Program Schemes for B.E. CSE (Hons.) in Data Science (in collaboration with IBM)

Cluster: Engineering **Institute:** UIE **Department:** AIT-CSE

Type of Program: UG

First Year				Second Year			
	Course Name	**Course Category**	**Credits**		**Course Name**	**Course Category**	**Credits**
Semester -1	Logical Thinking & Problem Solving	Program Core	4	**Semester -3**	Computer Organization and Architecture	Program Core	3
	Mathematics-I	Program Core	5		Advanced Data Structures	Program Core	4
	Semiconductor Physics and Applications	Program Core	3		Database Management System	Program Core	4
	Computer Graphics Lab	Program Core	1		Object Oriented Programming using JAVA	Program Core	2
	Biology for Engineers	Program Core	3		Probability and Statistics	Program Core	4
	AI Applications Lab	Ability Enhancement	1		Agile Development Methodologies	Program Elective	4
	Communication Skills-I	Skill Enhancement	2		Aptitude-I	Ability Enhancement	1
	Design Thinking and Innovation	Skill Enhancement	1		Entrepreneurship Mindset	Ability Enhancement	1
					Critical Enquiry and Research Methodology	Ability Enhancement	1
	Universal Human Values, Ethics and Life Skills-1	Value Education	1		General Proficiency-II	Ability Enhancement	1

	Academic & Career Pathway Planning	Value Education	0		Universal Human Values, Ethics and Life Skills-2	Value Education	2

					Gender Equity and Empowerment	Value Education	1
					Social Internship	Internship	2
Semester -2	Course Name-1				Course Name-1		
	Data Structures & Algorithms	Program Core	4		Operating System	Program Core	5
	Mathematics-II	Program Core	5		Computer Networks	Program Core	4
	Programming Practice	Program Core	1	**Semester -4**	Advanced Database Management System	Program Core	1
	Digital Electronics	Program Core	4		Statistical Methods for AI	Program Core	4
					Professional Elective-I	Program Elective	4
	Emerging & Disruptive Technologies Workshop	Program Core	2		General Proficiency-III	Skill Enhancement	1
					Competitive Coding-I	Skill Enhancement	1
	General Proficiency-I	Ability Enhancement	1		Mid-Grade Project-1	Project Work	1
					RIE-1 (Semester-4)		
					Course Name	**Course Category**	**Credits**
					Employability-TPP: Aptitude-II	Ability Enhancement	1
					Innovation-Marketing & Management Essentials	Ability Enhancement	1
	Communications Skills - II	Skill Enhancement	1		Research-Academic Writing	Ability Enhancement	1
					RIE-2 (Semester-4)		
	Soft Skills-I	Skill Enhancement	1		**Semester**	**Course Name**	**Credits**
	Engineering Physics				Employability-TPP: Soft Skills-II	Skill Enhancement	1

		Program Core	4		Innovation - AI Automation & Sustainability	Skill Enhancement	1
					Research - Research Ethics & Intellectual Property Rights	Skill Enhancement	1

	Third Year				Fourth Year		
	Course Name	**Course Category**	**Credits**		**Course Name**	**Course Category**	**Credits**
Semester -5	Course Name-1			**Semester -7**	Course Name-1		
	Descriptive Analytics	Program Core	4		Predictive Analytics Modelling	Program Elective	4
	Design and Analysis of Algorithms	Program Core	4		Professional Elective-VI	Program Elective	3
	Programming in Python	Program Core	2		Professional Ethics	Ability Enhancement	1
	Full Stack Development -I	Program Elective	2		Competitive Coding-IV	Skill Enhancement	1
	Professional Elective-II	Program Elective	1		Environmental Science and Management	Value Education	2
	Professional Elective-III	Program Elective	3		Capstone Project – I	Project Work	3
	Competitive Coding-II	Skill Enhancement	1		Industrial Internship	Internship	1
	General Proficiency-IV	Skill Enhancement	1		Introduction to SDGs	Value Education	1
	Technical Internship	Internship	1		Open Elective-I	Open Electives	3
	RIE-3 (Semester-5)						Open Elective-II

	Semester	Course Name	Credits		Predictive Analytics Modelling	Program Elective	4
	Employability - Soft Skills-III	Skill Enhancement	1				
	Innovation - Finance & Economics Fundamentals	Skill Enhancement	1				
	Research - Emerging Research Tools and Technologies	Skill Enhancement	1				
	RIE-4 (Semester-5)						
	Semester	**Course Name**	**Credits**				
	Employability - Aptitude-III	Ability Enhancement	1				
	Innovation - Business Strategies & Operations	Ability Enhancement	1				
	Research - Statistical Data Analysis	Ability Enhancement	1				
	Course Name-1				Course Name-1		
	System Design	Program Core	3		**Course Name**	**Course Category**	**Credits**
	Big Data Technologies (Spark & Scala)	Program Core	4		Big Data Security	Program Elective	4
Semester-6	Theory of Computation	Program Core	3	**Semester -8**	Open Elective-III	Open Electives	3
	Full Stack Development-II	Program Core	2		Capstone Project – II	Project Work	9
	Software Engineering	Program Core	2				
	Professional Elective-IV	Program Elective	3				

	Professional Elective-V	Program Elective	3				

	Competitive Coding-III	Skill Enhancement	1				
	Mid-Grade Project-2	Project Work	1				
	RIE-5 (Semester-6)						
	Semester	**Course Name**	**Credits**				
	Employability - Soft Skills-IV	Skill Enhancement	1				
	Innovation - Business Planning & Legal Basics	Skill Enhancement	1				
	Research - Domain specific Term paper	Skill Enhancement	1				
	RIE-6 (Semester-6)						
	Semester	**Course Name**	**Credits**				
	Employability - Aptitude-IV	Ability Enhancement	1				
	Innovation - Customer Engagement & Organic Growth	Ability Enhancement	1				
	Research - AI & Data-Driven Research	Ability Enhancement	1				

Elective Baskets			
Professional Elective -I (Semester-4)		Course Category	
Semester	**Course Name**		**Credits**
Semester-4	Data Engineering-I	Program Elective	4
Semester-4	Data Science and Analytics	Program Elective	4
Semester-4	NoSQL Databases	Program Elective	4
Professional Elective -II (Semester-5)			
Semester	**Course Name**		**Credits**
Semester-5	Business Intelligence	Program Elective	1
Semester-5	Data Mining and Warehousing	Program Elective	1
Semester-5	Foundations of Machine Learning	Program Elective	1
Professional Elective -III (Semester-5)			
Semester	**Course Name**		**Credits**
Semester-5	Programming in R	Program Elective	3
Semester-5	Big Data Engineering	Program Elective	3
Semester-5	Exploratory Data Analysis	Program Elective	3
Professional Elective-IV (Semester-6)			
Semester	**Course Name**		**Credits**
Semester-6	Artificial Intelligence	Program Elective	3
Semester-6	Big Data & Hadoop	Program Elective	3
Professional Elective-V (Semester-6)			
Semester	**Course Name**		**Credits**
Semester-6	Web Data Mining	Program Elective	3
Semester-6	Deep Learning	Program Elective	3
Semester-6	Data Engineering-II	Program Elective	3
Professional Elective-VI (Semester-7)			
Semester	**Course Name**		**Credits**
Semester-7	Planning Analytics	Program Elective	3
Semester-7	Prompt Engineering	Program Elective	3
Semester-7	Sectoral Analysis	Program Elective	3
Semester-7	Docker and Kubernetes	Program Elective	3

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4th Year Curriculum Design Framework [For Hons. / Hons. with Research Tracks of Four Year Undergraduate Programs (FYUP)]

Extending Expertise	Credits	Contextualizing Learning	Course Category	Credits	Experiential Learning	Course Category	Credits
Data Engineering-I	4	Open Elective-I	Open Elective	3	Mid-Grade Project-1	Project	1
Data Science and Analytics	4	Environmental Science and Management	Value Education	2	Mid-Grade Project-2	Project	1
NoSQL Databases	4	Professional Ethics	Value Education	1	Capstone Project – I	Project	3
Programming in R	3	Open Elective-II	Open Elective	3	Capstone Project – II	Project	9
Big Data Engineering	3	Open Elective-III	Open Elective	3	Industrial Internship	Internship	1
Exploratory Data Analysis	3	Introduction to SDGs	Value Education	1	Technical Internship	Internship	1
Artificial Intelligence	3						
Big Data & Hadoop	3						
Web Data Mining	3						
Deep Learning	3						
Data Engineering-II	3						
Planning Analytics	3						
Prompt Engineering	3						
Sectoral Analysis	3						
Docker and Kubernetes	3						
Business Intelligence	1						
Data Mining and Warehousing	1						
Foundations of Machine Learning	1						