

# Course of Study 2018-19 Computer Engineering IILP



School: School of Computing Sciences and Engineering Department: Computer Science and Engineering Programme: BTech in Computer Engineering (IILP)

Semester	Course I	Course II	Course III	Course IV	Course V	L	Т	Р	С	ontact Hours
	TYBS101	TYCS101	TYCS102	TYCS103	TYHS111					Co
	L T P C	L T P C	L T P C	L T P C	L T P C					
	3 1 0 4	3 1 2 5	3 0 0 <b>3</b>	3 0 0 <b>3</b>	1 0 2 <b>2</b>					
	BS	PC	PC	PC	ES					
I	Algebra and Differential Calculus Statistics, Probability	Programming and Data Structures Through C	Microprocessor & Interfacing	Information Security Fundamentals	Communication Skills	10	3	4	15	17
	TYBS201	<b>TYCS201</b>	TYCS202	TYCS203	TYES201					
	L T P C	L T P C	L T P C	L T P C	L T P C					
	3 0 2 4	3 1 2 5	3 0 0 <b>3</b>	3 0 0 <b>3</b>	3 0 2 4					
Ξ	BS	PC	PC	PC	ES					
	Applied Physics and Chemistry	Object oriented Programming Through C++ (MOOC)	Computer Organization & Architecture	Discrete Mathematics	Fundamentals of Computing and Open Source Technology	15	2	6	20	23

Head of Department

**IILP** Coordinator

Programme Coordinator

Dean Academics

Associate Dean

<b>Document Reference</b>	<b>Revision No. / Date</b>	<b>Prepared By</b>	Approved By
SUN/SOCSE/UG/Btech/IILP/2019	20 August 2019		



Curriculum Development School: School of Computing Sciences and Engineering Department: Computer Science and Engineering Programme BTech in Computer Engineering (IILP)

Semester			Course I					Course II					Course III				Course IV				Course V		L	Т	Р	С	Contact Hours
		T	( CS.	301			ΤY	<u>CS3(</u>	)2			TYC	CS30	3		TY	CS304	1	_	TY	CE31	1					
	L	T	P	•	С	L		Г	P	С	L	Т	Р	C	L	Т	P	C	L	Т	Р	C	_				
	4	0	2	2	5	3	(	0	0	3	3	1	2	5	3	1	0	4	0	0	0	3					
Π			PC					PC				1	PC				PC			P	WSI						
	C I tl	Dbje prog hrou (N	t ori ram gh J 100	ent mi (AV (AV	æd ng √A		Coi Net	nput twor	er ks		Sys	Ope tem	ratin (MC	.g DOC)		The Comj	ory o putati	f on		Inter	nshi	рI	13	2	4	20	19
		ΤY	CS4	401			ΤY	CS4(	2			TYO	CS40	3		TY	<b>HS40</b> 1	1		TY	<b>CS4</b> 1	1					
	L	Т	P		С	L	Т	P	(	С	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С					
	3	1	2	2	5	3	1	0	4	4	3	1	2	5	2	0	2	3	0	0	4	2					
Ν			PC					PC				I	PC			I	ISS			P	WSI		11	2	10	10	24
	Co	omp	iler	De	sign	P	Sy rogr	vsten amn	n ning		N	Data Iana Sys	a Bas gem stems	se ent S	C	Tec Comm	hnica unica	l tion		Sei	nina	ır	11	3	10	19	24

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School: School of Computing Sciences and Engineering Department: Computer Science and Engineering Programme: BTech in Computer Engineering (IILP)

Semester		1	Course I				Course II				Course III				Course IV				Course v						L	Т	Р	С	ntact Hours
	,	TYC	CS501	L		TY	CS50	2		TYC	S503			TY	CS51	1	,	ГҮС	S512	2									$\mathbf{C}_{0}$
	L	Т	Р	С	L	Τ	P	C	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С									
	3	0	0	3	3	1	2	5	3	1	2	5	0	0	0	4	0	0	6	3									
$\triangleright$		F	C			]	PC			Р	С			P	WSI			PW	/SI							2	10	20	01
	Е	Soft ngir	ware leerir	ng		Desi Anal Alg	gn ar lysis orithr	nd of n	Prog	gramn Pyt	ning hon	With	I	nteri	nship	) II	Μ	ini F	Proje	ct					9	2	10	20	21
	,	TYC	CS601	L		TY	CS60	2		TYC	SE			TY	CSE	-	,	ГҮС	so	-	T	<b>YC</b>	S61	1					
	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С					
	3	0	0	3	3	1	2	5	3	0	0	3	3	0	0	3	3	0	0	3	0	0	6	3					
Μ		F	C			]	PC			PO	CE	•		Р	CE			0	Е			PW	<b>VSI</b>		15	1	8	20	24
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School: School of Computing Sciences and Engineering Department: Computer Science and Engineering Programme: BTech in Computer Engineering (IILP)

Semester			Course I				Course II				Course III				Course IV			ĩ	Course V		L	Т	Р	С	ontact Hours
		ΤY	<b>CS70</b> 1	l		ΤY	CSE			ΤY	CSO	-		ΤY	CS711	L		TYC	CS712	2					CC
	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С	L	Т	Р	С					
	3	1	2	5	3	0	0	3	3	0	0	3	0	0	16	8	0	0	0	6					
ΠΛ			PC			]	PCE			(	OE			Р	WSI			PV	VSI		9	1	18	25	28
	So	ftwa and Ass	re Tes Quali uranc	sting ty e		I	PEIII			С	DEII		Pro	oject Viv	Stage a Voc	II & e	In	tern	ship	III		1	10	25	20

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School: School of Engineering and Technology Department: Computer Engineering Programme: BTech in Computer Engineering (IILP)

# List of Program Electives

ProgramElective I									
Computer	Engineering								
Course Code	Course	L	Т	Р	С				
TYCSE01	Information and Cyber Security	3	0	0	3				
TYCSE02	Neural Networks	3	0	0	3				
TYCSE03	Soft Computing	3	0	0	3				
TYCSE04	Mobile Computing	3	0	0	3				

Program E	Program Elective II									
Computer	Engineering									
Course Code	Course	L	Т	Р	С					
TYCSE05	Information Storage and Retrieval	3	0	0	3					
TYCSE06	Advanced Software Engineering	3	0	0	3					
TYCSE07	Distributes System	3	0	0	3					
TYCSE08	Embedded and Real Time Operating System	3	0	0	3					

Program Elective III										
<b>Computer Engin</b>	neering									
Course Code	Course	L	Т	Р	С					
TYCSE09	Grid and Cluster Computing	3	0	0	3					
TYCSE10	Internet of Things	3	0	0	3					
TYCSE11	Advanced Computer Networks	3	0	0	3					
TYCSE12	Advanced Databases	3	0	0	3					

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Curriculum Development School: School of Engineering and Technology Department: Computer Engineering Programme: BTech in Computer Engineering (IILP)

# List of Open Electives

Open Elective I							
Computer Engineering							
Course							
Code	course	Ľ	1	1	C		
TYCSO01	Cloud Computing	3	0	0	3		
TYCSO02	Web Technology	3	0	0	3		
TYCSO03	Machine Learning	3	0	0	3		
TYCSO04	Data Mining	3	0	0	3		

Open Elective II Computer Engineering							
Course Code	Course	L	Т	Р	С		
TYCSO05	Ubiquitous Computing	3	0	0	3		
TYCSO06	Business Intelligence	3	0	0	3		
TYCSO07	Artificial Intelligence	3	0	0	3		
TYCSO08	Cloud Virtualization	3	0	0	3		

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# **SEMESTER I**

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**Computer Engineering (IILP)** 

# Year: First Year

#### Semester – I

Course: Algebra and Differential Calculus Statistics, Probability Course Code: TYBS101

Teaching Scheme (Hrs. /Week)			Continuous Internal Assessment (CIA) End Semester Examination					ester tion	Total	
L	Т	P	C	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	1	0	4	20	20	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Semester	r Exam (	Lab) – 00 Hrs.			

#### **Perquisites:**

- 1. Introduction and basic concepts of derivative and integration of functions.
- 2. Basic concepts and methods to solve simultaneous equations, quadratic equations.

#### **Objectives: The course will enables students to:-**

- 1. To solve System of linear equations using matrix methods.
- 2. To understand partial differentiation with their applications stationary values arising in engineering optimization problems.
- 3. To solve ordinary differential equations
- 4. To understand the basic concepts of statistics and probability

Unit No	Module	Details	Hours
1	Ι	<b>Matrices:</b> Elementary Operations, Rank of a Matrix using Echelon form, Reduction to normal form, Solution of system of Homogeneous and Non –Homogeneous Linear Equations.	5
1	Π	<b>Matrices (Continued):</b> Linear Dependent and Independent vectors, Linear & Orthogonal Transformations, Eigen values & Eigen vectors, Diagonal Form	5
2	Ι	<b>Partial Differentiation:</b> Partial derivatives of first and second order, Total Derivatives, Partial derivatives of implicit functions, composite functions and associated Theorems.	5
2	II	<b>Applications of Partial Derivatives:</b> Maxima & Minima of Functions of Two variables, Lagrange's method of undetermined multipliers, Errors & Approximations	5
3	Ι	<b>Ordinary Differential Equations:</b> Order and degree of Differential Equations, Solutions of Ordinary Differential Equations of first order and first degree, Methods of finding General Solution of DE of first order and first degree such as variable separable, substitution, homogeneous & non homogeneous DEqs,	5
	II	<b>Ordinary Differential Equations (continued)</b> : Exact DEqs, Reducible to exact DEqs, Linear DEqs, Reducible to linear DEqs, Symmetrical simultaneous differential equation and its applications.	4
1	Ι	<b>Statistics:</b> Measures of central tendency, standard deviation, coefficient of variation	4
4	II	<b>Statistics (Continued):</b> correlation and regression, reliability of regression estimates	4

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5	I Probability: Basic concepts of Probability, Probability Theor properties of probability, probability density function.		4
5	II	<b>Probability distributions</b> : Binomial, Poisson and Normal distributions, chi-square test.	4

Outcomes:
On completion of the course, student will be able to-
CO1 Student will able to use matrix algebra and solve system of linear equations using matrix
methods
CO2 Student will able to ordinary differential equations of first order and first degree
<b>CO3</b> Student will be able to solve symmetrical simultaneous differential equations
<b>CO4</b> Student will be able to understand basic statistical tools, correlation and regression lines.
CO5 Student will be understand probability theory and distribution
Text Books
1. Higher Engineering Mathematics by B.V.Ramana, (Tata-McGraw Hill)
2. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.)
Reference Book
1. Higher Engineering Mathematics by B.S.Grewal (Khanna Publications, Delhi)
2. Advanced Engineering Mathematics, 2e by M.D.Greenberg (Pearson Education)
E-Resources
1. https://onlinecourses.nptel.ac.in/noc18_ce04/preview

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# Year: First Year Course: Programming and Data Structures Through C

Semester – I Course Code: TYCS101

Sc	Teac hem /W	ching e (H eek)	g [rs.	Continuous Internal Assessment (CIA) End Semester Examination					nester ation	Total
L	Τ	P	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	1	2	5	20	20	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.						End Seme	ster Exar	n (Lab) – 00 Hrs.		

# **Perquisites:**

C Programming

Objectives:					
The course will enables students to:-					
1	Introduce the basics of C programming language.				
2	Introduce the concepts of ADTs.				
3	Introduce the concepts of Hashing and Sorting.				

Unit No	Details	Hours						
1	<b>Introductory concepts of C-</b> Data types-Control structures-Definitions of Data Structure and Algorithm –The Abstract Data Type-Algorithm efficiency- Searching List structures Hashed List structures Pasis sensents Hashing methods	8						
2	<b>Linear and Linked List concepts-</b> Linked List Algorithms-Processing a Linked List-List Applications-Complex Linked List Structures-Implementation-Case studies	8						
3	Stacks: Basic Operations- Linked List Implementation- Applications-Stack ADT- Array Implementation- Queues: Operations-Linked List design-Implementation-Case study-Overflow and underflow of stack size							
4	Trees: Basic Tree Concepts-Binary Trees- Tree Traversals- General Trees- SearchTrees: Binary Search Trees-AVL trees-Graphs: Operations-Depth First Traversal-Breadth First Traversal-Implementation-StorageStructures-Case studies	8						
5	General Sort concepts-Insertion Sort-Shell Sort-Selection Sort-Heap Sort-Exchange Sort-Bubble sort-Quick Sort-Case studies	7						

#### **Outcomes:**

On com	On completion of the course, student will be able to-							
CO1	Several data structures concepts like stack, queues, linked list, trees and files							
CO2	Applications of data structures							
<b>CO3</b>	Problem solving using data structure tools and techniques							
Text Bo	ooks							
1. 1	1. RICHARD F.GILBERG AND BEHROUZ A.FOROUZAN "DATA STRUCTURES - A Pseudo							
	<i>codeApproach with C++</i> ",THOMSON ASIA, 2005.							

**Reference Book** 

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**Computer Engineering (IILP)** 

1. HERBERT SCHILDT "The Complete Reference C++" Fourth Edition, TataMcGraw Hill Edition, 2003.

2. YEDIDYAH LANGSAN, MOSHE J. AUGENSTEIN AND AORON M. TANENBAUM "Data Structures using C and C++", Prentice-Hall of India Pvt Ltd, 2004.

3. SARTAJ SAHNI "Data Structures, Algorithms and Applications in C++", McGraw-Hill International Edition, 2000.

4. MARK ALLEN WEISS, "Data Structures and Algorithm Analysis in C++" Addison-Wesley Publishing Company, 1994.

5. AHO, HOPCROFT, ULLMAN – "Data Structures and algorithms" – Pearson Education – 1983.

6. JEAN PAUL TREMBLAY & PAUL SORENSON - "An Introduction to Data Structures with

#### **List of Experiments:**

1. Programs for Control Structures, Arrays, and Functions.

2. Programs using pointers.

3. Programs using structures.

4. Programs using file IO and pre-processing.

5. Array implementation of List Abstract Data Type (ADT)

6. Linked list implementation and cursor implementation of List ADT

7. Stack ADT – Array and linked list implementations

8. Implement the Queue ADT in different ways and use it for different applications

9. Search ADT using different implementations including Sorted Link List, Binary Search Tree hashing, and different applications

10. Sorting of numbers

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# Year: First Year Course: Microprocessor & Interfacing

#### Semester – I Course Code: TYCS102

Teaching Scheme (Hrs. /Week)			g Irs.	Continuous Internal Assessment (CIA)				End Semester Examination		Total	
L	Τ	P	C	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab		
3	0	0	3	20	20 20 10 50 10						
Ma	Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Seme	ster Exan	n (Lab) – 00 Hrs.			

Perquisites:	
Digital Circuits	

Objecti	Objectives:						
The cou	rse will enables students to:-						
1	Architecture of 8086 & 8088 microprocessors						
2	Instruction sets of 8086/88 and programming.						
3	Math Coprocessor & I/O processor and multiprocessor configuration						
4	Interfacing of microprocessor with various peripheral devices						

Unit No	Details	Hours
1	<b>Intel 8085 Architecture</b> Introduction to 8085 - 8085 architecture- Instruction Set & Assembler Directives- Assembly Language Programming with 8085.	7
2	<b>Intel 8086/8088 Architecture</b> Introduction to 8086/8088 - 8086/8088 architecture- Instruction Set & Assembler Directives- Assembly Language Programming with 8086/8088- Special Architectural Features.	9
3	<b>Communication Interfaces</b> Basic Peripherals & their interfacing with 8086/8088- Semiconductor Memory Interfacing-Dynamic RAM Interfacing-Interfacing I/O Ports-PIO 8255-Modes of Operation-Interfacing Analog to Digital Data Converters-Stepper Motor Interfacing	8
4	<b>Peripheral Interfaces:</b> Special Purpose Programmable Peripheral Devices & their Interfacing-Programmable Interval Timer 8253-Programmable Interrupt Controller 8259A-DMA Controller 8257-DMA Transfers & Operations-Programmable DMA Interface 8237.	12
5	<b>Multiprocessor Systems:</b> Interconnection Topologies- Software Aspects of Multiprocessor Systems- Numeric Processor 8087- Bus Arbitration & Control-Tightly Coupled & Loosely Coupled Systems	9

Outcon	Outcomes:						
On com	On completion of the course, student will be able to–						
1	Draw 8086 & 8088 microprocessors architectures.						
2	Write 8086 & 8088 microprocessor programs.						
3	Understand various peripherals and configurations of microprocessors.						
Text Books							
1. 1	1. Ray A K, K M Bhurchandi, "Advanced Microprocessor & Peripherals", Tata McGraw Hill,1st						
]	Edition,2000.(CH1,CH2,CH3,CH4,CH5,CH6,CH7,CH8,CH16.)						

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#### **Reference Book**

1. Douglas V Hall, "Microprocessor & Interfacing", Tata McGraw Hill, 2nd Edition, 1999.

2. Rafiquzzuman M, "Microprocessor theory & Applications", Prentice Hall of India, 1994.

3. Yuchenhiu, Glenn A Gibson, "*Microprocessor Systems - 8086/8088 Family*", PrenticeHall of India, 2nd Edition, 1986.

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# Year: First Year Course: Information Security Fundamentals

### Semester – I Course Code: TYCS103

Teaching Scheme (Hrs. /Week)			g Irs.	Continuo	Continuous Internal Assessment (CIA)			End Semester Examination		Total
L	T	P	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	0	0	3	20	20	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Semest	er Exam	(Lab) – 00 Hrs.			

# **Perquisites:**

Basic concept of networking

Objecti	ves:
The cou	urse will enables students to:-
1	To Learn Types of Threats, Vulnerabilities, Risks and various terminologies in Information
-	Security.
2	To Learn the formation of Security policy at various levels inside the Organization
3	To emphasizes the need of Performing Asset Classification and Declassification, Retention
	and Disposal of Information Asset
4	To Learn the various levels of Authorization for access Viz., Owner, Custodian and User.

Unit No	Details	Hours
1	<ul> <li>Module 1:Motivation and objectives: Research methods vs Methodology Introduction to Information Security Definition of Information Security, Evolution of Information Security; Basics Principles of Information Security; Critical Concepts of Information Security; Components of the Information System;</li> <li>Module 2: Balancing Information Security and Access; Implementing IT Security, The system Development Life cycle, Security professional in the organization.</li> </ul>	9
2	<ul> <li>Module 1 The Need for IT Security Business Needs-Protecting the functionality, Enabling the safe operations, Protecting the data, safe guarding the technology assets;</li> <li>Module 2 The Need for IT Security: Threats-compromises to Intellectual property, deliberate software attacks, Espionage and trespass, sabotage and vandalism;</li> </ul>	9
3	Module 1: Attacks-Malicious Codes, Back Doors, Denial of ServiceModule 2: Distributed Denial of Service, Spoofing, sniffing, Spam, Social Engineering.	8
4	<ul> <li>Module 1 Risk Management: Definition of risk management, risk identification, and risk control, Identifying and Accessing Risk,</li> <li>Module 2: Assessing risk based on probability of occurrence and likely impact, the fundamental aspects of documenting risk via the process of risk assessment, the various risk mitigation strategy options, the categories that can be used to</li> </ul>	9

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	classify controls. Network Infrastructure Security and Connectivity	
5	<ul> <li>Module 1: Understanding Infrastructure Security- Device Based Security, Media-Based Security, Monitoring and Diagnosing; Monitoring Network- Firewall, Intrusion Detection System, Intrusion</li> <li>Module 2: Prevention system; OS and Network Hardening, Application Hardening; Physical and Network Security- Policies, Standards and Guidelines.</li> </ul>	9

#### **Outcomes:**

# On completion of the course, student will be able to-

On con	pretion of the course, student will be use to			
CO1	To enable students to understand the concepts of IT security, Threats, Vulnerabilities, Impact and control measures.			
CO2	And also to get familiarize with Asset management along with the objective to create awareness in Digital Rights management			
CO3	To identify the various levels of Authorization for access Viz., Owner, Custodian and User.			
CO4	To Understanding Infrastructure Security- Device Based Security, Media-Based Security			
Text B	ooks			
1.	Information Security Risk Analysis - Thomas R. Peltier, Third Edition, Pub: Auerbach, 2012			
2.	Operating System Concepts, 8th Edition by Abraham Silberschatz, Peter B. Galvin, Greg			
	Gagne, Pub: John Wiley & sons, Inc., 2009.			
Referen	nce Book			
1.	Information security: Principles and Practice - Mark Stamp, 2 <sup>nd</sup> Edition, Pub: John Wiley & Sons, Inc., 2011			

# **E-Recourses**

- 1. http://nptel.ac.in/courses/106103068/
- 2. http://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/

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**Computer Engineering (IILP)** 

# Year: First Year

**Course:** Communication Skills

#### Semester – I

Course Code:TYHS111

Teaching Scheme (Hrs. /Week)		Continuous Internal Assessment (CIA)				End Semester Examination		Total		
L	Т	Р	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
1	0	2	2	20	20	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Sen	nester Exa Hrs	am (Lab) – 00			

#### **Perquisites:**

- 1. Functional grammar-Parts of speech, Tenses, Sentence pattern
- 2. Formal letter
- 3. Fluency in reading and speaking

Objecti	Objectives:				
The cou	rse will enables students to:-				
1	To acquire basic language skills (LSRW) to communicate with speakers of English				
	language.				
2	To develop their intellectual, personal and professional abilities.				
3	To develop skill to communicate fluently.				
4	To enhance team building and time management skills.				
5	To inculcate employability skills among students.				

Unit No	Modules	Details	Hours
	Ι	English Vocabulary building: Affixes, Prefixes & Suffixes	3
1	II	Word building- Compound words, Standard Abbreviations	2
1	III	Antonyms and Synonyms- functional usage	2
	IV	Active & Passive voice	2
	Ι	Writing skills: Parts of speech	3
	II	Paragraph writing	2
2	III	Use of Idioms, Phrases and Proverbs in sentences	2
	IV	Basic sentence pattern	1
	V	Importance of punctuation	1
	т	CALL- Computer Assisted Language Laboratory	4
	1	Listening exercises- Extempore	4
2	II	Vocabulary building - Task based Lab Activities	5
5	III	Language fluency, Linguistic accuracy & Communicative fluency	5
	IV	Listening to varied registers-Role play - Situational Dialogues	2
	V	Pronunciation, Intonation, Stress and Rhythm- Public speaking	4
	Ι	Oral & Written Presentation: Tenses	2
4	II	Ice breaking, reporting, Question & answer skill	2
	III	Formal & Informal speech	3

#### **Outcomes:**

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On con	mpletion of the course, student will be able to-
CO1	Students will acquire basic proficiency in English including reading and listening
	comprehension, writing and speaking skills.
CO2	Students will be able to write formal letters effectively.
CO3	Students will be able to prepare, organize and deliver oral presentation.
<b>CO4</b>	Students will develop reading speed and build academic vocabulary.
CO5	Students will demonstrate behaviour and attitudes appropriate to university environment.
Text E	Books
1.	Communication Skills by Sanjay Kumar and PushpaLata, Oxford University Press.
2.	Developing Communication Skill by Krishna Mohan, MeeraBanerji, McMillan India Ltd.
3.	English for Business Communication by Simon Sweeney, Cambridge University Press.
4.	Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
Refere	ence Book
1.	Ethics in Engineering Practice and Research by Caroline & Whitbeck, Cambridge University
	Press.
2.	Basic Managerial Skills by E. H. McGrath, Eastern Economy Edition, Prentice hall India.
3.	Change Your Thoughts; Change Your Life by Wayne Dyer, Hay House India, ISBN-139788189988050.
4.	The Power of Your Subconscious Mind by Dr Joseph Murphy MaanuGraphics, ISBN-13 9789381529560.
5.	Baltra, A. (1986). "Computer assisted language learning: What is it all about?" Paper presented at a conference at the University of California, Irvine.
6.	Jones, C. (1986). It's not so much the program, more what you do with it: The importance of
	methodology in CALL. "System, 14"(2), p.171-78.
7.	Rivers, W. (Ed.). (1987) "Interactive language teaching." NY: Cambridge University Press.
E-Rec	ourses
1.	https://www.britishcouncil.in/sites/default/files/esfe_report.pdf
2.	https://www.britishcouncil.org/sites/default/files/english-soft-skills-maghreb-research-
	<u>report.pdf</u>
3.	http://nptel.ac.in/courses/109104030/references/references.pdf
4.	http://promeng.eu/downloads/training-materials/ebooks/soft-skills/effective-
1	communication-skills ndf

List of Experiments			
Sr. No.	Description		
1	Module 1: CALL- Computer Assisted Language Laboratory: Listening exercises-		
1	Extempore		
2	Module 2: Vocabulary building -Task based Lab Activities		
3	Module 3: Language fluency, Linguistic accuracy & Communicative fluency		
4	Module 4: Listening to varied registers-Role play - Situational Dialogues		
5	Module 5: Pronunciation, Intonation, Stress and Rhythm- Public speaking		

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# **SEMESTER II**

<b>Document Reference</b>	Revision No. / Date	Prepared By	Approved By
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# Year: First Year Course: Applied Physics and Chemistry

#### Semester – II Course Code: TYBS201

Sc	Teaching cheme (Hrs. /Week)Continuous Internal Assessment (CIA)End Semester Examination			Total						
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	0	2	4	20	20	10		50		100
Max. Time. End Semester Exam (Theory) - 03 Hrs. End Semester E					ster Exar	n (Lab) – 00 Hrs.				

#### **Perquisites:**

- 1. Introduction and basic concepts of derivative and integration of functions.
- 2. Basic concepts and methods to solve simultaneous equations, quadratic equations.

Object	Objectives:							
The cou	The course will enables students to:-							
1	To solve System of linear equations using matrix methods.							
2	To understand partial differentiation with their applications stationary values arising in							
	engineering optimization problems.							
3	To solve ordinary differential equations							
4	To understand the basic concepts of statistics and probability							

Unit No	Modul es	Details	Hours
1	Ι	<b>Laser:</b> Laser - introduction, difference between ordinary source of light and laser. Properties of laser, Absorption, spontaneous and stimulated emission, population inversion, pumping and types of pumping. Active medium, Components of laser. Three level and four level system, Ruby laser, He-Ne laser, Applications of laser industrial, medical etc. Holography.	8
2	II	<b>Semiconductor physics</b> Introduction to formation of energy bands in solids. Classification of solids, electrical conductivity in conductor and semiconductors. Influence of external factors on conductivity (temperature, impurity), Hall effect.	6
3	III	<b>Superconductivity</b> : properties of superconductor, Meissner effect, isotope effect, persistent current, critical current density, critical magnetic field, BCS theory of superconductivity, type-I and type-II superconductors. DC and AC Josephson effect, SQUIDS, application of superconductivity like magnets, transmission line, levitation, etc.).	6
4	IV	Water Technology: Boiler problems- scale, sludge, priming, foaming, caustic, and corrosion, causes, preventions, and disadvantages. Embroilment Water softening processes (external and internal treatment methods) – Zeolite process, Ion exchange method, Desalination, Reverse osmosis &Electro dialysis. Phosphate conditioning, colloidal conditioning, calgon conditioning for boiler feed water.	10
5	V	<b>Polymer:</b> Degree of polymerisation, classification of polymers based on sources, composition, structure etc., Types of polymerisation- addition and condensation polymerisation, free radical mechanism of addition	10

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# **Computer Engineering (IILP)**

polymerisation. compounding of plastics, glass transition temperature and
factors affecting it. Important polymers- Preparation, properties and
Engineering uses. Thermoplastics, Thermosetting plastics, polythene (LDPE
and HDPE), Polycarbonate, Nylon-6, Nylon-66, , Rubber, processing of natural
rubber, vulcanization of rubber, synthetic rubber, Natural and synthetic
rubber.

# **Outcomes:**

On cor	mpletion of the course, student will be able to-					
CO1	Student will able to understand basics involved in lasers.					
CO2	Student will able to classify solids, will understands the concepts involved in conductivity.					
CO3	Student will be able to understand basic concepts of superconductivity.					
<b>CO4</b>	Student will be able to understand impurities in water and their treatment methods.					
CO5	Student will be understand preparation, properties and applications of some polymers.					
Text B	Books					
1.	A text book of Engg. Physics by M. N. Avadhalula and P. G. Kshirsagar, S. Chand Pub.					
2.	Engg. Physics by Abhijit Nayak, S. K. Kataria and sons Pub.					
3.	R. K. Gaur and S.C. Gupta, 'Engineering Physics' Dhanpat Rai Publications, New					
	Delhi(2003)					
4.	A Text book of Engineering Chemistry by Dr S S Dara, Dr S S Umare, S Chand &					
	company Ltd.					
5.	Engineering Chemistry - Sunita Rattan					
6.	Engineering Chemistry, K. Shesha Maheshwari, Mridula Chug, Pearson, 2018					
Refere	ence Book					
1.	Engineering Physics, malik and singh, Tata Mc Graw Hill.					

- 2. A textbook of engineering Physics, Pillai, sivakami, new age International, limited
- 3. Corrosion Engineering ,Fontenna & Greene
- 4. Chemistry, Raymond Chang. (Tata McGraw Hill).

# **E-Recorses**

List of Experiments
1. To determine the wavelength of laser by using plane diffraction grating
2. To Determine the sound absorption coefficient
3. To study Hall effect
4. To determine band gap of semiconductor
5. Identify and determination of type and amount of alkalinity in given water sample
6. Performing titration of Strong acid Vs Weak base by using PH Meter
7. Determining Hardness of given water sample By EDTA method
8. Preparation of phenol formaldehyde resin .

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# Year: First Year Course: Object oriented Programming Through C++ (MOOC)

Semester – II Course Code: TYCS201

Sc	Teaching cheme (Hrs. /Week) Continuous Internal Assessment (CIA)			iching ne (Hrs. Continuous In Veek)		) End Semester Examination		Total		
L	Т	P	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	1	2	5	20	20	10		50		100
Ma	Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Seme	ster Exan	n (Lab) – 00 Hrs.		

### **Perquisites:**

C++ Programming

Objecti	Objectives:					
The cou	The course will enables students to:-					
1	To study the object-oriented programming principles and techniques.					
2	To understand and apply fundamental concepts of OOP such as data abstraction,					
	encapsulation, inheritance, dynamic binding and polymorphism.					
3	To create base of cutting-edge programming.					

Unit No	Details	Hours
1	Foundations of Object Oriented Programming :Introduction: Introduction to procedural, modular, object-oriented and generic programming techniques, Limitations of procedural programming, Need of object-oriented programming, fundamentals of object-oriented programming: objects, classes, data members, methods, messages, data encapsulation, data abstraction and information hiding, inheritance, polymorphism	8
2	C++ Extensions to C : Variable declarations, global scope, 'const', reference variables, operators in C++(scope resolution, new , delete), dynamic memory allocation, function prototypes, default and constant arguments, 'cin', 'cout', inline functions	8
3	Overloading and Inheritance : Function overloading, friend function, friend class Operator Overloading : Introduction, Need of operator overloading, rules for operator overloading, overloading the unary and binary operators using member function, operator overloading using friend function, overloading relational and logical operators, overloading new, delete and assignment operator, type conversions Inheritance : Introduction, Need of inheritance, base and derived classes, member access control, types of inheritance, derived class constructor, constructors in multiple inheritance, overriding member functions, ambiguity in multiple inheritance, virtual base class	7
4	Virtual Functions and Templates : Virtual functions : Pointers to objects, 'this' pointer, Pointers to derived class, virtual function, rules for virtual function, pure virtual function, abstract class, virtual destructors, early and late binding, container classes Templates : Introduction, Function template and class template, overloading function template, member function templates and template arguments, Introduction to Standard Template Library (STL), containers, iterators and algorithms	8

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#### **Computer Engineering (IILP)**

5	Exception Handling and File I/O : Namespaces: Introduction, Rules of namespaces Exception Handling: Introduction, Exception handling mechanism: try, catch and throw, Multiple Exceptions, Exceptions with arguments Managing Console I/O Operations: Introduction C++ streams, stream classes, unformatted I/O, formatted	7
	I/O and I/O manipulators File I/O: Introduction, Classes for file stream operations, file operations (open, close, read, write, detect end of file), file modes, File pointers	
	and their manipulations, error handling during file operations	

Outcon	Outcomes:						
On com	pletion of the course, student will be able to-						
1	Apply standards and principles of OOP to write executable code.						
2	Understand and apply constructs such as friend function, static members, constructors and						
	destructors in C++.						
3	Understand and apply exception handling mechanism and debugging in C++.						
Text Bo	ooks						
1. ]	R G Dromey, "How to Solve it by Computer", Pearson Education, 2008, ISBN-13: 978-						
8	131705629. 2. Maureen Spankle, "Problem Solving and Programming Concepts", Pearson,						
20	011, ISBN-13: 978-0132492645.						
2. F	Robert Lafore, "Object-Oriented Programming in C++", SAMS Techmedia.						
Referen	Reference Book						
1	Joyce Farrell, "Programming Logic and Design", Cengage Learning, ISBN-13: 978-						
l	1285776712.						
2.	E. Balaguruswamy, "Object-oriented Programming with C++", Tata McGraw Hill, 5th edition.						
2	2 Harbort Schildt "Child The Complete Defenses" McCrow Hill						

Herbert Schildt, "C++: The Complete Reference", McGraw-Hill.
 Shukla, "Object-Oriented Programming in C++, w/cd", Wiley, ISBN-9788126516582.

5. Kogent, "Object Oriented Programming Methodology", Wiley, ISBN-9789351191841.

#### **List of Experiments**

- 1. Create class Student having Roll No. and Name member variable and get\_data () and put\_data() member functions. Take values for member variables through member functions and print those values by calling member functions through object.
- 2. Create any one class and demonstrate the use of static member variable and static member functions.
- 3. Write a program to display name and age of five managers using array of objects.
- 4. Write a program to demonstrate the use of friend function within class.
- 5. Write a program containing Default Constructor, Parameterized Constructor, and Destructor
- 6. Write a program to sort the numbers in an array using separate functions for read, display, sort and swap.
- 7. Write a program to perform addition, subtraction, multiplication and division operations on complex numbers.
- 8. Write a program to implement database of persons using inheritance which have different profession e.g. engineer, doctor, student, laborer etc.
- 9. Write a program in C++ to handle the "Divide by zero" exception.
- 10. Write a program in C++ using the open (), eof() and getline() member functions to open and read file content line by line.

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# Year: First Year Course: Computer Organization & Architecture

# Semester – II

**Course Code:** TYCS202

Teaching Scheme (Hrs. /Week)			g Irs.	Continuous Internal Assessment (CIA)				End Semester Examination		Total
L	Τ	Ρ	C	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	0	0	3	20	20	10		50		100
Ma	Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exam					n (Lab) – 00 Hrs.				

# **Perquisites:**

Fundamental of Programming Languages

Objecti	Objectives:					
The cou	irse will enables students to learn:-					
1	Various Computer architectures					
2	Functions of CPU, Control unit, I/O Processing					
3	Memory and its types					
4	Design of the above components					

Unit No	Details	Hours
1	<b>Introduction :</b> Evolution of Computer Systems-Computer Types-Functional units- Basic operational concepts-Bus structures- Memory location and addresses- memory operations- Addressing modes-Design of a computer system- Instruction and instruction sequencing, RISC versus CISC.	8
2	<b>Central Processing Unit:</b> Introduction-Arithmetic Logic Unit - Fixed point arithmetic, floating point arithmetic-Execution of a complete instruction-Basic concepts of pipelining.	8
3	<b>Control Unit Design:</b> Introduction-Control Transfer-Fetch cycle - Instruction Interpretation & Execution - Hardwired control – Micro programmed control.	7
4	<b>Memories And Subsystems :</b> Semiconductor memory - Static and Dynamic - Associative memory- Cache memory- Virtual memory- Secondary memories-Optical magnetic tape & magnetic disks & controllers.	8
5	<b>I/O Processing</b> :Introduction-Data transfer techniques- Bus Interface- I/O Channel-I/O Processor, I/O devices -Direct memory access.	7

# **Outcomes:**

-						
On com	On completion of the course, student will be able to-					
-						
1	Understand Functions of CPU, Control unit, I/O Processing					
2	Learn Memory and its types					
3	Understand Memory organization and its types					
5	Onderstand Memory organization and its types					
Tart Da						
Text Bo	JOKS					
1 Car	Hamacher "Computer Organization" FifthEdition McGrawHill International Edition 2002					
1.Cai	1. Carl Hamacher, Computer Organization, Fittheution, McGraw Hill International Edition, 2002					
Referen	Reference Book					
1 P Pal	Chaudhuri "Computer Organization and Design" 2nd Edition PHI ' 2003					
1.1.1 archaudhain, Comparer Organization and Design , 2nd Edition, 111 2005						

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William Stallings, "Computer Organization and Architecture – Designing for Performance", PHI, 2004.
 John P.Hayes, "Computer Architecture and Organization", III Edition, McGraw Hill International

3. John P.Hayes, "Computer Architecture and Organization", III Edition, McGraw Hill International Editions, 1998.

**E-Recourses** 

1.

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# Year: First Year Course: Discrete Mathematics

#### Semester – II Course Code: TYCS203

Teaching Scheme (Hrs. /Week)			g Irs.	Continuous Internal Assessment (CIA)				End Semester Examination		Total
L	Τ	P	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	0	0	3	20	20	10		50		100
Ma	Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Seme	ster Exan	n (Lab) – 00 Hrs.		

# **Perquisites:**

Basic Mathematics

Objecti	Objectives:			
The cou	rse will enables students to learn:-			
1	Have knowledge of the concepts needed to test the logic of a program.			
2	Have an understanding in identifying structures on many levels.			
3	Be aware of a class of functions which transform a finite set into another finite sewhich			
	relates to input output functions in computer science.			
4	Be aware of the counting principles			
5	Be exposed to concepts and properties of algebraic structures such as semigroups, monoids			
	and groups.			

Unit No	Details	Hours
1	<b>Logic And Proofs Propositional Logic</b> – Propositional equivalences-Predicates and quantifiers – Nested Quantifiers – Rules of inference-introduction to proofs – proof methods and strategy.	8
2	<b>Combinatorics:</b> Mathematical induction – Strong induction and well ordering – The basics of counting - The pigeonhole principle – Permutations and combinations – Recurrence relations- Solving linear recurrence relations- generating functions – Inclusion and exclusion and applications.	8
3	<b>Graphs:</b> Graphs and graph models – Graph terminology and special types of graphs – presenting graphs and graph isomorphism – connectivity – Euler and Hamilton paths.	7
4	Algebraic Structures: Algebraic systems – Semi groups and monoids – Groups- Subgroups and homomorphisms – Cosets and Lagrange's theorem – Ring & Fields.	8
5	Lattices And Boolean Algebra:Partial ordering – Posets – Lattices as Posets – Properties of lattices-Lattices as algebraic systems – Sub lattices – direct product and Homomorphism – Some special lattices – Boolean algebra	8

Outcon	Outcomes:			
On com	pletion of the course, student will be able to-			
1	Solve real world problems logically using appropriate set, function, and relation models and			
	interpret the associated operations and terminologies in context.			
2	Analyze and synthesize the real world problems using discrete mathematics.			
Text Bo	Text Books			

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1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", 6th Edition, SpecialIndianedition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, (2007).

2. Trembly J.P. and Manohar R, "Discrete Mathematical Structures with Applications toComputer Science", Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 30th Re-print (2007).

# **Reference Book**

1. Ralph. P. Grimaldi, "Discrete and Combinatorial Mathematics: An AppliedIntroduction", Fourth Edition, Pearson Education Asia, Delhi, (2002).

2. Thomas Koshy, "Discrete Mathematics with Applications", Elsevier Publications, (2006).

3. Seymour Lipschutz and Mark Lipson," Discrete Mathematics", Schaum'sOutlines, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2007, Second edition, Fifth reprint, (2007).

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### Year: First Year Course: Fundamentals of Computing& Open Source Technology

Semester – II Course Code: TYES201

Teaching Scheme (Hrs. /Week)			g Irs.	Continuous Internal Assessment (CIA)				End Semester Examination		Total
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	0	2	4	20	20	10		50		100
Ma	Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exam (Lab) – 00 Hrs.					n (Lab) – 00 Hrs.				

#### **Perquisites:**

Computer Organization and Architecture

Objectives:				
The cou	The course will enables students to learn:-			
1	To learn basics of computer hardware.			
2	To learn use of Open source operating system and compilers			
3	To learn various programming language paradigms			
	To learn fundamentals of Open Source Technology.			
	To know basic fundamentals of Open Source Softwares.			

Unit No	Details	Hours
1	<b>Program Development Concepts:</b> Fundamental building blocks of Computer, Block diagram of Computer, Evolution of Computers, Operating System, Softwares, Types of Software: - System Software and Application Software, Input Output devices	6
2	Introduction to Algorithms, Characteristics of Algorithm, flowcharts, <b>Programming language tools:</b> Programming language tools Editor, Compiler, Linker and Loader. Types of Editor, Types of Compiler. Program execution process.	6
3	<b>Introduction to Programming Languages:</b> Types of programming languages: - Machine Level, Assembly Level, High Level programming Languages, Procedure Oriented programming language and Object Oriented Programming Language	6
4	<b>Open Source:</b> Why open source, What is Open Source, Open Source Principles, Why OSS has Succeeded, Free software, What is Free Software? Open Source Standards. Introduction to open source operating systems and programming languages,	6
5	<b>Introduction to program development environments</b> : BOSS and GCC, Open Source Versus Closed Source, The Ethics of open Source, Social and Financial Impacts of Open Source Technology	6

Outcomes:				
On com	On completion of the course, student will be able to-			
1	Understand types of open source softwares and their use			
2	Learn different computer hardware components and its working			
3	Differentiate between various programming languages			

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#### **Computer Engineering (IILP)**

	Computer Engineering (IEEF)
4	Understand the concept of open Source Technology
5	To Understand the and Financial Impacts of Open Source Technology
Text E	Books
1.	YashavantKanetkar, "Let Us C", BPB Publications, 10/E,2010.
2.	E. Balagurusamy, "Programming in ANSI C", Tata McGraw-Hill Education,4E
Refere	ence Book
1.	ReemaThareja, "Computer Fundamentals and Programming in C", OXFORD University
	Press,2012.
2.	Stephen G Kochan "Programming in C", Pearson Education, 3/E, 2004.
3.	Ashok N Kamthane, "Computer Programming", Pearson Education, 2/E,2008.
4.	Vikas Gupta, "Computer Concepts and C Programming", Dreamtech Press, 2009.
5.	K R Venugopal and S R Prasad, "Mastering C", Tata McGraw Hill, 1/E, 2011.
6.	Behrouz A Forouzan, Richard F Gilberg, "COMPUTER SCIENCE - A Structured
	Programming approach using C", Thomson, 3/E Indian Edition, 2007.
7.	Kernighan, Ritchie, "The C Programming Language", Prentice Hall of India, 2/E,1988.
8.	Pradeep K Sinha and PritiSinha, "Computer Fundamentals", BPB Publications, 4/E,2007.
E-Rec	ourses
	1.
-	

List of Experiments				
Sr. No.	Description			
1	Module 1: CALL- Computer Assisted Language Laboratory: Listening exercises- Extempore			
2	Module 2: Vocabulary building - Task based Lab Activities			
3	Module 3: Language fluency, Linguistic accuracy & Communicative fluency			
4	Module 4: Listening to varied registers-Role play - Situational Dialogues			
5	Module 5: Pronunciation, Intonation, Stress and Rhythm- Public speaking			

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# **SEMESTER III**

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**Computer Engineering (IILP)** 

Year: Second Year						Sem	lester – I	LI.			
Course: Object Oriented Programming in Java					Course Code: TYCS301						
Teaching Scheme (Hrs. /Week)			rs.	Continuous Internal Assessment (CIA)			End Semester Examination		Total		
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
4 0 2 5 10 20 10 10 50									100		
M	Max. Time, End Semester Exam (Theory) - 03 Hrs.						End Semes	ster Exan	n (Lab) – 00 Hrs.		

Prerequisites:	
C, C++.	

Object	Objectives:						
The cou	The course will enables students to:-						
1	To understand fundamental concepts of OOP such as data abstraction, encapsulation, inheritance,						
	dynamic binding and polymorphism.						
2	To understand the implementation of OOP concepts with JAVA.						
3	To learn the features of core java that makes it more popular.						

Unit No	Details	Hours				
	Module 1: Introduction: Programming language Types and Paradigms, Why Java,	4				
1	Flavors of Java, Features of Java Language,					
	Module 2: JVM – The heart of Java, Java's Magic Bytecode, Java Program Development,					
	Data types, Loops, Java Source File Structure, Compilation, Executions.					
	Module 1: Inheritance : Use and Benefits of Inheritance in OOP, Types of Inheritance in					
2	Java, Inheriting Data members and Methods, Role of Constructors in inheritance.					
	Module 2: Overriding Super Class Methods, Use of "super", Polymorphism in	3				
	inheritance, Type Compatibility and Conversion Implementing interfaces.	-				
3	Module 1Array & String:Defining an Array, Initializing & Accessing Array, Multi –					
	Dimensional Array, Operation on String, Mutable & Immutable String,					
	Module 2: Using Collection Bases Loop for String, Tokenizing a String, Creating Strings					
	using StringBuffer.					
	Module 1:Exception Handling: The Idea behind Exception, Exceptions & Errors, Types of					
	Exception, Control Flow In Exceptions, JVM reaction to Exceptions, Use of try, catch,	4				
	ally, throw, throws in Exception Handling, In-built and User Defined Exceptions,					
4	Checked and Un-Checked Exceptions.					
	Module 2: File Handling: Input/Output Operation in Java (java.io Package), Streams and					
	the new I/O Capabilities, Understanding Streams, The Classes for Input and Output, The	3				
	Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to					
	Files, Buffer and Buffer Management.					
	Module 1:GUI Programming: Designing Graphical User Interfaces in Java, Components					
	and Containers, Basics of Components, Using Containers, Layout Managers, AWT					
5	Components, Adding a Menu to Window, Extending GUI Features Using Swing					
	Components, Java Utilities (java.util Package) The Collection Framework : Collections of					
	Objects, Collection Types, Sets, Sequence, Map, Understanding Hashing, Use of					

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ArrayList& Vector.	
Module 2: Event Handling: Event-Driven Programming in Java, Event- Handling Process,	
Event-Handling Mechanism, The Delegation Model of Event Handling, Event Classes,	4
Event Sources, Event Listeners.	

Outcor	mes:
On con	npletion of the course, student will be able to-
CO1	Learn Object Oriented Programming Concepts
CO2	Use and create packages and interfaces in a Java program
CO3	Use graphical user interface in Java programs
CO4	Create Applets
CO5	Implement exception handling, Multithreading in Java
Text B	ooks
1.	E Balagurusamy"Programming with Java", Fifth Edition, McGraw Hill Education, 2014, ISBN:
	978-9351343202.
2.	Herbert Schildt, "Java A Beginner's Guide", 6th Edition, Tata McGraw-Hill , 2014, ISBN:
	9789339213039.
3.	R. NageswaraRao, "Core Java: An Integrated Approach", 1est Edition, DreamtechPress, 2016,
	ISBN: 978-9351199250.
Refere	nce Book
1.	Herbert Schildt"Java: The Complete Reference"; Ninth Edition, Oracle Press, ISBN 978-0-07-
	180855-2.
2.	D.T.EditorialSerices "Java 8 programming" Black Book.

3. D.T Editorial Services, R. NageswaraRao"Core Java: An Integrated Approach"

List of Experiments					
Sr. No.	Description				
1	Write a java Program to Print Hello World				
2	Write a java Program to Print Whether the no is Prime or Not.				
3	Write a java Program for Handling Exception				
4	Write a java Program to Implement Inheritance				
5	Write a java Program to Implement any application using AWT				

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# **Year: Second Year Course: Computer Networks**

#### Semester – III **Course Code: TYCS302**

Teaching Scheme (Hrs. /Week)Continuous Internal Assessment (CIA)					End Semester Examination Total						
L	Т	Р	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab		
3	0	0	3	20	20	10		50		100	
Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Sen	nester Exa Hrs	am (Lab) – 00				

#### **Perquisites:**

Computer Organization and Architecture

Objecti	ves:
The cou	rse will enables students to learn:-
1	To understand the concepts of data communications.
2	To study the functions of different layers.
3	To make the students to get familiarized with different protocols and network components.

Unit No	Details	Hours
1	<b>Introduction :</b> Network Architecture – Historical review – Network software architecture: layers and protocol, OSI Vs TCP. Network hardware architecture: topologies, devices. Introduction to types of networks-Optical Networks, Sensor networks.	8
2	<b>Physical And Data Link LAYERS :</b> Basics for Data communications— Transmission Media— Guided and unguided transmission media — Communication satellites - Data link Layer design issues—Error Detection & Correction—Elementary Data link Protocols—Sliding window Protocols.	8
3	Mac & Network Layers : Media access control and LANs: The channel allocation – Methods and protocols for LANs – IEEE 802 standards and LAN technologies – Ethernet, token ring – hardware addressing - Network layer design issues— Routing Algorithms—Congestion Control Algorithms	7
4	<b>Transport Layer:</b> Transport services—Elements of transport Protocols—A simple transport Protocols—UDP—TCP—Performance issues.	8
5	<b>Application Layer</b> DNS—E-mail—WWW-Multimedia—Introduction to Cryptography–basic concepts-firewalls.	7

#### **Outcomes:** On completion of the course, student will be able to-Know networking devices and their implementation. 1 2 Know the connectivity protocol of each layer. **Text Books** Andrew S. Tanenbaum, "Computer Networks", Pearson, Fourth Edition, 2005. **Reference Book** 1. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw-Hill, 2004.

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**Computer Engineering (IILP)** 

 James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down ApproachFeaturing the Internet", Pearson Education, Third Edition 2003.
 William Stallings, "Data and Computer Communication", SeventhEdition, Pearson Education, 2003.

Document Reference	<b>Revision No. / Date</b>	Prepared By	Approved By
SUN/SOCSE/UG/Btech/IILP/2019	20 August 2019		



# Year: Second Year Course: Operating Systems(MOOC)

#### Semester – III Course Code: TYCS303

Teaching Scheme (Hrs. /Week)			g [ <b>rs.</b>	Continu	ous Interna	us Internal Assessment (CIA)			End Semester Examination		
L	Т	Р	C	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab		
3	1	2	5	20	20	10		50		100	
Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Sen	nester Exa Hrs	am (Lab) – 00				

# **Perquisites:**

Computer Organization and Architecture, Fundamentals of Data Structures.

Objecti	ves:
The cou	rse will enables students to learn:-
1	Understand Structure and functions of OS
2	Learn Process scheduling, Deadlocks
3	Understand Device management
4	Learn Memory management
5	Learn File systems

Unit No	Details	Hours
1	<b>Introduction:</b> Computer system overview-basic elements, Instruction execution, Interrupts, memory hierarchy, I/Ocommunication techniques, operating system overview-objectives and functions, Evolution of OS Microsoft windows overview.	9
2	<b>Processes:</b> Process description and control - process states, process description, process control; Processes and Threads,Symmetric Multiprocessing and microkernels. Windows Thread and SMP Management. Case studies-UNIX,SOLARIS thread management	9
3	<b>Concurrency And Scheduling:</b> Principles of concurrency - mutual exclusion, semaphores, monitors, Readers/Writers problem; Deadlocks –prevention-avoidance – detection .Scheduling: Types of scheduling – scheduling algorithms. Case studies-UNIX scheduling.	8
4	<b>Memory :</b> Memory management requirements, partitioning, paging, and segmentation; Virtual memory - Hardware and control structures, operating system software, Linux memory management, case studies- WINDOWS memorymanagement, UNIX and SOLARIS Memory management	9
5	<b>Input/Output And File Systems :</b> I/O management and disk scheduling – I/O devices, organization of I/O functions; OS design issues, I/Obuffering, disk scheduling, Disk cache, File management – organization, directories, file sharing, recordblocking, secondary storage management; case studies-LINUX I/O, UNIX File management.	9

#### **Outcomes:**

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**Computer Engineering (IILP)** 

On com	On completion of the course, student will be able to-				
1	Learn use of operating system effectively.				
2	Learn concepts such as deadlock, device management, process scheduling				
3	Learn role of operating system in file management.				

#### **Text Books**

William Stallings, "*Operating Systems – internals and design principles*", Prentice Hall India, 5<sup>th</sup>Edition, 2005.

#### **Reference Book**

1. Andrew S. Tannenbaum& Albert S. Woodhull, "*Operating System Design and Implementation*", Prentice Hall India, 2nd Edition, 1998.

2. Gary Nutt, "Operating System - A Modern Perspective", Pearson Education Asia, 2nd Edition 2000.

3. Harvey .M. Deitel, "Operating Systems", 2nd Edition, 2000.

4. Silberschatz, Peter Galvin, "Operating System Concepts", AWL 6th Edition, 2002,

5. Ida M.Flynn, Ann MclverMcHoes, "Understanding Operating Systems", 3rd Edition, Thomson

List of Ex	periments
Sr. No.	Description
1	Simulate the following CPU scheduling algorithms
I	a) Round Robin b) SJF c) FCFS d) Priority
2	Simulate all file allocation strategies
4	a) Sequential b) Indexed c) Linked
3	Simulate MVT and MFT
1	Simulate all File Organization Techniques
-	a) Single level directory b) Two level c) Hierarchical d) DAG
5	Simulate Bankers Algorithm for Dead Lock Avoidance
6	Simulate an Algorithm for Dead Lock Detection
7	Simulate all page replacement algorithms
/	a) FIFO b) LRU c) LFU
8	Simulate Paging Technique of memory management.

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# Year: Second Year Course: Theory of Computation

# Semester – III Course Code: TYCS304

Teaching Scheme (Hrs. /Week)			g Irs.	Continuous Internal Assessment (CIA) End Semester Examination						Total
L	Т	Р	C	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	1	0	4	20	20	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.								End Sem	ester Exa	am (Lab) – 00
									Hrs	•

# **Perquisites:**

Discrete Mathematics

Objecti	Objectives:						
The cou	The course will enables students to learn:-						
1	1 Study of Finite Automata, Regular Expressions, Grammars.						
2	Pushdown Automata, Turing Machines						
3	Undecidability problems.						
4	Turing Machine						
5	Computational Complexity						

Unit No	Details	Hours
1	Finite Automata : Introduction - Basic Mathematical Notation and techniques- Finite State systems – Basic Definitions – Finite Automaton – DFA & NDFA – Finite Automaton with €moves – Regular Languages- Regular Expression – Equivalence of NFA and DFA – Equivalence of NDFA's with and without € moves – Equivalence of finite Automaton and regular expressions – Minimization of DFA Pumping Lemma for Regular sets – Problems based on Pumping Lemma.	10
2	<b>Grammars : Grammar Introduction</b> – Types of Grammar - Context Free Grammars and Languages– Derivations and Languages – Ambiguity- Relationship between derivation and derivation trees – Simplification of CFG – Elimination of Useless symbols - Unit productions - Null productions – Greiback Normal form – Chomsky normal form – Problems related to CNF and GNF	8
3	<b>Pushdown Automata Pushdown Automata</b> - Definitions – Moves – Instantaneous descriptions – Deterministic pushdown automata – Equivalence of Pushdown automata and CFL - pumping lemma for CFL – problems based on pumping Lemma	9
4	<b>Turing Machine: Turing Machines</b> - Introduction – Formal definition of Turing machines – Instantaneous descriptions- Turing Machine as Acceptors – Turing Machine as Transducers Computable Languages and functions – Turing Machine constructions – Modifications of Turing Machines.	8
5	<b>Computational Complexity: Undecidability</b> - Basic definitions- Decidable and undecidable problems - Properties of Recursive and Recursively	8

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#### **Computer Engineering (IILP)**

	enumerable languages – Introduction to Computational Complexity:	
	Definitions-Time and Space complexity of TMs - complexity classes -	
	introduction to NP-Hardness and NP-Completeness	

#### **Outcomes:**

On com	pleti	on o	f the c	ours	se, stu	dent	will	be a	ble t	0-	
1	тт	1 .	1 1	• •	A .		D	1	Г	•	

1	Understand	Finite	Automata,	Regular	Expressions,	Grammars.
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2 Apply moves of Pushdown Automata

3 Understand Computational Complexity

4 Understand constructions and Modifications Turing Machine

#### **Text Books**

E.Hopcroft and J.D.Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson, Education Publishers, 2nd Edition, 2004

#### **Reference Book**

1. Michael Sipser, "Introduction to the Theory of Computation", Thomson Asia, 2004

2. J.C.Martin, "Introduction to Languages and Theory of Computation", McGraw Hill, 2003

3. K.L.P. Mishra, N.Chandrasekaran, "Theoretical Computer Science", PHI, 3rd Edition, 2007

Document Reference	Revision No. / Date	Prepared By	Approved By		
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# Year: Second Year Course: Industry Internship

#### Semester – III Course Code: TYCE311

Teaching Scheme (Hrs. /Week)			g e ek)	Contir	nuous Inte	ernal Ass	essment (	End Ser Examir	mester nation	Total			
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab			
			3					50	50				
Max. Time, End Semester Exam (Theory) -00 Hrs. End Semester Ex								am (Lab) – 00 Hrs.					

Objectives:									
Studen	Students are able to:-								
1	To expose students to the 'real' working environment and get acquainted with the								
	organization structure, business operations and administrative functions.								
2	To set the stage for future recruitment by potential employers.								

Unit No	Details	Hours
1	Course (catalog) description: As a part of the B. Tech Curriculum, <b>Industry</b> <b>Internship</b> is a Practical course, in which the students of CSE are trained for technical skills. Grading: The Course is graded based on: Presentation : 50% Student's reports : 50% <b>Employers Expectations:</b> Source of highly motivated pre professionals. Students bring new perspectives to old problems. Visibility of your organization is increased on campus. Quality candidates for temporary or seasonal positions and projects. Freedom for professional staff to pursue more creative projects. Flexible, cost effective work force not requiring a long term employer commitment. Proven, cost effective way to recruit and evaluate potential employees. Your image in the community is enhanced as you contribute your expertise to the educational enterprise	

Outco	Outcomes:							
On con	mpletion of the course, student will be able to-							
1	An ability to work in actual working environment.							
2	An ability to utilize technical resources.							
3	An ability to write technical documents and give oral presentations related to the work							
	completed.							

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# **SEMESTER IV**

Document Reference	<b>Revision No. / Date</b>	Prepared By	Approved By
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# Year: Third Year Course: Compiler Design

#### Semester –IV Course Code: TYCS401

Sc	Teac hem /We	ching e (H eek)	g rs.	Continuous Internal Assessment (CIA)				End Semester Examination		Total
L	Т	Р	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	1	2	5	20	20	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Sem	ester Ex	am (Lab) – 00			
									Hrs	•

# **Perquisites:**

Fundamentals of Data structures, Theory of Computation

Objecti	Objectives:							
The cou	The course will enables students to:-							
1	To study the concepts of Assembler, Macro Processor, Loader and Linker							
2	To learn about the various phases of compiler and syntax analysis							
3	To learn the various parsing techniques							
4	To learn the semantic analysis, translation of statements							
5	To learn about Generating and Optimizing codes							

Unit No	Details	Hours
1	Assembler, Macro, Loader&Linker: Assembler: Overview of the assembly process - Design of two pass assembler- Single pass assembler - Macros : Macro definition and usage- schematics for macro expansion - Design of a Macro pre-processor - Design of a Macro assembler ; Introduction to Loaders and Linkers.	8
2	<b>Introduction To Compilers :</b> Compiler: Introduction - Analysis of the source program - phases of a compiler - Compiler construction tools- Lexical analysis - Role of the lexical analyzer - Specification of tokens –Recognition of tokens - Lexical analyzer generators- Design aspects of Lexical Analyzer	8
3	<b>Syntax Analysis – Parsing :</b> Syntax Analysis: Role of the parser - Context free grammars - Top-down parsing: shift reduce- predictive parsing; Bottom-up parsing: Operator precedence, LR parsers (SLR, Canonical LR,LALR) - Parser generators- Design aspects of Parser.	8
4	Semantic Analysis – Translation & Runtime Storage: Syntax-directed translation: Syntax-directed definitions - S-attributed definition - L-attributed definition - Topdown and bottom-up translation- Type checking - Type systems - Specification of a type checker; Run time environment - Source language issues - Storage organization – Storage allocation strategies - Access to nonlocal names - Parameter passing - Symbol tables- Design aspects of Syntax Directed Translation	9
5	<b>Code Generation &amp; Optimization:</b> Intermediate code generation: Intermediate languages - Declaration - Assignment Statement – Boolean expression - Procedure calls - Code optimization : Introduction - Sources of optimization - Introduction to data flow analysis- Code generator : Issues in the design of a code generator- the	9

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# **Computer Engineering (IILP)**

target machine- A simple code generator- Design aspects of Code Optimizer.	
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Outcom	ies:							
On com	pletion of the course, student will be able to-							
1	Implement a lexical analyzer from a specification of alanguage's lexical rules							
2	Construct a parse tree, or explain why no parse tree exists, given a BNF grammar and a string over the appropriate alphabet							
3	Enhance the parser to perform translation into the intermediatecode language as it parses an input.							
Text Bo	oks							
1. Alfre	ed V. Aho, Ravi Sethi& Jeffrey. D. Ullman, "Compilers Principles, Techniques" Pearson Education third edition 2007							
2. D.M. Hill,199	Dhamdhere, "System Programming and Operating Systems", 2nd Edition., Tata Mcgraw 5							
Referen	ce Book							
1. Kenne	eth C. Louden, Compiler Construction, Principles and Practice, Thomson Books, 2007.							
2. Aho	A.V & Ullman J.D, "Principles of Compiler Design", Narosa publications, 1985.							
3. S.S.	3. S.S. Muchnick Harcourt Asra," Advanced Compiler Design implementation", Morgan							
Kaufman	n,1997.							

4. Anrew W. Appel, "Modern Compiler Implementation in JAVA", Cambridge University Press, 2003.

List of Ex	List of Experiments						
Sr. No.	Description						
	Design a lexical analyzer for given language and the lexical analyzer should ignore						
1	redundant spaces, tabs and new lines. It should also ignore comments. Although the						
I	syntax specification states that identifiers can be arbitrarily long, you may restrict the						
	length to some reasonable value. Simulate the same in C language.						
2	Write a C program to identify whether a given line is a comment or not						
3	*Write a C program to recognize strings under 'a', 'a*b+', 'abb'						
4	*Write a C program to test whether a given identifier is valid or not.						
5	Write a C program to simulate lexical analyzer for validating operators.						
6	Implement the lexical analyzer using JLex, flex or other lexical analyzer generating						
U	tools						
7	Write a C program for implementing the functionalities of predictive parser for the						
/	mini language specified in Note 1.						
Q	a) *Write a C program for constructing of LL (1) parsing. b) *Write a C program for						
0	constructing recursive descent parsing						
9	Write a C program to implement LALR parsing.						
	a) *Write a C program to implement operator precedence parsing. b) *Write a C						
10	program to implement Program semantic rules to calculate the expression that takes an						
	expression with digits, + and * and computes the value.						

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# Year: Third Year Course: System Programming

# Semester –IV Course Code: TYCS402

Sc	Teac hem /Wo	ching e (H eek)	g irs.	Continuous Internal Assessment (CIA)				End Semester Examination		Total
L	Т	Р	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	1	0	4	20	20	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Sem	ester Ex	am (Lab) – 00			
									Hrs	

#### **Perquisites:**

Fundamentals of Data structures, Theory of Computation

Objecti	Objectives:							
The cou	rse will enables students to:-							
1	To study and understand different system software like Assembler, Macro-processor and							
	Loaders / Linkers.							
2	To design and develop useful system software.							
3	To study and understand compiler design.							
4	To understand semantic analysis and storage allocation in compilation process.							
5	To understand different code generation techniques							

Unit No	Details	Hours
1	<b>INTRODUCTION TO SYSTEMS PROGRAMMING AND ASSEMBLERS</b> Module 1: Introduction:Need of System Software, Components of System Software, Language Processing Activities, Fundamentals of Language Processing.	4
	Module 2: Assemblers:Elements of Assembly Language Programming, A simple Assembly Scheme, Pass structure of Assemblers, Design of Two Pass Assembler, Single pass assembler.	4
2	MACROPROCESSORS, LOADERS AND LINKERS Module 1: Macro Processor:Macro Definition and call, Macro Expansion, Nested Macro Calls and definition, Advanced Macro Facilities, Design of two-pass Macro Processor.	4
2	Module 2: Loaders:Loader Schemes, Compile and Go, General Loader Scheme, Absolute Loader Scheme, Subroutine Linkages, Relocation and linking concepts, Selfrelocating programs, Relocating Loaders, Direct Linking Loaders, Overlay Structure.	4
3	<b>INTRODUCTION TO COMPILERS</b> Module 1: Phase structure of Compiler and entire compilation process.	
	<b>Module 2: Lexical Analyzer:</b> The Role of the Lexical Analyzer, Input Buffering. Specification of Tokens, Recognition of Tokens, Design of Lexical Analyzer using UniformSymbol Table, Lexical Errors.LEX: LEX Specification, Generation of Lexical Analyzer by LEX	
4	<b>PARSERS:</b> Module 1: Role of parsers, Classification of Parsers: Top down parsers-recursive descent parser and predictiveparser.	4

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#### **Computer Engineering (IILP)**

	Module 2: Bottom up Parsers –ShiftReduce:SLR, CLR and LALRparsers. Error Detection and Recovery in Parser. YACC specification and Automaticconstruction of Parser (YACC	4
5	<b>SEMANTIC ANALYSIS AND STORAGE ALLOCATION</b> Module 1: Need, Syntax Directed Translation, Syntax Directed Definitions, Translation of assignment Statements, iterative statements, Boolean expressions, conditional statements, Type Checking and Type conversion.	4
3	Intermediate Code Formats: Module 2: Postfix notation, Parse and syntax tress, Three address code, Quadrples and triples. Storage Allocation:Storage organization and allocation strategies. Code Generation, Code Optimization	4

#### **Outcomes:**

On completion of the course, student will be able to-

1	To learn independently modern software development tools and createsnovel solutions for
1	language processing applications.

- 2 To design and implement assemblers and macro processors.
- 3 To use tool LEX for generation of Lexical Analyzer.
- 4 To use YACC tool for generation of syntax analyzer.
- 5 To generate output for all the phases of compiler

#### **Text Books**

1. D. M. Dhamdhere, Systems Programming and Operating Systems, Tata McGraw-Hill, ISBN 13:978-0-07-463579-7, Second Revised Edition.

2. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Compilers Principles, Techniques and Tools, Addison Wesley, ISBN: 981–235–885 -4, Low Price Edition.

3. J. J. Donovan , Systems Programming, McGraw –Hill , ISBN 13:978-0-07-460482-3, Indian Edition.

#### **Reference Book**

1. Leland L. Beck, "System Software An introduction to Systems Programming", Pearson Education, ISBN13: 9788177585551.

<b>Document Reference</b>	<b>Revision No. / Date</b>	<b>Prepared By</b>	Approved By
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#### Year: Second Year Course: Database Management System

#### Semester – IV Course Code: TYCS403

Teaching Scheme (Hrs. /Week)			rs.	Continuous Internal Assessment (CIA)				End Semester Examination		Total	
L	Т	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	1	2	5	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exam (Lab) – 00 Hrs.				n (Lab) – 00 Hrs.							

#### **Prerequisites:**

Elementary knowledge about computers including experience of using UNIX.

#### Computer Programming & Utilization

Knowledge about data structures and algorithms, corresponding to the basic course on Data Structures and Algorithms.

#### **Objectives:**

The course will enables students to:-

1	To understand the fundamental concepts of database management
2	To learn databases and applications software primarily in the relational model
3	To use querying languages, primarily SQL, and other database supporting software
4	To understand the basic issues of transaction processing and concurrency control
5	To implement security and integrity policies relating to databases

Unit No	Details	Hours
	Module 1: Database Concepts, Database System Architecture, Data Modelling: Data	
	Models, Basic Concepts, entity, attributes, relationships, constraints, keys, users and	4
1	architecture of DBA	
	Module 2: Components of E-R Model, conventions, converting E-R diagram into tables,	4
	EER Model components, converting EER diagram into tables, legacy system model	4
	Module 1: Basic concepts, Attributes and Domains, Codd's Rules, Relational Integrity:	
	Domain, Entity, Referential Integrities, Enterprise Constraints, Views, Schema Diagram,	4
	Database Design : Functional Dependency, Directives	
2	Module 2: Purpose of Normalization, Data Redundancy and Update Anomalies,	
	Normalization: 1NF, 2NF, 3NF, BCNF. Decomposition: lossless join decomposition and	3
	dependency preservation, Multi valued Normalization (4NF), Join Dependencies and the	5
	Fifth Normal Form	
	Module 1: Introduction to SQL: Characteristics and advantages, SQL Data Types and	
	Literals, DDL, DML, DCL, TCL, SQL Operators, Tables: Creating, Modifying, Deleting,	4
	Views: Creating, Dropping, Updating using Views, Indexes, Nulls	
3	Module 2: SELECT Query and clauses, Set Operations, Predicates and Joins, Set	
	membership, Tuple Variables, Set comparison, Ordering of Tuples, Aggregate Functions,	4
	Nested Queries, Database Modification using SQL Insert, Update and Delete Queries,	4
	MongoDB	
4	Module 1: Stored Procedures, Cursors, Triggers, assertions, roles and privileges	4

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#### **Computer Engineering (IILP)**

	Programmatic SQL: Embedded SQL, Dynamic SQL	
	Module 2: Basic concept of a Transaction, Transaction Management, Properties of	
	Transactions, Concept of Schedule, Serial Schedule, Serializability: Conflict and View,	3
	Cascaded Aborts, Recoverable and Non- recoverable Schedules	
	Module 1: Need, Locking Methods, Deadlocks, Time-stamping Methods, Optimistic	4
	Techniques, Recovery methods : Shadow-Paging and Log-Based Recovery, Checkpoints	4
	Module 2: Centralized and Client-Server Architectures, 2 Tier and 3 Tier	
5	Architecture, Introduction to Parallel Databases, Key elements of Parallel Database	
	Processing, Architecture of Parallel Databases, Introduction to Distributed Databases,	4
	Architecture of Distributed Databases, Distributed Database Design, Internet Databases,	
	Database Connectivity using Mongo databases	

Outcomes:			
In completion of the course, student will be able to-			
Learn fundamental concepts of database management			
Analyze database models & entity relationship models			
Apply the basics of database languages and construct queries using SQL, PLSQL			
Design cost effective transaction queries for databases.			
Yext Books			
1. Silberschatz A., Korth H., Sudarshan S., "Database System Concepts", 6thEdition, McGraw Hill			
Publishers, ISBN 0-07-120413-X			
Reference Book			

#### 1. S.K.Singh, Database Systems : Concepts, Design and Application , 2nd Edition, Pearson, 2013,

- 2. Connally T., Begg C., "Database Systems", 3rd Edition, Pearson Education, 2002, ISBN 81-7808-X
- 3. P. S. Deshpande, "SQL & PL / SQL for Oracle 11g Black Book", DreamTech Publication

List of	f Experiments
Sr.	Description
No.	
1	Study of Open Source Databases : MySQL/ MongoDB/CouchDBetc.
	Design 10 SQL queries for suitable database application using SQL DML statements:
2	Insert, Select, Update, Delete with operators
•	Design at least 10 SQL queries for suitable database application using SQL DML
3	statements: all types of Join, Sub-Query and View
	Use the relations below to write SOL queries to solve the business problems specified
	Use the relations below to write SQL queries to solve the business problems specified.
	CLIENT (clientno#,name, client_referred_by#)
4	ORDER (orderno#, clientno#, order_date, empid#)
	ORDER_LINE (orderno#, order line number#, item_number#, no_of_items,
	item_ cost, shipping_date)
	ITEM (item_number#, item_type, cost)

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**Computer Engineering (IILP)** 

	EMPLOYEE (empid#, emp_type#, deptno, salary, firstname, lastname)
5	Write a PL/SQL block to calculate the student grades
6	Write a PL/SQL block to implement types of cursors
7	Write a PL/SQL stored procedure and function
8	Write a database Trigger
9	Implement aggregation and indexing with suitable example using MongoDB
10	Design and Implement any 5 query using MongoDB

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# Year: Third Year Course: Technical Communication

#### Semester –IV Course Code: TYHS401

Teaching Scheme (Hrs. /Week)			g [ <b>rs.</b>	Continu	ll Assessmen	End Semester Examination		Total		
L	Т	Р	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
2	0	2	3	20	20	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.						End Sem	ester Ex	am (Lab) – 00		
									Hrs	•

# **Perquisites:**

- 1. Functional grammar-Paragraph writing, Tenses, Sentence pattern
- 2. Fluency in reading and speaking

Objecti	Objectives:						
The cou	The course will enables students to:-						
1	To help the students in building interpersonal skills.						
2	To develop Emotional Intelligence to deal with difficult situations.						
3	To create an open environment for Communication						
4	To enhance team building and time management skills.						
5	To inculcate employability skills among students.						

Unit No	Details	Hours
1		8
2		8
3		8
4		9
5		9

Outcomes:							
On com	On completion of the course, student will be able to-						
1	Students will acquire communication strategies to participate in group and class discussions.						
2	Students will be able to utilize digital literacy tools to develop listening skills.						
3	Students will be able use a variety of accurate sentence structures.						
4	Students will be able to comprehend, analyze and interpret texts written in English.						
5	Students will use grammatical structures appropriately & deliver an effective oral presentation.						
Text Bo	Text Books						
1. Comn	1. Communication Skills by Sanjay Kumar and PushpaLata, Oxford University Press.						
2. Developing Communication Skill by Krishna Mohan, MeeraBanerji, McMillan India Ltd.							
3. Englis	sh for Business Communication by Simon Sweeney, Cambridge University Press.						

#### **Reference Book**

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#### **Computer Engineering (IILP)**

- 1. Ethics in Engineering Practice and Research by Caroline & Whitbeck, Cambridge University Press.
- 2. Personality Development and Group Discussions by Barun K. Mitra, Oxford University Press.
- 3. Group Discussions and Interview Skills by PriyadarshiPatnaik , Foundation Books , Cambridge University Press.

4. The Power of Your Subconscious Mind by Dr Joseph Murphy MaanuGraphics , ISBN-13 9789381529560.

- 5. The 80/20 Principal by Richard Koch, Nicholas BrealeyPublishings, ISBN-13 9781857883992.
- 6. Time management from inside out by Julie Morgenstern, Owl Books (NY), ISBN-13 9780805075908.

7. You can win by Shiv Khera, Macmillan, ISBN-139789350591932.

#### **E-Resources**

- 1. https://www.britishcouncil.in/sites/default/files/esfe\_report.pdf
- 2. https://www.britishcouncil.org/sites/default/files/english-soft-skills-maghreb-research-report.pdf
- 3. https://pdfs.semanticscholar.org/c1d3/e21ea8496e2d828678cde2981aac1bd4ce3e.pdf
- 4. http://www.iosrjournals.org/iosr-jhss/papers/Vol11-issue4/D01142022.pdf

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Year: Third Year Course: Seminars

#### Semester – IV Course Code: TYCS411

Teaching Scheme (Hrs. /Week)		Continuous Internal Assessment (CIA)					End Semester Examination		Total		
L	Τ	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
		4	2		25 25 50						
M	Max. Time, End Semester Exam (Theory) -00 Hrs.					End Ser	nester Ex	xam (Lab) – 00 Hrs.			

Objectives:								
Studen	its are able to:-							
1	To expose students to the 'real' working environment and get acquainted with the							
	organization structure, business operations and administrative functions.							
2	To set the stage for future recruitment by potential employers.							

Unit No	Details	Hours
<b>No</b>	Course (catalog) description: As a part of the B. Tech Curriculum, SEMINAR is a Practical course, in which the students of CSE are trained for presentation skills. Course Guidelines: Grading: The Course is graded based on: Presentation : 50% Student's reports : 20% PPT presentation : 25% Attendance : 05% Note: • Presentation will take place in the weekly class. The presentation is evaluation by your class in charge. • Report must be submitted during presentation. The report evaluation is done by your class in charge. • A Viva voce comprising a comprehensive questions based on your presentation. Etiquette : • Dress properly • Behave well • Portray good image as a university student • Be punctual • Observe work ethics • Concern for safety • Be professional	

#### **Outcomes:**

On completion of the course, student will be able to-1 An ability to work in actual working environment.

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2	An ability to utilize technical resources.
3	An ability to write technical documents and give oral presentations related to the work
	completed.

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# **SEMESTER V**

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# Year: Fourth Year Course: Software Engineering

#### Semester – V Course Code: TYCS501

Sc	Teac hem /We	ching e (H eek)	g [ <b>rs.</b>	Continu	ous Interna	l Assessmen	t (CIA)	End Sen Examin	Total	
L	Т	P	С	CIA-1	CIA-2	CIA-3	Lab	Theory	Lab	
3	0	0	3	20	20	10		50		100
Ma	Iax. Time, End Semester Exam (Theory) - 03 Hrs.End Semester Exam						am (Lab) – 00			
									Hrs	,

# **Perquisites:**

Data Structures, Object Oriented Programming

Objecti	ves:
The cou	rse will enables students to learn:-
1	Planning and Estimation of Software projects
2	Software Requirements Specification, Software Design Concepts
3	Implementation issues ,Validation and Verification Procedures
4	Maintenance of Software and methodologies

Unit No	Details	Hour s
1	<b>Software Project Management:</b> Software project planning: Importance of software – Introduction – Defining the problem – Developing a solution strategy – Planning and development process – Other planning activities. Software cost estimation: Introduction – Software cost factors – Software cost estimation techniques – Staffing level estimation – Estimating software maintenance costs.	10
2	<b>Software Requirements Analysis:</b> Introduction – The software requirement specifications – Formal specification techniques – Languages andprocessors for requirements specification : SDAT, SSA, GIST, PSL/PSA, REL/REVS- Software prototyping –rapid prototyping techniques- user interface prototyping- Analysis & modeling – data, functional & behavioural models – Structured analysis & data dictionary.	8
3	<b>Software Design Concepts:</b> Abstraction – Modularity – Software architecture – Cohesion, coupling – Various design concepts and notations – Real time and distributed system – Design – Documentation – Data flow oriented design – Jackson system development – Design for reuse – Programming standards. User interface Design- principles- SCM- Need for SCM- Version control – Introduction to SCM process – software configuration items	9
4	<b>Implementation And Testing:</b> Implementation Issues : Introduction – Structured coding techniques – Coding style – Standards and guidelines – Documentation guidelines-Modern Programming Languages Features : The translation process – PL characteristics. Software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regressiontesting – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration	8

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	testing – validation testing – system testing and debugging	
	Software Maintenance & Reliability Issues : Introduction – Quality assurance –	
	Walk through and inspections – Static analysis – Symbolic execution-Software	
	Maintenance: Introduction – Enhancing maintainability during development –	
5	Managerial aspects of software maintenance – Configuration management – Source	8
	code metrics – Other maintenance tools andtechniques. Software reliability –	
	issues- Software reliability Vs Hardware reliability – Failures and Faults -	
	Classification of Failures – Components and Operational Models	

#### **Outcomes:**

On completion of the course, student will be able to-

1	To identify unique features of various software application domains and classify
	softwareapplications.
2	To choose and apply appropriate lifecycle model of software development.

3 To analyze software requirements by applying various modeling techniques

4 To list and classify CASE tools and discuss recent trends and research in software engineering.

#### **Text Books**

1. Richard Fairley, "Software Engineering Concepts", McGraw Hill, 1985.

2. Roger S. Pressman, "Software Engineering A Practitioner Approach" 4th edition, McGraw Hill, 1999

#### **Reference Book**

1. Roger S.Pressman, *Software engineering- A practitioner's Approach*, McGraw-HillInternational Edition, 5th edition, 2001.

- 2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
- 3. PankajJalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
- 4. Shooman, Software Engineering, McGraw Hill, 1983.

5. John D. Musa, "Software Reliability", McGrawHill, 1985

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# Year: Third Year Course: Design and Analysis of Algorithms

#### Semester – V Course Code: TYCS502

Teaching Scheme (Hrs. /Week)			e e ek)	Continuous Internal Assessment (CIA)				End Semester Examination		Total	
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	1	2	5	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.						End Ser	nester Ex	xam (Lab) – 00 Hrs.			

# **Prerequisites:**

Data Structure, Discrete Mathematics and Logic

Object	tives:
The co	urse will enables students to:-
1	Analyze the asymptotic performance of algorithms.
2	Write rigorous correctness proofs for algorithms.
3	Demonstrate a familiarity with major algorithms and data structures.
4	Apply important algorithmic design paradigms and methods of analysis.
5	Synthesize efficient algorithms in common engineering design situations.

Unit No	Details	Hours
1	<b>Module 1:</b> Algorithm, Psuedo code for expressing algorithms, performance Analysis-Space complexity, Time complexity,	4
1	<b>Module 2:</b> Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis.	4
2	Module 1: Divide and conquer: General method, applications-Binary search	4
Δ.	Module 2: Divide and conquer: Quick sort, Merge sort	3
2	<b>Module 1</b> : Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem.	4
3	<b>Module 2:</b> Greedymethod:Spanning trees, Minimum cost spanning trees, Single source shortest path problem.	4
	<b>Module 1:</b> Dynamic Programming: General Method, Applications-Matrix chain multiplication, Optimal binary search tree,	4
4	<b>Module 2:</b> Dynamic Programming: 0/1 Knapsack problem, All pairs shortest path problem, Travelling salesman problem, Reliability design.	3
5	<b>Module 1:</b> Backtracking: General method, Applications-N Queen problem, Sum of subsets problem, Graph coloring, Hamiltonian cycles.	4
	<b>Module 2:</b> Branch and Bound: General method, Applications- Travelling sales person problem, LC Branch and bound solution, FIFO Branch and Bound Solution.	4

Outcomes:								
On cor	On completion of the course, student will be able to-							
1	Analyze worst-case running times of algorithms using asymptotic analysis.							
2	Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it							

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3	Describe the dynamic-programming paradigm and explain when an algorithmic design
	situation calls for it.
4	Describe the greedy paradigm and explain when an algorithmic design situation calls for it.
5	Explain the major graph algorithms and their analyses. Employ graphs to model
	engineering problems, when appropriate. Synthesize new graph algorithms and algorithms
	that employ graph computations as key components, and analyze them
Toyt B	looks

#### **I EXT BOOKS**

- 1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharam, Universities Press.
- 2. Design and Analysis of Algorithms, S Sridhar, Oxford
- 3. Design and Analysis of Algorithms, ParagHimanshu Dave, HimansuBAlachandra Dave, 2ed, Pearson Education.

#### **Reference Book**

- 1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
- 2. Introduction to the Design and Analysis of Algorithms, AnanyLevitin, PEA
- 3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein, PHI Pvt. Ltd.
- 4. Algorithm Design, Foundation, Analysis and internet Examples, Michel T Goodrich, Roberto Tamassia, Wiley

List of	f Experiments						
Sr.	Description						
No.							
1	Implement 0/1 Knapsack problem using Dynamic Programming.						
2	To sort the elements using quick sort						
3	Write a program to sort the elements using merge sort						
4	Write a program to implement booth's multiplication						
5	From a given vertex in a weighted connected graph, find shortest paths to other						
5	vertices using Dijkstra's algorithm						
6	Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's						
U	algorithm						
7	Print all the nodes reachable from a given starting node in a digraph using BFS						
/	method						
8	Check whether a given graph is connected or not using DFS method.						
0							
	Implement any scheme to find the optimal solution for the Traveling Salesperson						
9	problem and then solve the same problem instance using any approximation algorithm						
	and determine the error in the approximation						
	Find Minimum Cost Spanning Tree of a given undirected graph using Prim's						
10	algorithm						

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# Year: Third Year Course: Programming with Python

# Semester – V Course Code: TYCS503

Teaching Scheme (Hrs. /Week)			g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	Τ	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	1	2	5	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester E						nester Ex	xam (Lab) – 00 Hrs.				

#### **Prerequisites:**

C Programing, C++ Programing

Object	tives:
The co	urse will enables students to:-
1	Understands programing fundamentals
2	Know basics of python
3	Understand use of python library for complex problem solving

Unit No	Details	Hours
	Module 1: Introduction to Python What is Python Where is it used Pres and Cons. Python Version 2, Version 2	Λ
1	Python Installing on Windows & on Linux and Mac OS	4
	Module 2:Data Types & Operators	
	Numerics ( int, complex and float ), Boolean ( and, or , not ), Strings, List, Tuples,	
	Dictionaries, Relational Operators ( or Comparisons ) >, >= <,<=, !, !=, is not,	4
	Datetime(), Calendar(),Collections(), Heapq. s.replace(), s.find(), s.split(), s.alpha()	
	and more	
	Module 1: Files, Directories, Regular Expressions & Flow Controls	
	Path(), Stat(), Filecmp(), Glob(), Shutil(), replace (), sub(), search(), Pattern	4
	matching. if, then, else, while, If, elif, for loop, Iterators, range.	
2	Module 2:Functions, Python OS Module functions, Parallel Processing and	
	spawning processes Creating Isolated Environment- Virtualenv(), Creating	
	processes using fork(), and exec(),Listing current working directory, current OS,	3
	Listing files in directories, and other osfunctions. Syntax, Calling functions,	
	Returning from functions, Pass by Reference and Value, Functionsarguments.	
	Module 1: Exception Handling, Object Oriented Programming & Standard	
	and other Libraries	4
3	Try, except, else: Try, finally, Raising exceptions. Instantiating Classes, Serialising	
	PythonObjects.	4
	Module 2: Data Compression and Archiving ( zip, gzip, bz2, zipfile).	4
	Module 1: Web development, Network Programming & Extending and	
	Embedding Python in	
4	other programming languages	4
	HITP web services ( http.client() ). Introduction to Socket Module and Functions (	
	connect, bind liston accent cond/recy	
	bind, listen, accept, send/recv),	

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	<b>Module 2:</b> Sample Client and Server Examples. Creating extensions withand without third party tools.	3
5	Module 1: Python in IoT, Scientific and DB programming in Python ( installation and beginnersamples), numpy (Installation and Use cases) and Pandas: Data Processing module Raspberry, Paho-mqtt. Mysqldb(Installation, Use cases), Opencv (Installation, GUI Featuresand Videos), MatPlotlib (Includes installation, Examples of 2D plots, Colors, Text,Introduction to APIs).	4
	<b>Module 2:</b> Pandas - Overview, setup, Data Structures, Indexing and Selected data, Reshaping Data, Grouping.	4

#### **Outcomes:**

On cor	On completion of the course, student will be able to-							
1	Understands programing fundamentals							
2	Know basics of python							
3	Understand use of python library for complex problem solving							
Text B	Books							
Progra	ming with python (IBM ICE Publication)							
Refere	ence Book							
http://v	www.python.org							
https://	/www.tutorialspoint.com/python/python_pdf_version.htm							
https://	https://www.python-course.eu/python3_deep_copy.php							
https://	https://www.safaribooksonline.com/library/view/learning-python-5th/9781449355722/							
http://shop.oreilly.com/product/0636920028154.do								
https://	https://www.guru99.com/python-tutorials.html							
IPytho	IPython : https://ipython.org/documentation.html							
REPL	REPL : https://repl.it/repls							
Extend	tending and Embedding Python :							
https://	/docs.python.org/3/extending/index.html#extending-index							
Places	where we can get free data: https://visual.ly/blog/data-sources/							

List of	List of Experiments							
Sr.	Description							
No.								
	Write a python program to perform the following:							
	Add two numbers							
1	• Calculate the area of a cube							
	• Check is the number is even, odd, prime							
	Print Fibonacci series							
	Write a python program to perform following:							
	Display Calendar							
2	• Shuffle a deck of cards.							
-	• Sort different words in alphabetic order.							
	Count the occurrences of a letter, vowels, etc in a given sentence							
-	XX7 1							
3	Write a python program to merge mails							

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4	Write a python program to find the resolution of an image						
5	Write a python program to find the hash of file						
6	Write a python game to guess colors. Player can guess a color, and if the random color picked is same, then the player gets 5 points.						
7	Create a simple rail application						

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# **Computer Engineering (IILP)**

# Year: Third Year **Course: Industry Internship**

#### Semester – V Course Code: TYCS511

Teaching Scheme (Hrs. /Week)		g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total	
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
			4			50					
Max. Time, End Semester Exam (Theory) -00 Hrs. End Semester Exam (La							am (Lab) – 00 Hrs.				

Objectives:								
Studen	ts are able to:-							
1	To expose students to the 'real' working environment and get acquainted with the							
	organization structure, business operations and administrative functions.							
2	To set the stage for future recruitment by potential employers.							

Unit No	Details	Hours
1	Course (catalog) description: As a part of the B. Tech Curriculum, <b>Industry</b> <b>Internship</b> is a Practical course, in which the students of CSE are trained for technical skills. Grading: The Course is graded based on: Presentation : 50% Student's reports : 50% <b>Employers Expectations:</b> Source of highly motivated pre professionals. Students bring new perspectives to old problems. Visibility of your organization is increased on campus. Quality candidates for temporary or seasonal positions and projects. Freedom for professional staff to pursue more creative projects. Flexible, cost effective work force not requiring a long term employer commitment. Proven, cost effective way to recruit and evaluate potential employees. Your image in the community is enhanced as you contribute your expertise to the educational enterprise	

Outco	Outcomes:							
On con	mpletion of the course, student will be able to-							
1	An ability to work in actual working environment.							
2	An ability to utilize technical resources.							
3	An ability to write technical documents and give oral presentations related to the work							
	completed.							

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Year: Third Year Course: Mini Project

#### Semester – V Course Code: TYCS512

Teaching Scheme (Hrs. /Week)		g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total	
L	T	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
		6	3			50					
Max. Time, End Semester Exam (Theory) -00 Hrs. End Semester Exa						xam (Lab) – 00 Hrs.					

Object	Objectives:							
Studen	ts are able to:-							
1	To expose students to the 'real' working environment and get acquainted with the							
	organization structure, business operations and administrative functions.							
2	To set the stage for future recruitment by potential employers.							

Unit No	Details	Hours
<b>No</b>	Course (catalog) description: As a part of the B. Tech Curriculum, SEMINAR is a Practical course, in which the students of CSE are trained for presentation skills. Course Guidelines: Grading: The Course is graded based on: Presentation : 50% Student's reports : 20% PPT presentation : 25% Attendance : 05% Note: • Presentation will take place in the weekly class. The presentation is evaluation by your class in charge. • Report must be submitted during presentation. The report evaluation is done by your class in charge. • A Viva voce comprising a comprehensive questions based on your presentation. Etiquette : • Dress properly • Behave well • Portray good image as a university student • Be punctual • Observe work ethics • Concern for safety • Be professional	

#### **Outcomes:**

On completion of the course, student will be able to-1 An ability to work in actual working environment.

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2	An ability to utilize technical resources.
3	An ability to write technical documents and give oral presentations related to the work
	completed.

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# **SEMESTER VI**

Document Reference	<b>Revision No. / Date</b>	Prepared By	Approved By
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**Computer Engineering (IILP)** 

#### Year: Third Year Course: Artificial Intelligence

#### Semester – VI Course Code: TYCS601

Teaching Scheme (Hrs. /Week)		g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total	
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.				End Ser	nester Ex	xam (Lab) – 00 Hrs.					

# **Prerequisites:**

Object	tives:							
The co	The course will enables students to:-							
1	To learn various types of algorithms useful in Artificial Intelligence (AI).							
2	To convey the ideas in AI research and programming language related to							
	emergingtechnology.							
3	To understand the concepts of machine learning, probabilistic reasoning, robotics, computer							
	vision, and natural language processing.							
4	To understand the numerous applications and huge possibilities in the field of AI that							
	gobeyond the normal human imagination.							

Unit No	Details	Hours
	<b>Module 1: Foundation:</b> Intelligent Agents, Agents and environments, Good behavior, The nature of environments, structure of agents	4
1	<b>Module 2:</b> Problem Solving, problem solving agents, example problems, Searching for solutions, uniformed search strategies, avoiding repeated states, searching with partial information.	4
2	<b>Module 1: Searching:</b> Search and exploration, Informed search strategies, heuristic function, local search algorithms and optimistic problems, local search in continuous spaces, online search agents and unknown environments, Constraint satisfaction problems (CSP), Backtracking search and Local search for CSP, Structure of problems,	4
	<b>Module 2: Games:</b> Optimal decisions in games, Alpha- Beta Pruning, imperfect real-time decision, games that include an element of chance.	3
3	<b>Module 1: Knowledge Representation</b> : First order logic, representation revisited, Syntax and semantics for first order logic, Using firstorder logic, Knowledge engineering in first order logic, Inference in First order logic, prepositional versus first order logic, unification and lifting,	4
5	<b>Module 2:</b> forward chaining, backward chaining, Resolution, Knowledge representation, Ontological Engineering, Categories and objects, Actions - Simulation and events, Mental events and mental objects.	4
4	<b>Module 1:Learning :</b> Learning from observations: forms of learning, Inductive learning, Learning decision trees, Ensemble learning, Knowledge in learning, Logical formulation of learning, Explanation based learning, Learning using relevant information,	4

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	Module 2: Inductive logic programming, Statistical learning methods, Learning	
	with complete data, Learning with hidden variable, EM algorithm, Instance	2
	based learning, Neural networks - Reinforcement learning, Passive reinforcement	3
	learning, Active reinforcement learning, Generalization in reinforcement learning.	
	Module 1:Perception and Expert System :Visual perception-Waltz's algorithm,	4
5	Module 2: Introduction to Expert System, Architecture and functionality, Example	4
	Expert system	4

Outco	mes:				
On con	npletion of the course, student will be able to-				
1	Design and implement key components of intelligent agents and expert systems.				
2\	To apply knowledge representation techniques and problem solving strategies to common				
	AI applications.				
3	Applyand integrate various artificial intelligence techniques in intelligent system				
	development as well as understand the importance of maintaining intelligent systems.				
4	Build rule-based and other knowledge-intensive problem solvers.				
Text Books					
1. Stuart Russell, Peter Norvig, "Artificial Intelligence", A Modern Approach, Pearson					
Educa	Education/Prentice Hall of India.				
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw-Hill.					
Reference Book					
1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd.					
2. Ge	orge F. Luger, "Artificial Intelligence-Structures and Strategies for Complex Problem				

Solving", Pearson Education/ PHI.

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# Year: Third Year

Course: Object Oriented Analysis and Design

Semester – VI Course Code: TYCS602

Teaching Scheme (Hrs. /Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	1	2	5	10	20	10	10		50		100
	Max. Time, End Semester Exam (Theory) - 03 Hrs.						Hrs.	End Sen	nester Ex	xam (Lab) – 00 Hrs.	

# **Prerequisites:**

Software Engineering

Object	Objectives:							
The co	urse will enables students to:-							
1	To Introduce various designing techniques and methods for object oriented							
2	Performance analysis with real time system							
3	Demonstrate a familiarity with object oriented data and system.							
4	To give clear idea on implementing design with UML diagram like state diagram, activity							
	diagram, use case diagram etc.							

Unit No	Details	Hours				
1	<b>Module 1:</b> Introduction, Object orientation, OO Development, OO themes, Modeling as a design technique, Class Modeling.	4				
1	<b>Module 2:</b> Abstraction, The three models, Object and class concepts, Link and association concepts, Generalization & Inheritance, Navigation of class models.					
2	<b>Module 1:</b> Advanced object and class concepts, Association Ends, N-ary association, Aggregation, Abstract classes, Multiple inheritance, Metadata, Reification, Constraints, Derived data, Packages.	4				
	<b>Module 2:</b> State Modeling: Events, States, Transitions and Conditions, State diagrams, State diagram behavior.	3				
3	<b>Module 1</b> : Nested state diagram, Signal Generalization, Nested states, Concurrency, Relation of class and state models, Use case model, Sequence models.	4				
	<b>Module 2:</b> Activity models, Use case relationships, Procedural sequence model, Special constructs for activity models.	4				
4	<b>Module 1:</b> Development stages, Development life cycle, Devising a system concepts, Elaborating a concepts.	4				
4	<b>Module 2:</b> Preparing a problem statements, Overview of analysis, Domain class models, Domain state model, Domain Interaction model.	3				
5	<b>Module 1:</b> Overview of System Design, Estimating Performance, Making a reuse plan, Breaking a system into subsystems, Identifying Concurrency, Allocation of subsystems, Management of data storage, Handling global resources, Choosing a software control strategy, Handling boundary conditions, Architecture of the ATM system.	4				
	<b>Module 2:</b> Realizing the use cases, Designing algorithms recursing Downwards, Refactoring, Design Optimization, Reification of behavior, Organizing a class	4				

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**Computer Engineering (IILP)** 

design, ATM examples.

#### **Outcomes:**

On cor	On completion of the course, student will be able to-							
1	Describe Object Oriented Analysis and Design concepts and apply them to solve problems							
2	Prepare Object Oriented Analysis and Design documents for a given problem using Unified							
	Modeling Language							

#### **Text Books**

Blaha, Rumbaugh:"Object Oriented Modeling and Design with UML"(2/e) Pearson Education.

# **Reference Book**

1. Dathan ,Ramnath : "Object Oriented Analysis, Design &Implementation," OUP.

- 2. McRobb& Farmer: "Object Oriented System Analysis & Design" McGraw Hill.
- 3. Booch, Rumbaugh& Jacobson: "The UML User guide" PearsonEducation.

4. Whitten & Bentley: "System Analysis & Design Methods" TataMcGraw Hill.

5. Booch: "Object Oriented Analysis & Design with Applications", Pearson Education.

6. Visual modeling with *Rational Rose* and *UML* by Terry Quatrani, by Addison-Wesley Professional.

List of	f Experiments
Sr.	Description
No.	
1	Study of Software Development Life Cycle
2	Study of Unified Modeling language and IBM Rational Rose.
3	Design of Information Flow diagram for Hospital Management System.
4	Design of Use Case diagram for Hospital Management System.
5	Design of Activity diagram for Hospital Management System.
6	Design of Sequence diagram for Hospital Management System.
7	Design of Class diagram for Hospital Management System.
8	Design of State Chart diagram for Hospital Management System.
9	Design of a Mini Project using UML

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#### Year: Third Year Course: Information and Cyber Security

Semester – VI Course Code: TYCSE01

Teaching Scheme (Hrs. /Week)				Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	I	-	3	10	20	10	10		50		100
	Max. Time, End Semester Exam (Theory) - 03 Hrs. E						End Ser	nester Ex	xam (Lab) – 00 Hrs.		

Prerequisites:
Software Engineering

Objectives:							
The co	surse will enables students to:-						
1							
2							
3							
4							

Unit No	Details	Hours
	<b>Module 1: Introduction to Cyber Security:</b> Overview of Cyber Security, Internet Governance – Challenges and Constraints.	4
Unit NoDer Mo Inte1Mo 	<b>Module 2:Cyber Threats:-</b> Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.	4
2	Module 1: Cyber Security Vulnerabilities and Cyber Security Safeguards: Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness.	4
	<b>Module 2:Cyber Security Safeguards</b> Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.	3
3	<b>Module 1</b> : Securing Web Application, Services and Servers: Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services,	4
	<b>Module 2:</b> Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.	4
4	Module 1:Intrusion Detection and Prevention Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems.	4
	<b>Module 2:</b> Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.	3

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5	<b>Module 1:Cryptography and Network Security:</b> Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS. Security at Network Layer-IPSec.	4
	<b>Module 2:Cyberspace and the Law</b> : Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.	4

Outcomes:								
On completion of the course, student will be able to-								
1								
2								
Text Books								
1.								
Reference Book								
7.								

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# Year: Third Year Course: Neural Network

#### Semester – VI Course Code: TYCSE02

Teaching Scheme (Hrs. /Week)			g e ek)	Contin	nuous Inte	ernal Ass	essment	(CIA)	End Ser Examir	nester nation	Total		
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab			
3	-	-	3	10	20	10	10		50		100		
	Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exam (Lab) – 00 Hrs							xam (Lab) – 00 Hrs.					

# **Prerequisites:**

Basic knowledge of computer architecture

Object	Objectives:									
The co	urse will enables students to:-									
1	Understand the learning and generalisation issue in neural computation.									
2	Understand the basic ideas behind most common learning algorithms for multilayer									
	perceptrons, radial-basis function networks, and Kohonen self-organising maps.									
3	To introduce some of the fundamental techniques and principles of neural computation.									
4	To investigate some common models and their applications.									

Unit No	Details	Hours						
1	<b>Module 1: Introduction:</b> Fundamental concepts: neuron models and basic learning rules, History, Articial and biological neural networks. Artificial intelligence and neural networks							
	Module 2:Learning of a single neuron and single layer neural networks	4						
2	<b>Module 1: Neurons and Neural Networks:</b> Biological neurons, Models of single neurons, Different neural network models, Multilayer neural networks and back-propagation	4						
	<b>Module 2:</b> Associative memory, <b>Single Layer Perceptrons:</b> Least mean square algorithm, Learning curves, Learning rates, Perceptron	3						
3	<b>Module 1</b> : <b>Multilayer Perceptrons:</b> The XOR problem, Back-propagation algorithm, Heuristic for improving the back-propagation algorithm, Some examples	4						
	<b>Module 2:</b> Self-organizing neural networks, Learning of self-organizing neural network, Self-organizing feature map	4						
4	<b>Module 1:Radial-Basis Function Networks:</b> Interpolation, Regularization, Learning strategies	4						
	Module 2:Neural Network Trees, Neural Network Trees based learning case study	3						
5	Module 1:Kohonen Self-Organising Maps:Self-organising map, The SOM algorithm, Learning vector quantisation							
	Module 2: RBF neural networks and support vector machines.	4						

Outcomes:								
On con	On completion of the course, student will be able to-							
1	Understand the learning and generalisation issue in neural computation.							

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#### **Computer Engineering (IILP)**

		Computer Engineering (IEEF)					
2		Understand the basic ideas behind most common learning algorithms for multilayer perceptrons, radial-basis function networks, and Kohonen self-organising maps.					
3		Implement common learning algorithms using an existing package.					
4	-	Apply neural networks to classification and recognition problems.					
Te	xt B	ooks					
1. 2.	1 <b>S</b> . <b>K</b> .	<b>Haykin</b> , Neural Networks: A Comprehensive Foundation 2nd edition, (Prentice Hall, 1999) <b>Mehrotra, C. Mohan, and S. Ranka</b> , Elements of Artificial Neural Networks, MIT Press,					
	199	97.					
3.	C.	Looney, Pattern Recognition Using Neural Networks, Oxford University Press, 1997					
4.	C.	Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995.					
5.	J.	Hertz, A. Krogh, R.G. Palmer, Introduction to the Theory of Neural					
	Co	mputation (Addison-Wesley, 1991)					
Re	fere	nce Book					
1.	Jac	ek M. Zurada, Introduction to Artificial Neural Systems, PWS Publishing Company,					
	199	95.					
2.	Sin	non Haykin, Neural Networks: A Comprehensive Foundation, Macmillan College Publishing					
	Co	mpany, 1994.					
3.	Mo	bhamad H. Hassoun, Foundamentals of Artificial Neural Networks, The MIT Press, 1995.					
4. LaureneFausett, Fundamentals of Neural Networks: Architectures, Algorithm							
	Ар	plications, Prentice Hall International, Inc., 1994.					
5.	B.	D. Ripley, Pattern Recognition and Neural Networks, Cambridge University Press., 1996.					

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# Year: Third Year Course: Soft Computing

#### Semester – VI Course Code: TYCSE03

Teaching Scheme (Hrs. /Week)			g e ek)	Contin	nuous Inte	ernal Ass	essment	(CIA)	End Ser Examir	nester nation	Total		
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab			
3	-	-	3	10	20	10	10		50		100		
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exar							xam (Lab) – 00 Hrs.						

# **Prerequisites:**

Basic knowledge of computer architecture, Neural network

Object	Objectives:									
The co	The course will enables students to:-									
1	Understand the learning and generalisation issue in neural computation.									
2	Understand the basic ideas behind most common learning algorithms for multilayer									
	perceptrons, radial-basis function networks, and Kohonen self-organising maps.									
3	To introduce some of the fundamental techniques and principles of neural computation.									
4	To investigate some common models and their applications.									

Unit No	Details	Hours
1	<b>Module 1: Artificial Neural Network -I</b> Biological neuron, Artificial neuron model, concept of bias and threshold, McCulloch- Pits Neuron Model, implementation of logical AND, OR, XOR functions Soft Topologies of neural networks, learning paradigms: supervised, unsupervised, reinforcement,	4
	<b>Module 2:</b> Linear neuron model : concept of error energy , gradient descent algorithm and application of linear neuron for linear regression, Activation functions : binary , bipolar (linear, signup, log sigmoid, tan sigmoid) Learning mechanisms: Hebbian, Delta Rule o Perceptron and its limitations Draft	4
2	<b>Module 1: Artificial Neural Network-II:</b> Multilayer perceptron (MLP) and back propagation algorithm o Application of MLP for classification and regression o Self- organizing Feature Maps,	4
	<b>Module 2:</b> k- means clustering o Learning vector quantization Radial Basis Function networks: Cover's theorem, mapping functions. Application of RBFN for classification and regression o Hopfield network, associative memories.	3
3	<b>Module 1:</b> Fuzzy Logic –I: Concept of Fuzzy number, fuzzy set theory(continuous, discrete) o Operations on fuzzy sets, Fuzzy membership functions (core ,boundary ,support), primary and composite linguistic terms.	4
	<b>Module 2:</b> Concept of fuzzy relation, composition operation (T-norm,T-conorm) o Fuzzy if-then rules.	4
4	<b>Module 1:Fuzzy Logic-II:</b> Fuzzification , Membership Value Assignment techniques, De-fuzzification (Maxmembership principle, Centroid method, Weighted average method), Concept of fuzzy inference, Implication rules- Dienes-Rescher Implication,	4
	Module 2:Mamdani Implication, Zadeh Implication, Fuzzy Inference systems - Mamdani fuzzy model , Sugeno fuzzy model , Tsukamoto fuzzy model,	3

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	Implementation of a simple two-input single output FIS employing Mamdani	
	model Computing.	
	<b>Module 1:Fuzzy Control Systems:</b> CONTROL SYSTEM DESIGN PROBLEM 1.5, Control (Decision) Surface, Assumptions in a Fuzzy Control System Design V. Fuzzy Logic Controllers Soft o Comparison with traditional PID control.	4
5	advantages of FLC,	
	Module 2: Architecture of a FLC: Mamdani Type , Example Aircraft landing control problem.	4

Outco	mes:								
On co	mpletion of the course, student will be able to-								
1	use a new tool /tools to solve a wide variety of real world problems								
2	find an alternate solution, which may offer more adaptability, resilience and optimization								
3	Identify the suitable antenna for a given communication system								
4	Gain knowledge of soft computing domain which opens up a whole new career option								
5	Tackle real world research problems								
Text I	Books								
1. Fu La	undamentals of Neural Networks: Architectures, Algorithms And Applications, ureneFausett Pearson Education Inc. 2008								
2. Fu	Fuzzy Logic With Engineering Applications, Third Edition Thomas, Timothy Ross, John Wiley								
3. Ne Li	Neuro- Fuzzy and Soft Computing, J.S. Jang, C.T. Sun, E. Mizutani, PHI Learning Private Limited.								
4. 4.	4. Principles of Soft Computing, S. N. Sivanandam, S. N. Deepa, John Wiley & Sons, 2007								
Refer	ence Book								
1. Int Ac	troduction to the theory of neural computation, John Hertz, Anders Krogh, Richard Palmer, Idison –Wesley Publishing Company, 1991								
2. Ne	eural Networks A comprehensive foundation,, Simon Haykin, Prentice Hall International Inc- 99								
3. Ne Eu	Neural and Adaptive Systems: Fundamentals through Simulations, José C. Principe Neil R. Euliano, W Curt Lefebvre, John-Wiley & Sons 2000								
4. 4.	4. Pattern Classification, Peter E. Hart, David G. Stork Richard O.Duda, Second Edition, 2000								

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#### Year: Third Year Course: Soft Computing

Semester – VI Course Code: TYCSE03

Teaching Scheme (Hrs. /Week)			g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs.						End Ser	nester Ex	xam (Lab) – 00 Hrs.			

#### **Prerequisites:**

Basic knowledge of computer architecture, Neural network

Object	Objectives:									
The co	The course will enables students to:-									
1	Understand the learning and generalisation issue in neural computation.									
2	Understand the basic ideas behind most common learning algorithms for multilayer									
	perceptrons, radial-basis function networks, and Kohonen self-organising maps.									
3	To introduce some of the fundamental techniques and principles of neural computation.									
4	To investigate some common models and their applications.									

Unit No	Details	Hours
1	<b>Module 1: Artificial Neural Network -I</b> Biological neuron, Artificial neuron model, concept of bias and threshold, McCulloch- Pits Neuron Model, implementation of logical AND, OR, XOR functions Soft Topologies of neural networks, learning paradigms: supervised, unsupervised, reinforcement,	4
1	<b>Module 2:</b> Linear neuron model : concept of error energy , gradient descent algorithm and application of linear neuron for linear regression, Activation functions : binary , bipolar (linear, signup, log sigmoid, tan sigmoid) Learning mechanisms: Hebbian, Delta Rule o Perceptron and its limitations Draft	4
2	<b>Module 1: Artificial Neural Network-II:</b> Multilayer perceptron (MLP) and back propagation algorithm o Application of MLP for classification and regression o Self- organizing Feature Maps,	4
	<b>Module 2:</b> k- means clustering o Learning vector quantization Radial Basis Function networks: Cover's theorem, mapping functions. Application of RBFN for classification and regression o Hopfield network, associative memories.	3
3	<b>Module 1:</b> Fuzzy Logic –I: Concept of Fuzzy number, fuzzy set theory(continuous, discrete) o Operations on fuzzy sets, Fuzzy membership functions (core ,boundary ,support) , primary and composite linguistic terms.	4
	<b>Module 2:</b> Concept of fuzzy relation, composition operation (T-norm,T-conorm) o Fuzzy if-then rules.	4
4	<b>Module 1:Fuzzy Logic-II:</b> Fuzzification , Membership Value Assignment techniques, De-fuzzification (Maxmembership principle, Centroid method, Weighted average method), Concept of fuzzy inference, Implication rules- Dienes-Rescher Implication,	4
	Module 2:Mamdani Implication, Zadeh Implication, Fuzzy Inference systems - Mamdani fuzzy model , Sugeno fuzzy model , Tsukamoto fuzzy model,	3

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	Implementation of a simple two-input single output FIS employing Mamdani	
	model Computing.	
5	<b>Module 1:Fuzzy Control Systems:</b> CONTROL SYSTEM DESIGN PROBLEM 1.5, Control (Decision) Surface, Assumptions in a Fuzzy Control System Design V, Fuzzy Logic Controllers Soft o Comparison with traditional PID control, advantages of FLC.	4
	Module 2: Architecture of a FLC: Mamdani Type , Example Aircraft landing control problem.	4

Out	comes:								
On c	completion of the course, student will be able to-								
1	use a new tool /tools to solve a wide variety of real world problems								
2	find an alternate solution, which may offer more adaptability, resilience and optimization								
3	Identify the suitable antenna for a given communication system								
4	Gain knowledge of soft computing domain which opens up a whole new career option								
5	Tackle real world research problems								
Text	Books								
5. I	Fundamentals of Neural Networks: Architectures, Algorithms And Applications,								
l	LaureneFausett, Pearson Education, Inc, 2008.								
6. l	Fuzzy Logic With Engineering Applications, Third Edition Thomas, Timothy Ross, John Wiley								
Ċ	& Sons,2010								
7. l	Neuro- Fuzzy and Soft Computing, J.S. Jang, C.T. Sun, E. Mizutani, PHI Learning Private								
]	Limited.								
8. 4	Principles of Soft Computing, S. N. Sivanandam, S. N. Deepa, John Wiley & Sons, 2007								
Refe	erence Book								
5. 1	introduction to the theory of neural computation, John Hertz, Anders Krogh, Richard Palmer,								
1	Addison – Wesley Publishing Company, 1991								
6. l	Neural Networks A comprehensive foundation,, Simon Haykin, Prentice Hall International Inc-								
]	1999								
7. I	Neural and Adaptive Systems: Fundamentals through Simulations, José C. Principe Neil R.								
l	Euliano, W. Curt Lefebvre, John-Wiley & Sons, 2000								
8. 4	4. Pattern Classification, Peter E. Hart, David G. Stork Richard O.Duda, Second Edition, 2000								

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#### Year: Third Year Course: Mobile Computing

#### Semester – VI Course Code: TYCSE04

Teaching Scheme (Hrs. /Week)				Conti	nuous Inte	ernal Ass	essment	End Semester Examination		Total	
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	0	-	3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exam (Lab) – 00 Hrs.						xam (Lab) – 00 Hrs.					

#### **Prerequisites:**

Object	tives:
Studen	ts are able to:-
1	To develop problem solving abilities using Mobile Computing
2	To study foundations of Mobile Computing

Unit No	Details	Hours				
1	<b>Fundamental of Wireless and basics of wireless network:</b> Module 1: Digital communication, wireless communication system and limitations wireless madia fragmancy mactrum	4				
	Module 2: technologies in digital wireless communication, wireless communication channel specification, wireless network, wireless switching technology, wireless communication	4				
2	Mobile Communications and Computing Module 1: An Overview Mobile Communication, Mobile Computing, Mobile Computing Architecture, Mobile Devices, Mobile System Networks, Data Dissemination, Mobility Management, Security, Mobile Devices and Systems, Mobile Phones	4				
	Module 2: Digital Music Players, Hand-held Pocket Computers, Hand-held Devices: Operating Systems, Smart Systems, Limitations of Mobile Devices, Automotive Systems.	3				
3	GSM and other architectures: Module 1: GSM-Services & System Architectures ,Radio Interfaces, Protocols Localization, Calling, Handover, Security, New Data Services, modulation, multiplexing	4				
	Module 2: controlling the medium access, spread spectrum, coding methods, CDMA, IMT 2000, WCDMA and CDMA 2000, 4G Networks.					
4	Mobile Network and Transport Layer: Module 1: IP & Mobile IP Network Layers, Packet Delivery & Handover Management, Location Management, Registration, Tunneling& Encapsulation, Route Optimization, Dynamic Host Configuration Protocol	4				

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	Module 2: Mobile Transport Layer, Conventional TCP/IP Transport Layer	
	Protocol, Indirect TCP, Snooping TCP, Mobile TCP, Mobile Ad-hoc	2
	Networks(MANET), Routing and Routing Algorithms in MANET, security in ad-	3
	hoc networks	
	Data Dissemination and Data Synchronization in Mobile Computing	
	Module 1: Communication Asymetry, classification of data delivery mechanism,	4
5	data dissemination broadcast models	
	Module 2: selective tuning and indexing techniques, synchronization,	4
	synchronization software for mobile devices, synchronization protocols.	4

#### **Outcomes:**

On completion of the course, student will be able to-

1 To write a survey on Mobile Computing Building Blocks.

2 To write a presentation on survey FOSS tools and Technologies.

3 To write test cases to solve problems using Mobile Computing algorithms

#### **Text Books**

- 1. Raj Kamal, Mobile Computing, 2/e, Oxford University Press-New Delhi
- 2. Dr. Sunil kumar S. Manavi, Mahabaleshwar S. Kakkasageri, Wireless and Mobile Networks, concepts and protocols, Wiley, India.

#### **Reference Book**

- 1. Andrew Tanenbaum, Modern Operating System, 3rd/e, Pearson Education International, ISBN Q-IB-filBMST-L
- 2. Digital Content: iOS Technology Overview: IOSTechOverview.pdf, Apple Inc. Copyright 2014

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#### Year: Third Year

Course: Information Storage and Retrieval

#### Semester – VI Course Code: TYCSE05

Teaching Scheme (Hrs. /Week)			g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	0	-	3	10 20 10 10 50 100							100
Max. Time, End Semester Exam (Theory) - 03 Hrs.						End Sen	nester Ex	xam (Lab) – 00 Hrs.			

#### **Prerequisites:**

1. Data Structures and Files. 2. Database management systems.

Object	Objectives:					
Studen	ts are able to:-					
1	To understand information retrieval process.					
2	To understand concepts of clustering and how it is related to Information retrieval.					
3	To deal Storage, Organization & Access to Information Items.					
4	To evaluate the performance of IR system and understand user interfaces for searching					
5	To understand information sharing on semantic web.					

Unit No	Details	Hours					
	Introduction:						
	Module 1:Basic Concepts of IR, Data Retrieval & Information Retrieval, text	4					
	mining and IR relation, IR system block diagram.						
1	Module 2: Automatic Text Analysis: Luhn's ideas, Conflation Algorithm, Indexing						
	and Index Term Weighing, Probabilistic Indexing Inverted file, Suffix trees &	4					
	suffix arrays, Signature Files, Scatter storage or hash addressing, Clustered files,	4					
	Hypertext and XML data structures.						
	Module 1:Retrieval strategies: Vector Space model, Probabilistic retrieval						
2	strategies, Language models, Inference networks, Extended Boolean retrieval,						
	Latent semantic indexing, neural networks, Fuzzy set retrieval.						
	Module 2:Retrieval utilities: Relevance feedback, Cluster Hypothesis, Clustering						
	Algorithms: Single Pass Algorithm, Single Link Algorithm.						
	Module 1:Performance evaluation: Precision and recall, MRR, F-Score, NDCG,	4					
2	user oriented measures, cross fold evaluation.						
3	Module 2: Visualisation in Information System: Starting points, document context,	4					
	User relevance judgement, Interface support for search process.	4					
	Module 1:Distributed IR: Introduction, Collection Partitioning, Source Selection,	4					
4	Query Processing, web issues.	4					
	Module 2:MULTIMEDIA IR: Introduction, Data Modeling, Query languages,						
	Generic multimedia indexing approach, One dimensional time series, two						
	dimensional color images, Automatic feature extraction.						

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-	Module 1:Searching the Web: Challenges, Characterizing the Web, Search							
	Engines, Browsing, Matasearchers, Web crawlers, Meta-crawler, Web data							
Э	mining, Finding needle in the Haystack, Searching using Hyperlinks,							
	Module 2:Page ranking algorithms: Pagerank, Rank SVM.							

Outco	mes:
On con	npletion of the course, student will be able to-
1	Understand the concept of Information retrieval.
2	Deal with storage and retrieval process of text and multimedia data.
3	Evaluate performance of any information retrieval system.
4	Design user interfaces.
5	Understand importance of recommender system
Text <b>B</b>	Books
1. Y	ates &Neto, Modern Information Retrieval, Pearson Education, ISBN:81-297-0274-6
2. C	.J. Rijsbergen, Information Retrieval, (www.dcs.gla.ac.uk)., 2ndISBN:978- 408709293.
3. E	David Grossman, OphirFrieder, Information Retrieval - Algorithms and Heuristics, Springer
Inte	rnational Edition, ISBN: 978-1-4020-3004-8.
4. C	rigoris Antoniou and Frank van Harmelen, A semantic Web Primer, Massachusetts Institute
of T	echnology, ISBN: 978-0-262-01242-3.
5. 1	Pascal Hitzler, Markus Krötzsch, Sebastian Rudolph, Foundations of Semantic Web
Tec	hnologies, Chapman & Hall/CRC, ISBN: 9781420090505.
6. H	ang Li, Learning to Rank forInformationRetrievaland Natural Language.
7. P	rocessing, Morgan & Claypool, ISBN: 9781608457076.
Refere	ence Book
1.	Christopher D. Manning, PrabhakarRaghavan and HinrichSchutzen, Introduction to
Info	rmation Retrieval, Cambridge University Press, Online book, ISBN:978-0-521-86571-5
2. 1	Robert Korfhage, Information Storage and Retrieval, John Wiley & Sons,1 Edition,
ISB	N:9788126507702.
3. K	owalski, Gerald, Maybury, Mark, Information Storage and Retrieval Systems : Theory and
Imp	lementation, Springer US, 2 nd Edition, ISBN:978-0-7923-7924-9.
4. Z	chang, Jin, Visualization for Information Retrieval, Springer-Verlag Berlin Heidelberg,1st
Edit	ion,ISBN:978-3-642-09442-2Mark leven, Introduction to search engines and web navigation,
Johr	Wiley and sons Inc, 2 ndEdition, ISBN 9780-170-52684-2.
5. V	. S. Subrahamanian, Satish K. Tripathi, Multimedia information System, Kulwer Academic
Pub	lisher.

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#### Year: Third Year Course: Advance Software Engineering

#### Semester – VI Course Code:TYCSE06

Teaching Scheme (Hrs. /Week)			g e ek)	Continuous Internal Assessment (CIA)				End Semester Examination		Total	
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10 20 10 10 50 100							100
Max. Time, End Semester Exam (Theory) - 03 Hrs.						End Ser	nester Ex	(Lab) – 00 Hrs.			

#### **Prerequisites:**

Software Engineering

Object	tives:
Studen	ts are able to:-
1	appreciate the wider engineering issues which form the background to developing complex,
	evolving (software-intensive) systems
2	plan a software engineering process to account for quality issues and non-functional
	requirements
3	employ a selection of concepts and techniques to complete a small-scale study into one of
	the advanced topic areas
4	Embark on more in-depth research or practice in software engineering.

Unit No	Details	Hours
1	Module 1: Introduction to software engineering.	4
1	Module 2:Basics of software engineering.	4
2	<b>Module 1:</b> Embedded software and systems engineering: overview, examples and industrial realities.	4
2	Module 2:Project Management - Project Planning and Scheduling standards, Scheduling.	3
3	<b>Module 1</b> : Unified Software Development Process, Software Process Improvement, Software Economics, Software Quality.	4
	<b>Module 2:</b> Software Metrics - Measurement, Estimation and Prediction, Requirements Management, Configuration Management, Risk Management, Testing and Inspection.	4
	<b>Module 1:</b> Architecture Description Languages, Pattern-Oriented Software Architecture, Component-based Development.	4
4	<b>Module 2:</b> Distributed Software Architectures using Middleware, Enterprise Application Integration, Architectures for Mobile and Pervasive Systems, Model Driven Architecture.	3
5	Module 1: UML Extension Mechanisms.	4
	Module 2:Object Constraint Language, Model Checking.	4

### **Outcomes:**

On completion of the course, student will be able to-			
1	Apply software engineering life cycle by demonstrating competence in communication,		
	planning, analysis, design, construction, and deployment.		

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**Computer Engineering (IILP)** 

2	Have brief account of associated professional and legal issues.
3	Ability to perform independent research and analysis.
4	Ability to work as an effective member or leader of software engineering teams.
5	To manage time, processes and resources effectively by prioritizing competing demands to
	achieve personal and team goals Identify and analyzes the common threats in each domain.
Text B	Books
Softw	are Engineering: A Practitioner's Approach, Roger S Pressman 6th Edition
Refere	ence Book
0 0	

Software Engineering: IyanSomarville, 7th Edition

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**Computer Engineering (IILP)** 

#### Year: Sixth Year **Course: Distributed System**

#### Semester – VI **Course Code: TYCSE07**

Teaching Scheme (Hrs. /Week)		Continuous Internal Assessment (CIA)				End Semester Examination		Total			
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
Max. Time. End Semester Exam (Theory) - 03 Hrs. End Semester Exar					kam (Lab) – 00 Hrs.						

#### **Prerequisites:**

1. Web Technology. 2. Computer Network Technology. 3. Operating System.

Object	tives:
Studen	ts are able to:-
1	appreciate the wider engineering issues which form the background to developing complex,
	evolving (software-intensive) systems
2	plan a software engineering process to account for quality issues and non-functional
	requirements
3	employ a selection of concepts and techniques to complete a small-scale study into one of
	the advanced topic areas
4	Embark on more in-depth research or practice in software engineering.

Unit No	Details	Hours
1	<b>Module 1:</b> Characteristics and examples of distributed systems, Design goals, Types of distributed systems, Trends in distributed systems, Focus on Resource Sharing, Challenges.	4
1	<b>Module 2:</b> Architectures: Architectural styles, middleware and middleware organization, system architectures, Example architectures. Case Study: The World Wide Web	4
2	<b>Module 1:</b> Communication: Introduction, Layered protocols, Types of communication, Inter-process Communication, Remote Procedure Call (RPC), Message oriented communication, Multicast Communication,	4
2	<b>Module 2:</b> Network Virtualization: Overlay Network Coordination: Clock Synchronization, Logical Clocks, Mutual Exclusion, Election algorithms, Distributed event matching, Gossip Based coordination	3
	<b>Module 1</b> : Replication: Reasons for replication, Replica management, Failure masking and replication, Consistency protocols, Catching and replication in web,	4
3	<b>Module 2:</b> Fault Tolerance: Introduction, Failure models, Fault systems with arbitrary failures, Reliable client server communication, Reliable group communication, Distributed commit, Recovery, Checkpoints	4
4	<b>Module 1:</b> Distributed File Systems: Introduction, File System Architecture, Sun Network File System, and HDFS. Name Services: Introduction, Name Services and the Domain Name System, Directory Services.	4
	<b>Module 2:</b> Case Study- 1: The Global Name Service, 2. The X.500 Directory Service. Distributed Multimedia Systems: Characteristics of Multimedia Data, Quality of Service Management, Resource management, Stream Adaptation.	3

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	Module 1:Architecture of Traditional Web-Based Systems, Apache Web Server,				
	Web Server Clusters, Communication by Hypertext Transfer Protocol,	4			
5	Synchronization, Web Proxy Caching, Replication for Web Hosting Systems	l			
	Module 2:Replication of Web Applications, Fault Tolerance in distributed web	4			
	based systems, Security Concerns.	4			

Out	comes:					
On c	completion of the course, student will be able to-					
1	Understand the principles and desired properties of distributed systems based on different					
	application areas.					
2	Understand and apply the basic theoretical concepts and algorithms of distributed systems					
	in problem solving.					
3	Recognize the inherent difficulties that arise due to distributed-ness of computing resources.					
4	Identify the challenges in developing distributed applications					
Tex	t Books					
1. M	laarten van Steen, Andrew S. Tanenbaum, Distributed Systems, PHI, 3rd Edition Version 3.01,					
ISB	N: 978-15-430573-8-6(Printed).					
2. A	ndrew S. Tanenbaum, Maarten van Steen, Distributed Systems - Principles and Paradigms,					
PHI	, 2nd Edition, ISBN: 978-0130888938.					
Refe	erence Book					
1. (	George Coulouris, Distributed Systems: Concepts and Design, Pearson, 5 th edition, Jean					
]	Dollimore, Tim Kindberg, Gordon Blair, ISBN:13: 978-0132143011, ISBN:10: 0132143011. 2.					
	AbhijitBelapurkar, AnirbanChakrabarti, HarigopalPonnapalli, NiranjanVarada					
2. 1	rajan, SrinivasPadmanabhuni, SrikanthSunderrajan, Distributed System Security: Issues,					
]	Processes and solutions, Willey online Library, ISBN: 978-0-470-51988-2.					
2 /	2 Sunita Mahaian Saama Shah Distributed Computing Outand University Dress and Edition					

3. 3. SunitaMahajan, Seema Shah, Distributed Computing, Oxford University Press, 2nd Edition, ISBN-13: 978-0198093480.

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#### Year: Third Year Course: Embedded and Real Time Operating System

#### Semester – VI Course Code: TYCSE08

Teaching Scheme (Hrs. /Week)			g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
	Ma	x. T	'ime,	End Semester Exam (Theory) - 03 Hrs.				End Semester Exam (Lab) – 00 Hrs.			

#### **Prerequisites:**

Systems Programming and Operating System

Object	tives:
Studen	its are able to:-
1	To understand a typical embedded system and its constituents
2	To learn the selection process of processor and memory for the embedded system
3	To learn communication buses and protocols used in the embedded and real-time systems
4	To understand real-time operating system (RTOS) and the types of RTOS
	To learn various approaches to real-time scheduling

Unit No	Details	Hours
1	<b>Module 1:</b> Introduction to Embedded systems, Characteristics, Challenges, Processors in Embedded systems, hardware Unit s and devices in an embedded system – Power source, memory, real-time clocks, timers, reset circuits, watchdog-timer reset,	3
	<b>Module 2:</b> Input-output ports, buses and interfaces, ADC, DAC, LCD, LED, Keypad, pulse dialer, modem, transceivers, embedded software, software are tools for designing an embedded system.	3
2	<b>Module 1:</b> Embedded SOC, ASIC, IP core, ASIP, ASSP, examples of embedded systems. Advanced architectures/processors for embedded systems- ARM, SHARC, DSP, Superscalar Units. Processor organization, Memory organization, Performance metrics for a processor, memory map and addresses, Processor selection and memory selection for real-time applications.	3
	<b>Module 2:</b> Networked embedded systems- I2C, CAN, USB, Fire wire. Internet enabled systems- TCP, IP, UDP. Wireless and mobile system Protocols- IrDA, Bluetooth, 802.11, ZigBee.	3
3	<b>Module 1</b> : Devices and communication buses: Types of I/O communication, types of serial communication, Serial protocols, Devices and buses- RS-232C, RS-485, HDLC, SPI, SCI, SI, SDIO. Parallel ports and interfacing.	3
	<b>Module 2:</b> Parallel device protocols: ISA, PCI, PCI/X, ARM bus, Wireless devices.	3
4	<b>Module 1:</b> Introduction to real-time operating systems. Hard versus soft real-time systems and their timing constraints. Temporal parameters of real-time process:	3

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	Fixed, Jittered and sporadic release times, execution time.					
Module 2: Types of real-time tasks, Precedence constraints and data dependency						
	among realtime tasks, other types of dependencies for real-time tasks. Functional	2				
parameters and Resource parameters of real-time process, Real-time applications						
	Guidance and control, Signal processing, Multimedia, real-time databases.					
	Module 1:Real-time task and task states, task and data. Approaches to real-time					
	scheduling: clock driver, weighted round-robin, priority-driven- Fixed priority and	4				
F	dynamic priority algorithms -Rate Monotonic (RM), Earliest-Deadline-First	4				
5	(EDF), Latest-Release-Time (LRT), Least-Slack-TimeFirst (LST).					
	Module 2:Static and Dynamic systems, on-line and off-line scheduling,	4				
	Scheduling a-periodic and sporadic real-time tasks	4				

Outcome	es:							
On comp	pletion of the course, student will be able to-							
1 R	Recognize and classify embedded and real-time systems							
2 H	Explain communication bus protocols used for embedded and real-time systems							
3 C	Classify and exemplify scheduling algorithms							
4 A	Apply software development process to a given RTOS application							
D	Design a given RTOS based application							
Text Boo	oks							
1. Raj H	Kamal, "Embedded Systems: Architecture, programming and Design", 2nd Edition,							
McGraw-	-Hill, ISBN: 13: 9780070151253							
2. Jane W	V. S. Liu, "Real-Time Systems", Pearson Education, ISBN: 10: 0130996513							
3. David	E. Simon, "An Embedded Software Primer", Pearson Education, ISBN: :8177581546							
Reference	ce Book							

1. Sriram V. Iyer, Pankaj Gupta, "Embedded Real-time Systems Programming", Tata McGraw-Hill, ISBN: 13: 9780070482845

2. Dr. K. V. K. K. Prasad, "Embedded Real-Time Systems: Concepts: Design and Programming", Black Book, Dreamtech Press, ISBN: 10: 8177224611,13: 9788177224610

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#### Year: Third Year Course: Cloud Computing

#### Semester – VI Course Code: TYCSO01

Teaching Scheme (Hrs. /Week)		Contin	nuous Internal Assessment (CIA)				End Sei Examii	mester nation	Total		
L	T	P	С	CIA-1	CIA-2	CIA-3	CIA-	Lab	Theory	Lab	
							4				
3	0	0	3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) -3Hrs. End Semester					mester E	xam (Lab) - 0Hrs.					

#### **Prerequisites:**

Basic information of cloud

Object	Objectives:						
Studen	ts are able to:-						
1	The student will learn about the cloud environment, building software systems and						
	components that scale to millions of users in modern internet, cloud concepts capabilities						
	across the various cloud service models including Iaas, Paas, Saas, and developing cloud						
	based software applications on top of cloud platforms.						
2	To learn how to use Cloud Services.						
3	To implement Virtualization						

Unit No	Details							
	Module 1:Fundamentals of Cloud Computing: Cloud Computing Basics – History of	5						
	Cloud Computing, Characteristics of Cloud Computing, Need for Cloud computing,							
	Advantages and Possible Disadvantages of cloud computing,							
1	Module 2: Cloud Deployment Models - Public, Private, Hybrid, Community, Other	4						
	deployment Models. Evolving Data Center into Private Cloud, Datacenter Components,							
	Extracting Business value in Cloud Computing – Cloud Security, Cloud Scalability, Time							
	to Market, Distribution over the Internet, Cloud Computing Case Studies.							
2	<b>Module 1 :Cloud Delivery Models:</b> Introduction to Cloud Services, Infrastructure as a Service (IaaS) – Overview, Virtualization, Container, Pricing Models, Service Level Agreements, Migrating to the Cloud, IaaS Networking options, Virtual Private Cloud(VPC), IaaS Storage – File and Object storage, Data Protection, IaaS security, Benefits, Risks and Examples of IaaS. Platform as a Service (PaaS) – Overview, IaaSvsPaaS, PaaS Examples, benefits and risks.	5						
	Module 2:Software as a Service (SaaS) – Introducing SaaS, SaaS Examples – Office 365, Google G Suite, Salesforce.com, Evaluating SaaS – user and vendor perspective, Impact of SaaS, Benefits and risks of SaaS. Other Services on Cloud, Cloud Delivery Models Considerations	4						

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	<b>Module 1 :Cloud Platforms:</b> Introducing Cloud Platforms, Evaluating cloud platforms, Cloud Platform technologies – Amazon Web Services, Microsoft Azure,	5
	Google Cloud Platform, Salesforce.com, Impact of Cloud platforms. Private Cloud	
	Platforms - Introducing Private clouds - Microsoft Azure stack, Open stack, AWS	
3	Greengrass, Impact of Private clouds	
	<b>Module 2: Cloud Migration</b> : Delivering Business Processes from the Cloud: Business process examples, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud, Efficient Steps for migrating to cloud., Risks: Measuring and assessment of risks, Company concerns Risk Mitigation methodology for Cloud computing, Case Studies	4
	Module 1 :Cloud Computing - Challenges, Risk and Mitigation: Cloud Storage,	5
	Application performance, Data Integration, Security. Ensuring Successful Cloud	
4	Module 2: Adoption: Designing a Cloud Proof of Concept, Vendor roles and	4
	capabilities, moving to the Cloud. Impact of Cloud on II Service Management.	
	<b>Risks and Consequences of Cloud Computing</b> – Legal issues, Compliance issues, Privacy and Security	
	Module 1 • Managing the Cloud – Managing and Securing Cloud Services	5
	Vietualization and the Cloud Managing Desistens and devices on the sloud SOA and	5
5	Virtualization and the Cloud, Managing Desktops and devices on the cloud, SOA and	
	Cloud computing, Managing the Cloud environment,	
	Module 2: Planning for the Cloud – Economic Cost Model and Leveraging the Cloud,	4
	Cloud computing resources, Cloud Dos and Don'ts.	

Outco	omes:						
1	The student will learn about the cloud environment, building software systems and components that scale to millions of users in modern internet, cloud concepts capabilities across the various cloud service models including Iaas,Paas, Saas, and developing cloud based software applications on top of cloud platforms.						
2	Able to learn how to use Cloud Services.						
3	Able to implement Virtualization						
Text I	Books						
1. Ki Co 2. Ju W	<ol> <li>Kirk Hausman, Susan L. Cook, TelmoSampaio, "CLOUD ESSENTIALS CompTIA® Authorized Courseware for Exam CLO-001", John Wiley &amp; Sons Inc., 2013</li> <li>Judith Hurwitz ,Robin Bloor , Marcia Kaufman , Fern Halper, "Cloud Computing for Dummies", Wiley Publishing Inc., 2010</li> </ol>						
Refer	ence Book						
1.							

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#### Year: Third Year **Course: Web Technology**

#### Semester – VI **Course Code: TYCSEO02**

Teaching Scheme (Hrs. /Week)			g e ek)	Contin	nuous Inte	ernal Ass	essment	End Semester Examination		Total	
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exam (Lab) –							xam (Lab) – 00 Hrs.				

**Prerequisites:** Discrete Mathematics, FLAT

Object	tives:
Studen	ts are able to:-
1	Introduce the fundamental problems of machine learning.
2	Provide understanding of techniques, mathematical concepts, and algorithms used in
	machine learning to facilitate further study in this area.
3	Provide pointers into the literature and exercise a project based on literature search and one
	or more research papers.

Unit No	Details	Hours
1	<b>Module 1:</b> Introduction - What is Web Engineering? Web Development History, Motivation, Categories of Web Applications, Web Applications Characteristics. Evolution and Need for Web Engineering, Web Engineering Models, Software Engineering v/s Web Engineering World Wide Web: Introduction to TCP/IP and WAP, DNS, Email, TelNet, HTTP and FTP.	4
	<b>Module 2:</b> Introduction to Browser and search engines, Search fundamentals, Search strategies, Directories search engines and Meta search engines, Working of the search engines, Miscellaneous Web Browser details, Introduction to Web Servers: Features of web servers, caching, case study-IIS, Apache, Configuring web servers.	4
2	<b>Module 1:</b> The role of the Information Architect, Collaboration and Communication, Organizing Information, Organizational Challenges, Organizing Web sites parameters and Intranets Creating Cohesive Websites: Conceptual Overview Website Development, Website Design issues, Conceptual Design, High-Level Design, Indexing the Right Stuff, Grouping Content. Architectural Page Mockups, Design Sketches, Navigation Systems.	4
	<b>Module 2:</b> Searching Systems Good & bad web design, Process of Web Publishing. Phases of Web Site development, enhancing your web-site, submission of website to search engines Web security issues, security audit of websites, Web effort estimation, Productivity, Measurement, Quality usability and reliability. Requirements Engineering for Web Applications: Introduction, Fundamentals, Requirement Source, Type, Notations Tools.	3
3	<b>Module 1</b> : Introduction HTML: HTML and DHTML, HTML Basic Concepts, Static and dynamic HTML, Structure of HTML documents, HTML Elements, Linking in HTML, Anchor Attributes, Image Maps, Meta Information, Image	4

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#### Computer Engineering (IILP)

	Preliminaries, Layouts, Backgrounds, Colors and Text, Fonts, Tables, Frames and			
	layers, Audio and Video Support with HTML Database integration, CSS,			
	Positioning withStyle sheets, Forms Control, Form. Elements. Difference between			
	HTML and HTML5			
	Module 2:. Applying Styles, values, selectors, class, ids, inheritance, layout,			
	backgrounds, borders, margin, padding, lists, fonts, text formatting, positioning,	4		
	Dynamic HTML, DHTML with CSS.			
	Module 1: Introduction to JavaScript: Introduction to Scripting, Difference			
	between Java and JavaScript, JavaScript Characteristics, JavaScript and Common	4		
	Programming Concepts			
	Module 2:Introduction, Benefits Of Using PHP, MySQL, Server/Client			
4	Environment, Development Concept: How PHP Script Work, PHP Syntax, Embed			
	PHP In HTML/HTML In PHP, PHP Data Types, Variable In PHP, Operator in	2		
	PHP, Control Structure, Looping Structure, Function, File Inclusion: Include()/	3		
	Require(), Array, String Function: chr()/ strlen()/ strpos()/strcmp(), State			
	Management : Cookies, Session management.			
	Module 1: Working with PHP My Admin: Types Data Type, Creating Database &			
	Tables, Dropping Database & Tables, Adding Fields, Selecting Table MySQL	4		
	Function in PHP : Database Connections, Managing Database Connections,	4		
	Performing Queries, Closing Connection.			
5	Module 2: The J2EE and its multitier architecture, The enterprise application, Java			
	Servlet and CGI, A simple servlet, life cycle of servlet, anatomy of servlet,			
	javax.servlet package, Generic servlet, Http Servlet, reading data from client,	4		
	HTTP request headers, sending data to client, HTTP response header, cookies,			
	session management.			

#### **Outcomes:**

On completion of the course, student will -

1 Provide understanding of the limitations of various machine learning algorithms and the way to evaluate performance of machine learning algorithms.

#### **Text Books**

1. Steven M. Schafer, "HTML, XHTML and CSS", Fourth Edition by, Wiley India Edition. ISBN: 978-81-265-1635-3.

2. Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP", 4th Edition, BPB Publications.

3. Jason Hunter, "Java Servlet Programming", 2nd Edition, O'reilly Publications.

#### **Reference Book**

1. Roger S. Pressman, David Lowe, "Web Engineering", Tata Mcgraw Hill Publication, 2007

2. Jim Keogh, "J2EE: The Complete Reference", 1st Edition , Tata McGraw Hill Pulishing Company, ISBN: 978-0-07-052912-0

3. Professional WordPress: Design and Development by Brad Williams, David Damstra, Hal Stern, Wrox publications

4. Ralpha Moseley, M.T. Savaliya, "Developing Web Applications", Wiley, 2nd Edition, ISBN : 978-81-265-3867-6

5. Web Technologies Black Book: HTML, JavaScript, PHP, Java, JSP, XML and AJAX by Kogent Learning Solutions Inc.

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#### Year: Third Year Course: Machine Learning

#### Semester – VI Course Code: TYCSO03

Teaching Scheme (Hrs. /Week)			g e ek)	Contir	nuous Inte	ernal Ass	essment	End Semester Examination		Total	
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exam (La							xam (Lab) – 00 Hrs.				

#### **Prerequisites:**

Discrete Mathematics, FLAT

Object	Objectives:								
Studen	ts are able to:-								
1	Introduce the fundamental problems of machine learning.								
2	Provide understanding of techniques, mathematical concepts, and algorithms used in								
	machine learning to facilitate further study in this area.								
3	Provide pointers into the literature and exercise a project based on literature search and one								
	or more research papers.								

Unit No	Details	Hours					
	Module 1: Basic Maths: Probability, Linear Algebra, Convex Optimization	4					
1	Module 2:Background: Statistical Decision Theory, Bayesian Learning (ML,						
	MAP, Bayes estimates, Conjugate priors)	4					
	Module 1: Regression : Linear Regression, Ridge Regression, Lasso	4					
2	Module 2:Dimensionality Reduction : Principal Component Analysis, Partial	3					
	Least Squares	5					
	Module 1: Classification : Linear Classification, Logistic Regression, Linear						
	Discriminant Analysis, Quadratic Discriminant Analysis, Perceptron, Support						
3	Vector Machines Kernels,						
	Module 2:. Artificial Neural Networks Back Propagation, Decision Trees, Bayes	4					
	Optimal Classifier, Naive Bayes.						
	Module 1:Evaluation measures : Hypothesis testing, Ensemble Methods,	Δ					
4	Bagging Adaboost Gradient Boosting,						
	Module 2: Clustering, K-means, K-medoids, Density-based Hierarchical, Spectral	3					
	Module 1:Miscellaneous topics: Expectation Maximization, GMMs, Learning	Δ					
5	theory Intro to Reinforcement Learning	4					
	Module 2: Graphical Models: Bayesian Networks.	4					

#### **Outcomes:**

On completion of the course, student will -

1 Provide understanding of the limitations of various machine learning algorithms and the way to evaluate performance of machine learning algorithms.

#### **Text Books**

1. Christopher M. Bishop. Pattern Recognition and Machine Learning (Springer)

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- 2. David Barber, Bayesian Reasoning and Machine Learning (Cambridge University Press). Online version available
- 3. Tom Mitchell. Machine Learning (McGraw Hill)
- 4. Richard O. Duda, Peter E. Hart, David G. Stork. Pattern Classification (John Wiley & Sons)

#### **Reference Book**

- 1. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
- 2. Christopher Bishop. Pattern Recognition and Machine Learning. 2e

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#### Year: Third Year

#### Semester – VI

#### **Course: Data Mining**

#### **Course Code: TYCSO04**

Sc	Teaching Scheme (Hrs. /Week)Continuous Internal Assessment (CIA)			End Semester Examination		Total					
L	Т	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3			3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exa				ter Exan	n (Lab) – 00 Hrs.						

#### **Prerequisites:**

Data Base Management System.

Objecti	Objectives:						
The cour	se will enables students to:-						
1	To introduce students to the basic concepts and techniques of Data Mining.						
2	To develop skills of using recent data mining software for solving practical problems						
3	To gain experience of doing independent study and research						

Unit No	Details	Hours
1	<b>Module 1:</b> What is data mining, Related technologies - Machine Learning, DBMS, OLAP, Statistics, Data Mining Goals, and Stages of the Data Mining Process.	4
1	<b>Module 2:</b> Data Mining Techniques, Knowledge Representation Methods, Applications, Example: weather data.	4
2	Module 1: Types of Data in Cluster Analysis ,A Categorization of Major Clustering Methods, Partitioning Methods ,Hierarchical methods, Density Based Methods ,Grid Based Methods, Model Based Clustering Methods, Clustering High, Dimensional	4
	Data ,Constraint ,Based Cluster Analysis ,Outlier Analysis.Module 2:Model Based Clustering Methods, Clustering High, DimensionalData ,Constraint ,Based Cluster Analysis ,Outlier Analysis.	3
2	Module 1:Data Warehouse and DBMS, Multidimensional data model.	4
3	Module 2: OLAP operations, Example: loan data set.	4
4	<b>Module 1:</b> Issues Regarding Classification and Prediction, Classification by Decision Tree Introduction, Bayesian Classification Rule Based Classification.	4
4	<b>Module 2:</b> Classification by Back propagation ,Support Vector Machines, Associative Classification ,Lazy Learners ,Other Classification Methods .	3
5	<b>Module 1:</b> Multidimensional Analysis and Descriptive Mining of Complex Data Objects.	4
	<b>Module 2:</b> Spatial Data Mining, Multimedia Data Mining ,Text Mining ,Mining the World Wide Web.	4

#### **Outcomes:**

1

On completion of the course, student will be able to-

Understand the data warehouse and OLAP operations.

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2	Analyse different classification techniques.						
Text Bo	oks						
1. Jiawe	i Han and MichelineKamber "Data Mining Concepts and Techniques" Second Edition,						
2. Alex I	2. Alex Berson and Stephen J. Smith "Data Warehousing, Data Mining & OLAP", Tata McGraw						
3. Hill E	dition, Tenth Reprint 2007.						
4. K.P. S	oman, ShyamDiwakar and V. Ajay "Insight into Data mining Theory and Practice", Easter Economy						
Editic	n, Prentice Hall of India, 2006.						
Referen	ce Book						
1. G.K.	Gupta "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India,						
2006.							
2. Pang	Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education,						
2007							

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#### Year: Third Year Course: Project Stage I

#### Semester – VI Course Code: TYCS611

Sc	Teaching Scheme (Hrs. /Week)Continuous Internal Assessment (CIA)End Semester Examination				Total						
L	Τ	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
		8	4					50		50	100
Μ	Max. Time, End Semester Exam (Theory) -00 Hrs.					End Sen	nester Ex	xam (Lab) – 03 Hrs.			

Objec	tives:
Studen	ts are able to:-
1	To expose students to the 'real' working environment and get acquainted with the
	organization structure, business operations and administrative functions.
2	To set the stage for future recruitment by potential employers.
3	To develop time and space efficient algorithms;
4	To develop software engineering documents and testing plans;
5	To use algorithmic solutions using distributed, Embedded, concurrent and parallel environments.

Unit No	Details	Hours						
	Course (catalog) description: As a part of the B. Tech Curriculum,							
	ProjectStage- I is a Practical course, in which the students of CSE are							
	trained for project based learning.							
Proposed Criteria for Project Evaluation								
1	I suggest the following 9 aspects of every project and presentation. Every item is worth 10 points out of total 90. For each of the items I give several key words explaining my understanding of the item. This grading scheme is only a proposal and is open for any input, discussion and final approval by members of the seminar. As the evaluation procedure I suggest for each project and each of the first 8 items to assign a base group to evaluate it.							
	<ul> <li>(1) Topic: Is the topic chosen interesting, useful, worth researching?</li> <li>(2) Thesis: Are the theses of the project identifiable, plausible, insightful, and clear?</li> </ul>							
	<ul> <li>(3) Evidence / Sources: Are the sources of information used primary, sufficient, and relevant? Is evidence clearly related to claims?</li> <li>(4) Analysis / Logic / Argumentation: Is analysis fresh, posing new ways to think of the material? Are Ideas represented logically? Is the argument identifiable, reasonable and sound? Do authors anticipate and defuse counter-argument?</li> </ul>							
	Presentation:							
	(5) Structure: Is the structure evident, understandable, and appropriate? Is							
	transition from point to point smooth?							
	(6) Slides / transparencies: Are slides well designed (not too busy, right font)?							
	Are graphic and visual appropriate? Any spelling, grammar, word use slips?							

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(7) Timing: Is presentation timed properly, rehearsed?
(8) Style: Is the level of treatment appropriate (not too detailed or too general)?
Is the presentation energetic, enthusiastic, and clear? Is the volume good?
(9) Extra points for excellence

#### **Tools Required:**

Preferably 64-bit FOSS tools but if sponsoring company's requirement is non-open sourceplatform then it must be latest and current version of non-absolute tools. 64-bit i5/i7Desktops/Mobiles, Latest SAN,3-tier architectures along with latest version of FOSS Operating systems like Fedora 21or equivalent, LAMP tools, WEB server, Applications servers, Database servers, MongoDBor latest open source BigDATA tools, FOSS Programming Tools like gcc,g++,Eclipse,Python, Java and other tools are as per the requirement of the SRS. The documentationtools like Open office, GIT, Latex, Latex-Presentation

#### **Outcomes:**

On completion of the course, student will be able to-

1 An ability to work in actual working environment.

- 2 An ability to utilize technical resources.
- 3 An ability to write technical documents and give oral presentations related to the work completed.

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# **SEMESTER VII**

<b>Document Reference</b>	Revision No. / Date	Prepared By	Approved By
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#### Year: Fourth Year Course: Software Testing & Quality Assurance

#### Semester – VII Course Code: TYCS701

Teaching Scheme (Hrs. /Week)		g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total	
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	1	2	5	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Se						End Sen	nester Ex	am (Lab) – 00 Hrs.			

#### **Prerequisites:**

Software Engineering, Object Oriented Analysis and Design

Object	tives:
Studen	ts are able to:-
1	To understand the software testing methodologies such as flow graphs and path testing,
	transaction flows testing, data flow testing, domain testing and logic base testing.

Unit No	Details	Hours
	<b>Module 1:</b> What is testing?, Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.	4
1	<b>Module 2:</b> Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitising, path instrumentation, application of path testing.	4
	Module 1: transaction flows, transaction flow testing techniques.	4
2	<b>Module 2:</b> Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.	3
	Module 1: domains and paths, Nice & ugly domains, domain testing	4
3	Module 2:domains and interfaces testing, domain and interface testing, domains and test ability.	4
4	<b>Module 1:</b> path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.	4
4	<b>Module 2:</b> Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.	3
	Module 1: state graphs, good & bad state graphs, state testing, Testability tips.	4
5	<b>Module 2:</b> Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools.	4

Outcomes:						
On completion of the course, student will be able to-						
1 Ability to apply the process of testing and various methodologies in treatingfor testing f	for					
developed software.						
2 Ability to write test cases for given software to test it before delivery to the customer						
Text Books						
1. Software Testing techniques — Boris Beizer, Dreamtech, second edition.						
2. Software Testing Tools — Dr.K.V.K.K.Prasad, Dreamtech.						
Reference Book						

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- 1. The craft of software testing Brian Marick, Pearson Education.
- 2. Software Testing, 3rdedition, P.C. Jorgen sen, Aurbach publications (Dist.by SPD).
- 3. Software Testing, N.Chauhan, Oxford University press.

4. Introduction to Software Testing, P.Amman n & J offutt, cambridge Univ.Press.

5. Effective methods of Software Testing, perry, John Wiley, 2nd Edition, 1999.

6. Software Testing Concepts and Tools, P.Nageswararaodreamtech Press.

List of	f Experiments
Sr.	Description
No.	
1	To implement: Do while, while do, if else, switch, for loops in C.
2	To implement working of matrix multiplication in C.
3	To study System Specifications and Bugs.
4	Write Test Cases for known Application.
5	Create Test Plan Document for any Application.
6	Case Study: Study of any Testing Tool.
7	Case Study: Study of any Web Testing Tool.
8	Case Study: Study of Bug Tracking Tool.
9	Case Study: Study of any Test Management Tool.

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#### Year: Fourth Year Course: Grid and Cluster Computing

#### Semester – VII Course Code: TYCSE09

Teaching Scheme (Hrs. /Week)			g e ek)	Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Ex							(Lab) – 00 Hrs.				

#### **Prerequisites:**

Computer Architecture and Programming Concepts, Operating Systems, Data Communication And Computer Networks

Object	tives:
Studen	ts are able to:-
1	To investigate cluster and grid as computing platform for distributed computing.
2	To make students aware of distinguishing characteristics of cluster and grid computing.
3	Introducing software tools used in both cluster and grid computing.

Unit No	Details	Hours				
	Module 1: Basic concepts in Distributed Systems, Notion of time	4				
1	Module 2: Introduction to Cluster Computing, Scalable Parallel Computer					
1	Architectures, Cluster Computer and its Architecture, Categories of clusters,	4				
	Cluster Components, Cluster Middleware and Single System Image.					
	Module 1: Programming Environments and Tools, Networking Protocols and I/O					
	for clusters, Load Sharing, Load Balancing, Resource Management System,	4				
2	Process Scheduling, Performance measures and metrics, Detecting and Masking					
	Faults, Recovering from Faults					
	Module 2: Case Study : Beowulf and PARAM.	3				
	Module 1: Introduction to Message Passing Interface (MPI), Programming using					
	message-passing - send and receive operations, Message passing interface,					
3	Introduction to MPI routines — send, receive, broadcast, gather, scatter, barrier,	4				
	reduction, prefix, all-to-all communication. Demonstration of programs using MPI					
	routines — matrix-matrix multiplication, quick sort, etc.	4				
	Module 2:Introducing OpenMP programming.	4				
	Module 1:Introduction to Grid Computing, Difference between Cluster and Grid	4				
4	computing, Grid Architecture and its key components, Computational, Data,	4				
	Enterprise, and, Desktop grids					
	Module 2: Overview of applications of Grid Computing, Grid Infrastructure.	3				
	Module 1: Web Services and Service Oriented Architecture (SAO), Open Grid					
_	Services Architecture (OGSA), OGSA Platform Components, Open Grid Services	4				
5	Infrastructure (OGSI), OGSA Basic Services, Web Services Resource Framework	k				
	Module 2:List of Globally available Middleware, Introducing Grid Computing	4				

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	Toolkit : Globus, Introducing India's Grid Computing initiative GARUDA	
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Outco	mes:
On con	npletion of the course, student will –
1	Be acquainted with various tools and techniques used in the arena of Cluster and Grid
	Computing.
2	Able to justify the choice or selection of distributed computing platform for a specific
	application.
3	Able to design programs in OpenMP and MPI.
Text B	Books
1. Prab	hu, C. S. R. Grid and cluster computing. PHI Learning Pvt. Ltd., 2008.
2. Quir	nn, Michael J. Parallel Programming. TMH CSE 526, 2003.
3. Fost	er, Ian, and Carl Kesselman, eds. The Grid 2: Blueprint for a new computing infrastructure.
Else	vier, 2003.
4. Jose	ph, Joshy, and Craig Fellenstein. Grid computing. Prentice Hall Professional, 2004.
Refere	ence Book
1. Pach	neco, Peter S. Parallel programming with MPI. Morgan Kaufmann, 1997.
2. Buy	ya, Rajkumar. High performance cluster computing: Architectures and systems (volume 1).
Pren	itice Hall, Upper SaddleRiver, NJ, USA 1, 999, 1999.

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#### Year: Fourth Year Course: Internet of Things

#### Semester – VII Course Code: TYCSE10

Teaching Scheme (Hrs. /Week)		Continuous Internal Assessment (CIA)			End Semester Examination		Total				
L	Т	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3			3	10	20	10	10		50		100
Max. Time. End Semester Exam (Theory) -03 Hrs.						End Seme	ester Exa	am (Lab) - 0 Hrs.			

#### **Prerequisites:**

Networking Architecture

Objecti	Objectives:							
Students	s are able to:-							
1	To introduce the terminology, technology and its applications.							
2	To introduce the concept of M2M (machine to machine) with necessary protocols.							
3	To introduce the Python Scripting Language which is used in many IoT devices.							
4	To introduce the Raspberry PI platform, that is widely used in IoT applications.							
5	To introduce the implementation of web based services on IoT devices.							

Unit No	Details	Hours
1	<b>Module 1:</b> Definition and Characteristics of IoT, Physical Design of IoT, IoT Protocols, IoT communication models, Iot Communication APIs ,IoTenabaled Technologies, Wireless Sensor Networks, Cloud Computing, Big data analytics,	3
1	<b>Module 2:</b> Communication protocols, Embedded Systems, IoT Levels and Templates, Domain Specific IoTs, Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle.	3
2	Module 1: Introduction, State of the art, Architecture Reference Model- Introduction	3
2	Module 2: Reference Model and architecture, IoT reference Mode	3
	Module 1: The Vision, Introduction, From M2M to IoT.	3
3	<b>Module 2:</b> M2M towards IoT the global context, A use case example, Differing Characteristics.	3
4	<b>Module 1:</b> Introduction to Raspberry PI, Interfaces (serial, SPI, I2C) Programming.	3
4	<b>Module 2:</b> Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.	3
5	<b>Module 1:</b> Introduction to Cloud Storage models and communication APIsWebserver,	3
	<b>Module 2:</b> Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API.	3

#### **Outcomes:**

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On completion of the course, student will be able to-
1 Design of IOT architecture.
2 Implementation of different applications.
Text Books
1. Internet of Things - A Hands-on Approach, ArshdeepBahga and Vijay Madisetti, Universities Press, 2015,
ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN:
9789350239759
3. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From
Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition,
Academic Press, 2014.
Reference Book
1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1 <sup>st</sup> Edition, VPT, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st
Edition, Apress Publications, 2013

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#### Year: Fourth Year Course: Advanced Computer Networks

#### Semester – VII Course Code: TYCSE11

Teaching Scheme (Hrs. /Week)			g Irs.	Continuous Internal Assessment (CIA)				End Semester Examination		Total	
L	Т	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
Ma	Max. Time, End Semester Exam (Theory) - 03 Hrs.					End Seme	ster Exar	n (Lab) – 00 Hrs.			

#### **Prerequisites:**

Basics of Computer Networks and Data Communications

Objecti	Objectives:							
The cou	The course will enables students to:-							
1	To introduce the fundamental various types of computer networks.							
2	To demonstrate the TCP/IP and OSI models with merits and demerits.							
3	To explore the various layers of OSI Model.							
4	To introduce UDP and TCP Models.							

Unit No	Details	Hours
1	<b>Module 1:</b> Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, Example Networks such as ATM,	4
	<b>Module 2:</b> Frame Relay, ISDN Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.	4
2	<b>Module 1:</b> Introduction, Framing, and Error – Detection and Correction – Parity – LRC–CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC.	4
	<b>Module 2:</b> Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN –Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.	3
3	<b>Module 1</b> : Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP.	4
	Module 2: Forwarding, Uni-Cast Routing Protocols, Multicast Routing Protocols.	4
4	<b>Module 1:</b> Process to Process Delivery, UDP and TCP protocols, Data Traffic, Congestion, Congestion Control.	4
	<b>Module 2:</b> QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.	3
5	Module 1: Domain name space, DNS in internet, electronic mail.	4
5	Module 2: , SMTP, FTP, WWW, HTTP, SNMP.	4

#### **Outcomes:**

On completion of the course, student will be able to-

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1	To master the concepts of protocols, network interfaces, and design/performanceissues in
	local area networks and wide area networks.
2	To be familiar with wireless networking concepts.
3	To be familiar with contemporary issues in networking technologies.
4	To be familiar with network tools and network programming.
Text Bo	ooks
1	

#### 1. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition TMH, 2006.

2. Computer Networks, Andrew S Tanenbaum, 4th Edition. Pearson Education, PHI.

#### **Reference Book**

- 1. Data communications and Computer Networks, P.C. Gupta, PHI.
- 2. An Engineering Approach to Computer Networks, S. Keshav, 2nd Edition, Pearson Education.
- 3. Understanding communications and Networks, 3rd Edition, W.A. Shay, Cengage Learning.
- 4. Computer Networking: A Top-Down Approach Featuring the Internet. James F. Kurose & Keith W. Ross, 3 rd Edition, Pearson Education.
- 5. Data and Computer Communication, William Stallings, Sixth Edition, Pearson Education, 2000.

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#### **Computer Engineering (IILP)**

#### Year: Fourth Year Course: Advanced Databases

#### Semester – VII Course Code: TYCSE12

Teaching Scheme (Hrs. /Week)			e e ek)	Continuous Internal Assessment (CIA)					End Sen Examin	nester ation	Total
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	0	0	3	10	20	10	10		50		100
Μ	Max. Time, End Semester Exam (Theory) -3Hrs. End Semester Exam (Lab) – 00 Hrs						am (Lab) – 00 Hrs.				

#### **Prerequisites:**

Understanding of the database schema and need for normalization. Knowledge of Design the database schema with the use of appropriate data types for storage of data in database. Use different types of database analysis and visualization tools

Object	tives:
Studen	ts are able to:-
1	To Evaluate emerging architectures for database management systems
2	To develop an understanding of the manner in which relational systems are implemented
	and the implications of the techniques of implementation for database performance
3	to assess the impact of emerging database standards on the facilities which future database
	management systems will provide

Unit No	Details	Hours
1	<b>Module 1:</b> Database Concepts (File System and DBMS), Database Storage Structures (Tablespace, Control files, Data files)	5
1	<b>Module 2:</b> Structured and Unstructured data, SQL Commands (DDL, DML & DCL), Dataware Housing concept and tools (ETL tools),	5
2	<b>Module 1:</b> Introduction to Modern databases,NoSQL, NewSQL, NoSQLVs RDBMS databases, Advantages &Tradeoffs, Working with MongoDb,No,SQL, Data Models , XML, working with MongoDB),	4
	Module 2: Tools , OLTP and OLAP, data preparation and cleaning techniques	5
2	<b>Module 1:</b> Advanced query optimization: Volcano/Cascades framework for query optimization; multi-query optimization, materialized views and view maintenance	4
5	<b>Module 2:</b> index and view selection, database tuning. Adaptive query processing and optimization	4
4	<b>Module 1:</b> Query processing on RDF data.Transaction and query processing on main-memory and columnar databases.	4
4	Module 2: Data streams and stream management systems. Information retrieval and databases	4
	Module 1: Handling uncertain and precise data. Security and privacy.	4
5	<b>Module 2:</b> Crowd-sourced databases, applications of declarative querying outside of database applications	3

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Outco	mes:
At the	end Students will be able to-
1	Critically assess new developments in database technology
2	Interpret and explain the impact of emerging database standards
3	Evaluate the contribution of database theory to practical implementations of database
	management systems
Text B	Books
1.	Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database System Concepts 6th
	Ed, McGraw Hill, 2010.
2.	Transaction Processing, Concepts and Techniques, J. Gray and A. Reuter, Morgan
	Kauffman, 1994
Refere	ence Book
1.	MongoDB in Action by Kyle Banker
2.	The Definitive Guide – MongoDB by Kristina Chodorow
3.	MongoDB Aggregation Framework Principles and Examples by John Lynn
4.	Getting Started with NoSQL by GauravVaish
5.	Database System Concept by Henry Korth, S.Sudarshan& Abraham Silberschatz

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#### Year: Fourth Year Course: Ubiquitous Computing

#### Semester – VII Course Code: TYCSO05

Teaching Scheme (Hrs. /Week)			g e ek)	Contin	nuous Inte	ernal Ass	essment	End Semester Examination		Total	
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	-	-	3	10	20	10	10		50		100
Ma	Max. Time, End Semester Exam (Theory) - 03 Hrs. End Semester Exam (Lab) – 00 Hrs.										

#### **Prerequisites:**

Object	tives:
Studen	ts are able to:-
1	To describe ubiquitous computing, its properties applications and architectural design.
2	To explain various smart devices and services used in ubiquitous computing.
3	To teach the role of sensors and actuators in designing real time applications using
	Ubicomp.
4	To explore the concept of human computer interaction in the context of Ubicomp.
5	To explain Ubicomp privacy and challenges to privacy.

Unit No	Details	Hours
1	<b>INTRODUCTION TO UBIQUITOUS COMPUTING:</b> <b>Module 1:</b> Concept of Ubiquitous Computing and Advantages, Ubiquitous Computing Applications and Scope,Properties of Ubiquitous Computing, Modeling the Key Ubiquitous Computing Properties	4
	<b>Module 2</b> : Ubiquitous System EnvironmentInteraction. A architectural Design forUbiComSystems:SmartDEIModel.	4
2	<b>UBIQUITOUS COMPUTING SMART DEVICES AND SERVICES</b> <b>Module 1:</b> Smart Devices and Service properties, Smart mobile devices and Users, Mobile code, Smart Card Devices and Networks, Service Architecture Models.	4
	<b>Module 2:</b> Service Provision Life-Cycle. Virtual Machines and Operating Systems, OS for Mobile Computers and Communicator Devices.	3
3	ACTUATION AND CONTROL: Module 1: TaggingthePhysical World, Sensors andNetworks, Micro-Electro- Mechanical Systems	4
	<b>Module 2:</b> Embedded Systems and Real-TimeSystems. Programmable andPID type control system, Robots.	4
4	HUMAN COMPUTER INTERACTION Module 1: UserInterfaces andInteraction for devices, Abstract user interface throughBasic Smart Wearable and Implanted Devices. Human-Centered Design(HCD)	4
	<b>Module 2:</b> User Models:Direct and indirect user input and modeling, modeling users' planned tasks and multiple tasks-basedcomputing.	3
5	UBIQUITOUS COMPUTING PRIVACY	4

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#### **Computer Engineering (IILP)**

Module 1: Ubiquitous computing privacy definition, Solove's taxonomy of		
privacy, leagal background,		
Interpersonal privacy,		
Module 2: Ubicomp challenges to privacy: Collection scale, manner and		
motivation, data types, data accessibility; Case study of privacy solution such as		
Protecting RFID tags, Ways of addressing privacy in Ubicomp.		

Outcomes:				
On completion of the course, student will be able to–				
1	To <b>Demonstrate</b> the knowledge of design of Ubicomp and its applications.			
2	To <b>Explain</b> smart devices and services used Ubicomp.			
3	To <b>Describe</b> the significance of actuators and controllers in real time application design.			
4	To Use the concept of HCI to understand the design of automation applications.			
5	To <b>Classify</b> Ubicomp privacy and explain the challenges associated with Ubicomp privacy.			
Text Books				
1.	Stefan Poslad, Ubiquitous Computing, Wiley, Student Edition, ISBN:9788126527335 John			
	Krumm, Ubiquitous Computing Fundamentals			
Reference Book				
1.	Yin-LengThengand Henry B.L. Duh, Ubiquitous Computing, IGI, 2 <sup>nd</sup> Edition, ISBN:			
	9781599046938			
2.	Adam Greenfield, Everyware the Drawing age of Ubiquitous Computing, AIGA, 1st Edition,			
	ISBN: 9780321384010			

3. Laurence T. Yeng, EviSyukur and Seng W. Loke, Handbook on Mobile and Ubiquitous Computing, CRC, 2<sup>nd</sup> Edition, ISBN:9781439848111

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## Year: Fourth Year Course: Business Intelligence

#### Semester – VII Course Code: TYCSO06

Teaching Scheme (Hrs. /Week)			e e	Contin	inuous Internal Assessment (CIA) End Semester Examination Total					Total	
L	T	Р	С	CIA-1	CIA-2	CIA-3	CIA-	Lab	Theor	Lab	
							4		У		
3	0	0	3	10	20	10	10	-	50	-	100
Ma	Max. Time, End Semester Exam (Theory) -3Hrs. End Semester Exa						kam (Lab) - OHrs.				

## **Prerequisites:**

Database Management System.

Objec	tives:
Studer	nts are able to:-
1	This course focuses on how to design and build a Business Intelligence solution.
2	Students will also learn how to design and build a data warehouse within the context of student
	BI projects.
3	Students can develop their own projects within collaborative teams or be assigned an existing
	data source to develop a project.
4	To ensure success during the implementation phase, students will plan for and gather business
	requirements, as well as design the data warehouse in order to develop an effective BI plan.

Unit No	Details	Hou rs
1	<b>Module 1:</b> Introduction to Data, Information, and Knowledge, Design and implementation aspect of OLTP, Introduction toBusiness Intelligence and Business Models, Design and implementation aspect of OLAP/Data Warehouse,	5
1	BI Definitions & Concepts, <b>Module 2:</b> Business Applications of BI, Role of DW in BI, BI system components, Components of Data Warehouse Architectures.	4
	<b>Module 1:</b> Star schema, Snow flake schema, and Fact Constellation schema, Grain of dimensional model, transactions,	5
2	<b>Module 2:</b> Recurring Snapshots, Accumulating Snapshots, Dimensions (SCD types, conformed dimensions)Clickstream Source Data (Google Analytics as a Clickstream Data Source), Facts (additive, semi-additive, non-additive), Hierarchy in dimensions, parent child relationships, Many-Many Dimensional relationship, Multi Valued Dimensions and Dimension Attributes.	4
	<b>Module 1:</b> Data Quality, Data profiling, Data enrichment, data duplication, ETL Architecture and what is ETL, Extraction concept and Change data capture,	5
3	<b>Module 2:</b> Transformation concept, lookups, time lag, formats, consistency, Loading concept, Initial and Incremental loading, late arriving facts, What is Staging, Data marts, Cubes, Scheduling and dependency matrix.	4
4	<b>Module 1:</b> Metadata Layer, Presentation Layer, Data Layer, Use of different layers and overall Reporting architecture, Various report elements such as Charts, Tables,	5

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	Module 2:prompts Data aggregation: Table based, Materialized views, Query	4
	rewrite, OLAP, MOLAP, Dashboards, Ad-hoc reports, interactivity in analysis	
	(drill down, drill up), Security: report level, data level (row, column), Scheduling	
	Module 1: Analytics concepts and use in Business Intelligence, Exploratory and	5
	statistical techniques:- Cluster analysis, Data visualization, Predictive analysis	
5	Regression, Time series,	
5	Module 2:Data Mining :- Hierarchical clustering, Decision tree Text analytics :-	4
	Text mining, In-Memory Analytics and In-DB Analytics, Case study: Google	
	Analytics	

Outco	omes:								
1	Design and implement OLTP, OLAP and Warehouse concepts.								
2	Design and develop Data Warehouse using Various Schemas & Dimension								
	modelling.								
3	Use the ETL concepts, tools and techniques to perform Extraction, Transformation, and								
	Loading of data.								
4	Report the usable data by using various reporting concepts, techniques/tools, and use								
	charts, tables for reporting in BI.								
5	Use Analytics concepts like data mining, Exploratory and statistical techniques for								
	predictive analysis in Business Intelligence								
Text I	Books								
1. Re	eemaThareja, "Data Warehouse", Publisher: Oxford University Press.								
2. Jia	awei Han, MichelineKamber, Jian Pei "Data Mining: concepts and techniques", 2nd Edition,								
Pu	ıblisher: Elsevier/Morgan Kaufmann.								
3. Ra	alph Kimball, Margy Ross, "The Data Warehouse Toolkit", 3rd edition, Publisher: Wiley								
Refer	ence Book								
1.	1. William Inmon, "Building the Data Warehouse", Wiley publication 4 th edition.								
2.	2. Efrem G. Mallach, "Decision Support And Data Warehouse Systems", 1st Edition Publisher:								
Та	ta McGraw-Hill Education,. ISBN-10: 0072899816.								
3.	Efraim Turban, Ramesh Sharda, DursunDelen, David King, "Business Intelligence", ISBN-10:								
01	3610066X Publisher: Prentice Hall.ISBN-13: 9780136100669.								
4.	4. Dorian Pyle, "Business Modeling and Data Mining", Elsevier Publication MK.								

4. Dorian Pyle, "Business Modeling and Data Mining", Elsevier Publication MK.

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#### Year: Fourth Year Course: Artificial Intelligence

#### Semester – VII Course Code: TYCSO07

Teaching Scheme (Hrs. /Week)			ng e	Contin	Continuous Internal Assessment (CIA) End Semester Examination Total						Total
L	Τ	Р	С	CIA-1	CIA-2	CIA-3	CIA-	Lab	Theor	Lab	
							4		У		
3	0	0	3	10	20	10	10	-	50	-	100
Ma	Max. Time, End Semester Exam (Theory) -3Hrs. End Semester Exa						(Lab) - OHrs.				

## **Prerequisites:**

Linear algebra, Probability theory, Calculus, Calculus of variations, Graph theory.

Objec	tives:
Studer	nts are able to:-
1	To know about the basic building block of AI
2	Explain the concept of machine thinking
3	Explain the evolution of AI and modern concepts and programming platforms for AI
4	Explain about problem solving in AI
5	Explain about the concept of gaming concept in AI

Unit No	Details	Hou rs
	Module 1: General Concept and Philosophy of AI:	5
	Defining AI: AI what and what not?- Basic principle and concept of AI-The	
	intellectual History of AI -Foundations of AI-Frontiers of artificial intelligence-	
1	Parallel and distributed AIAI and the programming platform-Uses and	
	application of AI.	
	Module 2:Introduction to agent-Agent performance –Example of Agents- Agent	4
	Faculties- Can machine think?: 'Turning and testing-The Chinese room.	
	Computation and representation-Applications eras of AI-Computationalism-	
	Ethics of AI-Impacts of AI	
	Module 1:Intelligent System and Modern AI	5
	What is intelligence?-Structure of intelligent system-Biological brain -Basic	
	neural model- Intelligent Agents- Rationality- Agent Environment- Agent	
2	architectures-the concept of rationality-The structure of agent-The impact of AI	
2	in human labor-AI and the social equality.	
	Module 2: Technology that precursors to AI era - The concept of bot-AI and	4
	Automation-Super intelligence and AI-paths to super intelligence-Forms of	
	super intelligence-Future impacts of AI-AI programming platforms.	
	Module 1:Informed search and Constraint satisfaction problem	5
	State space search- Goal Directed Agent- Search Problem- illustration of search	
3	process- eight queens problem-tic tac toe - General state space search-Search	
	Tree- Terminology of search tree-Informed search -Best-first Search-A* search-	
	Hill climbing search-Simulated Annealing-Tabu search.	

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	<b>Module 2:</b> Introduction to constraint satisfaction problem- Backtracking Search for constraint satisfaction problem- Local Search for Constraint Satisfaction Problems- The Structure of Problems-Constraint propagation- forward checking-	4
	Arc consistency.	
	Module 1:Adversarial Search	5
	Introduction to Games- Two player game-Optimal Decisions in Games- Optimal	
	strategies- The minimax algorithm- min max with Tic-Tac-Toe-Optimal	
4	decisions in multiplayer games- Alpha-Beta Pruning- min max with Alpha-Beta pruning-Imperfect.	
	Module 2:Real-Time Decisions-classical AI: checkers-Chess-Othello-Go-	4
	Backgammon-Application of AI algorithm in Video Game.	
	Module 1:Uninformed search	5
	Search and AI -Define Uninformed Search- Depth first search (DFS)-Example	
	of DFS-Depth Limited Search-algorithm with example-(BFS) Breadth first	
5	search – Example of Breadth first search-Properties of BFS-Pros and Cons of	
1	BFS-Low Cost First Search- example of low cost first search-	
	Module 2:Iterative deepening Search-Bidirectional search-Time and space	4
	complexities-Uniform cost search.	

#### **Outcomes:**

1	Get to know about the basic principle of AI					
2	To understand the concept of machine thinking					
3	Understanding the modern concept in AI					
4	Understand the concept of problem solving and thus to improve the problem solving					
	skill					
5	Understand the concept of gaming and know the decision making in checker.					
Text I	Books					
1. Art	ificial Intelligence- Rich-And-Knight					
2. Art	ificial Intelligence- Kevin Warwick					
3. Art	ificial Intelligence-M.Tim Jones					
Refer	ence Book					
1. Ar	tificial Intelligence: Foundations Of Computational Agents- D. Poole- Cambridge					
Ur	University Press, 2010					
2. "A	artificial Intelligence and Intelligent Systems"- Padhy N.P-4th impression, Oxford					

- University Press, 2007.
- 3. Super intelligence paths, Dangers and Strategies- Nick Bostrom

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**Computer Engineering (IILP)** 

#### Year: Fourth Year Course: Cloud Virtualization

#### Semester – VII Course Code: TYCSO08

Teaching Scheme (Hrs. /Week)		Contin	uous Inte	rnal Asse	essment (C	End Semester Examination		Total			
L	Т	Р	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
3	0	0	3	10	20	10	10		50		100
Max. Time, End Semester Exam (Theory) -3Hrs.						End Semeste	er Exam	(Lab) – 00			
									Hrs.		

# **Prerequisites:**

Networking Concepts, Client Server Architecture, Linux Operating Systems, Computer Architecture

Object	Objectives:					
Student	ts are able to:-					
1	Articulate the main concepts, key technologies, strengths, and limitations of cloud computing and the possible applications for state-of-the-art cloud computing					
	computing and the possible appreations for state-or-the-art cloud computing					
2	Identify the architecture and infrastructure of cloud computing, including SaaS, PaaS, IaaS,					
	public cloud, private cloud, hybrid cloud, etc.					

Unit No	Details								
1	<b>Module 1:</b> Introduction to Cloud Computing, Evolution, Benefits and Barriers, Cloud SPI models, Cloud Computing Vs Cluster Computing, Technology Involved in Cloud Computing, Infrastructure as a Service (IaaS), Virtualization, Platform as a service (PaaS), Cloud platform management, Software as a Service, Case studies	5							
	<b>Module 2:</b> Service Management in Cloud Computing, Service Level Agreements (SLAs),Billing & Accounting, Scaling Cloud Hardware, Managing Data	5							
2	<b>Module 1:</b> Cloud computing standards and Interoperability, technical considerations for migration to the cloud, integrating existing applications with the cloud	5							
	<b>Module 2:</b> Performance Management in a Virtual Environment: Management techniques, methodology and key performance metrics used to identifying CPU, memory, network, virtual machine and application performance bottlenecks in a virtualized environment.	4							
3	<b>Module 1:</b> Backup and recovery of virtual machines using data recovery techniques; Scalability: Scalability features within Enterprise virtualized environments using advanced management applications that enable clustering, distributed network switches for clustering	4							
	Module 2: network and storage expansion; High Availability :	5							
4	<b>Nodule 1:</b> Virtualization high availability and redundancy techniques,	4							
	Module 2: Software Defined network.	0							
5	Module 2. Infrastructure security Data security and Storage Data privacy access	$\frac{2}{2}$							
5	management	2							

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Outco	mes:							
At the	At the end of Course students will be able to-							
1	Analyze the Cloud computing setup with it's vulnerabilities and applications using different							
	architectures.							
2	Design different workflows according to requirements and apply map reduce programming							
	model.							
3	Apply and design suitable Virtualization concept, Cloud Resource Management and design							
	scheduling algorithms.							
4	Create combinatorial auctions for cloud resources and design scheduling algorithms for							
	computing clouds							
5	Broadly educate to know the impact of engineering on legal and societal issues involved in							
	addressing the security issues of cloud computing.							
Text B	ooks							
Cloud	Computing Bible, Barrie Sosinsky, Wiley-India, 2010							
Refere	nce Book							
Cloud	Computing: Principles and Paradigms, Editors: RajkumarBuyya, James Broberg, Andrzej M.							
Goscin	ski, Wile,2011							

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# Year: Fourth Year Course: Project Stage II & viva voce

#### Semester – VII Course Code: TYCS711

Teaching Scheme (Hrs. /Week)			g Irs.	Continuous Internal Assessment (CIA)					End Semester Examination		Total
L	Τ	P	C	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
		8	4					50		50	100
Max. Time, End Semester Exam (Theory) -00 Hrs. End Semester Exam (Lab) – 03 H					xam (Lab) – 03 Hrs.						

Object	Objectives:								
Studen	ts are able to:-								
1	To expose students to the 'real' working environment and get acquainted with the								
	organization structure, business operations and administrative functions.								
2	To set the stage for future recruitment by potential employers.								
3	To develop time and space efficient algorithms;								
4	To develop software engineering documents and testing plans;								
5	To use algorithmic solutions using distributed, Embedded, concurrent and parallel environments.								

Unit No	Details	Hours							
	Course (catalog) description: As a part of the B. Tech Curriculum,								
	ProjectStage- I is a Practical course, in which the students of CSE are								
	trained for project based learning.								
	Proposed Criteria for Project Evaluation								
1	<ul> <li>I suggest the following 9 aspects of every project and presentation. Every item is worth 10 points out of total 90.</li> <li>For each of the items I give several key words explaining my understanding of the item. This grading scheme is only a proposal and is open for any input, discussion and final approval by members of the seminar. As the evaluation procedure I suggest for each project and each of the first 8 items to assign a base group to evaluate it.</li> <li><b>1</b> Content: <ul> <li>(1) Topic: Is the topic chosen interesting, useful, worth researching?</li> <li>(2) Thesis: Are the theses of the project identifiable, plausible, insightful, and clear?</li> <li>(3) Evidence / Sources: Are the sources of information used primary, sufficient,</li> </ul> </li> </ul>								
	<ul> <li>and relevant? Is evidence clearly related to claims?</li> <li>(4) Analysis / Logic / Argumentation: Is analysis fresh, posing new ways to think of the material? Are Ideas represented logically? Is the argument identifiable, reasonable, and sound? Do authors anticipate and defuse counter-argument?</li> </ul>								
	Presentation:								
	(5) Structure: Is the structure evident, understandable, and appropriate? Is								
	transition from point to point smooth?								
	(b) Slides / transparencies: Are slides well designed (not too busy, right font)?								
	Are graphic and visual appropriate? Any spennig, granniar, word use sups?								

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(7) Timing: Is presentation timed properly, rehearsed?
(8) Style: Is the level of treatment appropriate (not too detailed or too general)?
Is the presentation energetic, enthusiastic, and clear? Is the volume good?
(9) Extra points for excellence

#### **Tools Required:**

Preferably 64-bit FOSS tools but if sponsoring company's requirement is non-open sourceplatform then it must be latest and current version of non-absolute tools. 64-bit i5/i7Desktops/Mobiles, Latest SAN,3-tier architectures along with latest version of FOSS Operating systems like Fedora 21or equivalent, LAMP tools, WEB server, Applications servers, Database servers, MongoDBor latest open source BigDATA tools, FOSS Programming Tools like gcc,g++,Eclipse,Python, Java and other tools are as per the requirement of the SRS. The documentationtools like Open office, GIT, Latex, Latex-Presentation

#### **Outcomes:**

On completion of the course, student will be able to-

1 An ability to work in actual working environment.

- 2 An ability to utilize technical resources.
- 3 An ability to write technical documents and give oral presentations related to the work completed.

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## Year: Fourth Year Course: Industry Internship

#### Semester – VII Course Code: TYCS712

Teaching Scheme (Hrs. /Week)		Continuous Internal Assessment (CIA)				End Semester Examination		Total			
L	Τ	P	С	CIA-1	CIA-2	CIA-3	CIA-4	Lab	Theory	Lab	
	3		3					50			50
M	Max. Time, End Semester Exam (Theory) -00 Hrs.				End Ser	nester Ex	am (Lab) – 00 Hrs.				

Objectives:							
Students are able to:-							
1	To expose students to the 'real' working environment and get acquainted with the						
	organization structure, business operations and administrative functions.						
2	To set the stage for future recruitment by potential employers.						

Unit No	Details	Hours
1	Course (catalog) description: As a part of the B. Tech Curriculum, <b>Industry</b> <b>Internship</b> is a Practical course, in which the students of CSE are trained for technical skills. Grading: The Course is graded based on: Presentation : 50% Student's reports : 50% <b>Employers Expectations:</b> Source of highly motivated pre professionals. Students bring new perspectives to old problems. Visibility of your organization is increased on campus. Quality candidates for temporary or seasonal positions and projects. Freedom for professional staff to pursue more creative projects. Flexible, cost effective work force not requiring a long term employer commitment. Proven, cost effective way to recruit and evaluate potential employees. Your image in the community is enhanced as you contribute your expertise to the educational enterprise	

Outcomes:				
On con	mpletion of the course, student will be able to-			
1	An ability to work in actual working environment.			
2	An ability to utilize technical resources.			
3	An ability to write technical documents and give oral presentations related to the work			
	completed.			

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