

Department of Information Technology (In-house) Syllabus for B.Sc. in Information Technology (Artificial Intelligence) (Effective from academic session 2019-20)

Semester-III

		nation Technology (Artificial Intelligen	ce)			
-	Operating System and Ope					
Course C 391	urse Code: BITAI 301 ,BITAI Semester: III					
Duration	: 36 Hrs.	Maximum Marks: 100+100				
Teaching	Scheme	Examination Scheme				
Theory: 3	3 hrs./week	End Semester Exam: 70				
Tutorial:	0	Attendance : 5				
Practical	:4 hrs./week	Continuous Assessment:25				
Credit: 3	+2	Practical Sessional internal continuous	evaluatior	:40		
		Practical Sessional external examinatio	n:60			
Aim:						
SI. No.						
1.	General understanding of s	tructure of modern computers				
2.	Purpose, structure and fund					
3.	Illustration of key OS aspec	cts by example				
Objectiv	e:					
SI. No.						
1.	To learn the fundamentals	of Operating Systems.				
2.	To learn the mechanisms of	f OS to handle processes and threads and th	eir commu	nication		
3.	To learn the mechanisms in	volved in memory management in contemp	orary OS			
4.		ibuted operating system concepts that inclu- is, deadlock detection algorithms and agreer				
5.	-	nd management aspects of concurrency ma		013		
6.		to implement simple OS mechanisms	nagement			
Pre-Requ						
SI. No.						
1.	Strong programming skill	s (Knowledge of C)				
2.	Computer architecture					
3.	Elementary data structur	es and algorithms				
Contents			Hrs./week			
Chapter	Name of the Topic		Hours	Marks		
01	Introduction		3	5		
		ystems, Generations of Operating				
		ating Systems, OS Services, System				
	Calls, Structure of an OS - Layered, Monolithic, Microkernel Operating Systems, Concept of Virtual Machine. Case study on					
	UNIX and WINDOWS Op					
02	Processes		8	20		
	Processes Definition, Process Relationship, Different states of a Process,					
	Definition, Process Rela	tionship, Different states of a Process.				



	(Effective from academic session 2019-20)		
	switching Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multithreads, Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.		
03	Inter-process Communication: Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\ Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc.	4	5
04	Deadlocks Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery.	4	10
05	 Memory Management Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition– Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging. Virtual Memory: Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU). 	8	10
06	 I/O Hardware I/O devices, Device controllers, Direct memory access Principles of I/O Software: Goals of Interrupt handlers, Device drivers, Device independent I/O software, Secondary-Storage Structure: Disk structure, Disk scheduling algorithms File Management: Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance. 	6	10
07	Disk Management Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN,	3	10



Department of Information Technology (In-house) Syllabus for B.Sc. in Information Technology (Artificial Intelligence) (Effective from academic session 2019-20)

Disk reliability, Disk formatting, Boot-block, Bad blocks.

Sı	ub Total:			:	36	70
In	nternal Asses	sment Examination & Prepara	tion of Semester Examination	on 4	4	30
Тс	otal:			4	40	100
Practical:						
Course Code	e:BITAI391					
Credit: 2						
Skills to be d	•					
Intellectual s						
		lentify the purpose of the ar	•			
		ed a reliable source of inforr				
3. Can a	able to use a	a variety of techniques to ex	tend the original idea.			
		L& 2 compulsory & at least	three from the rest)			
1. Basics of U		inds.				
2. Shell progr	-					
•		U scheduling. a) Round Robi	in b) SJF c) FCFS d) Priority	/		
•		cation strategies				
5. Implement	•					
		gorithm for Dead Lock Avoid	lance			
•	•	nm for Dead Lock Detection				
9. Implemen	ח ווב מחד דו			1 40 1		
-		age replacement algorithm	ns a) FIFO b) LRU c) LFU	J 10. I	mplemen	t Share
memory and	IPC			J 10. I	mplemen	it Share
memory and 10. Implement	IPC nt Paging Te	echnique f memory manager	ment.	J 10. I	mplemen	it Shared
memory and 10. Implement 11. Implement	IPC nt Paging Te nt Threading		ment.	J 10. I	mplemen	it Shared
memory and 10. Implement 11. Implement Assignments	I IPC nt Paging Te nt Threadin ::	echnique f memory manager g & Synchronization Applica	ment. tions	J 10. I	mplemen	it Share
memory and 10. Implement 11. Implement Assignments	I IPC nt Paging Te nt Threadin ::	echnique f memory manager	ment. tions	J 10. I	mplemen	t Shared
memory and 10. Implement 11. Implement Assignments Based on the	I IPC nt Paging Te nt Threading : e curriculum	echnique f memory manager g & Synchronization Applica	ment. tions	J 10. I	mplemen	it Shared
memory and 10. Implement 11. Implement Assignments Based on the List of Books	I IPC nt Paging Te nt Threading : e curriculum	echnique f memory manager g & Synchronization Applica	ment. tions	J 10. I	mplemen	it Sharec
memory and 10. Implement 11. Implement Assignments Based on the	I IPC nt Paging Te nt Threadin curriculum	echnique f memory manager g & Synchronization Applica	ment. tions		mplemen	
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books:	I IPC nt Paging Te nt Threading curriculum curriculum	echnique f memory manager g & Synchronization Applica as covered by subject teach	ment. tions her. Edition/ISSN/ISBN			
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A	I IPC nt Paging Te nt Threadin curriculum duthor atz, Peter	echnique f memory manager g & Synchronization Applica as covered by subject teach Title of the Book	ment. tions her.			
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch	I IPC nt Paging Te nt Threading curriculum curriculum duthor atz, Peter g Gagne,	echnique f memory manager g & Synchronization Applica as covered by subject teach <u>Title of the Book</u> Operating System	ment. tions her. Edition/ISSN/ISBN			
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of AviSilbersch Galvin, Greg	I IPC nt Paging Te nt Threading curriculum curriculum Author atz, Peter g Gagne, Asia	echnique f memory manager g & Synchronization Applica as covered by subject teach <u>Title of the Book</u> Operating System	ment. tions her. Edition/ISSN/ISBN	Nam		Publisher
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Grey Wiley A	I IPC nt Paging Te nt Threading curriculum curriculum Author atz, Peter g Gagne, Asia	echnique f memory manager g & Synchronization Applica as covered by subject teach <u>Title of the Book</u> Operating System Concepts Essentials	ment. tions ner. Edition/ISSN/ISBN 978-1-119-32091-3	Nam	e of the F	Publishe
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Grey Wiley A	I IPC nt Paging Te nt Threading curriculum curriculum Author atz, Peter g Gagne, Asia	echnique f memory manager g & Synchronization Applica as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems:	ment. tions ner. Edition/ISSN/ISBN 978-1-119-32091-3	Nam	e of the F	Publishe
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Grey Wiley A	I IPC nt Paging Te nt Threading curriculum curriculum atz, Peter adz, Peter g Gagne, Asia tallings	echnique f memory manager g & Synchronization Applica as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design	ment. tions ner. Edition/ISSN/ISBN 978-1-119-32091-3	Nam	e of the F	Publishe
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Grey Wiley A William St	I IPC nt Paging Te nt Threading curriculum curriculum datz, Peter g Gagne, Asia tallings	echnique f memory manager g & Synchronization Applica as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design	ment. tions ner. Edition/ISSN/ISBN 978-1-119-32091-3	Nam Prer	e of the F	Publisher of India
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Grey Wiley A William St	I IPC nt Paging Te nt Threading curriculum curriculum datz, Peter g Gagne, Asia tallings	echnique f memory manager g & Synchronization Applicat as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design Principles	ment. tions her. Edition/ISSN/ISBN 978-1-119-32091-3 5th Edition	Nam Prer	e of the F	Publisher of India
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Grey Wiley A William St	I IPC nt Paging Te nt Threading curriculum curriculum datz, Peter g Gagne, Asia tallings	echnique f memory manager g & Synchronization Application as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design Principles Operating System: A	ment. tions her. Edition/ISSN/ISBN 978-1-119-32091-3 5th Edition	Nam Prer	e of the F	Publisher of India
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Grey Wiley A William St	I IPC nt Paging Te nt Threading control of the curriculum atz, Peter g Gagne, Asia tallings ooks: crowley	echnique f memory manager g & Synchronization Application as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design Principles Operating System: A Design-oriented Approach	ment. tions her. Edition/ISSN/ISBN 978-1-119-32091-3 5th Edition	Nam Prer	e of the F	Publisher of India
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Grey Wiley A William St Reference Bo Charles C	I IPC nt Paging Te nt Threading curriculum curriculum atz, Peter g Gagne, Asia tallings cooks: crowley ddison-	echnique f memory manager g & Synchronization Application as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design Principles Operating System: A Design-oriented Approach Operating Systems: A	ment. tions her. Edition/ISSN/ISBN 978-1-119-32091-3 5th Edition 1st Edition	Nam Prer	e of the F	Publisher of India
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Greg Wiley A William St Reference Bo Charles C J. Nutt, Ac Wesl	I IPC nt Paging Te nt Threading curriculum curriculum atz, Peter ag Gagne, Asia tallings ooks: crowley ddison- ley	echnique f memory manager g & Synchronization Application as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design Principles Operating System: A Design-oriented Approach Operating Systems: A Modern Perspective	ment. tions her. Edition/ISSN/ISBN 978-1-119-32091-3 5th Edition 1st Edition 2nd Edition	Nam Prer	e of the F ntice Hall win Publi	Publisher of India shing
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilberscha Galvin, Greg Wiley A William St Reference Bo Charles C	I IPC nt Paging Te nt Threading curriculum curriculum atz, Peter ag Gagne, Asia tallings ooks: crowley ddison- ley	echnique f memory manager g & Synchronization Application as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design Principles Operating System: A Design-oriented Approach Operating Systems: A Modern Perspective Design of the Unix	ment. tions her. Edition/ISSN/ISBN 978-1-119-32091-3 5th Edition 1st Edition	Nam Prer	e of the F	Publisher of India shing
memory and 10. Implement 11. Implement Assignments Based on the List of Books Text Books: Name of A AviSilbersch Galvin, Greg Wiley A William St Reference Bo Charles C	I IPC nt Paging Te nt Threading curriculum atz, Peter g Gagne, Asia tallings ooks: rowley ddison- ley Bach	echnique f memory manager g & Synchronization Application as covered by subject teach Title of the Book Operating System Concepts Essentials Operating Systems: Internals and Design Principles Operating System: A Design-oriented Approach Operating Systems: A Modern Perspective	ment. tions her. Edition/ISSN/ISBN 978-1-119-32091-3 5th Edition 1st Edition 2nd Edition	Nam Prer	e of the F ntice Hall win Publi	of India of India



List of e	quipment/app	paratus for labo	oratory experi	iments:			
Sl. No.							
1.		Computer					
2.		Linux/Uban	tu operating	system			
End Sen	nester Examina	ation Scheme.	Maximu	um Marks-70	. т	ime allotted	-3hrs.
Group	Unit	Objective (MCQ only correct ans			Subjective	Questions	
		No of question to be set	Total Marks	No of question to be set	To answer	Marks per question	Total Marks
Α	1 to 7	10					
В	1 to 7		10	5	3	5	60
•		hoice type questi				-	-
٠	Only multiple ch Specific instruct given on top of	tion to the stude the question pap	nts to maintain per.	one correct ar the order in a	nswer are to be	set in the ob	-
• • Examina	Only multiple ch Specific instruct given on top of	tion to the stude the question pap for end semest	nts to maintain per. er examinatio	one correct ar the order in a	nswer are to be	set in the obj	should be
• • Examina	Only multiple ch Specific instruct given on top of	tion to the stude the question pap	nts to maintain per. er examinatio Marks of	one correct ar the order in a on: f each	nswer are to be nswering object	set in the obj tive questions e Ques	tion to be
• • Examina Group	Only multiple ch Specific instruct given on top of	tion to the studer the question par for end semest Chapter	nts to maintain ber. er examinatio Marks of question	one correct ar the order in a on: f each	nswer are to be nswering object Question to be set	set in the obj tive questions e Ques answ	tion to be
• Examina Group A	Only multiple ch Specific instruct given on top of	tion to the studer the question par for end semest Chapter All	nts to maintain per. er examination Marks of question 1	one correct ar the order in a on: f each (1	nswer are to be nswering object Question to be set	e Ques answ	tion to be
• • Examina Group A B	Only multiple ch Specific instruct given on top of	tion to the studer the question par for end semest Chapter All All	nts to maintain per. er examinatio Marks of question 1 5	one correct ar the order in ar on: f each (1 1	Answer are to be nswering object Question to be set 10	e Ques answ 10 3	tion to be
• Examina Group A B C	Only multiple cl Specific instruct given on top of ation Scheme f	tion to the studer the question paper for end semest Chapter All All All	nts to maintain per. er examinatio Marks of question 1 5 15	one correct ar the order in ar on: f each (5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	nswer are to be nswering object Question to be set	e Ques answ	tion to be
• Examina Group A B C Examina	Only multiple ch Specific instruct given on top of ation Scheme f	tion to the studer the question paper for end semest Chapter All All All for Practical Se	nts to maintain per. er examinatio Marks of question 1 5 15 ssional exami	one correct ar the order in ar on: f each (1 5 1 5 1 5 1 5 1 1 5 1 1 1 5 1 1 1 1	Answer are to be nswering object Question to be set 10	e Ques answ 10 3	tion to be
• Examina Group A B C Examina Practica	Only multiple ch Specific instruct given on top of ation Scheme f ation Scheme f I Internal Sess	tion to the studer the question paper for end semest Chapter All All All for Practical Sectional Continuo	nts to maintain per. er examinatio Marks of question 1 5 15 ssional exami	one correct ar the order in ar on: f each (1 5 1 5 1 5 1 5 1 1 5 1 1 1 5 1 1 1 1	Answer are to be nswering object Question to be set 10	e Ques answ 10 3	tion to be
• Examina Group A B C Examina Practica Internal	Only multiple cl Specific instruct given on top of ation Scheme f ation Scheme f I Internal Sess Examination:	tion to the studer the question par for end semest Chapter All All for Practical Se ional Continuo	nts to maintain per. er examinatio Marks of question 1 5 15 ssional exami	one correct ar the order in ar on: f each (1 5 1 5 1 5 1 5 1 1 5 1 1 1 5 1 1 1 1	Answer are to be nswering object Question to be set 10	e Ques answ 10 3	tion to be
• Examina Group A B C Examina Practica Internal Continu	Only multiple ch Specific instruct given on top of ation Scheme f ation Scheme f I Internal Sess	tion to the studer the question par for end semest Chapter All All All for Practical Sectional Continuo	nts to maintain per. er examinatio Marks of question 1 5 15 ssional exami	one correct ar the order in ar on: f each (1 5 1 5 1 5 1 5 1 1 5 1 1 1 5 1 1 1 1	Answer are to be nswering object Question to be set 10	e Ques answ 10 3 3	tion to be
• • Examina Group A B C Examina Practica Internal Continu External	Only multiple ch Specific instruct given on top of ation Scheme f ation Scheme f Internal Sess Examination: ous evaluation	tion to the studer the question par for end semest Chapter All All All for Practical Sectional Continuo	nts to maintain per. er examinatio Marks of question 1 5 15 ssional exami	one correct ar the order in ar on: f each (1 5 1 5 1 5 1 5 1 1 5 1 1 1 5 1 1 1 1	Answer are to be nswering object Question to be set 10	e Ques answ 10 3 3	tion to be
Examina Group A B C Examina Practica Internal Continu External Signed La	Only multiple ch Specific instruct given on top of ation Scheme f ation Scheme f I Internal Sess Examination: ous evaluation Examination: Estamination	tion to the studer the question par for end semest Chapter All All All for Practical Sectional Continuo	nts to maintain per. er examinatio Marks of question 1 5 15 ssional exami	one correct ar the order in ar on: f each (1 5 1 5 1 5 1 5 1 1 5 1 1 1 5 1 1 1 1	Question to be set	e Ques answ 10 3 3	tion to be



		tion Technology (Artificial Intelligence)		
-		m and Database Management System Lab		
	ode: BITAI 302,BITAI 392	Semester: III		
Duration		Maximum Marks: 100+100		
Teaching		Examination Scheme		
	3 hrs./week	End Semester Exam: 70		
Tutorial:		Attendance : 5		
	:4 hrs./week	Continuous Assessment:25		
Credit: 3	+2	Practical Sessional internal continuous eval)
		Practical Sessional external examination:60		
Aim:				
SI. No.				
1.	To store and transform dat			
2.		form of table, schema and report forms		
3.	To provide security of data			
4.		rarchical form or a navigational form		
Objective	e:			
Sl. No.				
1.		atabase schema and need for normalization		
2.	Experience with SQL			
3.		ical implementation of database		
4.	Use database for concurrent	nt use		
Pre-Requ				
SI. No.				
1.	Elementary knowledge abo	out computers including some experience using the second	ng UNIX C	or
2.		I Itilization		
Ζ.	Computer Programming &	Othization		
Contents			Hrs./we	o k
Chapter	Name of the Topic		Hours	Marks
01	Database system archit	acture	6	15
01	-	Independence, Data Definition Language	0	15
		ion Language (DML). Data models: Entity-		
		work model, relational and object oriented		
	•	onstraints, data manipulation operations.		
02	Relational query langua	ages	12	25
		e and domain relational calculus, SQL3, DDL		
	u 1	pen source and Commercial DBMS - MYSQL,		
		er. Relational database design: Domain and		
		strong's axioms, Normal forms, Dependency		
		design. Query processing and optimization:		
		l algebra expressions, Query equivalence,		
	Join strategies, Query o	ptimization algorithms.		
03	Storage strategies		6	10



Department of Information Technology (In-house) Syllabus for B.Sc. in Information Technology (Artificial Intelligence) (Effective from academic session 2019-20)

	Indices, B-trees, hashing.		
04	Transaction processing Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.	6	10
05	Database Security Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.	3	5
06	Advanced topics Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.	3	5
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	40	100

Practical:

Course Code: BITAI392

Credit: 2

Skills to be developed:

Intellectual skills:

- 1. Can be able to implement the plan .
- 2. Can be able to use a variety of techniques to extend the original idea.
- 3. Can be able to analyze relevant data.
- 4. Can be considered valid by the fact of it.

List of Practical: Sl. No. 1& 2 compulsory & at least three from the rest)

- 1. Design a Database and create required tables. For e.g. Bank, College Database
- 2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
- 3. Write a sql statement for implementing ALTER, UPDATE and DELETE
- 4. Write the queries to implement the joins
- 5. Write the query for implementing the following functions: MAX(),MIN(),AVG(),COUNT()
- 6. Write the query to implement the concept of Intergrity constrains
- 7. Write the query to create the views
- 8. Perform the queries for triggers
- 9. Perform the following operation for demonstrating the insertion ,updation and deletion using the referential integrity constraints.
- 10. Write the query for creating the users and their role.

Assignments:

Based on the curriculum as covered by subject teacher.

List of Books

Text Books:

Name of Author	Title of the Book	Edition/ISSN/ISBN	Name of the Publisher
Abraham Silberschatz,	Database System	6th Edition	McGraw-Hill



		(Effectiv	e from acad	emic sessi	on 2019-20)		
Henry F. K	orth, S.	Concepts					
Sudarshan	ı						
R. Elmasri	and S.	Fundamentals of		5th Edition Pe		Pearson Ed	lucation
Navathe		Database Sy	stems				
Reference	Books:					•	
J. D. Ullma	an	Principles of	Database			Computer	Science
		and Knowled				Press	
		Systems	0				
Abiteboul,	, Richard	Foundations	of				
Hull, Victo	r Vianu,	Databases					
Addison-W	Vesley						
List of equ	ipment/appa	ratus for labo	ratory experi	ments:		•	
Sl. No.							
1.		Computer/L	aptop				
2.		Oracle /Mys					
	ster Examinat			m Marks-7	0. Ti	ime allotted	-3hrs.
Group	Unit	Objective C				Questions	
•		(MCQ only w			· · · , · · · ·	-	
		correct answ					
		No of	Total	No of	To answer	Marks per	Total
		question to	Marks	question to)	question	Marks
		be set	-	be set			
Α	1 to 6	10	10				
							60
В	1 to 6			5	3	5	
С	1 to 6			5	3	15	
					inswer are to be		
•				the order in a	answering object	tive questions	should be
-	ven on top of th						
	on Scheme fo				<u> </u>		• • •
Group		Chapter	Marks of	•		•	tion to be
			question		set	answ	erea
<u>A</u>		All	1		10	10	
B		All	5		5	3	
C		All	15		3	3	
	on Scheme fo			nation:			
	nternal Sessio	nal Continuo	us Evaluation				
	xamination:	1		1		1	
Continuou	is evaluation					40	
	amination: Exa	miner-				1	
Signed Lab	Note Book				10		
	Note Book				10 40		



Name of the Course: B.Sc. in Information Technology (Artificial Intelligence) Subject: Data Visualisation and Data Visualisation lab Gourse Code: BITAI 303 & BITAI 393 Semester: III 393 Duration: 36 Hrs. Maximum Marks: 100+100 Teaching Scheme Examination Scheme Theory: 3 hrs./week End Semester: Exam: 70 Tutorial: 0 Practical: 4 hrs./week Continuous Assessment: 25 Credit: 3+2 Practical Sessional internal continuous evaluation: 40 Alim: Si. No. 1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: Si. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandab		•	from academic session 2019-20)		
Course Code: BITAI 303 & BITAI Semester: III 393 Maximum Marks: 100+100 Teaching Scheme Examination Scheme Theory: 3 hrs./week End Semester Exam: 70 Tutorial: 0 Attendance : 5 Practical Ahrs./week Continuous Assessment:25 Credit: 3+2 Practical Sessional internal continuous evaluation:40 Aim: Practical Sessional external examination:60 Aim: I. 1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI.No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requiste: SI.No. 1. Computer Programming & Utilization, Graphics 1. Computer Programming & Utilizati					
393 Maximum Marks: 100+100 Teaching Scheme Examination Scheme Theory: 3 hrs./week End Semester Exam: 70 Tutorial: 0 Attendance : 5 Practical: 4 hrs./week Continuous Assessment:25 Credit: 3+2 Practical Sessional internal continuous evaluation:60 Aim: Si. No. 1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: Si. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: Si. No. 1. Computer Programming & Utilization, Graphics Interview of visualization, graphics, drawing, photorealism, human perception. 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perceptio	-				
Teaching Scheme Examination Scheme Theory: 3 hrs./week End Semester Exam: 70 Tutorial: 0 Attendance : 5 Practical: 4 hrs./week Continuous Assessment:25 Credit: 3+2 Practical Sessional internal continuous evaluation:40 Practical: Sessional external examination:60 Attendance : 5 Attendance: 5 Practical Sessional external examination:60 Attendance: 5 Practical Sessional external examination:40 Practical: Sessional external examination:60 Attendance: 5 St. No. 1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI.No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI.No.		ode: BITAI 303 & BITAI	Semester: III		
Theory: 3 hrs./week End Semester Exam: 70 Tutorial: 0 Attendance: 5 Practical: 4 hrs./week Continuous Assessment:25 Credit: 3+2 Practical Sessional Internal continuous evaluation:40 Practical Sessional external examination:60 Aim: SI. No. 1. to explore sources and tell stories 2. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Contents Hrs./week Chapter Name of the Topic 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, multidimensional scaling, packing 6	Duration :	36 Hrs.	Maximum Marks: 100+100		
Interview Attendance : 5 Practical:4 hrs./week Continuous Assessment:25 Credit: 3+2 Practical Sessional internal continuous evaluation:40 Alim: Practical Sessional external examination:60 Alim: I Si. No. I 1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: Si. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: Si. No. 1. Contents Hrs./week Contents Hrs./week Contents Induction, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tuffe's design rule	Teaching	Scheme	Examination Scheme		
Practical:4 hrs./week Continuous Assessment:25 Credit: 3+2 Practical Sessional internal continuous evaluation:40 Min: Practical Sessional external examination:60 Aim: I SI. No. I 1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: Si. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: Si. No. 1. Computer Programming & Utilization, Graphics Hours Marks 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 10 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tuffe's design rules, using color 6 10	Theory: 3	hrs./week	End Semester Exam: 70		
Practical Sessional internal continuous evaluation:40 Practical Sessional external examination:60 Aim: SI. No. 1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. I. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Image: Si No. 1. Computer Programming & Utilization, Graphics Image: Si No. 1. Computer Programming & Utilization, Graphics Image: Si No. 1. Computer Programming & Utilization, Graphics Image:	Tutorial:	0	Attendance : 5		
Practical Sessional external examination:60 Aim: SI. No. 1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. I. Computer Programming & Utilization, Graphics Image: Start Sta	Practical:	4 hrs./week	Continuous Assessment:25		
Aim:	Credit: 3+	2	Practical Sessional internal continuous eval	uation:40	
SI. No. 1. to explore sources and tell stories 1. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Hrs./week Chapter Name of the Topic Hours Marks 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tuffe's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, 6 10 10 04 Visualization systems, Information Visualization Marta, database 6 10			Practical Sessional external examination:60		
1. to explore sources and tell stories 2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: 51. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: Sl. No. 1. Computer Programming & Utilization, Graphics 12 Contents Hrs./week Chapter Name of the Topic Hours Marks 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tuffe's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, 6 10 10 04 Visualization systems, Information Visualization Marta, database 6 10					
2. to predict sales volumes and identify areas that need attention or improvement 3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Hrs./wet Chapter Name of the Topic Hours 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tuffe's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, 6 10 10 04 Visualization systems, Information Visualization Mantra, database 6 10	Sl. No.				
3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: 51. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Contents: Pre-Requisite: SI. No. 1. 1. Computer Programming & Utilization, Graphics Contents: Pre-Requisite: SI. No. 1. 1. Computer Programming & Utilization, Graphics Image: Contents in formation, Graphics Contents: Image: Contents: Contents: Contents: Contents: Objective of the Topic Image: Contents: Contents:	1.	to explore sources and tell	stories		
3. to understand what factors influence customers' behavior to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: 51. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Contents Hre./wet Contents: Contents Objective: 3. Orientation, overview of visualization, graphics, drawing, photorealism, human perception. Hrs./wet Contents: Contents: Objective: 3. Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 01 Orientation, overview of visualization, graphics, drawing, Photorealism, numan perception. 6 10 02 Data, mapping, charts, glyphs, parallel coordinates, stacked gra	2	to predict sales volumes an	d identify areas that need attention or im	nroveme	nt
to know which products to place where 4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Vertice of the Topic 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tuffe's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, 6 10 10 04 Visualization systems, Information Visualization Mantra, database 6 10	2،		a racinity areas that need attention of him		
4. to discover how to increase revenues or reduce expenses spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Image: Site in the image of the Topic Hours Marks 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, 6 10 10 04 Visualization systems, Information Visualization Marka 6 10	3.	to understand what factors	influence customers' behavior		
spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Image: Site of the Topic Otientation, overview of visualization, graphics, drawing, photorealism, human perception. 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing 6 10		to know which products to	place where		
spreadsheets are hard to visualize patterns and trends can be spotted quickly and easily saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data 	4.	to discover how to increase	e revenues or reduce expenses		
saves time and energy Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Interview of the Topic Hrs./week Contents Contents Contents Interview of visualization, graphics, drawing, photorealism, human perception. 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, for multidimensional scaling, packing 6 10 04 Visualization systems, Information Visualization Mantra, database 6 10			-		
Objective: SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Interview of the Topic Marks 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, for multidimensional scaling, packing 6 10 04 Visualization systems, Information Visualization Mantra, database 6 10		patterns and trends can be	spotted quickly and easily		
SI. No. 1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite:		saves time and energy			
1. The main objective of data visualization is to understand the significance of data and to communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Contents Hrs./week Contents Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing 6 10 04 Visualization systems, Information Visualization Mantra, database 6 10	-	•			
communicate this information clearly and efficiently. Analyzing and reasoning about data through visualizations makes complex data more accessible, understandable and usable.Pre-Requisite:SI. No.1.Computer Programming & Utilization, GraphicsContentsHrs./wetContentsMame of the Topic01Orientation, overview of visualization, graphics, drawing, photorealism, human perception.61202Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color72003Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing61004Visualization systems, Information Visualization Mantra, database610					
through visualizations makes complex data more accessible, understandable and usable. Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics In Computer Programming & Utilization, Graphics Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics In Computer Programming & Utilization, Graphics Marks Ontents Hrs./we-k Contents Priorientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, for multidimensional scaling, packing 6 10 04 Visualization systems, Information Visualization Mantra, database 6 10	1.				
Pre-Requisite: SI. No. 1. Computer Programming & Utilization, Graphics Image: Since of the Programming & Utilization, Graphics Contents Hrs./week Contents Chapter Name of the Topic Hours Marks 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing 6 10 04 Visualization systems, Information Visualization Mantra, database 6 10			, , , ,	•	
Sl. No. Image: Computer Programming & Utilization, Graphics 1. Computer Programming & Utilization, Graphics Hrs./week Contents Contents Contents Contents Other Topic Other Topic 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing 6 10 04 Visualization systems, Information Visualization Mantra, database 6 10		through visualizations makes	s complex data more accessible, understand	lable and	usable.
Sl. No. Image: Computer Programming & Utilization, Graphics 1. Computer Programming & Utilization, Graphics Hrs./week Contents Heours Marks 01 Orientation, overview of visualization, graphics, drawing, photorealism, human perception. 6 12 02 Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color 7 20 03 Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing 6 10 04 Visualization systems, Information Visualization Mantra, database 6 10	Pre-Requ	isite:			
ContentsChapterName of the TopicHrs./week01Orientation, overview of visualization, graphics, drawing, photorealism, human perception.61202Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color72003Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing61004Visualization systems, Information Visualization Mantra, database610					
ChapterName of the TopicHoursMarks01Orientation, overview of visualization, graphics, drawing, photorealism, human perception.61202Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color72003Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing61004Visualization systems, Information Visualization Mantra, database610	1.	Computer Programming & U	tilization, Graphics		
01Orientation, overview of visualization, graphics, drawing, photorealism, human perception.61202Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color72003Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing61004Visualization systems, Information Visualization Mantra, database610	Contents			Hrs./we	ek
photorealism, human perception.702Data, mapping, charts, glyphs, parallel coordinates, stacked graphs, Tufte's design rules, using color703Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing604Visualization systems, Information Visualization Mantra, database6	-			Hours	
Tufte's design rules, using color Tufte's design rules, using color 03 Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing 6 10 04 Visualization systems, Information Visualization Mantra, database 6 10	01			6	12
03Graphs, networks, tree maps, Principle Component Analysis, multidimensional scaling, packing61004Visualization systems, Information Visualization Mantra, database610	02			7	20
04 Visualization systems, Information Visualization Mantra, database 6 10	03	Graphs, networks, tree	maps, Principle Component Analysis,	6	10
	04	Visualization systems, In	formation Visualization Mantra, database	6	10



Department of Information Technology (In-house) Syllabus for B.Sc. in Information Technology (Artificial Intelligence) (Effective from academic session 2019-20)

05	Overview and intro to web programming, intro to D3 and	3	5
	selections, D3 chart help.		
06	Interactive computing, MVC, browsers, event callbacks, interaction	3	5
	design, D3 events, Tooltips, D3 Graphs, D3 transitions, interactive		
	dynamics .		
07	Narrative structure, narrative layouts, narrative spectrum, Ellipsis.	3	5
08	Declarative programming, reactive programming, course	2	3
	conclusion .		
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	40	100

Practical:

Course Code: BITAI 393

Credit: 2

List of Practical: Sl. No. 1& 2 compulsory & at least three from the rest

Based on the curriculum as covered by subject teacher.

Assignments:

Based on the curriculum as covered by subject teacher.

List of Books

Text Books:

Text DOOKS.								
Name of Author		Title of the Book		Edition/ISSI	N/ISBN	Name of the Publisher		
Cole		Storytelling	With Data:	3rd		Wiley		
Nussbaume	rKnaflic	A Data Visua	lization					
		Guide for Bu	siness					
		Professional	s					
Reference E	Books:					•		
Andy Kirk		Data Visualis	sation: A	2nd		SAGE Publi	cations Ltd	
		Handbook fo	or Data					
		Driven Desig	n					
Claus O. Wi	lke	Fundamentals of Data		3 rd		O'Reilly Me	edia, Inc.	
		Visualization	: A Primer					
		on Making Ir	formative					
		and Compell	ing Figures					
List of equip	oment/appai	ratus for labo	ratory experi	ments:				
Sl. No.								
1.		Computer/La	aptop					
End Semest	er Examinati			m Marks-70.		ime allotted-	3hrs.	
Group	Unit	Objective Q		Subjective Questions				
		(MCQ only w						
		correct answ				1		
		No of	Total	No of	To answer	Marks per	Total	



Department of Information Technology (In-house) Syllabus for B.Sc. in Information Technology (Artificial Intelligence)

		question to be set	Marks	question to be set		question	Marks
Α	1 to 8	10	10				
В	1 to 8			5	3	5	60
С	1 to 8			5	3	15	
 Specific give 	cific instruction n on top of the	n to the studen e question pap	its to maintain	the order in a	nswer are to be answering object		
Group	ii Scheme für	Chapter	Marks of each		Question to be		estion to be
•		•	question		set	-	wered
Α		All	1		10	10	
В		All	5		5	3	
С		All	15		3	3	
			sional exami				
		nal Continuo	us Evaluation				
Internal Exa	mination:	1		1		r	
Continuous	evaluation					40	
External Exa	mination: Exa	miner-				1	
Signed Lab N					10		
On Spot Expe	eriment				40		
Viva voce					10	60	



Name of	the Course: B.Sc. in Informat	tion Technology (Artificial Intelligence)
Subject: I	Probability & Statistics	
Course Co	ode: BITAI 304	Semester: 3
Duration	: 36 Hrs	Maximum Marks: 100
Teaching	Scheme	Examination Scheme
Theory: 3	Bhrs./week	End Semester Exam: 70
Tutorial:1	1 hrs./week	Attendance: 5
Practical:	0	Continuous Assessment: 25
Credit:4		Practical Sessional internal continuous evaluation: NA
		Practical Sessional external examination: NA
Aim:		
SI. No.		
1.		equip the students with standard concepts and tools at an level that will serve them well towards tackling various problems
2.	The objective of this course	e is to familiarize the students with statistical techniques.
•	: Throughout the course, stu ty & statistics by being able to	dents will be expected to demonstrate their understanding of o learn each of the following
SI. No.		
1.	The ideas of probability and probability distributions an	d random variables and various discrete and continuous ad their properties.
2.	The basic ideas of statistics regression.	including measures of central tendency, correlation and
3.	The statistical methods of s	studying data samples.
Pre-Requ	isite:	
SI. No.		
1.	Knowledge of basic algebra	a, calculus.
2.	Ability to learn and solve m	nathematical model.



MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL NH-12 (Old NH-34), Simhat, Haringhata, Nadia -741249

Contents				4 Hrs./v	week
Chapter	Name of the T	lopic		Hours	Marks
01	Definition of equations, solut nonhomogeneo complimentary equations an D'Alembert's dimensional w of variables Laplacian in p Bessel function and its solution	and by near ons, one tion The with	20		
02	variables, Inc Poisson appro Bernoulli tria Discrete Rand coefficient, Cl properties, dis gamma densit	aces, conditional probability, lependent random variables wimation to the binomial di ls, sums of independent ran dom Variables, Moments, V nebyshev's Inequality. Contin stribution functions and der ies.Bivariate distributions and ients, conditional densities, Ba	, the multinomial distribution, infinite sequence ndom variables; Expectation Variance of a sum, Correla uous random variables and nsities, normal, exponential d their properties, distributio	tion, s of n of ation their and	25
03	Kurtosis - P evaluation of and regression squares- fitting curves. Test difference of difference of s	es, Measures of Central ten robability distributions: Bin statistical parameters for thes n – Rank correlation. Curve g of straight lines, second de of significance: Large sam proportions, Tests for single tandard deviations. Test for ra f fit and independence of attril	tomial, Poisson and Norm se three distributions, Correla fitting by the method of gree parabolas and more gen uple test for single propor mean, difference of means, atio of variances - Chi-square	al - ttion least heral tion, and	25
	Sub Total:			36	70
	Internal Asses Examination	ssment Examination & Prepa	aration of Semester	4	30
	Total:			40	100
Assignmer	nts:			I	1
Based on th	he curriculum as	covered by subject teacher.			
List of Boo	oks				
Text Book	s:				
Name of A		Title of the Book	Edition/ISSN/ISBN	Name of the	D 1 11 1



Department of Information Technology (In-house) Syllabus for B.Sc. in Information Technology (Artificial Intelligence)

(Effective from academic session 2019-20)

		(Enecuv	e from acad	emic sessi	ion 2019-20)			
Erwin Krey	Erwin Kreyszig Adv Mat		Engineering	9 th Edition		John	John Wiley & Sons	
N. G. Das		Statistical Me	thods	007008327 978007008		Tata 1	Mc.Gra	w Hill
Reference I	Books:							
P. G. Hoel, and C. J. Ste		Introduction t Theory	o Probability			Unive	ersal Bo	ook Stall
W. Feller		An Introduction Probability The Applications	neory and its	3rd Ed.		Wiley me allotted-3hrs.		
End Semes	ter Examinati	on Scheme.	Maximum	Marks-70.	Tim	e allott	ed-3hrs	5.
Group	Unit	Objective Q (MCQ only v correct answe	with the	Subjective Questions			ions	
		No of question to be set	Total Marks	No of question to be set	To answer	Mark quest	-	Total Marks
Α	1 to 3	10	10					
В	1 to 3			5	3	5		60
С	1 to 3			5	3	15		
• Spe	•	on to the student			answer are to be nswering objection		•	-
Examinatio	on Scheme for	end semester e	xamination:					
Group		Chapter	Marks of question	each	Question to be	set	Questi answei	on to be red
Α		All	1		10		10	

All

All

5

15

5

5

3

3

B

С



Name		e from academic session 2019-20)				
	he Course: B.Sc. in Informat Iicroprocessor & Microcontr	ion Technology (Artificial Intelligence) oller				
Course Co	de: BITAI 305	Semester: III				
Duration:	36 Hrs.	Maximum Marks: 100				
Teaching	Scheme	Examination Scheme				
Theory: 3	hrs./week	End Semester Exam: 70				
Tutorial: 1	hr./week	Attendance : 5				
Practical:	0	Continuous Assessment:25				
Credit: 4		Practical Sessional internal continuous eval	uation:N/	٩		
		Practical Sessional external examination:NA	4			
Aim:						
SI. No.						
	To understand the basic 80	85, 8086 processor and an 8-bit (8051) contr	ollers, the	eir		
		ization and their functions, interfacing an ex				
	the processors/ controllers					
Objective						
Sl. No.	Students are able to					
1.	Recall and apply a basic concept of digital fundamentals to Microprocessor based person					
	computer system.					
2.	Identify a detailed s/w & h/	w structure of the Microprocessor.				
		peripherals (8255, 8253 etc.) are interfaced	with			
	Microprocessor.					
4.	Distinguish and analyze the	properties of Microprocessors & Microcontr	rollers.			
		formation through serial & parallel ports.				
6.	Train their practical knowle	dge through laboratory experiments.				
Pre-Requi	site:					
Sl. No.						
1	Basic knowledge of Digital	Electronics, Computer Orgnization.				
 Contents	basic knowledge of Digital		Hrs./we	ok		
	Name of the Topic			Marks		
Chapter 01	•	uter based system. History of evolution of	Hours 8	16		
UI	Microprocessor and Microprocesso	rocontrollers and their advantages and of 8085 Microprocessor, Pin description of nultiplexing, Status Signals and the control 8085 microprocessor, Addressing modes,	o	10		
02	Delays, Stack and Subrout and hardware), I/O Device	mming with examples, Counter and Time ine, Interrupts of 8085 processor(software Interfacing-I/O Mapped I/O and Memory ing SID and SOD pins and RIM, SIM ita transfer.	9	17		
03	Introduction to 8051 Mi	Architecture, Addressing modes, Interrupts crocontroller –Architecture, Pin Details. ction set, Examples of Simple Assembly	10	22		



Department of Information Technology (In-house) Syllabus for B.Sc. in Information Technology (Artificial Intelligence) (Effective from academic session 2019-20)

	Language.		
04	Memory interfacing with 8085, 8086. Support IC chips- 8255 ,8251,8237/8257,8259. Interfacing of 8255 PPI with 8085 and Microcontroller 8051. Brief introduction to PIC microcontroller (16F877)	9	15
	Sub Total:	36	70
	Internal Assessment Examination & Preparation of Semester Examination	4	30
	Total:	40	100

List of Books

Name of Auth	nor	Title of the Book	Editio BN	n/ISSN/IS	Name of the Publisher
N. Senthil Ku	mar, M.	Microprocessors and			Oxford university press
Saravanan and	t	microcontrollers			
Jeevananthan					
K. Ayala		8051 Microcontroller			Cengage learning
- R.Gaonkar		MICROPROCESSOR			Penram international
		architecture, programming	g		Publishing LTD
		and Application with 808.			
, Ajit Pal,		Microcontrollers:Principle	es&		PHI 2011.
-		Applications			
Naresh Grove	r,	Microprocessor			DhanpatRai, 2003
		comprehensive studies			
		Architecture, Programmin	ıg		
		and Interfacing"			
V. Udayashan	ıkara and	8051 Microprocessor			TMH
M.S Mallikarj	junaswami				
S Mathur		Microprocessor 8085 and	its		PHI
		Interfacing			
Reference Bo	oks:				
K Uday Kun	nar, B .S	The 8085			(Pearson)
Umashankar		Microprocessor,			
		Architecture,			
		Programming and			
		Interfacing-			
Mazidi, Mazi	di and	The 8051			(PEARSON)
McKinley		microcontroller and			
		Embedded systems -			
N. B. Bahadu	re	Microprocessors – The			PHI
		8086/8088,			
		80186/80386/80486 and			
		the Pentium family –			
Uma Rao and		The 8051			(PEARSON).
AndhePallavi		microcontrollers			
End Semester	r Examinat		n Marks-70.		ime allotted-3hrs.
Group	Unit	Objective Questions		Subjective	e Questions
		(MCQ only with the			



			a m)		,		
		correct answ	er)		1	1	
		No of	Total	No of	To answer	Marks per	Total
		question to	Marks	question to		question	Marks
		be set		be set			
Α	1 to 4	10					
			10				60
В	1 to 4			5	3	5	
С	1 to 4			5	3	15	
 Only 	/ multiple choi	ce type questio	n (MCQ) with	one correct ar	nswer are to be	set in the obj	ective part.
Spece	cific instruction	n to the studen	ts to maintain	the order in ar	nswering object	ive questions	should be
give	n on top of the	e question pape	er.				
Examinatio	n Scheme for	[•] end semeste	r examinatio	n:			
Group		Chapter	Marks of	each C	Question to be	e Quest	ion to be
			question	s	et	answe	ered
Α		All	1	1	L O	10	
В		All	5	5	5	3	
С		All	15	3	3	3	



	he Course: B.Sc. in Informati alue & Ethics in Profession					
-	de: BITAI 306	Semester: III				
Duration:		Maximum Marks: 100				
Teaching		Examination Scheme				
	hr./week	End Semester Exam: 70				
Tutorial: (Attendance : 5				
Practical:		Continuous Assessment:25				
Credit: 1	-	Practical Sessional internal continuous eval	uation: N	A		
		Practical Sessional external examination: N	4			
Aim:						
Sl. No.						
1.	To understand the ethics in	Artificial Intelligence				
Objective						
Sl. No.						
	Students will learn key philosophical concepts related to responsible conduct of resear					
2.	-	arity with current debates in, and case studie	es of, eth	ical issue		
	in non-medical scientific research.					
3.	-	o describe and explain the rationale behind p	philosoph	nical		
	ethical positions.					
D C						
Pre-Requi	site:					
SI. No.						
	<u> </u>					
1	Knowledge of Analysis		11			
1 Contents			Hrs./we	1		
1 Contents Chapter	Name of the Topic		Hours	Marks		
1 Contents	Name of the Topic HUMAN VALUES	hics – Integrity – Work ethic – Service		1		
1 Contents Chapter	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue -	- Respect for others – Living peacefully –	Hours	Marks		
1 Contents Chapter	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation 	Hours	Marks		
1 Contents Chapter	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – 	Hours	Marks		
1 Contents Chapter	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – bn to Yoga and meditation for professional 	Hours	Marks		
1 Contents Chapter	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – bn to Yoga and meditation for professional 	Hours	Marks		
1 Contents Chapter 01	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – bn to Yoga and meditation for professional 	Hours 6	Marks 15		
1 Contents Chapter	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation pathy – Self confidence – Character – on to Yoga and meditation for professional anagement. 	Hours	Marks		
1 Contents Chapter 01	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma ENGINEERING ETHICS Senses of "Engineering E	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of 	Hours 6	Marks 15		
1 Contents Chapter 01	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma ENGINEERING ETHICS Senses of "Engineering E inquiry – Moral dilemma	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation pathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of as – Moral Autonomy – Kohlberg"s theory – 	Hours 6	Marks 15		
1 Contents Chapter 01	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma ENGINEERING ETHICS Senses of "Engineering E inquiry – Moral dilemma Gilligan"s theory – Co	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of 	Hours 6	Marks 15		
1 Contents Chapter 01	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma ENGINEERING ETHICS Senses of "Engineering E inquiry – Moral dilemma Gilligan"s theory – Co	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation pathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of as – Moral Autonomy – Kohlberg"s theory – onsensus and Controversy – Models of eories about right action – Self-interest – 	Hours 6	Marks 15		
1 Contents Chapter 01 02	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introduction excellence and stress man ENGINEERING ETHICS Senses of "Engineering E inquiry – Moral dilemman Gilligan"s theory – Comprofessional roles - The Customs and Religion – U	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of as – Moral Autonomy – Kohlberg"s theory – onsensus and Controversy – Models of eories about right action – Self-interest – Uses of Ethical Theories 	Hours 6 8	Marks 15 10		
1 Contents Chapter 01	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma ENGINEERING ETHICS Senses of "Engineering E inquiry – Moral dilemma Gilligan"s theory – Co professional roles - The Customs and Religion – U	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of as – Moral Autonomy – Kohlberg"s theory – onsensus and Controversy – Models of eories about right action – Self-interest – Uses of Ethical Theories LEXPERIMENTATION 	Hours 6	Marks 15		
1 Contents Chapter 01 02	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma ENGINEERING ETHICS Senses of "Engineering E inquiry – Moral dilemma Gilligan"s theory – Co professional roles - The Customs and Religion – U ENGINEERING AS SOCIA Engineering as Experi	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation pathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of as – Moral Autonomy – Kohlberg"s theory – onsensus and Controversy – Models of eories about right action – Self-interest – Uses of Ethical Theories L EXPERIMENTATION imentation – Engineers as responsible 	Hours 6 8	Marks 15 10		
1 Contents Chapter 01 02	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma ENGINEERING ETHICS Senses of "Engineering E inquiry – Moral dilemma Gilligan"s theory – Co professional roles - The Customs and Religion – U ENGINEERING AS SOCIA Engineering as Experi	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation bathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of as – Moral Autonomy – Kohlberg"s theory – onsensus and Controversy – Models of eories about right action – Self-interest – Uses of Ethical Theories LEXPERIMENTATION 	Hours 6 8	Marks 15 10		
1 Contents Chapter 01 02	Name of the Topic HUMAN VALUES Morals, values and Eth learning – Civic virtue – Caring – Sharing – Hones – Commitment – Emp Spirituality – Introductio excellence and stress ma ENGINEERING ETHICS Senses of "Engineering E inquiry – Moral dilemma Gilligan"s theory – Co professional roles - The Customs and Religion – U ENGINEERING AS SOCIA Engineering as Experi	 Respect for others – Living peacefully – sty – Courage – Valuing time – Cooperation pathy – Self confidence – Character – on to Yoga and meditation for professional anagement. Ethics" – Variety of moral issues – Types of as – Moral Autonomy – Kohlberg"s theory – onsensus and Controversy – Models of eories about right action – Self-interest – Uses of Ethical Theories LEXPERIMENTATION imentation – Engineers as responsible of Ethics – A Balanced Outlook on Law. 	Hours 6 8	Marks 15 10		



		•	e from acad						
	Bargainin Crime –	and Reducing g – Confidenti Professional	ality – Confli Rights – En	cts of Interes	st – Occupat	ional			
	Property	Rights (IPR) – D	Discrimination	า					
05	GLOBAL I	SSUES					6	15	
00		onal Corporat	ions – Envir	onmental Etł	nics – Comp	outer	•		
	Ethics –	Weapons De	velopment ·	- Engineers	as Manage	rs –			
		g Engineers – I	-	•					
		Leadership	–Code of C	Conduct – (Corporate S	ocial			
	Responsil	ollity							
	Sub Total:						36	70	
	Internal Asses	sment Examina	tion & Prepara	ation of Semes	ter Examinati	ion	4	30	
	Total:					40	100		
List of Book Text Books Name of A	:	Title of the B	ook	Edition/ISSI	N/ISBN	Nar	ame of the Publish		
	and Roland	Ethics in Engi	neering			Tata	a McGra	w Hill	
Schinzinger									
Govindaraj	-	Engineering Ethics				Pre	ntice Ha	ll of India	
Natarajan S Kumar V. S									
Charles B.		Engineering I	Ethics			Pea	earson Prentice Hall		
Fledderma	nn								
Laura P. Ha		Business Ethi				Mc	Graw Hi	ll education	
Joe Desjard	lins	Making for P							
		Integrity and Responsibilit							
Reference	Books:	Responsionit	у						
Charles E. H		Engineering I	Ethics –			Cen	gage Le	arning	
Michael S.	Pritchard	Concepts and							
and Michae									
John R Boa	tright	Ethics and th of Business	e Conduct			Реа	rson Ed	ucation	
Edmund G	Seebauer	Fundamenta	ls of Ethics			Oxf	ord Univ	versity Press	
and Robert		for Scientists				•		,	
	-	Engineers							
- 10						_		<u></u>	
	Unit	ion Scheme.		ım Marks-70.	Subjective		llotted-	Shrs.	
Group	Unit	(MCQ only w			Subjective	e Que	5110115		
		correct answ							
		No of	Total	No of	To answer		ks per	Total	
		question to be set	Marks	question to be set		que	stion	Marks	
A	1 to 5	10		DE JEL					
				1		1		1	



		(60
-	4 H F		10	_	2	-	60
В	1 to 5			5	3	5	
•				_			
C	1 to 5			5	3	15	
• 0	nly multiple choi	ce type question	n (MCQ) with	one correct an	iswer are to be	set in the obje	ctive part.
• Sp	ecific instruction	n to the student	s to maintain	the order in ar	nswering object	ive questions s	should be
•	ven on top of the				0,		
	on Scheme for			n:			
Group		Chapter	Marks of	each C	Question to be	e Questi	on to be
			question	s	et	answe	red
					-		
Α		All	1	1	.0	10	
A B		All	1 5	5	-	10 3	