

SOET		B.SC.(H) DATA SCIENCE: 2019-22 (Scheme of Studies as per Choice-Based Credit System)															
YEAR	ODD SEMESTER								EVEN SEMESTER								
	SNO		COURSE CODE	COURSE TITLE	L	T	P	C	SNO		COURSE CODE	COURSE TITLE	L	T	P	C	
FIRST	1	SE	ETME101A	BASICS OF MECHANICS	3	1	-	4	1	CC	ETCS501A	LANGUAGES OF DATA M	3	1	-	4	
	2	OE		OPEN ELECTIVE-I	4	-	-	4	2	OE		OPEN ELECTIVE-II	4	-	-	4	
	3	SE	ETEL 101A	COMMUNICATION SKII	4	-	-	4	3	SE	ETEL 402A	SOFT SKILLS AND PERSONALITY DEVELOPMENT	3	0	-	3	
	4	CC	ETCS103A	PROGRAMMING FOR PROBLEM SOLVING	3	1	-	4	4	SE	ETCH 125A	ENVIRONMENTAL STUDI	3	-	-	3	
	5	CC	ETCS521A	COMPUTER CENTRE PLANNING & ESTABLISHMENT	3	1	-	4	5	CC	ETCS316A	WEB TECHNOLOGIES	3	1	-	4	
	6	SE	ETME151A	BASICS OF MECHANICAL ENGINEERING LAB	-	-	-	2	6	CC	ETCS112A	OBJECT ORIENTED PROGRAMMING	3	1	-	4	
	7	SE	ETEL171A	COMMUNICATION SKII	-	-	-	2	7	CC	ETCS551A	LANGUAGES OF DATA MODELING LAB	-	-	-	2	1
	8	CC	ETCS153A	PROGRAMMING FOR PROBLEM SOLVING LAB	-	-	-	2	8	CC	ETCS166A	OBJECT ORIENTED PROGRAMMING LAB	-	-	-	2	1
	9	CC	ETCS565	COMPUTER CENTRE PLANNING & ESTABLISHMENT LAB	-	-	-	2	9	CC	ETCA164A	WEB TECHNOLOGIES LAB	-	-	-	2	1
			TOTAL	17	3	8	24				TOTAL	19	3	6	25		
SECOND	1	CC	ETCS502A	STATISTICAL DATA AN	3	1	-	4	1	CC	ETCS503A	DATA MINING AND PREDICTIVE MODELING	3	1	-	4	
	2	CC	ETCS217A	DATA STRUCTURES	3	1	-	4	2	CC	BSMA137A	ALGEBRA	4	-	-	4	
	3	CC	ETMA208A	NUMERICAL ANALYSIS	4	-	-	4	3	CC	ETCS307A	DATABASE MANAGEMENT SYSTEMS	3	1	-	4	
	4	SE	BSMA217A	REAL ANALYSIS	4	-	-	4	4	SE	ETMC 226A	FUNDAMENTALS OF MANAGEMENT	3	-	-	3	
	5	CC	ETCS219A	FOUNDATION OF COMPUTER SYSTEMS	3	1	-	4	5	SE	BSMA326A	OPERATIONAL RESEARCH	4	-	-	4	
	6	CC	ETCS552A	STATISTICAL DATA AN	-	-	-	2	6	CC	ETCS553A	DATA MINING AND PREDICTIVE MODELING LAB	-	-	-	2	1
	7	CC	BSMA351A	NUMERICAL ANALYSIS	-	-	-	2	7	CC	ETCA365A	LINUX ENVIRONMENT LAB	-	-	-	2	1
	8	CC	ETCS 257A	DATA STRUCTURES LAB	-	-	-	2	8	CC	ETCS 355A	DATABASE MANAGEMENT SYSTEMS LAB	-	-	-	2	1
	9	OE	ETDM301A	Disaster Management	3	-	-	3									
			TOTAL	20	3	6	26				TOTAL	17	2	6	22		
THIRD	1	CC	ETCS504A	BIG DATA ANALYTICS	3	1	-	4	1	CC	ETCS401A	ARTIFICIAL INTELLIGENCE	3	1	-	4	
	2	CC	ETCS211A	OPERATING SYSTEMS	3	1	-	4	2	CC	ETCS202A	SOFTWARE ENGINEERING	3	1	-	4	
	3	SE	ETEL401A	PERSONALITY DEVELOPMENT AND COMMUNICATION SKILLS	3	-	-	3	3	SE	ETCS505A	TECHNICAL WRITING	3	-	-	3	
	4	CC	ETCS304A	COMPUTER NETWORKS	3	1	-	4	4	CC	ETCS506A	PYTHON PROGRAMMING	3	1	-	4	
	5	SE	ETEC210A	DIGITAL ELECTRONICS	3	1	-	4	5	CC	ETCS555A	PYTHON PROGRAMMING LAB	-	-	-	2	1
	6	CC	ETCS554A	BIG DATA ANALYTICS	-	-	-	2	6	CC	ETCS451A	ARTIFICIAL INTELLIGENCE LAB	-	-	-	2	1
	7	CC	ETCS255A	OPERATING SYSTEMS LAB	-	-	-	2	7	CC	ETCS252A	SOFTWARE ENGINEERING LAB	-	-	-	2	1
	8	CC	ETCS365A	COMPUTER NETWORKS LAB	-	-	-	2	8	SE	ETCA368A	MAJOR PROJECT	-	-	-	6	3
	9	SE	ETCS507A	SEMINAR	-	-	-	2									
	10			Value Added Courses	2	-	-	-									
			TOTAL	17	4	8	23				TOTAL	12	3	12	21		
												TOTAL CREDITS		141			

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B.SC.(H) DATASCIENCE - YEAR 2021-24 (SCHEME OF STUDIES AS PER CHOICE-BASED CREDIT SYSTEM (CBCS) AND LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF))																		
YEAR	ODD SEMESTER							EVEN SEMESTER										
	SNO	Category	COURSE CODE	COURSE TITLE	L	T	P	C	EMP/ENT/SE/OP	SNO	Category	COURSE CODE	COURSE TITLE	L	T	P	C	EMP/ENT/SE/OP
FIRST	1	SEC	ETCS308A	Web Technologies	3	1	-	3	SE/EMP/OP	1	GE	ETMA124A	ORDINARY DIFFERENTIAL EQUATIONS	4	-	-	4	SE
	2	GE	ETPH103A	Mechanics	4	-	-	4	SE	2	AEC	UCES125A	ENVIRONMENTAL STUDIES	3	-	-	3	SE
	3	AEC	UCCS 155A	COMMUNICATION SKILLS	4	-	-	4	SE	3	CC	ETCS501A	LANGUAGES OF DATA MODELING	3	1	-	4	EMP
	4	CC	ETCS104A	Introduction to Computer Science and Programming in Python	3	1	-	4	EMP/OP	4	SEC		OPEN ELECTIVE	3	-	-	3	SE
	5	SEC	ETMC121A	Management Thoughts and Applications	3	0	0	3	SE	5	CC	ETCS112A	OBJECT ORIENTED PROGRAMMING	3	1	-	4	SE/OP
	6	CC	ETCS150A	Introduction to Computer Science and Programming in Python Lab	-	-	2	1	EMP/OP	6	CC	ETCS551A	LANGUAGES OF DATA MODELING LAB	-	-	2	1	EMP
	7	SEC	ETCA164A	WEB TECHNOLOGIES LAB	-	-	2	1	SE/EMP/OP	7	CC	ETCS166A	OBJECT ORIENTED PROGRAMMING LAB	-	-	2	1	SE/OP
	8	GE	ETPH153A	MECHANICS lab	0	0	4	2	SE	8	GE	ETMA174A	ORDINARY DIFFERENTIAL EQUATIONS LAB	-	-	4	2	SE
				TOTAL	17	2	8	22					TOTAL	16	2	8	22	
SECOND	1	CC	ETCS211A	OPERATING SYSTEMS	3	1	-	4	SE	1	CC	ETCS202A	SOFTWARE ENGINEERING	3	1	-	4	EMP/ENT/OP
	2	CC	ETCS217A	DATA STRUCTURES	3	1	-	4	SE/EMP	2	CC	ETCS401A	ARTIFICIAL INTELLIGENCE	3	1	-	4	EMP/ENT
	3	CC	ETCS304A	COMPUTER NETWORKS	3	1	-	4	EMP/OP	3	CC	ETCS307A	DATABASE MANAGEMENT SYSTEMS	3	1	-	4	EMP/ENT/OP
	4	GE	ETMA215A	PROBABILITY AND STATISTICS	4	-	-	4	SE	4	GE	ETMA214A	LINEAR ALGEBRA	5	1	-	6	SE
	5	PCC	ETCS231A	Discrete Mathematics	3	1	-	4	SE/OP	5	CC	ETCS 220A	ANALYSIS AND DESIGN OF ALGORITHMS	3	1	-	4	SE/EMP
	6	CC	ETCS255A	OPERATING SYSTEMS LAB	-	-	2	1	SE	6	CC	ETCS252A	SOFTWARE ENGINEERING LAB	-	-	2	1	EMP/ENT/OP
	7	CC	ETCS365A	COMPUTER NETWORKS LAB	-	-	2	1	EMP/OP	7	CC	ETCS451A	ARTIFICIAL INTELLIGENCE LAB	-	-	2	1	EMP/ENT
	8	CC	ETCS 257A	DATA STRUCTURES LAB	-	-	2	1	SE/EMP	8	CC	ETCS 355A	DATABASE MANAGEMENT SYSTEMS LAB	-	-	2	1	EMP/ENT/OP
	9			Value Added Course	3	-	-	0	SE	9	CC	ETCS262A	Analysis and Design of Algorithms Lab	-	-	2	1	SE/EMP
	10	AEC	UCDM301A	DISASTER MANAGEMENT	3	-	-	3	SE				Value Added Course	3	-	-	0	SE
				TOTAL	22	4	6	26					TOTAL	21	5	8	26	
THIRD	1	CC	ETCS502A	STATISTICAL DATA ANALYSIS	3	1	-	4	EMP/ENT/CC	1	CC	ETCS520A	Internet Technologies	3	1	-	4	EMP
	2	CC	ETCS503A	DATA MINING AND PREDICTIVE MODELING	3	1	-	4	EMP/ENT/CC	2	CC	ETCS519A	BLOCKCHAINS	3	1	-	4	EMP
	3	CC	ETCS552A	STATISTICAL DATA ANALYSIS LAB	-	-	2	1	EMP/ENT/CC	3	CC	ETCS221A	Computer Organization & Architecture	3	1	-	4	SE
	4	CC	ETCS553A	DATA MINING AND PREDICTIVE MODELING LAB	-	-	2	1	EMP/ENT/CC	4	CC	ETCS423A	Neural Network	4	-	-	4	EMP/ENT
	5	SEC	ETCS301A	Programming in MATLAB	2	-	-	2	SE/SEC	5	CC	ETCS561A	BLOCKCHAINS LAB	-	-	2	1	EMP
	6	SEC	ETCS350A	Programming in MATLAB LAB	-	-	2	1	SE/SEC	6	DSE		DSE -3	4	-	-	4	
	7	DSE		DSE -1	3	-	-	3		7	DSE		DSE -3 LAB	-	-	2	1	
	8	DSE		DSE -1 LAB	-	-	2	1		8	PROJ	ETCS464A	Major Project	-	-	12	6	EMP/ENT/DSF
	9	DSE		DSE - 2	3	-	-	3		9								
	10	DSE		DSE - LAB	-	-	2	1										
				Value Added Course	3	-	-	0	SE									
			TOTAL	17	2	10	21					TOTAL	17	3	16	28		
TOTAL CREDITS													145					

DSE -1								
(i)	DSE	ETCS409A	Advanced Computer Networks	3	-	-	3	EMP
	DSE	ETCS452A	Advanced Computer Networks Lab	-	-	2	1	EMP
(ii)	DSE	ETCS410A	Mobile and Wireless Communication	3	-	-	3	EMP
	DSE	ETCS479A	Mobile and Wireless Communication Lab	-	-	2	1	EMP
(iii)	DSE	ETCS411A	Machine Learning	3	-	-	3	EMP/ENT
	DSE	ETCS455A	Machine Learning Lab	-	-	2	1	EMP/ENT


DSE -2								
(i)	DSE	ETCS517A	Soft Computing	3	-	-	3	EMP/ENT
	DSE	ETCS559A	Soft Computing Lab	-	-	2	1	EMP/ENT
(ii)	DSE	ETCS523A	Big Data Analytics and Visualization	3	-	-	3	EMP/ENT
	DSE	ETCS563A	Big Data Analytics and Visualization Lab	-	-	2	1	EMP/ENT
(iii)	DSE	ETCS515A	Ethical Hacking	3	-	-	3	EMP/ENT
	DSE	ETCS557A	Ethical Hacking Lab	-	-	2	1	EMP/ENT

DSE -3								
(i)	DSE	ETCS422A	Cloud Computing	4	-	-	4	EMP/ENT
	DSE	ETCA362A	Cloud Computing Lab	-	-	2	1	EMP/ENT
(ii)	DSE	ETCS424A	Data Warehousing and Data Mining	4	-	-	4	EMP/ENT
	DSE	ETCS463A	Data Warehousing and Data Mining Lab	-	-	2	1	EMP/ENT
(iii)	DSE	ETCS421A	Internet of Things	4	-	-	4	EMP/ENT
	DSE	ETCS457A	Internet of Things Lab	-	-	2	1	EMP/ENT

DSE -4								
		ETCS464A	MAJOR PROJECT	-	-	12	6	EMP/ENT

EMP	Employability
SE	Skill Enhancement
ENT	Entrepreneurship
OP	Open Elective

CC	Core Courses
AEC	Ability Enhancement Compulsory Course
SEC	Skill Enhancement Course
DSE	Discipline Specific Elective
GE	Generic Elective
PROJ	PROJECT


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ETCA368A	MAJOR PROJECT	C
		3

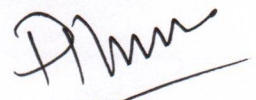
The major-project may be a complete hardware or a combination of hardware and software under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work and technical leadership. The assignment to normally include:

1. Review and finalization of the Approach to the Problem relating to the assigned topic.
2. Preparing an Action Plan for conducting the investigation, including team work.
3. Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed.
4. Final development of product/process, testing, results, conclusions and future directions.
5. Preparing a Dissertation in the standard format for being evaluated by the Department.
6. Final Seminar Presentation before a Departmental Committee.



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ETCS464A	Major Project	L	T	P	C
Version 1.0		-	-	-	6
Pre-requisites/Exposure	--				
Co-requisites	--				

The course is designed to provide an opportunity to students to demonstrate the ability to devise, select and use a range of methodologies and tools to the Chosen/Given project, applying the theoretical knowledge to a real life situation. Experiential Learning outside classroom through self-exploration, practical experience, Industry, field experience, live experience, research, design projects etc.

The learning process in the Project seeks out and focuses attention on many latent attributes, which do not surface in the normal class room situations. These experiential learning attributes through project includes Intellectual ability, Professional judgment and decision making ability, Inter-disciplinary approach, Skills for data handling, Ability in written and oral presentation, Sense of responsibility Developing professional Skills Application of theory, concepts in given industry /practical / field scenario.

Course Outcomes

On completion of this course, the students will be able to

- CO1. Use applied scientific knowledge to identify and implement relevant principles of mathematics and computer science.
- CO2. Use the relevant tools necessary for engineering practice.
- CO3. Define overall needs and constraints to solve a problem and develop/ design a prescribed engineering sub-system.
- CO4. Communicate effectively and learn to be a team player.

Catalog Description

Students are expected make a project based on the latest advancements related to the parent branch of Engineering. Students may opt for an in-disciplinary project (if feasible). The project may be a complete hardware or a combination of hardware and software under the guidance of a Supervisor from the Department. This is expected to provide a good training for the student(s) in technical aspects

Student will be continuously evaluated during the semester in form of Project Progress Seminars. At the end of the semester, assessment of the research/project work of each student will be made by the board of examiners including supervisors on the basis of a viva-voce examination and the report submitted by the student.

Course Content

The assignment to normally include:

1. Review and finalization of the Approach to the Problem relating to the assigned topic.
2. Preparing an Action Plan for conducting the investigation, including team work.
3. Detailed Analysis/Modelling/Simulation/Design/Problem Solving/Experiment as needed.
4. Final development of product/process, testing, results, conclusions and future directions.
5. Preparing a report in the standard format for being evaluated by the Department.
6. Final project presentation before a Departmental Committee.

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Modes of Evaluation: Quiz I/Assignment/ presentation/ extempore/ Written Examination

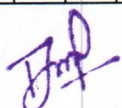
Examination Scheme:

Components	Quiz I	Attendance	Mid Term Exam	Presentation/ Assignment/ etc.	End Term Exam
Weightage (%)	10	10	20	10	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	Mapped Program Outcomes
CO1	Use applied scientific knowledge to identify and implement relevant principles of mathematics and computer science.	PO3
CO2	Use the relevant tools necessary for engineering practice.	PO5
CO3	Define overall needs and constraints to solve a problem and develop/ design a prescribed engineering sub-system.	PO3
CO4	Communicate effectively and learn to be a team player.	PO10

		Engineering Knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual or team work	Communication	Project management and finance	Life-long Learning	Skills	Best Practices	Professional Responsibilities	Ethics	Analysis
Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5



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Academic Year: 2020-23

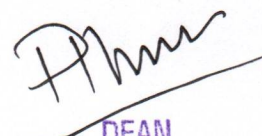
Program: B.SC (H) data science

ETCS464A	Major Project			3		2					3						
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1=weakly mapped
2= moderately mapped
3=strongly mapped



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