Curriculum Framework under Choice Based Credit System (CBCS) and

Syllabus for Outcome Based Education (OBE) in

B.Sc. (Data Science and Analytics) degree program

for the students admitted from the academic year 2023 – 2024 and onwards

SREE SARASWATHI THYAGARAJA COLLEGE

An Autonomous, NAAC Re–Accredited with 'A+' Grade, ISO 21001:2018 Certified Institution,
Affiliated to Bharathiar University, Coimbatore,
Approved by AICTE for MBA/MCA and by UGCfor2(f) & 12(B) status

Palani Road, Pollachi–642107, Coimbatore Dist., Tamilnadu

Email:stc@stc.ac.in Website:www.stc.ac.in

SREE SARASWATHI THYAGARAJA COLLEGE [AUTONOMOUS], POLLACHI

B.Sc. (Data Science and Analytics) Degree Programme PEO, PO and PSO

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

Within a few years of obtaining B.Sc. degree in Data Science and analytics, the Graduate will be able to

PEO1: Analyze social and environmental aspects with professional values, ethics and equity to transform the knowledge, skills and expertise to the community

PEO2: Involve in lifelong learning to adapt educational needs in a changing world to maintain their competency and to contribute to the advancement of knowledge in a multi-disciplinary environment.

PEO3: Expertise in Analytical solution. Be uniquely positioned to pioneer new developments in the data science field, and to be leaders in industry, the public sector, and academia.

PEO4: Become Successful entrepreneurs with the strong business managerial skills

PROGRAMME OUTCOMES (PO)

The Graduates at the completion of the programme will be able to

PO1: Demonstrate professionally with social, cultural and ethical responsibility as an individual as well as in multifaceted teams with positive attitude

PO2: Adapt to sustain in emerging era and constantly upgrade skills towards independent and lifelong learning.

PO3: Communicate complex concepts with professionalism by adapting appropriate resources and modern tools.

PO4: Develop scalable techniques for data analysis and decision making in many areas, including machine learning, algorithms, statistics, operations research, databases, complexity analysis, visualization, and privacy and security.

PO5: Understand and solve legal and security issues of analytical applications and recognize the importance of research to develop leading innovative analytical products.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

At the completion of the programme, the Graduates will be able to

PSO1: Apply the knowledge gained by understanding the statistical methods, probability, mathematical foundations and computing methods relevant to data analytics.

PSO2: Able to interpret analytical models to make better business decisions.

PSO3: Able to apply the knowledge gained about the analytics chain beginning with problem identification and translation, followed by model building and validation with the aim of knowledge discovery in the given domain.

PSO4: Acquire in depth knowledge of fundamental concepts, data science related programming skills and synthesize analytical skills

PSO5: Able to understand the challenges in big data computing and provide innovative solutions.

Mapping the PO with PEO

PO/PEO	PEO1	PEO2	PEO3	PEO4
PO1	S	M	M	M
PO2	M	S	M	S
PO3	L	M	S	M
PO4	M	M	M	S
PO5	L	M	S	S

S- Strong; L- Low; M-Medium

Mapping the PSO with PEO

PSO/PEO	PEO1	PEO2	PEO3	PEO4
PSO1	**M**	**S**	**M**	**M**
PSO2	**S**	**M**	**M**	**M**
PSO3	**M**	**S**	**S**	**S**
PSO4	**M**	**S**	**S**	**S**

S- Strong; L- Low; M-Medium

Curriculum Framework with Choice Based Credit System (CBCS) and Syllabus for Outcome Based Education (OBE) in Bachelor of Science (Data Science and Analytics) degree programme for the students admitted from the academic year 2021 – 22 onwards

The Choice Based Credit System (CBCS) preserves the identity, autonomy and uniqueness of every programme and reinforce their efforts to be student centric in curriculum designing and skill imparting.

Choice Based Credit System (CBCS): Choice based credit system (CBCS), provides a learning platform wherein the student has the flexibility to choose their course from a list of electives, core, allied, non-major courses, value-based courses, and skill-based courses. This is a student-centric approach to learning or acquiring

higher education. The curriculum with CBCS aims to achieve and accomplish the students experience their choice of courses and credits for their horizontal and vertical mobility.

For BSc (Data Science and Analytics) programme, a student must earn 140 credits as mentioned in the below table.

Summary of Courses Pattern and Credit Distribution in Choice Based Credit System

(UG Data Science and Analytics Programme – 2023 - 2024)

Part	Curriculum Structure	No. of Courses	Credits to be earned
I	Language	04	12
II	English	04	12
III	Core Courses [CC]	21	72
	Generic Elective Courses [GE]	04	12
	Discipline Specific Elective Courses [DSE]	04	12
IV	Skill Enhancement Courses [I,II,V,VI]	04	08
	Non Major Elective Courses [I,II]	02	04
	Ability Enhancement Courses [I,II]	02	04
	Value Based Courses [EVS & VE]	02	04
	Extension Activity	-	Grade
	Total	**47**	**140**
IV	*Extra Credit Courses (2 MOOC & 1 Aptitude)	**03***	**05***
	Grand Total	**47+3***	**140+05***

SEMESTER – 1

Part	Domain	Type	Course Code	Course Name	L	P	T	CIA	ESE	Total	Credit
I	LAN I	T	23LAN1T10/ 23LAN1H10/ 23LAN1M10/ 23LAN1F10	Language I	4	-	-	25	75	100	3
II	ENG I	T	23LAN1E10	English I	4	-	-	25	75	100	3
III	CORE I	T	23BDA1C10	Digital Fundamentals and Computer Organization	5	-	-	25	75	100	4
III	CORE II	T	23BDA1C20	Introduction to C Programming	5	-	-	25	75	100	4
III	GE I	T	23BMAGGE0	Fundamentals of Statistics	4	-	-	25	75	100	3
IV	SEC I NME	T	23BDA1N10	NME –Data Visualization using Tableau	2	-	0	25	75	100	2
IV	SEFC	P	23BDA1S10	Programming in C Lab	-	4	0	25	75	100	2
IV	AECC SS I	T	23AECSS10	Soft Skills I	2	-	0	50		50	2
TOTAL					**26**	**4**	**0**	**225**	**525**	**750**	**23**

SEMESTER – II

Part	Domain	Type	Course Code	Course Name	L	P	T	CIA	ESE	Total	Credits
I	LAN II	T	23LAN2T10/ 23LAN2H10/ 23LAN2M10/ 23LAN2F10	Language II	4	-	-	25	75	100	3
II	ENG II	T	23LAN2E10	English II	4	-	-	25	75	100	3
III	CORE III	T	23BDA2C10	Data Structures and Algorithms	5	-	-	25	75	100	4
III	CORE IV	T	23BDA2C20	Object Oriented Programming with Java	5	-	-	25	75	100	4
III	GE II	T	23BMAGGK0	Foundation of Mathematics	4	-	-	25	75	100	3
IV	SEC II NME	P	23BDA2N20	NME-Data Visualization using Tableau Lab	2	-	-	25	75	100	2
IV	SEC III	P	23BDA2S10	Object Oriented Programming Lab	-	4	-	25	75	100	2
IV	AECC SS II	T	23AECSS20	Soft Skills II	2	-	-	50	-	50	2
TOTAL					**26**	**4**	**0**	**225**	**525**	**750**	**23**

SEMESTER III

Part	Domain	Type	Course Code	Course Name	L	P	T	CIA	ESE	Total	Credits
I	LAN III	T	24LAN3T10/ 24LAN3H10/ 24LAN3M10/ 24LAN3F10	Language III	3	-	-	25	75	100	3
II	ENG III	T	24LAN3E10	English – III	3	-	-	25	75	100	3
III	CORE V	T	24BDA3C10	Python Programming for Data Science	4	-	-	25	75	100	4
III	CORE VI	P	24BDA3C20	Python Programming Lab	-	4	-	40	60	100	2
III	CORE VII	T	24BDA3C30	Introduction to Database Management System	4	-	-	25	75	100	4
III	CORE VIII	P	24BDA3C40	Database Management System Lab		4	-	40	60	100	2
III	GE III	T	24BMA3GB0	Introduction to Linear Algebra	2	-	2	25	75	100	3
IV	VBE	T	23DHE3V10	Value Education & Human Rights	2	-	-	50	-	50	2
	ECC	-		NPTEL	-	-	-	-	-	-	2*
TOTAL					**18**	**8**	**2**	**255**	**495**	**750**	**23**

SEMESTER – IV

Part	Domain	Type	Course Code	Course Name	L	P	T	CIA	ESE	Total	Credits
I	LAN IV	T	24LAN4T10/ 24LAN4H10/ 24LAN4M10/ 24LAN4F10	Language IV	4	-	-	25	75	100	3
II	ENG IV	T	24LAN4E10	English – IV	4	-	-	25	75	100	3
III	CORE IX	T	24BDA4C10	Advanced R Programming	4	-	-	25	75	100	4
III	CORE X	P	24BDA4C20	R Programming Lab	-	4	-	40	60	100	2
III	CORE XI	T	24BDA4C30	Data Mining & Visualization	5	-	-	25	75	100	5
III	CORE XII	P	24BDA4C40	Data Visualization using Microsoft Excel Lab	-	4	-	40	60	100	2
III	GE IV	T	24BDA4G10	Introduction to Artificial Intelligence & Machine Learning	3	-	-	25	75	100	3
IV	VBC II	T	23DHE4V10	Environmental Studies	2	-	-	50	-	50	2
	ECC	-		NPTEL	-	-	-	-	-	-	2*

TOTAL					**22**	**8**	**0**	**255**	**495**	**750**	**24**
SEMESTER – V											
Part	**Domain**	**Type**	**Course Code**	**Course Name**	**L**	**P**	**T**	**CIA**	**ESE**	**Total**	**Credits**
III	CORE XIII	T	24BDA5C10	Business Analytics	4	-	-	25	75	100	4
III	CORE XIV	T	24BDA5C20	BigData Analytics	4	-	-	25	75	100	4
III	CORE XV	P	24BDA5C30	BigData Analytics Lab	-	6	-	40	60	100	3
III	CORE XVI	T	24BDA5C40	Computer Networks	4	-	-	25	75	100	4
III	CORE XVII	P	24BDA5C50	Mini Project/Internship	-	4	-	40	60	100	2
III	DSE I	T	24BDA5E10	Exploratory Data Analysis	3	-	-	25	75	100	3
III	DSE II	T	24BDA5E20	Social Media Analytics	3	-	-	25	75	100	3
III	SEC III	P	24BDA5S10	Data Visualization Using Tableau Lab	-	2	-	30	45	75	2
IV	EXTN	-	23BDA6X10	Extension Activity							
TOTAL					**18**	**12**	**0**	**235**	**540**	**750**	**25**
SEMESTER – VI											
Part	**Domain**	**Type**	**Course Code**	**Course Name**	**L**	**P**	**T**	**CIA**	**ESE**	**Total**	**Credits**
III	CORE XVIII	T	24BDA6C10	MapReduce Programming	5	-	-	25	75	100	5
III	CORE XIX	P	24BDA6C20	MapReduce Programming Lab	-	6	-	40	60	100	3
III	CORE XX	P	24BDA6C30	Main Project	-	6	-	40	60	100	3
III	CORE XXI	T	24BDA6C40	Advancements in Cloud Computing	3	-	-	25	75	100	3
III	DSE III	T	24BDA6E10	Web Analytics	3	-	-	25	75	100	3
III	DSE IV	T	24BDA6E20	Information Retrieval	3	-	-	25	75	100	3
IV	SEC IV	P	24BDA6S10	Data Visualization using PowerBi Lab	-	4	-	30	45	75	2
TOTAL					**14**	**16**	**0**	**210**	**465**	**675**	**22**
GRAND TOTAL					**124**	**52**	**2**	**1405**	**3045**	**4425**	**140**

Scheme of Examination (Student admitted from 2023-24 onwards)

Extra Credit Course 1: Two MOOCs to be completed – one in Third Semester & one in Fourth Semester; ECC – 2 on Aptitude by Fourth Semester [50 marks internal paper]

Students from **B.Sc. (DSA)** to choose any one of the course from the following list of **Languages courses offered:**

List of Part – 1 Language Courses

S No	Semester	Course Type	Course Code	Course Name
1	I	Theory	23LANIT10	Tamil – I
2	I	Theory	23LAN1H10	Hindi – I
3	I	Theory	22LAN1M10	Malayalam – I
4	I	Theory	23LAN1F10	French – I
5	II	Theory	23LAN2T10	Tamil – II
6	II	Theory	23LAN2H10	Hindi – II
7	II	Theory	23LAN2M10	Malayalam – II
8	II	Theory	23LAN2F10	French – II
9	III	Theory	24LAN3T10	Language – III Tamil
10	III	Theory	24LAN3M10	Language – III Malayalam
11	III	Theory	24LAN3H10	Language – III Hindi
12	III	Theory	24LAN3F10	Language – III French
13	IV	Theory	24LAN4T10	Language – IV Tamil
14	IV	Theory	24LAN4M10	Language – IV Malayalam
15	IV	Theory	24LAN4H10	Language – IV Hindi
15	IV	Theory	24LAN4F10	Language – IV French

List of Generic Elective Courses (CBCS)

S. No.	Semester	Type of course	Course Code	Course Name
GE – I				
1	I	Theory	23BMAGGE0	Fundamentals of Statistics
GE – II				
1	II	Theory	23BMAGGKO	Foundation of Mathematics
GE – III				
1	III	Theory	24BMA3GB0	Introduction to Linear Algebra
GE – IV				
1	IV	Theory	24BDA4G10	Introduction to Artificial Intelligence and Machine Learning.

List of Value Based Courses

S. No.	Semester	Course Code	Course Name
1	III	23DHE3V10	Value Education and Human Rights
2	IV	23DHE4V10	Environmental Sciences

List of Non – Major Electives (NME) offered

S. No.	Semester	Type of course	Course Code	Course Name	Offering Department
1	I	Theory	23BDA1N10	Data Visualization using Tableau	DSA
2	II	Practical	23BDA2N20	Data Visualization using Tableau Lab	

List of Discipline Specific Elective Courses (CBCS)

LIST OF ELECTIVE COURSES					
No	**Sem**	**Discipline Specific Elective**	**Type**	**Code**	**Course Name**
Electives of B.Sc. (DSA)					
1	V	DSE I	Theory	24BDA5E10	Exploratory Data Analysis
2	V	DSE II	Theory	24BDA5E20	Social Media Analytics
3	VI	DSE III	Theory	24BDA6E10	Web Analytics
4	VI	DSE IV	Theory	24BDA6E20	Information Retrieval

List of Skill Enhancement Courses

S.No.	Semester	Type of course	Course Code	Course Name
1	I	Practical	23BDA1S10	Programming in C Lab
2	II	Practical	23BDA2S10	Object Oriented Programming Lab
3	V	Practical	24BDA5S10	Data Visualization using Tableau Lab
4	VI	Practical	24BDA6S10	Data Visualization using PowerBi Lab

List of Core Courses

S.No.	Semester	Core	Type of course	Course Code	Course Name
1	I	Core I	Theory	23BDA1C10	Digital Fundamentals and Computer Organization
2	I	Core II	Theory	23BDA1C20	Introduction to C Programming
3	II	Core III	Theory	23BDA2C10	Data Structures and Algorithms
4	II	Core IV	Theory	23BDA2C20	Object Oriented Programming with Java
5	III	Core V	Theory	24BDA3C10	Python Programming for Data Science
6	III	Core VI	Practical	24BDA3C20	Python Programming Lab
7	III	Core VII	Theory	24BDA3C30	Database Management System
8	III	Core VIII	Practical	24BDA3C40	Database Management System Lab
9	IV	Core IX	Theory	24BDA4C10	Advanced R Programming
10	IV	Core X	Practical	24BDA4C20	R Programming Lab
11	IV	Core XI	Theory	24BDA4C30	Data Mining and Visualization
12	IV	Core XII	Practical	24BDA4C40	Data Visualization using Microsoft Excel Lab
13	V	Core XIII	Theory	24BDA5C10	Business Analytics
14	V	Core XIV	Theory	24BDA5C20	Big Data Analytics
15	V	Core XV	Practical	24BDA5C30	Big Data Analytics Lab
16	V	Core XVI	Theory	24BDA5C40	Computer Networks
17	V	Core XVII	Practical	24BDA5C50	Mini Project / Internship
18	VI	Core XVIII	Theory	24BDA6C10	Map Reduce Programming
19	VI	Core XIX	Practical	24BDA6C20	Map Reduce Programming Lab
20	VI	Core XX	Project	24BDA6C30	Main Project
21	VI	Core XXI	Theory	24BDA6C40	Advancements in Cloud Computing