboratory**

0ICPE451	Ubiquitous Computing
0ICPE452	Security Assessment and Disaster Recovery
0ICPE453	Blockchain Platforms and Use cases


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(Internet of Things and Cyber security including Block Chain Technology)

Teaching and Evaluation Scheme
B. Tech :Semester-VIII

Course Code	Course	Teaching Scheme				Evaluation Scheme				
		L	T	P	Credits	Scheme	Theory (Marks)		Practical (Marks)	
							Max.	Min. for Passing	Max.	Min. for Passing
0ICOE4**	Open Elective-IV (MOOC)	3	--	--	3	ISE I	10	20		
						MSE	30			
						ISE II	10			
						ESE	50	20		
0ICPE4**	Professional Elective-V (MOOC)	3	--	--	3	ISE I	10	20		
						MSE	30			
						ISE II	10			
						ESE	50	20		
0ICPR458	Internship / Project (Phase-II)	--	--	20	10	ISE	--	--	100	40
						ESE		--	200	80
Total		06	-	20	16	Total	200		300	
Total Contact Hours/Week: 26 hrs						Total=200+300=500				
Course Category	HS	BS		ES		PC	PE	OE	PR	Total
Credits	00	00		00		00	03	03	10	16
Cumulative Sum	11	17		22		66	17	12	15	160
Credits (AICTE)	12	25		24		48	18	18	15	160

0ICOE4**- Open Elective-IV		0ICOE4**- Professional Elective-V	
0ICOE410	MOOC	0ICPR411	Industrial IOT
		0ICPR412	TCP/IP Network Security
		0ICPR413	Blockchain and FinTech

****Open Elective-IV(MOOC)and Professional Elective-V(MOOC) subjects are offered as per the course list provided by NPTEL Jan – Jun 2025.**


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Course Details:

Class	B. Tech, Sem-VII
Course Code and Course Title	01COE401— Open Elective – III Ubiquitous Computing
Prerequisite/s	--
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme: ISE/MSE/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01COE401_1	Describe the characteristics of pervasive computing applications including the basic computing application problems, performance objectives and quality of services, major system components and architectures of the systems(K2)
01COE401_2	Analyze the strengths, problems and limitations of the current tools, devices and communications for pervasive computing systems.(K4)
01COE401_3	Recognize the different ways that humans will interact with systems in a ubiquitous environment and account for these accordingly(K2)
01COE401_4	List and exemplify the key technologies involved in the development Ubicomp systems(K2)
01COE401_5	Develop an attitude to identify and propose solutions for security and privacy issues(K6)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction to Ubiquitous Computing Concept: Distributed Computing, Mobile Computing, Pervasive Computing, Wearable Computing, Modeling the Key Ubiquitous/Pervasive Computing Properties, Mobile Adaptive Computing, Mobility Management and Caching.	6
Unit 2	Pervasive Computing Devices Smart Environment: CPI and CCI Smart Devices: Application and Requirements, Device Technology and Connectivity, Human Computer Interaction.	7
Unit 3	Human Computer Interaction Explicit HCI, Implicit HCI, User Interface and Interaction for four hand-held widely used devices, Hidden UI via basic smart devices, Hidden UI via wearable and Implanted devices, Human centered design, user models.	8
Unit 4	Middleware for Pervasive Computing Adaptive middleware, Context aware middleware, Mobile middleware, Service Discovery, Mobile Agents.	7
Unit 5	Security in Pervasive Computing Security and Privacy in Pervasive Networks, Experimental Comparison of Collaborative Defense Strategies for Network Security.	7

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Unit 6	Challenges and Outlook Overview of challenges, smart devices, Smart Interaction, Smart physical environment device interaction, Smart human-device interaction, Human Intelligence versus machine intelligence, social issues. Case Study- Wearable Computing/ Cyber Physical System.	7
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	"Ubiquitous Computing, Smart devices, environment and interaction,"	Stefan Poslad	Wiley	1 st	2014
2	Fundamentals of Mobile and Pervasive Computing	Frank Adelstein, Sandeep Gupta, Golden Richard III, Loren Schwiebert, "	Tata McGraw Hills	2 st	2000

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	"Pervasive Computing,"	Jochen Burkhardt, Horst Henn, Stefan Hepper, Klaus Rindtor, Thomas Schaeck	Pearson	Eighteenth Impression,	2014.


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(Internet of Things and Cyber Security Including Blockchain Technology)

Course Details

Class	B. Tech, Sem. VII
Course Code and Course Title	01COE402 – Open Elective – III (Smart Contracts and Solidity)
Prerequisite/s	—
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme (Theory) : ISE1 / MSE/ISE2/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

01COE402_1	Explain the fundamental concepts of blockchain technology and its role in enabling smart contracts. (K2)
01COE402_2	Apply Solidity programming skills to create and deploy smart contracts on blockchain platforms like Ethereum. (K3)
01COE402_3	Utilize blockchain development tools and frameworks to test and deploy smart contracts. (K3)
01COE402_4	Create comprehensive smart contract designs for complex applications, considering security, scalability, and user experience. (K6)
01COE402_5	Design smart contract projects, including detailed code implementations, testing strategies, and deployment considerations, along with real-world use cases. (K6)

Course Contents

Unit No.	Unit Name	Contact Hours
Unit-1	Introduction to Ethereum, concepts of Smart Contracts, Dapps, And DAOs, What is Ethereum Virtual Machine (EVM), Ethereum Technology Overview, Architectural Overview, Ethereum Block chain Platform, Current and Potential Uses of Ethereum.	8
Unit-2	Introduction to Programming Smart Contracts, A Simple Smart Contract, Account Types, Gas, and Transactions, Accessing Contracts and Transactions, Mix, Dapps, Developer Tools, Ethereum Tests, Web3 Base Layer Services, Installing, Building, Testing, & Deploying Ethereum nodes.	7


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Unit-3	Introduction to Solidity Programming , Layout of a Solidity Source File, Structure of a Contract, Types, Units and Globally Available Variables, Input Parameters and Output Parameters, Control Structures, Function Calls, Creating Contracts via new, Order of Evaluation of Expressions, Assignment, Scoping and Declarations, Error handling: Assert, Require, Revert and Exceptions.	6
Unit-4	Solidity Programming –Contracts, Creating Contracts, Visibility and Getters, Function Modifiers, Constant State Variables, Functions, Inheritance, Abstract Contracts, Interfaces, Libraries.	7
Unit-5	Introduction to Decentralized Apps (Dapps) ,Decentralized Application Architecture, Connecting to the Block chain and Smart Contract, Decentralized Apps – Coding Details, Voting Contract and App,.	7
Unit-6	Blind Auction Contract and App , Coding Style Guide, Design Patterns, Coding Style Guide, Code Layout, Naming Conventions, Common Design Patterns, Withdrawal from Contracts, State Machine	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Ethereum" O'Reilly	Andreas M. Antonopoulos, Dr.Gavin wood	Media Inc	2 st	2019
2	Blockchain Technology: Cryptocurrency and Applications	S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan	Oxford University Press	1 st	2019
3	The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming	Josh Thompson	Create Space Independent Publishing Platform	1 st	2017


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(Internet of Things and Cyber Security Including Blockchain Technology)

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain Technology: Cryptocurrency and Applications	S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan	Oxford University Press	1 st	2019
2	The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming	Josh Thompson	Create Space Independent Publishing Platform	1 st	2017


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Course Details:

Class	B. Tech, Sem - VII
Course Code and Course Title	OICPC403- Cloud Computing
Prerequisite/s	OICPCI5T/Computer Networks
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme (Theory) : ISE-1/MSE/ISE-2/ESE	10/30/10/50

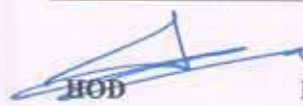
Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OICP403_1	Explain Cloud Computing concepts. (K2)
OICP403_2	Describe virtualization concept(K2)
OICP403_3	Analyze different cloud services(K3)
OICP403_4	Design different Applications in cloud. (K4)
OICP403_5	Launch and run web application on AWS cloud(K5)

Course Contents:

Sr. No.	Unit Name	Contact Hours
Unit 1	Introduction to Cloud: Getting to know the Cloud, Cloud and other similar configurations, Components of Cloud Computing. Cloud Types and Models: Private Cloud, Community Cloud, Public Cloud, Hybrid Clouds.	7
Unit 2	Virtualization: Introduction and benefits, Implementation Levels of Virtualization, Virtualization at the OS Level, Virtualization Structure, Virtualization Mechanism, Open-Source Virtualization Technology, Xen Virtualization Architecture, Binary Translation with Full Virtualization, Para virtualization, Virtualization of CPU, Memory and I/O Devices,	7
Unit 3	Cloud Computing Services: Infrastructure as a Service, Platform as a Service, Software as a Service, Database as a Service, Specialized Cloud Services.	7
Unit 4	Data Security in Cloud: Challenges with Cloud Data, Challenges with Data Security, Data Confidentiality and Encryption, Data availability, Data Integrity. Cloud Data Management Interface, Cloud Storage Gateways, Cloud firewall, Virtual Firewall.	8
Unit 5	Service Management in Cloud Computing: Service Level Agreements (SLAs), Billing& Accounting, Comparing Scaling Hardware: Traditional vs. Cloud, Economics of scaling: Benefitting enormously, Managing Data - Looking at Data, Scalability & Cloud Services, Database & Data Stores in Cloud, Large Scale Data Processing.	5

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Unit 6	Case study on Open Source and Commercial Clouds: Amazon EC2, Google Compute Engine, Microsoft Azure, Cloud foundry, OpenStack.	8
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Cloud Computing Black Book	Jayaswal, Kallakurchi, Houde, Shah	Dreamtech Press	1 st	2014
2	Mastering Cloud Computing	Buyya R, Vecchiola C, Selvi S T	McGraw Hill Education (India),	1 st	2013

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Cloud Computing for Dummies	Judith Hurwitz	Wiley	1 st	2009
2	Cloud Computing - Principles and Paradigms	Buyya R, Broberg J, Goscinski A	Wiley	1 st	2013

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Course Details:

Class	B. Tech, Sem. VIII
Course Code and Course Title	0ICPC404- Machine Learning
Prerequisite/s	0ICE5253/ PROGRAMMING LABORATORY- I
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme (Theory) :ISE1 / MSE/ISE2/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

OICP404_1	Explain Machine Learning concepts. (K2)
OICP404_2	Analyze the Machine Learning model (K3)
OICP404_3	Analyze supervised and unsupervised techniques (K3)
OICP404_4	Design solution using Machine Learning techniques. (K4)
OICP404_5	To tackle real world problems in domain of data mining, information retrieval, computer vision (K5)

Course Contents:

Sr. No.	Unit Name	Contact Hours
Unit 1	Introduction to Machine Learning: Definition, Terminology, Types of learning, Machine Learning Problem categories, Machine learning architecture, process, Lifecycle, Performance measures, tools and framework, data visualization.	6
Unit 2	Regression: Simple regression – hypothesis, cost function, parameter learning with gradient descent, learning rate, Gradient Descent for linear regression, examples, simple regression in matrix form. Multivariate Linear Regression – Multiple features, hypothesis functions, Gradient Descent for multiple variables, Feature scaling, polynomial regression	7


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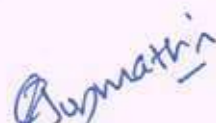


Department of Computer Science and Engineering

(Internet of Things and Cyber Security Including Blockchain Technology)

Unit 3	Classification- Logistic regression & Naïve Bayes : Logistic Regression – Definition, Hypothesis representation, decision boundary, cost function, Gradient Descent for Logistic Regression. Multiclass Classification, Regularization - Over fitting & Under fitting, cost function, Regularized Linear Regression, Regularized Logistic Regression, Conditional probability and Naïve Bayes Classifier. Instance-based classifier – K- Nearest Neighbor Classifier, Bayesian Network, Hidden Markov Model.	8
Unit 4	Classification- Decision trees and Support Vector Machine: Decision trees: definition, terminology, the need, advantages, and limitations. Constructing and understanding Decision trees, common problems with Decision trees, Decision tree algorithms, random forest. Support Vector Machine: What is SVM, Kernel Trick, Cost Function, Decision Trees vs. Support Vector Machine.	8
Unit 5	Unsupervised learning : Clustering, K Means clustering, Hierarchical clustering, Association Rule mining.	5
Unit 6	Neural Network & Recommendation System: Neural Networks- Neuron representation and model, Hypothesis for neuron, cost function, solution of a problem using single neuron. Gradient descent for a neuron. Neural network, Multiclass classification with neural network. Learning in neural network-back propagation algorithm Recommendation System: Popularity based recommender engines, Content based recommendation engines, Classification based recommendation engine, Collaborative filtering.	8


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Department of Computer Science and Engineering

(Internet of Things and Cyber Security Including Blockchain Technology)

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Machine Learning with Python- an approach to applied ML	AbhishekVijayvar giya	BPB Publications	1 st	2018
2	Machine Learning	Tom M. Mitchell	McGraw Hill Education	1 st	1997
Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Machine Learning for dummies	John Paul Muller	Wiley Publication	1 st	2016
2	Introduction to Machine Learning	EthemAlpaydin	PHI	2 nd	2013


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Course Details:

Class	B. Tech, Sem-VII
Course Code and Course Title	0ICPE405– PE-4- Ubiquitous Computing
Prerequisite/s	OICPC309 /Embedded System for IoT
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme: ISE/MSE/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

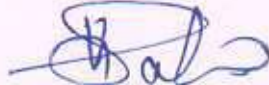
0ICPE405_1	Describe the characteristics of pervasive computing applications including the basic computing application problems, performance objectives and quality of services, major system components and architectures of the systems.(K2)
0ICPE405_2	Analyze the strengths, problems and limitations of the current tools, devices and communications for pervasive computing systems.(K4)
0ICPE405_3	Recognize the different ways that humans will interact with systems in a ubiquitous environment and account for these accordingly.(K2)
0ICPE405_4	List and exemplify the key technologies involved in the development Ubicomp systems.(K2)
0ICPE405_5	Develop an attitude to identify and propose solutions for security and privacy issues.(K6)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit 1	Introduction to Ubiquitous Computing Concept : Distributed Computing, Mobile Computing, Pervasive Computing, Wearable Computing, Modeling the Key Ubiquitous/Pervasive Computing Properties, Mobile Adaptive Computing , Mobility Management and Caching.	6
Unit 2	Pervasive Computing Devices Smart Environment: CPI and CCI Smart Devices: Application and Requirements, Device Technology and Connectivity, Human Computer Interaction.	7
Unit 3	Human Computer Interaction Explicit HCI, Implicit HCI, User Interface and Interaction for four hand-held widely used devices, Hidden UI via basic smart devices, Hidden UI via wearable and Implanted devices, Human centered design, user models.	8
Unit 4	Middleware for Pervasive Computing Adaptive middleware, Context aware middleware, Mobile middleware, Service Discovery, Mobile Agents.	7
Unit 5	Security in Pervasive Computing Security and Privacy in Pervasive Networks, Experimental Comparison of Collaborative Defense Strategies for Network Security.	7


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Unit 6	Challenges and Outlook Overview of challenges, smart devices, Smart Interaction, Smart physical environment device interaction, Smart human-device interaction, Human Intelligence versus machine intelligence, social issues. Case Study- Wearable Computing/ Cyber Physical System.	7
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Text Books:

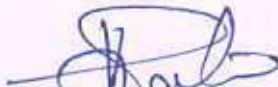
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	"Ubiquitous Computing, Smart devices, environment and interaction,"	Stefan Poslad	Wiley	1 st	2014
2	Fundamentals of Mobile and Pervasive Computing	Frank Adelstein, Sandeep Gupta, Golden Richard III, Loren Schwiebert, "	Tata McGraw Hills	2 nd	2000

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	"Pervasive Computing,"	Jochen Burkhardt, Horst Henn, Stefan Hepper, Klaus Rindtor, Thomas Schaeck	Pearson	18 th	2014.


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Course Details:

Class	B. Tech, Sem- VIII
Course Code and Course Title	0ICPE406 - PE-4- Security Assessment and Disaster Recovery
Prerequisite/s	OICPC30S - Data Encpption, Steganography and Digital Watermarking
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits:	3
Evaluation Scheme: ISE/MSE/ESE	10/30/10/50

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICPE406_1	Understanding Risk Management Basics and Cyber Risk Fundamentals. (K2)
0ICPE406_2	Demonstrate techniques for identifying and evaluating cyber risks. (K3)
0ICPE406_3	Determine appropriate scales for likelihood and consequence assessments in cyber risk scenarios. (K4)
0ICPE406_4	Evaluate organizational compliance with standards and frameworks. (K5)
0ICPE406_5	Define and develop metrics for measuring information security effectiveness. (K6)

Course Contents:

Sr. No.	Unit Name	Contact Hours
Unit 1	Introduction, what is risk and risk management, risk assessment, monitoring and review, cyberspace, cyber system. What is cyber risk, communication and consultation of cyber risk, cyber risk assessment, monitoring and review of cyber risk	7
Unit 2	Context establishment, context, goals and objectives, target of assessment, interface to cyberspace and attack surface, scope, focus and assumption, assets, scale and risk evaluation criteria,	7
Unit 3	Risk identification techniques, malicious risks, non-malicious risks, risk analysis, threat analysis, vulnerability analysis, likelihood of incidents, consequences of incidents, Risk evaluation, consolidation of risk analysis results, evaluation of risk level, risk aggregation, risk grouping, risk treatment identification, risk acceptance	7
Unit 4	Two-factor measure, three-factor measure, many-factor measure, which measure to use for cyber risk?, classification of scales, qualitative versus quantitative risk assessment, scale for likelihood, scale for consequence, what scale to use for cyber risk	7
Unit 5	Defining information security metrics, Risk analysis techniques, Automating metric calculations and tools. What is an IT security assessment, what is an IT security audit, what is compliance, how does and audit differs from assessment, case study: Enron, WorldCom, TJX Credit Card Breach	7

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Unit 6	Organization do to be in compliance, Auditing within IT infrastructure, managing IT compliance, Auditing standards and frameworks, COSO, COBIT, ISO/IEC 27001 standard, ISO/IEC 27002 standard, NIST 800-53,	7
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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Cyber-Risk Management	AtleRefsdal BjornarSolhaug, Ketil Stolen	Springer	1st	2015
2.	Information Security Risk Assessment Toolkit–	Mark Talabis and Jason Martin	Elsevier	1 st	2013
3.	T Security Risk Control Management – An Audit Preparation Plan	Raymond Pompon	Apress	1 st	2016

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Auditing IT Infrastructures for Compliance	Marty M. Weiss and Michael G. Solomon	Jones & Bartlett Learning	2 st	2015
2.	Quantitative Risk Assessment: The Scientific Platform by –	TerjeAven	Cambridge University Press	1 st	2011


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Course Details:

Class	B. Tech., Sem. VII
Course Code and Course Title	0ICPE407- PE-4-Blockchain Platform and UseCase
Prerequisite/s	OICPC305 /Blockchain Technology
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: ISE/MSE/ESE	10/30/10/50

Course Outcomes (COs):

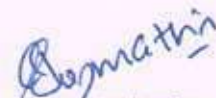
Upon successful completion of this course, the student will be able to:

0ICPE407_1	Describe the foundational principles of blockchain technology, including decentralization, consensus mechanisms, and cryptographic techniques (K2)
0ICPE407_2	Compare and contrast major blockchain platforms such as Ethereum, Hyperledger Fabric, and others in terms of architecture, consensus mechanisms, scalability, and suitability for various applications.(K5)
0ICPE407_3	Develop and deploy smart contracts using programming languages like Solidity (K6)
0ICPE407_4	Design decentralized applications (DApps) that leverage blockchain platforms for specific use cases.(K3)
0ICPE407_5	Assess the potential of blockchain technology in various sectors such as finance, supply chain management, healthcare, government, energy, and real estate.(K4)

Course Contents:

UnitNo.	Unit Name	Contact Hours
Unit 1	Introduction to Blockchain Technology Overview of distributed ledger technology (DLT),decentralization, consensus mechanisms, cryptographic principles	7
Unit 2	Blockchain Platforms Overview Introduction to major blockchain platforms: Ethereum, Hyperledger Fabric, Corda, Binance Smart Chain, Solana, Comparison of platforms based on architecture, consensus mechanisms, scalability, and use cases	7


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Unit 3	Smart Contracts and Decentralized Applications (DApps) Smart contracts: concepts, design patterns, Solidity programming language, Development frameworks and tools (Truffle, Remix), Case studies of popular DApps and their impact	7
Unit 4	Blockchain Use Cases in Finance and Banking Applications of blockchain in banking (e.g., cross-border payments, trade finance), Central bank digital currencies (CBDCs) and stablecoins, Regulatory considerations and challenges Blockchain Use Cases in Healthcare Patient data management and interoperability, Drug traceability and counterfeit prevention, Privacy and security considerations	7
Unit 5	Blockchain Use Cases in Supply Chain Management Traceability and provenance of goods using blockchain, Supply chain transparency and efficiency, Case studies of successful implementations (e.g., IBM Food Trust, VeChain) Blockchain Use Cases in Government and Public Sector Identity management and digital voting systems, Blockchain for transparent and accountable governance, Case studies from various countries and regions	7
Unit 6	Emerging Trends and Future Directions DeFi (Decentralized Finance) and its impact on traditional finance, Non-fungible tokens (NFTs): concepts, applications, and controversies, Blockchain interoperability and the role of cross-chain protocols	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain Technology	Chandramouli Subramanian	Universities Press	1 st	2020
2	Block Chain & Cryptocurrencies	Anshul Kaushik	Khanna Publishing House	1 st	2018
4	Blockchain for Dummies	Tiana Laurence	John Wiley & Sons.	2 nd	2019


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Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks	Imran Bashir	Packt Publishing	1 st	2017
2	Blockchain: Blueprint for a New Economy	Melanie Swan	Shroff Publisher O'Reilly Publisher Media	1 st	2015
3	Mastering Bitcoin: Programming the Open Blockchain	Andreas Antonopoulos.	-Shroff/O'Reilly;	2 st	2017



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Course Details:

Class	B. Tech., Sem. VII
Course Code and Course Title	0ICPC408-Blockchain Security and Performance
Prerequisite/s	0ICPC305 /Blockchain Technology
Teaching Scheme: Lecture/Tutorial/Practical	3/0/0
Credits	3
Evaluation Scheme: (Theory)	10/30/10/50
ISE-I /MSE/ISE-II/ ESE	

Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICPC408_1	Describe the foundational principles of blockchain security, including cryptographic techniques, consensus algorithms, and decentralization..(K2)
0ICPC408_2	Analyze the security risks associated with blockchain technology, such as 51% attacks, double spending, and smart contract vulnerabilities. (K4)
0ICPC408_3	Apply security best practices for blockchain networks, including key management, secure wallet management, and network security. (K3)
0ICPC408_4	Optimize blockchain architecture and design for improved performance(K5)
0ICPC408_5	Assess regulatory and compliance considerations related to blockchain security.(K5)


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Course Contents:

UnitNo.	Unit Name	Contact Hours
Unit 1	Basics: The Double-Spend Problem, Byzantine Generals' Computing Problems, Distributed Systems, Distributed Consensus, Distributed ledger technology, Types of blockchains (public, private, consortium). Cryptographic Foundations: Cryptographic hash functions, Digital signatures and public-key cryptography, Merkle trees and their role in blockchain	7
Unit 2	Blockchain Security: Threatmodels and attack vectors, Double-spending problem and consensus mechanisms, 51% attacks and Byzantine Fault Tolerance (BFT)	7
Unit 3	Consensus Algorithms : Proof of Work (PoW), Proof of Stake (PoS), and alternatives, Practical Byzantine Fault Tolerance (PBFT), PAXOS, RAFT, Comparison and analysis of consensus algorithms	7
Unit 4	Smart Contract Security: Introduction to smart contracts, Vulnerabilities (e.g., reentrancy, overflow, logic errors), Best practices for secure smart contract development	7
Unit 5	Performance Optimization Techniques: Network performance and latency issues, Optimization strategies for transaction throughput, Benchmarking and performance measurement tools	7
Unit 6	Case Studies and Real-World Applications: Ethereum and decentralized applications (dApps), Hyperledger and enterprise blockchain solutions, Regulatory considerations and privacy concerns	7

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain Technology	ChandramouliSubramanian	Universities Press	1 st	2020
2	Block Chain & Crypto Currencies	AnshulKaushik	Khanna Publishing House	1 st	2018
3	Blockchain for Dummies	Tiana Laurence	John Wiley & Sons.	2 nd	2019

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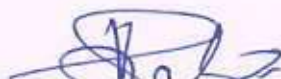
Department of Computer Science and Engineering

(Internet of Things and Cyber Security Including Blockchain Technology)

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks	Imran Bashir	Packt Publishing	1 st	2017
2	Blockchain: Blueprint for a New Economy	Melanie Swan	Shroff Publisher O'Reilly Publisher Media	1 st	2015
3	Mastering Bitcoin: Programming the Open Blockchain	Andreas Antonopoulos.	-	1 st	2017


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Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	0ICPE451 / – PE-4 Ubiquitous Computing Laboratory
Prerequisite/s	OTCPC362 /Embedded System for IoT Laboratory
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: (Practical) ISE/ESE	25/50
Course Outcomes (COs): Upon successful completion of this course, the student will be able to:	
0ICPE451_1	Develop and implement adaptive real-time systems and smart home automation (K3)
0ICPE451_2	Design and implement predictive maintenance systems and environmental monitoring solutions (K3)
0ICPE451_3	Integrate IoT devices and implement edge computing solutions for optimized performance (K3)

Exp. No.	Experiment List
1.	Create a mobile app that streams video in real-time and adapts quality based on network conditions.
2.	Develop a smart home system that adjusts lighting and temperature based on user presence and activity
3.	Implement a predictive maintenance system that anticipates machine failures using sensor data and machine learning.
4.	Design a system that collects and disseminates environmental data (e.g., air quality, noise levels) using multimedia presentations.
5.	Develop a location-based service application that provides relevant information (e.g., nearby restaurants) based on the user's current location.
6.	Create a system that optimizes energy usage in a data center by dynamically adjusting computing resources based on workload.
7.	Integrate multiple IoT devices to create a cohesive system for smart agriculture, monitoring soil moisture, temperature, and crop health.
8.	Develop an AR application that assists users in indoor navigation, providing real-time directions and contextual information.
9.	Implement an edge computing solution that processes data locally on IoT devices to reduce latency and bandwidth usage in a smart city application.
10.	Micro project


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Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	"Ubiquitous Computing, Smart devices, environment and interaction,"	Stefan Poslad	Wiley	1 st	2014
2	Fundamentals of Mobile and Pervasive Computing	Frank Adelstein, Sandeep Gupta, Golden Richard III, Loren Schwiebert, "	Tata McGraw Hills	2 nd	2000

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	"Pervasive Computing,"	Jochen Burkhardt, Horst Henn, Stefan Hepper, Klaus Rindtor, Thomas Schaeck	Pearson	18 th	2014.

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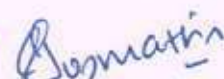
(Internet of Things and Cyber Security Including Blockchain Technology)

Course Details:

Class	B. Tech, Sem - VIII
Course Code and Course Title	0ICPE452 -- PE-4- Security Assessment and Disaster Recovery Laboratory
Prerequisite/s	0ICPC358/ Data Encryption, Steganography and Digital Watermarking Laboratory
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits:	1
Evaluation Scheme (Practical): ISE/ESE	25/50
Course Outcomes (COs): Upon successful completion of this course, the student will be able to:	
0ICPE452_1	Perform code auditing and static analysis to identify vulnerabilities and bugs (K3)
0ICPE452_2	Install and utilize Splunk for advanced data analysis and visualization (K3)
0ICPE452_3	Conduct cybersecurity risk assessment and generate detailed reports (K3)

Exp. No.	Experiment List
1.	To audit the c/c++ or Python code using RATS code checking tool.
2.	Implement Flawfinder stand-alone script to check for calls to know potentially vulnerable library function calls
3.	Implement FindBugs standalone GUI application, or Eclipse plugin for loading custom rules set.
4.	Implement pychecker stand-alone script to find bugs in the code.
5.	Installation of splunk and study basic working as to stores data in its index and therefore separate database required.
6.	Implement splunk to discovers useful information automatically without searching manually
7.	Implement splunk to converts log data into Visual graphs and reports to simplify analysis, reporting and troubleshooting
8.	Submit a report on cyber security risk assessment for SCADA and DCS networks.


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Cyber-Risk Management	Atle Refsdal Bjornar Solhaug, Ketil Stolen	Springer	1 st	2015
2.	Information Security Risk Assessment Toolkit–	Mark Talabis and Jason Martin	Elsevier	1 st	2013
3.	T Security Risk Control Management – An Audit Preparation Plan	Raymond Pompon	Apress	1 st	2016

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Auditing IT Infrastructures for Compliance	Marty M. Weiss and Michael G. Solomon	Jones & Bartlett Learning	2 nd	2015
2.	Quantitative Risk Assessment: The Scientific Platform by –	Terje Aven	Cambridge University Press	1 st	2011


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Course Details:

Class	B. Tech., Sem. VII
Course Code and Course Title	0ICPE453- PE-4-Lab Blockchain Platform and UseCase
Prerequisite/s	OICPC305 /Blockchain Technology
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: (Practical) ISE /ESE	25/50

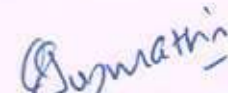
Course Outcomes (COs):

Upon successful completion of this course, the student will be able to:

0ICPE453_1	Develop and deploy smart contracts and decentralized applications on the Ethereum blockchain (K3)
0ICPE453_2	Set up and configure a Hyperledger Fabric network and develop chaincode (K3)
0ICPE453_3	Develop and implement blockchain-based applications for voting and healthcare management (K3)

Exp. No.	Experiment List
1.	Install and configure a local blockchain network using Ganache (for Ethereum)
2.	Deploy the contract on a local Ethereum network (using Remix IDE or Truffle framework).
3.	Develop a simple DApp (Decentralized Application) to interact with the deployed smart contract and Use Web3.js to connect the DApp to the blockchain.
4.	Set up a basic Hyperledger Fabric network using Docker and Understand the components like peer nodes, ordering service, and channels.


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5.	Write a simple chaincode in Go/JavaScript and Deploy the chaincode on the Hyperledger Fabric network and perform basic transactions.
6.	(i) Create a smart contract for a basic token (ERC-20) on Ethereum. (ii) Develop a basic DApp to facilitate token exchange between users.
7.	Design a smart contract to track products through a supply chain.
8.	Create a smart contract for identity verification and Implement a DApp where users can create, verify, and manage their identities on the blockchain.
9.	Design and implement a blockchain-based voting system and Ensure the system provides transparency, security, and anonymity
10.	Create a prototype for a blockchain-based healthcare record management system. Develop a smart contract for patient record management and access control.

Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Blockchain Technology	Chandramoulisubramanian	Universities Press	1 st	2020
2	Block Chain & Crypto Currencies	Anshul Kaushik	Khanna Publishing House	1 st	2018
4	Blockchain for Dummies	Tiana Laurence	John Wiley & Sons.	2 nd	2019


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Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks	Imran Bashir	Packt Publishing	1 st	2017
2	Blockchain: Blueprint for a New Economy	Melanie Swan	Shroff Publisher O'Reilly Publisher Media	1 st	2015


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Course Details:

Class	B. Tech, Sem. VII
Course Code and Course Title	0ICPC454 / Cloud Computing Laboratory
Prerequisite/s	OICPCI5T /Computer Networks Laboratory
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme: (Practical) ISE/ESE	25/50

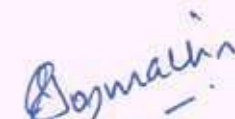
Course Outcomes(COs):

Upon successful completion of this course, the student will be able to:

0ICPC454_1	Install and configure virtualization environments and development tools (K3)
0ICPC454_2	Develop, deploy, and manage web applications using cloud platforms and simulation tools (K3)
0ICPC454_3	Set up containerization and Hadoop environments for application deployment (K3)

Exp. No.	Experiment List
1.	Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.
2.	Install a C compiler in the virtual machine created using virtual box and execute Simple Programs.
3.	Install Google App Engine. Create hello world app and other simple web applications using python/java.
4.	Use GAE launcher to launch the web applications.
5.	Simulate a cloud scenario using Cloud Sim and run a scheduling algorithm that is not present in CloudSim.
6.	Find a procedure to transfer the files from one virtual machine to another virtual machine.
7.	Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)
8.	Install Hadoop single node cluster and run simple applications like wordcount.
9.	Creating and Executing Your First Container Using Docker.
10.	Run a Container from Docker Hub.


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Text Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	, "Cloud Computing for Dummies",	Judith Hurwitz, R.Bloor, M.Kanfman, F.Halper,	Wiley India.	1 st	2014
2	Ronald Krutz and Russell Dean Vines, "Cloud Security", Wiley-India	Ronald Krutz and Russell Dean Vines	Wiley-India	1 st	2013

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Barrie Sosinsky, "Cloud Computing Bible", Wiley India	Barrie Sosinsky,	Wiley India	1 st	2009
2.	"Cloud Computing : A Practical Approach",	Antohy T Velte, et.al,	McGraw Hill.	1 st	2013

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Course Details:

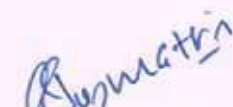
Class	B. Tech, Sem. VII
Course Code and Course Title	0ICPC455/Machine Learning Laboratory
Prerequisite/s	0ICE5253/ Programming Laboratory- I
Teaching Scheme: Lecture/Tutorial/Practical	0/0/2
Credits	1
Evaluation Scheme (Practical) : ISE/MSE	25/50

Course Outcomes(COs):

Upon successful completion of this course, the student will be able to:

0ICPC455_1	Implement regression and classification algorithms to solve predictive modeling problems (K3)
0ICPC455_2	Design and execute advanced machine learning algorithms for classification, regression, and clustering (K3)
0ICPC455_3	Develop data mining techniques and recommendation systems for data-driven insights (K3)

Exp. No.	Experiment List
1.	Study and implementation of Simple Linear Regression
2.	Write a program to implement Multiple Linear Regression
3.	Write a program to implement Logistic Regression.
4.	Write a program to implement Multi-class Classification
5.	Write a program to implement Decision Tree algorithm
6.	Write a program to implement Random Forest algorithm
7.	Write a program to implement K-means Clustering
8.	Write a program to implement association rule mining
9.	Write a program to implement Neural Network
10.	Write a program to implement Backpropagation algorithm of Neural Network
11.	Demonstrate simple recommendation system.


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ANNASAHEB DANGE COLLEGE OF ENGINEERING AND TECHNOLOGY ASHTA

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Department of Computer Science and Engineering

(Internet of Things and Cyber Security Including Blockchain Technology)

Text Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Machine Learning with Python- an approach to applied ML	AbhishekVijayvargiya	BPB Publications	1 st	2018
2	Machine Learning	Tom M. Mitchell	McGraw Hill Education	1 st	1997

Reference Books:					
Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Machine Learning for dummies	John Paul Muller	Wiley Publication	1 st	2016
2	Introduction to Machine Learning	EthemAlpaydin	PHI	2 nd	2013


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Course Details:

Class	Final Year B.Tech., Sem.VII
Course Code and Course Title	01CHS409 Project Management and Finance
Prerequisite/s	01CPC311/Software Engineering
Teaching Scheme: Lecture/Tutorial/Practical	2/0/0
Total Hours	28
Credits	02
Evaluation Scheme: ISE I/ ISEII	25/25

Course Outcomes(COs):

Upon successful completion of this course, the student will be able to:

01CHS409_1	Understand the concept to of Project Management(K ²)
01CHS409_2	Judge Team building and leadership skills through project management functions(K ⁴)
01CHS409_3	Prepare total project management plan and risk management plan including Individual participant's role.(K ³)
01CHS409_4	Estimate costing and pricing of project based on organizational requirements.(K ⁴)
01CHS409_5	Determining financial goals of the project(K ³)

Course Contents:

Unit No.	Unit Name	Contact Hours
Unit1	Introduction to Project Management Introduction, Understanding Project Management, Differing Views of Project Management, General Systems Management, Project Management Life Cycle	04 Hrs.
Unit2	Project Management Functions Controlling, Directing, Project Authority, Barriers to Project Team Development, Team Building as an Ongoing Process, Leadership in a Project Environment, Life-Cycle Leadership, Organizational Impact, Employee-Manager Problems, Management Pitfalls, Communications, Project Review Meetings, Project Management Bottlenecks	06 Hrs.
Unit3	Planning General Planning, Life-Cycle Phases, Proposal Preparation, Understanding Participants' Roles, Project Planning, The Planning Cycle, Work Planning Authorization, Project Plan, Total Project Planning	04 Hrs.
Unit4	Risk Management Definition of Risk, Definition of Risk Management, Risk Management Process, Plan Risk Management, Plan Risk Management, Risk Identification, Risk Analysis, Qualitative Risk Analysis, Quantitative Risk Analysis	04 Hrs.

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Unit5	Pricing and Estimating GlobalPricingStrategies, TypesofEstimates, PricingProcess, OrganizationalInput Requirements, Labor Distributions, The Pricing Review Procedure, Estimating Pitfalls, Estimating High-Risk Projects, Project Risks, Life-Cycle Costing(LCC)	06 Hrs.
Unit6	Financial Management Meaning, NatureandScopeofFinance, FinancialGoal: ProfitMaximizationvs WealthMaximization, FinanceFunctions- InvestmentDecision, FinancingDecision, Dividend Decision, Liquidity Decision	04 Hrs.

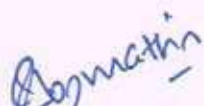
TextBooks:

Sr. No	Title	Author	Publisher	Edition	Yearof Edition
1.	Project Management: A Systems Approach to Planning, Scheduling, and Controlling	<u>HaroldKerzner</u>	Wiley	13 th	2022
2	Fundamentals of Financial Management	R.P.Rostogi	Taxmann Publications PrivateLimited	7 th	2024

Reference Books:

Sr. No	Title	Author	Publisher	Edition	Yearof Edition
1.	Advanced Project Portfolio Management and the PMO	<u>Gerald I.Kendall, Steven C.Rollins</u>	J. Ross Publishing	1 st	2003
2	FundamentalofFinancial Management	<u>SKGupta, RKSh arma</u>	OSRPublishers Odisha	1 st	2022


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Course Details:

Class	Final Year B.Tech., Sem.VII
Course Code and Course Title	0ICPR456 In-Plant Training
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	-
Total Hours	-
Credits	01
Evaluation Scheme: ESE	50

Course Outcomes(COs):

Upon successful completion of this course, the student will be able to:

0ICPR456_1	Analyze about the various softskills such as time management
0ICPR456_2	Understand the knowledge level skills, attribute for the students
0ICPR456_3	Apply the knowledge participate and collaborate new CAS projects
0ICPR456_4	Understand and improve their Knowledge and skills career development
0ICPR456_5	Analyze the industries fulfill the related skills career development

Course Contents:

The students Undergone for 15 days In-Plant Training under Curriculum credits

Mode of Assessment

This subject content of the internship emerging with thrust areas, the completion of work and the submission of report and assessment should be done at the end of part-I


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Course Details:

Class	Final Year B.Tech., Sem.VII
Course code and course Title	0ICPR457 Project(Phase-I)
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	0/0/4
Total Hours	-
Credits	02
Evaluation Scheme: ISE/ESE	50/100

Course Outcomes(COs):

Upon successful completion of this course, the student will be able to:

0ICPR410_1	Identify and formulate the real-world problem for the project in the field of their own interest (K2)
0ICPR410_2	Survey technical literature ,biogs, documents about latest technological trends etc. to come-up with an innovative idea for technical project(K2)
0ICPR410_3	Analyzethehardwareand/orsoftwarerequirementsoftheproposedwork(K4)
0ICPR410_4	Identify and use relevant tools (from industry) and technologies for documentation, designing,coding, testing and debugging the software, hardware pertaining to the project(K3)
0ICPR410_5	Defend or argue or appraise the results obtained during project work(K5)
0ICPR410_6	Design the prototype of the selected idea (K6)


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Course Contents:

- Project work is to be carried out in the group of three to four students.
- Someone has said that choosing teammates for project is way more significant than Choosing life partner. So here you will develop team building skills. On the contrary, Students must learn how to adjust with unknown team members and get the work done.
- Pre-project is intended to help the students become better learners and better engineers.
- The students shall select the project by reviewing the literature in the domain of their interest and with the consultation of the respective supervisor/guide and approval from the department and submit the brief document discussing outline of the project with clear objectives
- The students are encouraged to acquire and exercise professional skills such as inter-personal communication, presentation skills etc.
- The students shall be exposed to all the standard tools used in the industry with help of industry experts.
- The skills that students acquired during project are intended to make them better prepared for accomplishing their Major project with a great success.
- The students are supposed to learn to manage time to achieve the scheduled milestones of their project work.
- Students should maintain a project logbook containing weekly progress of the project.
- During semester project will be evaluated progress-wise as per the project calendar provided by the department.
- The students will prepare a prototype of their work by the end of the semester and it will be showcased along with a technical poster in the event organized by the department.
- project report should be prepared using Latex/word and submitted in soft and hard form



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Department of Computer Science & Engineering
(Internet of Things and Cyber security including Block Chain Technology)

Course Details:

Class	Final Year B.Tech., Sem. VIII
Course Code and Course Title	0ICPR458 Internship/Project(Phase-II)
Prerequisite/s	-
Teaching Scheme: Lecture/Tutorial/Practical	0/0/20
Total Hours	-
Credits	10
Evaluation Scheme: ISE/ESE	100/200

Course Outcomes(COs):

Upon successful completion of this course, student will be able to:

0ICPR457_1	Identify, formulate and solve a problem.(K1)
0ICPR457_2	Analyze the hardware and/or software requirements of the system(K4)
0ICPR457_3	Use different tools available in the market or design, coding, testing and deployment and documentation (K3)
0ICPR457_4	Design and construct hardware and/or software system, component, or process to meet desired requirements of the problem undertaken. (K6)



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Course Contents:

- Industry* or Institute Project is the task based work leading to partial or complete solution to a problem identified by industry/ institute. This final year project is intended to work on real-world problem solving and hence the students may be allowed to work as interns at various industries or institutes of national importance or the research labs.
- If the students opt for internships at industry, they will work on the problem statements defined by industry with contribution from internal mentor as well. The students who opt for in-house project will be encouraged to formulate the own ideas to solve the real-world problems in the domain of their interests leading to concrete solution to the problem in the institute premises. OR they can be part of any live ongoing research project in the department. The topics being selected should be from the thrust areas and sub-domains of computer science and engineering. The ideas sponsored by industry to be implemented at institute will also be encouraged. Also, it is advised that the students opting for in-house projects should extend their ideas identified in pre-project phase in semester VII.
- Irrespective of Industry sponsored project to be implemented at industry or in-house project, project group will select a project topic with consent from guide and approval from the department and submit the brief document discussing outline of the project with clear objectives. The students are required to undergo literature survey, formulate the problem and propose a methodology to achieve the objectives.
- Project work should involve analytical, experimental, design or combination of these in the area of Computer Science and Engineering; multi-disciplinary work is also encouraged.
- Students should maintain a project logbook containing weekly progress of the project.
- The project evaluation committee will evaluate the project throughout the semester. The progress of the project will be monitored and assessed as per the project calendar provided by the department.
- On completion of the work, students should prepare an article and should submit the same to national / international conference, research symposiums, and national / international peer reviewed journals. The students should participate in the project exhibitions/ competitions in and outside the institute at state/national level.
- On completion of the work, a project report should be prepared using Latex and the soft and print copy of the same should be submitted to the department.
- Students need to undergo all the modes of evaluation scheduled by the department time- to-time.



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