

Scheme – 2020

Department of Computer Science & Engineering

G. Pulla Reddy Engineering College (Autonomous): Kurnool

Accredited by NBA of AICTE and NAAC of UGC

Affiliated to JNTUA, Anantapuramu

Scheme and Syllabus for Minor in COMPUTER SCIENCE (for Non-IT Branches)

(With Effect from the Batch Admitted in 2020-21)

Minor in Computer Science

(for Non IT students)

Scheme of Instruction and Examination (Effective from 2020-2021)

s				Scheme of Instruction periods/week		Scheme of Examination			
S. No	Semester	Course Title	Credits	L	Р	End Exam	Internal Assessment	Total (100M)	
1	IV	Introduction to Algorithms	4	3	2	60	40	100	
2	V	Operating Systems	4	4	0	60	40	100	
3	VI	Object Oriented Programming in Java	4	3	2	60	40	100	
4	VII	Database Management Systems	4	3	2	60	40	100	
5	MOOCS-1		2	0	0			100	
6	MOOCS-2 / Mini Project		2	0	0			100	
		Total	20						

MOOCS-1

- : 1. Software Engineering
 - 2. Software Project management
 - 3. Artificial Intelligence

MOOCS-2/ **Mini project** : 1. Python Programming

- 2. R-programming
- 3. Machine Learning

INTRODUCTION TO ALGORITHMS (INA)

IV Semester : Minor in CS/DS Scheme : 202								scheme : 2020		
Course Code	Category	He	ours/W	eek	Credits	Max	imum Mar	ks		
MCS01	М	L	Т	Р	С	ContinuousEndInternalExam		TOTAL		
		3	-	2	4	4 40 60 1				
Sessional E	Sessional Exam Duration : 1 ½ HrsEnd Exam Duration: 3 Hrs									
Course Out	tcomes :At the er	id of th	e cours	se the stu	udent will b	e able to	0.1			
CO1: Under	rstand fundament	al char	acteris	tics, des	<u>ign, analysi</u>	s and complexitie	s of algorith	ims		
CO2:Descri	be the divide-and-c	conquer	paradig	$\frac{11}{11}$	xplain when	an algorithmic desi	gn situation	calls for it.		
CO3:Under	standand develop	algori	thms Io	or well-k	known prob	lems using greedy	methods.	-1		
CO5:Under	stand and apply dy	namic-p	rogram ktracki	iming app	proach for de	signing graph and i	matrix based	algorithms.		
	stand the concept		KHACK	ing ioi t		i searen argoritinn	13.			
				UN	I – TI					
Algorithms- design tools complexity,	Problem Solvin S: Pseudocode an Time complexity	ng, Intr nd flov 7, Asyn	roducti vchart, 1ptotic	on to A Analys notation	Algorithms, is of Algo 1- Big-O, T	Characteristics or rithms, Complex heta and Omega.	of algorithn ity of algo	ns, Algorithm rithms- Space		
				UN	IT – II					
Divide and Quick sort, S	Conquer: Gener Strassen's Matrix	al metl Multij	nod, B olicatio	inary se m	arch, Findi	ng Maximum and	d Minimum	n, Merge sort,		
				UN	IT – III					
Greedy met Deadlines, N Source Shor	Greedy method: The General Method, Knapsack Problem, Tree Vertex splitting, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single Source Shortest Paths									
				UN	IT – IV					
Dynamic Pr Binary Searc	rogramming: The ch Trees, String I	e Gene Editing	ral Me proble	ethod, N m, Relia	Iultistage (bility Desig	Graphs, All Pairs gn, The Travelling	Shortest P g Salesperso	aths, Optimal on Problem		
				UN	IT – V					
Backtrackin Hamiltonian	Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring and Hamiltonian cycles.									
Text Pooles										
I CAL DOUKS:										
1. Fundame Rajasekh	1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, SartajSahni and S. Rajasekharan, Universities Press.									
Reference I	Books:									
1. Algorithn John Wiley	n Design: Founda and sons.	tions, 2	Analys	is and Ir	nternet exan	nples, M. T. Good	rich and R.	Tomassia,		
2. Design an	nd Analysis of Al	gorithn	ns, S. S	Sridhar, (Oxford Uni	v. Press				
Ouestion Paner Pattern:										

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

The question paper for End examination shall be for 60 marks. The Question paper shall contain Five Units with Two Questions (Either or Type) from each unit. Each of these questions may contain sub question and the student should answer any one question from each unit. Each Question carries 12 marks..

List of Experiments

- 1. Implement Binary Search algorithm using Divide and Conquer Technique.
- 2. Implement Merge Sort algorithm using Divide and Conquer Technique.
- 3. Implement Knapsack using Greedy Technique.
- 4. Implement Kruskal's algorithm for finding minimum cost spanning tree using GreedyTechnique.
- 5. Implement Tree Traversing Techniques
- 6. Queens problem using Backtracking technique

OPERATING SYSTEMS (OS)

V Semester : Minor					Scheme: 2020					
Course Code	Course Category	Hou	rs/We	ek	Credits	redits Maximum Marks				
MCS02	М	L	T	P	C Continuous C Internal Assessment		EndExam	TOTAL		
Constant of East		4 1/ II	0	0	4	40	<u>60</u>			
Sessional Ex	am Duration: 1	72 H	rs			E	nd Exam Dura	tion:5 Hrs		
Course Outc	omes. At the end	of the	cours	e stud	ents will be	able to				
CO1: Acquaint y	CO1: A caugint with the basics of the Operating System and their different structures									
CO2: Comprehe	and the process m	anage	ment n	olicie	s. CPU Sche	eduling and Pro	cess synchroniz	zation		
CO3: Analyze n	nemory managem	ient sc	hemes	and a	llocation po	licies	j			
CO4: Understan	d storage manage	ement	and di	sk sch	eduling stra	tegies.				
CO5: Understan	d Deadlocks and	their l	Handli	ng me	chanisms,	0				
				<u> </u>	,					
				UN	IT–I					
What Operating Interface, Systen Process Manage Process Concept Processes, Interp	Systems Do, Ope n Calls, Types of ement: , Process Schedu process Communi	Syster Syster ling, S cation	Syster m Call chedul	m -Str s. UNI ling C nples o	ucture, Ope T– II riteria, Sche of IPC Syste	rations, Service duling Algorith	es, User Operations, Operations, Operation,	ng System		
Section Problem	, Semaphores, M	onitor	s.							
UNIT– III										
Memory Management: Main Memory-Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Virtual Memory-:Background, Demand paging, Page Replacement, Allocation of Frames.										
Storage Management: Mass Storage Structure- Storage Structure, Disk Structure, Disk Scheduling. File System Interface- File Concepts, Access Methods, File system Structure, File system Implementation, Directory Implementation, Allocation Methods, Free-Space Management.										
				UN	T– V					
Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.										

TextBooks :

1. Silberschatz, Galvin and Gagne, Operating System Concepts, 9th edition, [2013] WILEY INDIA Edition.

ReferenceBooks :

1. Gagne [2003], [6th Edition], Operating System Concepts, John Wiley & Sons, Inc publishers.

2. Tanenbaum [2000], Modern Operating System, Pearson Education.

WebReferences:

https://nptel.ac.in/courses/106106144/1

QuestionPaperPattern:

Sessional Exam:

The question paper for sessional examination shall be for 25 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. The question paper shall consist of three sections with Two Questions (EITHER/ OR Type) in each section. The student shall answer one question from each section.

End Exam:

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OBJECT ORIENTED PROGRAMMING IN JAVA (OOPJ)

VI Semester : Minor Scheme : 2020									
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Mar	ks	
MCS03	М	L	Т	Р	С	Continuous Internal Assessment		TOTAL	
		3	-	2	4	40	60	100	
Sessional E	xam Duration :	1 ½ H	[rs			En	d Exam Du	ration: 3 Hrs	
Course Out	Course Outcomes : At the end of the course the student will be able to								
CO1: Under	rstand the basic p	rogram	ming of	construc	ts.				
CO2: Expla	in inheritance an	d polyn	norphis	sm using	g classes, ob	ojects.			
CO3: Unde	rstand the string	nandlin	<u>g meth</u>	<u>iods, ab</u>	stract classe	es and interfaces in	n java.		
CO4: Comp	prehend the funda	mental	s of ex	ception	handling an	id file handling m	echanisms.		
CO5: Realiz	ze the java packa	ges and	l apple	t progra	mming.				
				UN	I – TIN				
Introductio Object On Polymorphi Java Progr Keywords, 1	Introduction to Java: Features of Java, JDK Environment Object Oriented Programming Concepts: Classes, Abstraction, Encapsulation, Inheritance, Polymorphism. Java Programming Fundamentals: Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch), Looping (for, while)								
UNIT – II									
Classes an Implementa Overriding,	Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes.								
				UN	IT – III				
Arrays and methods Abstract C	Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods Abstract Class Interface: Modifiers and Access Control Abstract classes and methods. Interfaces								
				UN	IT – IV				
Exception Handling: Exception types, using try catch and multiple catch, Nested try, throw, throws and finally, Creating User Defined Exceptions.File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, creating file, reading file, Writing File.									
				UN	$\mathbf{T} - \mathbf{V}$				
Packages: I Applet Pro	Packages: Packages Concept, Creating user defined packages Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet.								

Text Books:

1. Herbert Schildt [2017], [10th Edition], Java - The Complete Reference, TATA McGraw-Hill.

Reference Books:

Bruce Eckel [2014], [2nd Edition], Thinking in Java, Pearson Education. 1.

E.Balagurusamy, Programming with Java: A primer, 5th Edition, Tata McGraw-Hill, 2017. 2.

3. H.M Dietel and P.J Dietel [2017], [11th Edition], Java How to Program, Pearson Ed.

Ouestion Paper Pattern:

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List of Experiments 1. Class, object, Constructor: Student details, complex number arithmetic operations, transpose

- 2. Inheritance: Multilevel, Hierarchical
- 3. Packages: Access protection

of a matrix.

- 4. Interface: Multiple inheritance using interface
- 5. String handling: String class and its methods
- 6. Exception handling: built-in exceptions and custom exceptions
- 7. Files: Reading and writing.
- 8. AWT controls: Drawing various shapes and factorial of a number

DATABASE MANAGEMENT SYSTEMS (DBMS)

VII Sem	/II Semester : Minor Scheme : 2020							
Course Code	Category	Hours/W	eek		Credits	Maxin	num Ma	rks
MCS04	М	L	Т	Р	С	Continuous Internal Assessment	End Exam	TOTAL
		3	-	2	4	40	60	100
Sessiona	l Exam Durati	on : $1\frac{1}{2}$ Hrs		1 .	1 . •11	End Exan	1 Durati	on: 3 Hrs
Course (Jutcomes :At the	he end of the cou	$\frac{1}{1}$	he sti	ident will	$\frac{be able to}{\cdot}$		
COL: Ur	iderstand the fu	ndamentals of da	itaba	$\frac{1}{2}$	1d Its Worl	ang environme	ent.	
	sign database sy	stems using Ent	Ity R	elatic	tion and m	grams from the	e require	ments.
$CO1 \cdot \Lambda p$	by SOL July alleries	ase cleanon and		ipuia	culations	views sub-que	ries em	bedded
aueries	pry SQL queries	s ioi Data aggres	341101	I, Cal	culations,	views, sub-que	, iics, ciii	ocuucu
CO5:Ap	ply normalizatio	on techniques to	norm	nalize	a databas	e.		
		I	UN	IT –	I			
Introduce Application	ction: Introduct	tion to DBMS, ata. Data Models	Pur s. Da	pose tabas	of Datab e Users, D	ase Systems, Database Archit	Databas	e System
	,	,	UNI	[T –]	Ĩ			
Entity-R Notations R Schem	elationship M s, Entity Relatic a to Tables.	odel: Basic Co onship Diagrams	oncep , Mo	ots, C dellir	Cardinality ng using E	of Relations R Diagrams, F	hip, ER Reduction	Diagram n of an E-
	UNIT – III							
Structured Query Language (SQL) : Introduction to SQL, Data types, Data Definition language commands, Data Manipulation language Commands and Data control Language Commands, Candidate Key, Primary key, Foreign key, Select Clause, Where Clause, Logical Connectivity's – AND, OR, NOT.								
			UNI	T – I	V			
Advance operation	ed SQL: Set C as, views, Sub Q	Derations–Union Queries, Nested (n, In Jueri	terseo es, co	ct and Mi orrelated Q	nus, Aggregat ueries.	e Funct	ions, Join
			UN	(T – Y	V			
Relational Database Design: Features of Good Relational Database Designs, Decomposition, Normalization, Functional Dependency, Types of Normal Forms - First Normal Form, Second Normal Form and Third Normal Form.								
I ext Boo	JKS:		-41					
1. Data Base System Concepts, 7 th Edition, Avi Silberschatz, Henry F. Korth, S. Sudarshan, MC Graw Hill.								
Reference	Reference Books:							
1. A	n Introduction t	to Data Base Sys	stems	, C J	Date, Pear	rson Education		
2. F	 An Introduction to Data Base Systems, C J Date, Pearson Education Fundamentals of Database Systems, 7th Edition, Elmarsi&Navathe, Pearson Education 							

Web References:

1. https://nptel.ac.in/courses/106105175/2

Question Paper Pattern:

SessionalExam:

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List of Experiments
1. Creation of Tables
2. Queries using DDL and DML.
3. Queries using aggregate functions.
4. Queries using set operations, nested queries, corelated sub queries.
5. Case Study