

# **LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (LOCF)**

**Bachelor of Data Science  
(B.Sc. DS)  
(III - VI Semester)**

**For 2021-22 admitted students**

**DEPARTMENT OF COMPUTER SCIENCE**



**SRI KRISHNA ARTS ANDSCIENCE COLLEGE  
COIMBATORE-641008**

**DEPARTMENT OF COMPUTER SCIENCE**

**(2021-2024)**

<b>I. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)</b>	
<b>PEO 1</b>	Prepare industry relevant quality graduates with programming and critical thinking skills to serve the domestic and global community.
<b>PEO 2</b>	Disseminate the conceptual knowledge in the concerned discipline for societal development and transformation.
<b>PEO 3</b>	Develop as a capable technical industry leader with outstanding communicationskills.
<b>PEO 4</b>	Become technically competent in the field of computer science with a passion for lifelong learning.

<b>II. PROGRAMME LEARNING OUTCOMES (PLOS)</b>	
<b>No.</b>	<b>The Graduates of B.Sc Data Science Program will be able to:</b>
<b>PLO1</b>	Identify the programming and technical knowledge acquired in the current computational demands. (Cognitive)
<b>PLO2</b>	Analyze the complex problems and identify solutions through critical thinking skills.(Cognitive)
<b>PLO3</b>	Adapt to the latest tools and techniques used to develop domain based Innovativesolutionswiththeacquiredtechnicalandoperationalskills. (Psychomotor)
<b>PLO4</b>	Function and contribute as a team in the diversified environment in taking competitive decision. (Affective)
<b>PLO5</b>	Communicate effectively with the computing community as well as society to Comprehend effective documentation and presentation.(Affective)
<b>PLO6</b>	Incorporate advanced digital skills in designing,developing,managing and deploying in media and technical field. (Affective)
<b>PLO7</b>	Apply quantitative,numerical and statistical skills to solve challenging problems with effective solutions.(Cognitive)
<b>PLO8</b>	Articulate leadership skills in motivating the team towards the target in a multi-disciplinary environment. (Affective)
<b>PLO9</b>	Recognize the need and ability to involve independent and life-long learning in the changing era of technology.(Affective)
<b>PLO10</b>	Interpret the impact of professional business solutions on business environment for sustainable development.(Affective)
<b>PLO11</b>	Follow ethical principles and commit to professional responsibilities for a relevant technical practice. (Affective)

III. PROGRAMME LEARNING OUTCOMES VS GRADUATE ATTRIBUTES VS TAXONOMY OF VERBS													
PLO	Graduate Attributes											Blooms	
	Knowledge	Critical Thinking	Practical Skills	Team work	Communication skills	Digital skills	Numeracy	Leadership skills	Lifelong learning	Entrepreneurial skills	Ethics & Professionalis	Cognitive	Psychomotor
1	√											√	
2		√										√	
3			√										√
4				√									√
5					√								√
6						√							√
7							√					√	
8								√					√
9									√				√
10										√			√
11											√		√

IV. PROGRAMME LEARNING OUTCOMES VS PROGRAMME EDUCATIONAL OBJECTIVES				
PLO	PEO 1	PEO 2	PEO 3	PEO 4
PLO 1	√			
PLO 2	√			
PLO 3		√		
PLO 4			√	
PLO 5			√	
PLO 6		√		
PLO 7		√		
PLO 8			√	
PLO 9				√
PLO 10				√
PLO 11		√		

V. ADDITIONAL PROGRAMME OUTCOMES (APOs)	
APO 1	The students will have an ability to be socially intelligent with intelligent quotient and emotional quotient.
APO 2	They will be having virtual collaborating ability.
APO 3	They will have the ability to use the social media effectively for productive use.
APO 4	They will have critical thinking and innovative skills.
APO 5	They will be provided with good digital footprint.

VI. PROGRAMME SPECIFIC OUTCOMES(PSOs)	
PSO 1	Ability to understand the programming concepts, methodologies and algorithms to solve computational problems.
PSO 2	Ability to apply emerging software development techniques and tools in providing real-time solutions.

## VII. CURRICULUM STRUCTURE FOR BACHELOR OF COMPUTER SCIENCE

### Course Components, Credits & Marks Distribution

Part No	Group	Basic Structure: Distribution of Courses	Number of Courses	Total Marks	Total Credits
I - IV	1	AEC– Ability Enhancement Courses	10	1000	31
III & V	2	DSC–Discipline Specific Courses	15	1500	53
	3	DSE–Discipline Specific Electives	10	1000	37
	4	GEC–General Elective Courses	5	500	19
IV	5	ANCCI & II–Audit Non-Credit Courses	3	-	-
V		ANCCIII–Audit Non-Credit Courses	1	Completed	
-	6	DTC–Drive Through Courses (SWAYAM-NPTEL, Coursera, Any courses certified by statutory bodies, etc)	Any number	-	Addl. Credits
Total				4000	140

#### Group 1. Ability Enhancement Courses(AECs)(10 Courses)

AEC are the courses based upon the content that leads to knowledge enhancement. Ability Enhancement Courses (AEC) are the following.

S. No.	Course Code	Course Title	Semester	Ownership Department	Contact Hours	Credits	Marks
1	21AEC02/ 21AEC07/ 21AEC11/ 21AEC17/	<b>AEC PART I:</b> Tamil -I-Tamil Aruvi- I/Hindi-I/ French-I/ Malayalam-I	I	Lang Dept	6	3	100
2	21AEC22	<b>AEC PART II:</b> English-I: English for Professional Communication	I	English Dept	6	3	100
3	21AEC41	<b>AEC PART III:</b> Probability and Statistics	I	Maths Dept	5	3	100

4	21AEC04/ 21AEC08/ 21AEC12/ 21AEC18/	<b>AECPARTI</b> Tamil -II-Tamil Aruvi- II/Hindi-II/ French-II/ Malayalam-II	II	Lang Dept	6	3	100
5	21AEC24	<b>AECPARTII:</b> English-II: Campus to Corporate	II	English Dept	6	3	100
6	21AEC33	<b>AECPARTIII:</b> Academic Skill for Computer Studies	II	CS Dept	3	3	100
7	21AEC40	<b>AECPARTIII:</b> Computational Thinking	V	CS Dept	3	3	100
8	21AEC50	<b>AECPARTIII:</b> Capstone Project	IV	CS Dept	-	4	100
9	21AEC51	<b>AECPARTIV:</b> Environmental Studies	III	Bioscience Dept	3	3	100
10	21AEC56	<b>AECPARTIV:</b> Cyber Ethics	VI	CS Dept	3	3	100
<b>Total</b>						31	1000

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**Group2. Discipline Specific Courses(DSCs)(15Courses)**

These courses are to be studied compulsorily by the students as a core requirement. The students are required to take DSCs across six semesters. The courses designed under this category aim to cover the basics that a student is expected to imbibe in the particular discipline. It includes Major project.

S.No.	Course Code	Course Title	Semester	ContactH ours	Credits	Marks
1	21CDC01	<b>DSC1:</b> Digital Computer Fundamentals	I	4	4	100
2	21CDC02A	<b>DSC2A:</b> Programming in C	I	3	2	50
	21CDC02B	<b>DSC 2B:</b> Practical -C Programming		3	2	50
3	21CDC03	<b>DSC3:</b> Data Structures and Algorithms	II	4	4	100
4	21CDC04A	<b>DSC4A:</b> Object Oriented Programming Using C++	II	3	2	50
	21CDC04B	<b>DSC4B:</b> Practical: C++ Programming		3	2	50
5	21CDC05	<b>DSC5:</b> Operating System	III	4	3	100
6	21CDC06	<b>DSC6:</b> Programming in Java	III	5	5	100
7	21CDC07	<b>DSC7:</b> Practical: Java Programming	III	3	2	100
8	21CDC08A	<b>DSC8A:</b> Software Engineering	III	3	2	50
	21CDC08B	<b>DSC8B</b> Practical: Software Testing using Selenium		2	2	50
9	21CDC09	<b>DSC9:</b> Computer Networks	IV	3	3	100
10	21CDC10	<b>DSC10:</b> Relational Database Management Systems	IV	5	4	100
11	21CDC11	<b>DSC11:</b> Practical: SQL and PLSQL	IV	3	2	100
12	21CDC12	<b>DSC12:</b> Programming in Python	V	4	4	100

13	21CDC13	<b>DSC13:</b> Practical: Python Programming	V	3	2	100
14	21CDC14	<b>DSC14:</b> Major Project	VI	6	4	100
15	21CDC15A	<b>DSC15A:</b> Data Mining	VI	3	2	50
	21CDC15B	<b>DSC15B:</b> Practical: Data Science		3	2	50
Total					53	1500

### Group3. Discipline Specific Elective(DSEs) (10Courses)

Discipline Specific Elective courses offered under the main discipline of study which maybe specialized or advanced or supportive to the discipline of study. Students can choose any TEN courses from the following list.

S.No	Course Code	Course Title	Ownership Department	Contact Hours	Credits	Marks
1	21CDE01	<b>DSE1:</b> Practical: Excel Macro	CS Dept	3	2	100
2	21CDE02	<b>DSE1:</b> Practical-Spreadsheet for Data Scientists	CS Dept	3	2	100
3	21CDE03	<b>DSE2:</b> Mathematical Foundation for Computer Science	Maths Dept	5	3	100
4	21CDE04	<b>DSE3:</b> Operations Research for Computer Studies	Maths Dept	5	3	100
5	21CDE05	<b>DSE3:</b> Statistics for Data Science	CS Dept	5	3	100
6	21CDE06A	<b>DSE4A:</b> PHP and MySQL	CS Dept	3	3	50
	21CDE06B	<b>DSE4B:</b> Practical: PHP and MySQL		3	2	50
7	21CDE07A	<b>DSE4A:</b> DataVisualization	CS Dept	3	3	50
	21CDE07B	<b>DSE 4B:</b> Practical- Data Visualization using Power BI		3	2	50
8	21CDE08	<b>DSE5:</b> Embedded System	ECS Dept	5	3	100
9	21CDE09	<b>DSE5:</b> Robotics and Applications	ECS Dept	5	3	100
10	21CDE10	<b>DSE5:</b> PC Hardware	ECS Dept	5	3	100
11	21CDE11	<b>DSE6:</b> Industrial Exposure Training	CS Dept	-	5	100
12	21CDE12A	<b>DSE6A:</b> System Modelling using UML	CS Dept	3	3	50
	21CDE12B	<b>DSE6B:</b> Practical: System Modelling using UML		2	2	50
13	21CDE13A	<b>DSE6A:</b> Cloud Computing	CS Dept	3	3	50
	21CDE13B	<b>DSE 6B:</b> Practical: Cloud Computing		2	2	50
14	21CDE14A	<b>DSE7A:</b> Ethical Hacking	CS Dept	3	3	50
	21CDE14B	<b>DSE7B:</b> Practical: Ethical Hacking		3	2	50
15	21CDE15A	<b>DSE7A:</b> Web Intelligence	ICT Dept	3	3	50
	21CDE15B	<b>DSE7B:</b> Practical:Web Intelligence		3	2	50

16	21CDE16A	<b>DSE7A:</b> Android Programming	ICT Dept	3	3	50
	21CDE16B	<b>DSE7B:</b> Practical: Mobile Application Development using Android		3	2	50
17	21CDE17A	<b>DSE7A:</b> Programming in C#.net	CA Dept	3	3	50
	21CDE17B	<b>DSE7B:</b> Practical: C#.net		3	2	50
18	21CDE18A	<b>DSE7A:</b> Linux and Shell Programming	CA Dept	3	3	50
	21CDE18B	<b>DSE7B:</b> Practical: Shell Programming		3	2	50
19	21CDE19A	<b>DSE7A:</b> Computer Graphics Using Flash	CA Dept	3	3	50
	21CDE19B	<b>DSE7B:</b> Practical: Computer Graphics Using Flash		3	2	50
20	21CDE20A	<b>DSE7A:</b> Time Series Analysis	CS Dept	3	3	50
	21CDE20B	<b>DSE7B:</b> Practical: Scientific Programming Using R		3	2	50
21	21CDE21	<b>DSE8:</b> Cyber Security	CS Dept	4	3	100
22	21CDE22	<b>DSE8:</b> Mobile Computing	ICT Dept	4	3	100
23	21CDE23	<b>DSE8:</b> Information Retrieval	CA Dept	4	3	100
24	21CDE24	<b>DSE8:</b> Reinforcement Learning	CS Dept	4	3	100
25	21CDE25A	<b>DSE9A:</b> Data Analytics using R	CS Dept	3	2	50
	21CDE25B	<b>DSE 9B:</b> Practical: Data Analytics using R		3	2	50
26	21CDE26A	<b>DSE9A</b> Next Generation Databases - NoSQL	CS Dept	3	2	50
	21CDE26B	<b>DSE9B:</b> Practical: Next Generation Databases –NoSQL		3	2	50
27	21CDE27	<b>DSE10:</b> Artificial Intelligence	CS Dept	4	4	100
28	21CDE28	<b>DSE10:</b> Artificial Intelligence and Analytics	CS Dept	4	4	100
<b>Total</b>						<b>1000</b>

### Industrial Exposure Training(IET):

Students can opt for Industrial Exposure Training during fifth semester for a period of 4 weeks ; in such case one DSE course will be exempted.

The Continuous Internal Assessment mark distribution for IET is as follows:

Component	Mode of Conduct	Project Coverage	Marks
3Reviews	Presentation	Phase by Phase	25
Work Diary	Written	Phase by Phase	10
Report	Submission	Entire Phases	15
<b>Total</b>			<b>50</b>

Viva-voce Marks for the Industrial Exposure Training will be given based on the report and viva-voce examination, conducted by the Department.

**Report : 30 Marks**

**Viva-voce : 20Marks**

**Major Project:**

During the Sixth semester each student should undertake a project work and submit the report. A guide will be allotted to each student by the Department. A student can select any research topic in discussion with the guide. The internal and external examiners will evaluate the Project report jointly for **50 Marks** and Viva-voce examination shall be conducted jointly for **50 Marks**.

Three Reviews should be conducted and marks have to be entered in Myclassroom portal as follows:

**Review : 25 Marks**  
**Work Diary : 10 Marks**  
**Report : 15Marks**  
**Total : 50 (Internal)Marks**

**End Semester Viva-Voce will be conducted for 50 (External) Marks. (Dissertation - 30 Marks & Viva-voce - 20Marks)**

**Group4. Generic Elective Courses (GECs) (5Courses)**

Generic Elective Courses are advanced level course for the discipline. They are not specialization specific. No overlapping with specialization courses. A student of specific discipline of any specialization can subscribe. These courses are future and recent developments in the respective discipline. The student has to subscribe any 5coursesin the following list:

Sl.No.	Course Code	Course Title	Semester	Ownership Department	Contact Hours	Credits	Marks
1.	21CGE01	Agile Software Development	III	CS Dept.	5	4	100
	21CGE02	Social Media Mining					
	21CGE03	Big Data Analytics					
2.	21GEC01	Spoken Tamil	IV	Language Dept.	3	3	100
	21GEC02	Spoken Hindi					
	21GEC03	Spoken Telugu					
	21GEC04	Spoken Malayalam					
	21GEC05	Spoken French					
3.	21CGE04	Computer Forensics	IV	CS Dept.	5	4	100
	21CGE05	Cyber Threat Intelligence					
	21CGE06	Green Computing					



4.	21CGE07	Wireless Technology	V	CS Dept.	5	4	100
	21CGE08	Internet of Things					
	21CGE09	Cloud Computing					
5.	21CGE10	Organizational Behaviour	VI	Management Science Dept.	5	4	100
	21CGE11	Human Resource Management					
	21CGE12	Management Information System					
Total						19	500

#### Group 5. Audit Non-Credit Courses (ANCC)

NonCreditCoursesareintendedforstudentswhowanttogaingeneralknowledge , learn a new skill, upgrade existing skills, enrich their understanding of a wide range of topics, or develop personal interests. A student has to complete any two courses during Semester I and II.

PartIV-SemesterI-ANCC 1&SemesterII-ANCC 2		
S.No.	Course Code	Course Name
1	21ANC01	Human Rights
2	21ANC02	Women's Rights
3	21ANC03	Yoga for Human Excellence
4	21ANC04	Indian Culture and Heritage
5	21ANC05	Introduction to Cyber Security
6	21ANC06	Consumer Protection
7	21ANC07	Constitution of India
8	21ANC08	Waste Management

Part V - ANCC3- Extension Activities		
S.No.	Course Code	Course Name
1.	21ANC09	National Service Scheme
2.	21ANC10	National Cadet Corps
3.	21ANC11	Youth Red Cross
4.	21ANC12	Red Ribbon Club
5.	21ANC13	Rotaract Club
6.	21ANC14	Sports
7.	21ANC15	Association Activities

Student has to take part in anyone extension activity during their course of study.

### **Group 6. Drive-Through Course (DTC)**

These courses are intended to bring out and promote the self-learning initiative of the students – where their own motivation is what drives them to complete the course and not external compulsions. This fosters the habit of keeping oneself updated always by means of self-study. It gives the students the opportunities to explore new areas of interest and earn additional credits. Students can take any number of courses under this cafeteria system. The credits will not be taken for CGPA calculation. Additional 4 credits per Course will be give non submission of certificate.

1. SWAYAM-NPTEL
2. Coursera
3. Any courses certified by statutory bodies

## VIII. Semester-wise Scheme

Semester I										
Course Code	Course Title	T/P/E	ESE Dur . Hrs	Ins.H rs/Week	CIA Marks	ES Marks	Total Marks	Credits	SD/EM/EN	G/L/R/N
21AEC02/ 21AEC07/ 21AEC11/ 21AEC17 21AEC61	<b>AECPARTI Language I</b> Tamil-I- Tamil Aruvi-I /Hindi-I/ French-I Malayalam-I Sanskrit -I	T	3	6	50	50	100	3	SD	R N G R G
21AEC22	<b>AEC PARTII: English I:</b> English for Professional Communication	T	3	6	50	50	100	3	SD	G
21CDC01	<b>DSC-1:</b> Digital Computer Fundamentals	T	3	4	50	50	100	4	SD	G
21CDC02A	<b>DSC-2A:</b> Programming in C	E	2	3	25	25	50	2	SD/EM	G
21CDC02B	<b>DSC-2B:</b> Practical: C Programming		2	3	25	25	50	2	SD/EM	G
21CDE02	<b>DSE1:</b> Practical: Spreadsheet for Data Scientists	P	3	3	50	50	100	2	SD	G
21AEC41	<b>AEC: PARTIII</b> Probability and Statistics	T	3	5	50	50	100	3	SD/EM	G
	<b>ANCC-1(NF2F)</b>	T	2	-	-	-	Completed		SD	
<b>Total</b>				<b>30+ 2</b>			<b>600</b>	<b>19</b>		
Semester II										
Course Code	Course Title	T/P/E	ESE Dur . Hrs	Ins.H rs/Week	CIA Marks	ES Marks	Total Marks	Credits	SD/EM/EN	G/L/R/N
21AEC04/	<b>AEC-4: PARTI Language II</b> Tamil-II-Tamil	T	3	6	50	50	100	3	<b>SD</b>	R/ N/ G/ R/G

21AEC08/ 21AEC12/ 21AEC18 21AEC62	Aruvi -II/ Hindi- II/ French-II/ Malayalam-II Sanskrit -II									
21AEC24	<b>AEC PART II</b> <b>English II:</b> Campus to Corporate	T	3	6	50	50	100	3	SD	G
21AEC33	<b>AEC: PARTIII</b> Academic Skill for Computer Studies	T	3	3	50	50	100	3	SD	G
21CDC03	<b>DSC-3:</b> Data Structures and Algorithms	T	3	4	50	50	100	4	SD/ EM	G
21CDC04A	<b>DSC-4A:</b> Object Oriented Programming With C++	E	2	3	25	25	50	2	SD/ EM	G
21CDC04B	<b>DSC-4B:</b> Practical : C++Programming		2	3	25	25	50	2	SD/ EM	G
21CDE03	<b>DSE-2</b> Mathematical Foundation for Computer Science	T	3	5	50	50	100	3	SD/ EM	G
	<b>ANCC-2(NF2F)</b>	T	2	-	-	-	Completed		SD	R
<b>Total</b>				<b>30+ 2</b>			<b>600</b>	<b>20</b>		
<b>Semester III</b>										
<b>Course Code</b>	<b>Course Title</b>	<b>T/P /E</b>	<b>ESE Dur · Hrs</b>	<b>Ins .Hrs /We ek</b>	<b>CIA Mark s</b>	<b>ES Marks</b>	<b>Total Marks</b>	<b>Credits</b>	<b>SD/E M/EN</b>	<b>G/L/ R/N</b>
21CDC05	<b>DSC-5:</b> Operating System	T	3	4	50	50	100	3	SD/ EM	G
21CDC06	<b>DSC-6:</b> Programming in Java	T	3	5	50	50	100	5	SD/ EM	G
21CDC07	<b>DSC-7:</b> Practical: Java Programming	P	3	3	50	50	100	2	SD/ EM	G
21CDC08A	<b>DSC-8A:</b> Software Engineering	E	2	3	25	25	50	2	EN	G

21CDC08B	<b>DSC-8B:</b> Practical: Software Testing using Selenium Lab		2	2	25	25	50	2	SD/EM	G
21AEC51	<b>AEC:PARTIV</b> Environmental Studies	T	3	3	50	50	100	3	SD	G
21CGE01/ 21CGE02/ 21CGE03	<b>GEC 1:</b> Agile Software Development/ Social Media Mining/ Big Data Analytics	T	3	5	50	50	100	4	SD/EM	G
21CDE04 / 21CDE05	<b>DSE 3:</b> Operations Research for Computer Studies / Statistics for Data Science	T	3	5	50	50	100	3	SD/EM	G
<b>Total</b>				<b>30</b>			<b>700</b>	<b>24</b>		
<b>Semester IV</b>										
Course Code	Course Title	T/ P/E	ESE Dur · Hrs	Ins .Hrs /We ek	CIA Mark s	ES Marks	Total Marks	Credits	SD/ EM/ EN	G/ L/ R/ N
21CDC09	<b>DSC 9:</b> Computer Networks	T	3	3	50	50	100	3	SD/EM	G
21AEC50	<b>AEC PART III:</b> Capstone Project for Computer Studies	-	3	-	50	50	100	4	EN	N
21CDC10	<b>DSC10:</b> Relational Database Management Systems	T	3	5	50	50	100	4	SD	<b>G</b>
21CDC11	<b>DSC 11:</b> Practical: SQL and PL/SQL	P	3	3	50	50	100	2	EM	G
21CDE06A / 21CDE07A	<b>DSE 4A:</b> PHP and MySQL / Data Visualization	E	2	3	25	25	50	3	SD	G
21CDE06B / 21CDE07B	<b>DSE 4B:</b> Practical: PHP and MySQL / Practical : Data Visualization using Power BI		2	3	25	25	50	2	EM	G
21CDE08/ 21CDE09/ 21CDE10	<b>DSE 5:</b> Embedded System / Robotics and Applications / PC Hardware	T	3	5	50	50	100	3	SD	N

21GEC01/ 21GEC02/ 21GEC03/ 21GEC04/ 21GEC05	<b>GEC-2:</b> Spoken Tamil/ Spoken Hindi/ SpokenTelugu/ Spoken Malayalam/ Spoken French	T	3	3	50	50	100	3	SD	R N R R G
21CGE04/ 21CGE05/ 21CGE06	<b>GEC 3:</b> Computer Forensics/ Cyber Threat Intelligence/ Green Computing	T	3	5	50	50	100	4	SD/ EM	G
Total				30			800	28		
	Semester V									
Course Code	Course Title	T/ P/E	ESE Dur · Hrs	Ins .Hrs /We ek	CIA Mark s	ES Marks	Total Marks	Credits	SD/ EM/ EN	G/ L/ R/ N
21CDE11	<b>DSE-6:</b> Industrial Exposure Training	-	3	4 Wee ks	50	50	100	5	EN	G
OR										
21CDE12A / 21CDE13A	<b>DSE 6A:</b> System Modeling using UML / Cloud Computing	E	2	3	25	25	50	3	SD/ EM	G
21CDE12B / 21CDE13B	<b>DSE 6B:</b> Practical: System Modeling using UML / Practical : Cloud Computing		2	2	25	25	50	2	SD/ EM	G
AND										
21AEC40	<b>AEC-7: PARTIII</b> Computational Thinking	T	3	3	50	50	100	3	SD	G
21CDC12	<b>DSC-12:</b> Programming in Python	T	3	4	50	50	100	4	SD/ EM	G
21CDC13	<b>DSC-13:</b> Practical: Python Programming	P	3	3	50	50	100	2	SD/ EM	G
21CDE14A/ 21CDE15A/ 21CDE16A/ 21CDE17A/ 21CDE18A/	<b>DSE-7A:</b> Ethical Hacking/ Web Intelligence/ Android Programming/ Programming in C#.net/ Linux and Shell Programming/	E	2	3	25	25	50	3	EN	G

21CDE19A 21CDE20A	Computer Graphics Using Flash Time Series Analysis									
21CDE14B/ 21CDE15B/ 21CDE16B/ 21CDE17B/ 21CDE18B/ 21CDE19B 21CDE20B	<b>DSE-7B:</b> Practical: Ethical Hacking/ Practical: Web Intelligence/ Practical: Mobile Application Development using Android Practical: C#.net/ Practical: Shell Programming/ Practical: Computer Graphics Using Flash Practical: Scientific Programming Using R		2	3	25	25	50	2	SD/ EM	G
21CDE21 / 21CDE22 / 21CDE23 / 21CDE24	<b>DSE 8:</b> Cyber Security / Mobile Computing / Information Retrieval / Reinforcement Learning	T	3	4	50	50	100	3	SD	G
21CGE07/ 21CGE08/ 21CGE09	<b>GEC-4</b> Wireless Technology/ Internet of Things/ Cloud Computing	T	3	5	50	50	100	4	SD/ EM	G
<b>Total</b>				<b>30</b>			<b>700</b>	<b>26</b>		
<b>Semester VI</b>										
Course Code	Course Title	T/P/E	ESE Dur . Hrs	Ins .Hrs /Week	CIA Marks	ES Marks	Total Marks	Credits	SD/E M/EN	G/L/R/N
21AEC56	<b>AEC PART IV:</b> Cyber Ethics	T	3	3	50	50	100	3	SD	G
21CDC14	<b>DSC-14:</b> Major Project	-	3	6	50	50	100	4	EN	G
21CDC15A	<b>DSC-15A:</b> Data Mining	E	2	3	25	25	50	2	SD	G
21CDC15B	<b>DSC-15B:</b> Practical: Data Science		2	3	25	25	50	2	EM	G

21CDE25A / 21CDE26A	<b>DSE 9A:</b> Data Analytics using R / Next Generation Databases - NoSQL		2	3	25	25	50	2	SD/ EM	G
		E							EM	
21CDE25B/ 21CDE26B	<b>DSE-9B:</b> Practical : Data Analytics using R Next Generation Databases - NoSQL		2	3	25	25	50	2	SD/ EM	G
21CDE27 / 21CDE28	<b>DSE 10:</b> Artificial Intelligence / Artificial Intelligence and Analytics	T	3	4	50	50	100	4	SD/ EM	G
21CGE10/  21CGE11/  21CGE12	<b>GEC-5</b> Organizational Behavior/  Human Resource Management/ Management Information System	T	3	5	50	50	100	4	SD	G
	<b>ANCC-3</b> Extension Activities	-	3	-	-	-	Grade	-	SD	N
<b>Total</b>				<b>30</b>			<b>600</b>	<b>23</b>		

	<b>Total</b>	<b>4000</b>	<b>140</b>
<b>Drive-Through Course (DTC):</b> Courses offered in SWAYAM-NPTEL, Coursera OR Any courses certified by Statutory bodies	Additional 4 credits per Course will be given on submission of Certificate	During Semester I to Semester VI	

**Semester-wise Distribution of Marks and Credits:**

<b>Semester</b>	<b>Total Marks</b>	<b>Total Credits</b>
I	600	19
II	600	20
III	700	24
IV	800	28
V	700	26
VI	600	23
<b>Total</b>	<b>4000</b>	<b>140</b>



**OFFERED BY****List of Courses Offered by Mathematics Department**

Semester	Course Code	Course Name	Programme	T/P/E	Ins. hrs	CIA	ES	Total Marks	Credit
I	21AEC41	<b>AEC: PARTIII</b> Probability and Statistics	<b>B.Sc.DS</b>	T	5	50	50	100	3
II	21CDE03	<b>DSE2-Mathematical</b> Foundation for Computer Science	<b>B.Sc.DS</b>	T	5	50	50	100	3
III	21CDE05	<b>DSE3:</b> Statistics for Data Science	<b>B.Sc.DS</b>	T	5	50	50	100	3
V	21CDE20A	<b>DSE7A:</b> Time Series Analysis	<b>B.Sc.DS</b>	T	3	20	30	50	3
V	21CDE20B	<b>DSE7B:</b> Practical-Scientific Programming Using R	<b>B.Sc.DS</b>	P	3	25	25	50	2

**List of Courses Offered by Electronics and Communication Systems Department****(Any 1 out of 3 ) during Semester IV**

Semester	Course Code	Course Name	Program me	T/P/E	Ins .hrs	CIA	ES	Total Marks	Credit
IV	21CDE08	<b>DSE5:</b> Embedded System	<b>B.Sc.DS</b>	T	5	50	50	100	3
IV	21CDE09	<b>DSE5:</b> Robotics and Applications	<b>B.Sc.DS</b>	T	5	50	50	100	3
IV	21CDE10	<b>DSE 5:</b> PC Hardware	<b>B.Sc.DS</b>	T	5	50	50	100	3