

Curriculum Framework under Choice Based Credit System (CBCS) and

Syllabus for Outcome Based Education (OBE) in

BACHELOR OF DATA SCIENCE AND ANALYTICS

(BSC DSA) Degree Programme

for the students admitted from the academic year 2021 – 22



SREE SARASWATHI THYAGARAJA COLLEGE

An Autonomous, NAACRe–Accredited with ‘A’ Grade, ISO 9001:2008 Certified
Institution, Affiliated to Bharathiar University, Coimbatore, Approved by AICTE for

MBA/MCA and by UGC for 2(f) & 12(B) status

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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 POs with PEO

POs/PEOs	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 PSOs with PEO

PSOs/PEOs	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 OutcomeBasedEducation (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.

B.Sc (Data Science and Analytics) 2021-2022

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

Part	Curriculum Structure	No.ofCourses	Credits to be earned
I	Languages	2	6
II	English	2	6
III	Core (Major) Courses	21	81
	Allied Courses	4	16
	Core Electives	3	15
IV	Non-Major Electives (NME)	2	4
	Value Based Courses (VBC)	2	4
	Skill Based Courses (SBC)	4	8
V	Extension Activities	1	Grade
Total		41	140
Extra Credit Course - 1	MOOC	2	4
Extra Credit Course - 2	Professional English	2	8
Grand Total		45	152



Outcome Based Education:

“Outcome-Based Education” (OBE) is considered as a student-centered instruction model that focuses on measuring student performance through outcomes. Outcomes include knowledge, skills and attitudes. In the OBE model, the required knowledge and skill sets for a particular degree is predetermined and the students are evaluated for all the required parameters (Outcomes) during the course of the program.

Part – I: Languages: Part – 1 comprises of category namely Tamil/Hindi/Malayalam/French

Part – II: English: Part – 2 comprises of the category namely English

Part – III: Core Courses: A set of major papers that include Theory, Practical, Allied, Core Electives, Project and Internship in the major field of study selected by the student. Core courses are mandatory in nature.

Part – IV: Non - Major Electives (NME): A set of non – major elective courses are offered as choices of the students, outside of their major discipline. The courses other than the core and allied shall be opted by the students as Non – Major Elective. The Other Language student must opt for Tamil paper as NME

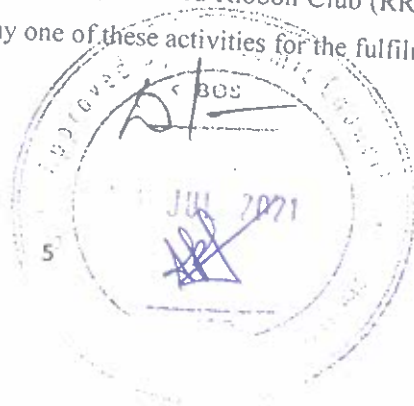
Value Based Courses (VBC): Courses of cross-cutting issues relevant to the current pressing concerns both nationally and internationally such as gender, environment and sustainability, human values and professional ethics, development of creative and divergent competencies.

Skill Based Courses (SBC): The courses offered as skill - based courses under Part IV of the programme is aimed at imparting Advanced Skill of the programme. This comprises of four courses from 3rd to 6th semesters. Massive

Open Online Courses (MOOC): According to the guidelines of UGC, the students are encouraged to avail this option of enriching by enrolling themselves in the MOOC provided by various portals such as SWAYAM, NPTEL, Coursera, etc. As per University Grants Commission (UGC) notification published in the gazette of India about UGC (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016 on 19th July 2016, The Massive Open Online Course (MOOC) through online portal is compulsory. The institute is transferring the equivalent credit earned through SWAYAM on receipt of MOOCs completion certificate and it shall incorporate these marks/credits in the overall mark sheet of the student.

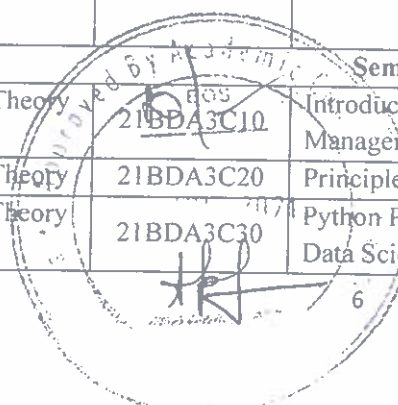
Professional English: The Professional Communication Skills Course is intended to help Learners in Arts and Science colleges. Develop their competence in the use of English with particular reference to the workplace situation. Enhance the creativity of the students, which will enable them to think of innovative ways to solve issues in the workplace. Develop their competence and competitiveness and thereby improve their employability skills. Help students with a research bent of mind develop their skills in writing reports and research proposals.

Part – V: Extension Activities: Students shall be actively participated in the extension activities such as National Service Scheme (NSS), Youth Red Cross (YRC), Sports, and Red Ribbon Club (RRC). The extension activities are must for each student to take part in at-least in any one of these activities for the fulfilment of the degree.



Scheme of Examination (Student admitted from 2021-22 onwards)

Semester I									
Part	Course Type	Course Code	Name of the course	Hr	CIA	Ext	Tot	Cr	
I	Language-1	Theory	21TAMIL10 21MAL1L10 21HIN1L10 21FRE1L10	Language-I (Tamil/Malayalam/Hindi/French)	6	50	50	100	3
II	English	Theory	21GEN1L10	Communicative English- I	6	50	50	100	3
III	Core 1	Theory	21BCAGCA0	Digital Fundamentals and Computer Organization	4	50	50	100	4
III	Core 2	Theory	21BDA1C10	Introduction to C Programming	4	50	50	100	4
III	Core 3	Practical	21BCT1C30	Programming In C Lab	3	50	50	100	2
III	Allied 1	Theory	21BMAGAR1	Vector Calculus & Analytical Geometry Of 3-Dimension	5	50	50	100	4
IV	VBC1	Theory	18DHE1V10	Value Education-I Environment Science	2	50	-	50	2
IV	ECC	Theory	21GEN1Z10	Professional English for physical sciences – I	4*	50*	50*	100*	4*
				Total for Semester – I	30 + 4*	-	-	650+ 100*	22+4*
Semester II									
I	Language - 2	Theory	21TAM2L20 21MAL2L20 21HIN2L20 21FRE2L20	Language-II(Tamil/Malayalam/Hindi/French)	6	50	50	100	3
II	English	Theory	21GEN2L20	Communicative EnglishII	6	50	50	100	3
III	Core 4	Theory	21BCS2C10	Data Structures and Algorithms	4	50	50	100	4
III	Core 5	Theory	21BDA2C20	Object Oriented Programming with Java	4	50	50	100	4
III	Core 6	Practical	21BDA2C30	Object Oriented Programming Lab	3	50	50	100	2
III	Allied 2	Theory	21BMAGA00	Introduction to Linear algebra	5	50	50	100	4
IV	VBC 2	Theory	18DHE2V20	Value Education – 2Value Education And Human Rights	2	50	-	50	2
IV	ECC	Theory	21GEN2Z10	Professional English for Physical Sciences II	4*	50	50	100*	4*
				Total for Semester – II	30 +4 *	-	-	650 +100 *	22+4*
Semester III									
III	Core 7	Theory	21BDA3C10	Introduction to Database Management System	5	50	50	100	5
III	Core 8	Theory	21BDA3C20	Principles of Data Science	5	50	50	100	5
III	Core 9	Theory	21BDA3C30	Python Programming for Data Science	4	50	50	100	3



III	Core 10	Practical	21BDA3C40	Database Management System Lab	5	50	50	100	4
III	Allied 3	Theory	22BMAGAM0	Fundamentals of Statistics	5	50	50	100	4
IV	SBC1	Practical	21BDA3S10	Python Programming Lab	4	30	45	75	2
IV	NME1	Theory	-	NME Course -I	2		50	50	2
Total for Semester – III					30			625	25
Semester IV									
III	Core 11	Theory	22BDA4C10	Exploratory Data Analysis	4	50	50	100	5
III	Core 12	Theory	21BDA4C20	R Programming	5	50	50	100	4
III	Core 13	Practical	21BDA4C30	R Programming Lab	5	50	50	100	4
III	Core 14	Theory	21BDA4C40	Data Mining and visualization	5	50	50	100	4
III	Allied 4	Theory	22BDA4A10	Introduction to Artificial Intelligence & Machine Learning	5	50	50	100	4
IV	SBC2	Practical	21BDA4S20	Data Mining and visualization Lab	4	30	45	75	2
IV	NME2	Theory	-	NME Course – 2	2		50	50	2
Total for Semester – IV					30			625	25
Semester V									
III	Core 15	Theory	21BDA5C10	Business Analytics	6	50	50	100	5
III	Core 16	Theory	21BDA5C20	Big Data Analytics	6	50	50	100	5
III	Core 17	Practical	21BDA5C30	Big Data Analytics Lab	5	50	50	100	3
III	Core 18	Project	21BDA5C40	Mini Project work Lab	4	50	50	100	2
III	CE1	Theory	-	Core Elective – I	5	50	50	100	5
IV	SBC3	Practical	21BDA5S30	Spreadsheet computation Lab	4	30	45	75	2
V	EAC		21ETN5X10	Extension Activity – National Service Scheme/ Sports	Gr ade	-			
Total for Semester – V					30			575	22
Semester VI									
III	Core 19	Theory	21BDA6C10	MapReduce Programming	5	50	50	100	4
III	Core 20	Practical	21BDA6C20	MapReduce programming Lab	6	50	50	100	4
III	Core 21	Theory	22BDA6C30	Main Project Work Lab	4	50	50	100	4
III	CF2	Theory	-	Core Elective – II	5	50	50	100	5
III	CE3	Theory	-	Core Elective – III	5	50	50	100	5
IV	SBC4	Theory	21BDA6S40	Cloud and Data Security	4	30	45	75	2
Total for Semester – VI					30			575	24
Total					180	+8*		3700	140+4*

Ins.Hrs : Instructional Hours

#Extra credit courses offered outside the regular hours

**Note: ** As per UGC guidelines SWAYAM Courses are made compulsory for students of B.Sc(Data Science and Analytics) programme admitted during 2020 – 21 onwards. Every student has to compulsorily complete 2SWAYAM courses and earn 4 credits (2 Credits per course) to become eligible for the award of degree. Credits will appear in the consolidated mark sheet only.

*Note: *As per TANSICHE norms, Professional English for Physical Sciences I and II are made compulsory for students of B.Sc(IT) programme admitted during 2020 – 21 onwards and earn 8 credits (4 Credits per

course) to become eligible for the award of degree.

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	21TAM1L10	Tamil – I
2	I	Theory	21HIN1L10	Hindi – I
3	I	Theory	21MAL1L10	Malayalam – I
4	I	Theory	21FRE1L10	French – I
5	II	Theory	21TAM2L20	Tamil – II
6	II	Theory	21HIN2L20	Hindi – II
7	II	Theory	21MAL2L20	Malayalam – II
8	II	Theory	21FRE2L20	French – II

List of Allied Courses (CBCS)

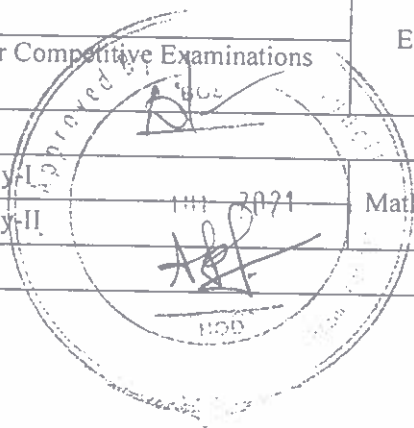
S.No.	Semester	Type of course	Course Code	Course Name
Allied – I				
1	I	Theory	21BMAGAP01	Vector Calculus & Analytical Geometry Of 3-Dimension
Allied – II				
1	II	Theory	21BMAGA000	Introduction to Linear algebra
Allied – III				
1	III	Theory	22BMAGAM0	Fundamentals of Statistics
Allied – IV				
1	IV	Theory	22BDA4A10	Introduction to Artificial Intelligence & Machine Learning

List of Value Based Courses

S.No.	Semester	Course Code	Course Name
1	I	18DHE1V10	Environmental Sciences
2	II	18DHE2V20	Value Education and Human Rights

List of Non – Major Electives (NME) offered

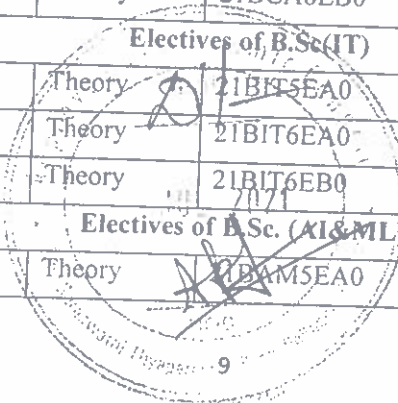
S. No.	Semester	Type of course	Course Code	Course Name	Offering Department
1	III	Theory	18TAM3N10	Basic Tamil – I	Tamil
2	III	Theory	18TAM3N20	Advanced Tamil – I	
3	IV	Theory	18TAM4N30	Basic Tamil II	
4	IV	Theory	18TAM4N40	Advanced Tamil II	
5	III	Theory	19BEN3N10	Basic English for Competitive Examinations – I	English
6	IV	Theory	19BEN4N20	Basic English for Competitive Examinations II	
7	III	Theory	19BMA3N10	Numerical Ability-I	Mathematics
8	IV	Theory	19BMA4N20	Numerical Ability-II	



9	III	Theory	19BPH3N10	Physics of Sports	Physics
10	IV	Theory	19BPH4N20	Physics of Music	
11	III	Theory	19BCH3N10	Chemistry for everyday life -1	Chemistry
12	IV	Theory	19BCH4N20	Chemistry for everyday life -2	
13	III	Theory	19BSY3N10	Psychology Life Skills-I	Psychology
14	IV	Theory	19BSY4N20	Psychology Life Skills-II	
15	III	Theory	19BCM3N10	Practical Banking	Commerce
16	IV	Theory	19BCM4N20	Capital Market	
19	III	Theory	19BBA3N10	Customer Relationship Management	Management
20	IV	Theory	19BBA4N10	Rural Marketing	
21	III	Practical	19BCS3N10	Excel Communications and Slide Logic	Computer Science
22	IV	Practical	19BCS4N20	Web Design for Non-Designers	
23	III	Theory	19BFS3N10	Risk & Threat Management	DCFS
24	IV	Theory	19BFS4N20	Forensics Auditing	

List of Core Elective Courses (CBCS)

S.No.	Semester	Elective	Type of course	Course Code	Course Name
Electives of B.Sc (CS)					
1	V	I	Theory	21BCS5EA0	Object Oriented System Development
2	V	I	Theory	21BCS5EB0	Mobile computing and WAP
3	VI	II	Theory	21BCS6EA0	Software Testing and Software Quality Assurance
4	VI	II	Theory	21BCS6EB0	Network Protocols
5	VI	III	Theory	21BCS6EC0	Software Project Management
6	VI	III	Theory	21BCS6ED0	Network Security
Electives of BCA					
1	V	I	Theory	21BCA5EA0	E- Commerce and M-Commerce
2	VI	II	Theory	21BCA6EA0	Business Intelligence
3	VI	III	Theory	21BCA6EB0	Cloud Computing
Electives of B.Sc(IT)					
1	V	I	Theory	21BIT5EA0	Data Mining & Data Warehousing
2	VI	II	Theory	21BIT6EA0	Big Data Analytics
3	VI	III	Theory	21BIT6EB0	Internet of Things
Electives of B.Sc. (AI&ML)					
1	V	I	Theory	21BAM5EA0	Robotics and its Applications



2	VI	II	Theory	21BAM6EA0	Mobile Application Development
3	VI	III	Theory	21BAM6EB0	Embedded Systems
Electives of B.Sc. (DSA)					
1	V	I	Theory	21BDA5EA0	Social Media Analytics
2	VI	II	Theory	21BDA6EA0	Web Analytics
3	VI	III	Theory	21BDA6EB0	Information Retrieval

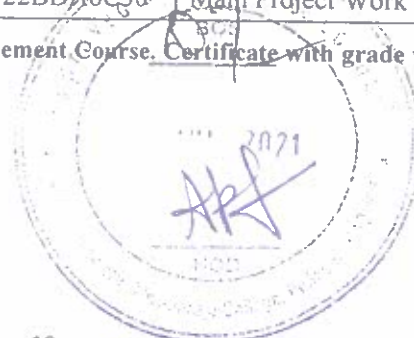
List of Skill Based Courses

S.No.	Semester	Type of course	Course Code	Course Name
1	III	Practical	21BDA3S10	Python Programming Lab
2	IV	Practical	21BDA4S20	Data Mining and visualization Lab
3	V	Practical	21BDA5S30	Spreadsheet computation Lab
4	VI	Theory	21BDA6S40	Cloud and Data Security

List of Core Courses

S.No.	Semester	Core	Type of course	Course Code	Course Name
1	I	Core 1	Theory	21BCAGCA0	Digital Fundamentals and Computer Organization
2	I	Core 2	Theory	21BDA1C10	Introduction to C Programming
3	I	Core 3	Practical	21BCT1C30	Programming In C Lab
4	II	Core 4	Theory	21BCS2C10	Data Structures and Algorithms
5	II	Core 5	Theory	21BDA2C20	Object Oriented Programming with Java
6	II	Core 6	Practical	21BDA2C30	Object Oriented Programming Lab
7	III	Core7	Theory	21BDA3C10	Introduction to Database Management System
8	III	Core8	Theory	21BDA3C20	Principles of Data Science
9	III	Core9	Theory	21BDA3C30	Python Programming for Data Science
10	III	Core10	Practical	21BDA3C40	Database Management System Lab
11	IV	Core11	Theory	22BDA4C10	Exploratory Data Analysis
12	IV	Core12	Theory	21BDA4C20	R Programming
13	IV	Core13	Practical	21BDA4C30	R Programming Lab
14	IV	Core14	Theory	21BDA4C40	Data Mining and Visualization
15	V	Core15	Theory	21BDA5C10	Business Analytics
16	V	Core16	Theory	21BDA5C20	Big Data Analytics
17	V	Core17	Practical	21BDA5C30	Big Data Analytics Lab
18	V	Core18	Project	21BDA5C40	Mini Project Work Lab
19	VI	Core19	Theory	21BDA6C10	MapReduce Programming
20	VI	Core20	Practical	21BDA6C20	MapReduce programming Lab
21	VI	Core 21	Theory	22BDA6C30	Main Project Work Lab

The Course "Yoga" is offered as Capability Enhancement Course. Certificate with grade will be awarded according to the marks obtained



SEMESTER – I

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21TAMIL10	Tamil	Part I Tamil Paper I	60	-	-	3
<p>Preamble: தமிழ் இலக்கியத்தில் உள்ள நேரடித்தன்மை, நிகழ்கால சமூக அசைவுகள், மொழிநடை ஆகியவற்றை மாணவர்கள் எளிதில் விளங்கிக் கொள்ளும் வகையில் முதல் பருவத்துக்கான பாடங்கள் தெரிவு செய்யப்பட்டுள்ளன. இன்றைய இலக்கியங்கள் தரும் படைப்பனுபவத்தின் நீட்சியாகப் பொதுக்கட்டுரைகள், கடிதம், கவிதை, சிறுகதை படைப்பதற்கான பயிற்சிகளையும் தமிழ்ப்பாடம் வழங்குகிறது.</p>						
<p>Prerequisite:</p> <ul style="list-style-type: none"> மேனிலைப்பள்ளி முடிய கற்றவற்றைப் பகுத்துத் தொகுத்து ஆராயும் போக்கில் பாடத்திட்டம் அமைக்கப்பட்டுள்ளது. மாநிடமதிப்புகளை உணரும் வகையிலும், போட்டித்தேர்வுகளை எதிர்கொள்ளும் நிலையிலும் □ தமிழ் □ - பகுதி - ஐ அமைக்கப்பட்டுள்ளது. பிழையின்றிப் பேச, எழுத ஆராயும் முயற்சிக்குப் பயிற்சி தரப்படுகிறது. 						
<p>Course Outcomes (COs)</p> <p>On successful completion of this course the students will be able to:</p>						
CO Number	Course Outcome (CO) Statement					Blooms Taxonomy Knowledge Level
CO1	இக்கால இலக்கியங்களின் பயன்களை அறிவித்தலின் வெளிப்பாடாக கவிதைப் பரிமாணங்கள், படைப்புகள் குறித்த அடிப்படைச் செய்திகளை உணர்ந்து கொள்ளுதல்.					K1
CO2	தமிழர்களின் பண்பாட்டுக் கூறுகளையும் பின்னணியையும் வெளிப்படுத்தும் விதமாகச் சிறுகதைகள், புதினம் சார்ந்த கருத்துகளைப் புரியவைத்தல்.					K2
CO3	நடைமுறையில் தமிழைப் பிழையின்றி எழுத உதவுதல், கவிதை, கடிதம், கதை எழுதும் திறமையை வளர்த்தல்.					K3

Mapping the Programme Outcomes

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M			S	S			
CO2	S	S	M			S	S			
CO3	S	S	S			M	S			

S- Strong; L- Low; M-Medium



Unit	Course contents	Hours	e-Resources/ e-Content	
I	அலகு ஐ கவிதைகள்	15	YouTube Videos & PPT	
	பாரதியார்			பொய்யோமெய்யோ - நிற்பதுவேநடப்பதுவே
	பாரதிதாசன்			மாண்டவன் மீண்டான் - ஆற்றோரம் தழைமரங்கள்
	நாமக்கல் கவிஞர்			கண்டிலேன் - ஐயம் இல்லைதெய்வம்
	வாணிதாசன்			மாலை <input type="checkbox"/> அங்கு இங்குமாய் சிதறிய
	கண்ணதாசன்			தத்துவப்பாடல் - பரமசிவன் கழுத்திலிருந்து
	நா.காமராசன்			சரித்திரகர்ப்பம் - அம்மா இருட்டுக்குள்
	மேத்தா			வெளிச்சம் வெளியே இல்லை <input type="checkbox"/> வீட்டுக்குவெளியே
	அப்துல் ரகுமான்			சுயப்பிரசவம் - தெரிந்துகொள்
	சிற்பி			பெல்ஜியம் கண்ணாடி <input type="checkbox"/> மரச்சட்ட தங்கரேக்குகள்
	இளம்பிறை			அறுவடைக்காலம் - அல்லும்பகலும்
	விஜயலட்சுமி			அற்புத ரகசியங்கள் - எந்தப்பாடலும்
கல்பனா	பறத்தல் அதன் சுதந்திரம் - ஓடி ஓடித் திரிந்து			
ஹைக்கூ கவிதைகள்	கிழிந்தது சேலை <input type="checkbox"/> என்.டி.ராஜ்குமார் விடுமுறையேவேண்டாம் - சீனு,தமிழ்நெஞ்சன் புதுச்செருப்பு <input type="checkbox"/> தோழன் மஞ்சள் பூசி <input type="checkbox"/> புதுவை தமிழ்நெஞ்சன் ஐயனார் கை <input type="checkbox"/> மணிசண்முகம்			
II	அலகு ஐஐ சிறுகதைகள்	15	PPT	
	புதுமைப்பித்தன்			சங்குத்தேவனின் தர்மம்
	சு.அழகிரிசாமி			பித்தளை வளையல்
	வ.ரா.			கோட்டைவீடு
	ஜெயகாந்தன்			இரண்டு குழந்தைகள்
	பிரபஞ்சன்			அப்பாவின் வேஷ்டி
	தனுஷ்கோடி ராமசாமி			தீம் தரிகிட
	ஆதவன்			கனவுக்குமிழி
தமயந்தி	பஞ்சாயத்து			
III	அலகு ஐஐஐ புதினம் திலகவதி கல்மரம்	10	PPT	
IV	அலகு ஐஏ இலக்கிய வரலாறு 1. கவிதை இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் 2. சிறுகதையின் தோற்றமும் வளர்ச்சியும் 3. புதினத்தின் தோற்றமும் வளர்ச்சியும்	10	PPT	
V	அலகுஏ இலக்கணம் பயிற்சிஅளித்தல் - மொழித்திறன் வளர்த்தல் 1. எழுத்துமாற்றத்தால் ஏற்படும் பிழைகள் 2. வல்லினம் மிகும்,மிகா இடங்கள் 3. மெல்லெழுத்துமிகும் இடங்கள் 4. வாக்கியங்களில் ஏற்படும் பிழைகள் 5. இலக்கணக் குறிப்பு 6. சரியானசொற்களைக் கண்டறிதல் கவிதைஎழுதுதல்,கடிதம்,விண்ணப்பம் வரைதல்.	10	YouTube Videos& PPT	
Total		60		
<p>வந்நவ டிழமு(எ):பாட நூல்கள்</p> <p>1. கவிதை,சிறுகதைத் திரட்டு - தமிழ்த்துறைவெளியீடு, ஸ்ரீ சரஸ்வதியாகராஜா கல்வாடி, 2021 ஜூன் பதிப்பு.</p> <p>2. பன்முகநோக்கில் தமிழ் இலக்கியவரலாறு - முனைவர் கா. வாசுதேவன், தேவன் பதிப்பகம், 16.43,திருநகர்,திருவாணைக்கோவில், திருச்சிராப்பள்ளி - 620 005</p>				

பன்னிரெண்டாம் பதிப்பு - 2017.

3. தமிழ் இலக்கியவரலாறு
சாகித்யஅகாடமிவெளியீடு,புதுதில்லி.
மறுபதிப்பு - 2012.

- மு. வரதராசன்

Reference Book(s):

- 1.கொங்குதேர் வாழ்க்கை - இ. இராஜமார்த்தாண்டன்
யுனெடெட் ரைட்டர்ஸ்,
67 - பீட்டர்ஸ் சாலை,
இராயப்பேட்டை,சென்னை -14.
முதல் பதிப்பு □ 2003
- 2.சிறுகதை,பின் தோற்றமும் வளர்ச்சியும் - சி.டி.சிவபாதசுந்தரம்,
க்ரியாபதிப்பகம்,
சென்னை,
முதல் பதிப்பு - 1989.
- 3.தமிழில் சிறுகதைபிறக்கிறது - சி.சு.செல்லப்பா,
காலச்சுவடுபதிப்பகம்,
நாகர்கோவில்,
பதிப்பு-2007
4. தமிழில் தவறின்றிஎழுத,பேச,
கற்க! - நல்லாமுர் முனைவர் கோ.பெரியண்ணன்
முத்தமிழ் பதிப்பகம்
9 எ மேகமில்லன் காலனி
நங்கைநல்லூர்,சென்னை □ 61.
பதிப்பு -2006.
- 5.தமிழ் நாவல் நூறாண்டுவரலாறும் - பெ.கோ. சுந்தரராஜன்(சி.டி),சோ. சிவபாதசுந்தரம்
வளர்ச்சியும் கிறிஸ்தவ இலக்கியசங்கம்,
அஞ்சல் பெட்டிஎண். 501,பார்க் டவுன்,சென்னை- 600 003.

Focus of Course:இக்கால இலக்கியங்களின் வகைமைகளைஎடுத்துக்காட்டும் விதத்தில் பாடத்திட்டம் அமைக்கப்பட்டுள்ளன.
பிழையின்றிப் பேச,எழுதப் பயிற்சிவழங்கப்படுகிறது. கடிதம்,கதை,கவிதைஎழுதுதலுக்குப் பயன்படும் வகையில்
பயிற்சிதரப்பட்டுள்ளது.

Course Designer: Dr. K.Ramganes, For Sr. Lecturer

Assistant Professor, Dept. of Tamil, STC

For Sr. Lecturer
BoS Chairman



SEMESTER – I

HINDI PAPER - I

Course Code:21HIN1L10

PARTIHINDI PAPER I		
UnitNo.		HOURS
I	PROSE:NUTHANGADYASANGRAH	18
	Lesson1 – BharathiyaSanskurthi -	
	Dr.RajendraPrsadLesson3 –Razia -RamavikshaBenipuri	
	Lesson4 –Makreal -Yespal	
	Lesson5 – BahthaPani Nirmala -‘AGEYA’	
	Lesson6–RashtrapithaMahathmaGandhi -Mukthibodh	
II	NONDETAILEDTEXTSHORTSTORIES:KAHANIKUNJ	18
	1. Pareksha –Premchand	
	2. Mamtha -JayashankarPrasad	
	3. Apnaparaya -Jaynendrakumar	
	4. Admika bachcha -Yespal	
	5. Bolaramkajeev -HarishankarParsayi	
6. Vapasi -MannuBhandari		
III	GRAMMAR :SHABDHAVICHARONLY (NOUN,PRONOUN,ADJECTIVE, VERB,TENSE, CASE ENDINGS)Theoretical &Applied.	14
IV	TRANSLATION:English–Hindionly. ANUVADHABHYAS –III(1-15lessonsonly)	12
V	COMPREHENSION: 1Passagefrom ANUVADHABHYAS–III(16-30)	10
	TOTAL	72



Text Book

Nuthangadyasangrah, 2009, editor: Jayaprakash, publisher: Sumitraprakashansumitravas, 16/4, Hastings road, Allahabad – 211001.

Kahani kunj, 2011, Editor : V.P. Amithab. Publisher : Govind Prakashan Sadhar Bagaar, Mathura, Uttar Pradesh, – 281 001

Bolchal Ki Hindi Aur Sanchar, 2015, Dr. Madhu Dhavan Vani Prakashan, New Delhi.

Reference Book

Naveen Hindi Vyakaran, 2002, Dakshin Bharath Hindi Prachar Sabha, Chennai- 600 017

WebLink

https://hi.wikipedia.org/wiki/https://en.wikipedia.org/wiki/Pre_mchandhttp://hindigrammar.in/



SEMESTER – I

MALAYALAM PAPER – I

Course Code: 21MAL1L10

UnitNo.	PARTI MALAYALAMPAPERI	HOURS
I	Novel-PathummayudeAadu-VaikamMuhammed Basheerr	18
II	Novel--PathummayudeAadu -VaikamMuhammedBasheerr	18
III	ShortStory-EntePriyappetaKadhakal –Akbar Kakkattil)	14
IV	ShortStory-EntePriyappetaKadhakal –Akbar Kakkattil)	12
V	Composition&Translation(EnglishtoMalayalam)	10
	TOTAL	72

TextBooks:

1. Novel-PathummayudeAadu-VaikamMuhammedBasheer(D.C.Books,Kottayam,Kerala)
2. Short Story -EntePriyappetaKadhakal – Akbar Kakkattil)(D.C.Books, Kottayam,Kerala)
3. Expansionofideas,General Eassayand Translation.(Asimplepassage)



ReferenceBooks:

- 1.MalayalaNovelSahithyaCharitram-K.M.Tharakan(N.B.S.Kottayam)
- 2.Chelukatha Innale Innu-M.Achuyuthan (D.C Books, Kottayam)
- 3.SahithyaCharitramPrasthanangalilude-Dr.K.M George,
(D.C.BooksKottayam)
- 4.MalayalaSahithyavimarsam-SukumarAzheekode(D.C.books)

**SEMESTER – I
FRENCH PAPER – I**

Course Code: 21FRE1L10

Part1 -French1	
UnitNo.	Topics
1	Etape0
	Etape 1(Lecons 1 -3)
2	Etape 2(Lecons 1 -3)
3	Etape3 -Leçons 1 -2
4	Etape3 –Leçon3
	Etape4 –Leçon1
5	Etape4 –Leçons 2 –3
Etapes 0to4,Pages 11to62	

Text Book Prescribed: Adomania 1 – Methode de francais Authors: Céline Himber, Corina Brillant, Sophie Erlich Publisher: HACHETTE FLE

Available at: GOYAL Publishers and Distributors Pvt Ltd, New Delhi (9810322459)

Reference: Latitudes 1

Author: Yves Loiseau, Régine Merieux Publisher: French and European Publications Inc

Available at: GOYAL publishers and distributors Pvt Ltd, New Delhi (9810322459)

SWAYAM : https://swayam.gov.in/nd2_cec19_lg04/preview

by Prof. Nirupama Rastogi (Retd) English and Foreign Languages University, Hyderabad



SEMESTER - I

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21GEN1L10	Communicative English-I	Language	70	5	-	3
Preamble: This course aims to provide a better understanding on the various aspects of communicative skills through a keen focus on LSRW.						
Prerequisite: Basic knowledge in Communicative English and Skills						
Unit	Course Contents					Hours
I	1. Listening and Speaking a. Listening and responding to complaints (formal situation) b. Listening to problems and offering solutions (informal) 2. Reading and writing a. Reading aloud (brief motivational anecdotes) b. Writing a paragraph on a proverbial expression/motivational idea. 3. Word Power/Vocabulary a. Synonyms & Antonyms 4. Grammar in Context • Adverbs Prepositions					15
II	1. Listening and Speaking: a. Listening to famous speeches and poems b. Making short speeches- Formal: welcome speech and vote of thanks. Informal occasions- Farewell party, graduation speech 2. Reading and Writing: a. Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic) b. Reading poetry b .i. Reading aloud: (Intonation and Voice Modulation) b .ii. Identifying and using figures of speech - simile, metaphor, personification etc. 3. Word Power : a. Idioms & Phrases 4. Grammar in Context: Conjunctions and Interjections					15
III	1. Listening and Speaking a. Listening to Ted talks b. Making short presentations – Formal presentation with PPT, analytical presentation of graphs and 3 reports of multiple kinds c. Interactions during and after the presentations 2. Reading and writing a. Writing emails of complaint b. Reading aloud famous speeches 3. Word Power a. One Word Substitution 4. Grammar in Context: Sentence Patterns					15
IV	1. Listening and Speaking a. Participating in a meeting: face to face and online b. Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks. 2. Reading and Writing a. Reading visual texts – advertisements b. Preparing first drafts of short assignments 3. Word Power a. Denotation and Connotation 4. Grammar in Context: Sentence Types					15
V	1. Listening and Speaking a. Informal interview for feature writing b. Listening and responding to questions at a formal interview 2. Reading and Writing a. Writing letters of application b. Readers' Theatre (Script Reading) c. Dramatizing everyday situations/social issues through skits. (writing scripts and performing) 3. Word Power a. Collocation 4. Grammar in Context: Working With Clauses					15
Total						



Text Book: Communicative English Text Book		
Reference Book(s): a. Books by Penny Ur b. The Oxford English-English-Tamil dictionary (for pronunciation) c. https://www.esolcourses.com/ d. For Readers' Theatre: https://www.youtube.com/watch?v=JaLQJt8orSw&t=469s (the link to the performance; refer scripts by Aaron Shepherd)		
Focus of the Course: Skill Development		
Course Designer TANSCHÉ		
BoS Chairman		
Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Gain mastery in LSRW Skills	K1
CO2	Understand the fundamentals of grammar	K1
CO3	Apply LSRW skills and practice it	K3
CO4	Comprehend the nuances of English Language	K3

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	S	S	S	S	M
CO2	M	S	S	M	M	S	M	S	L	M
CO3	M	S	S	S	L	S	M	S	S	S
CO4	M	S	S	M	M	S	M	S	S	M

S – Strong; L – Low; M – Medium



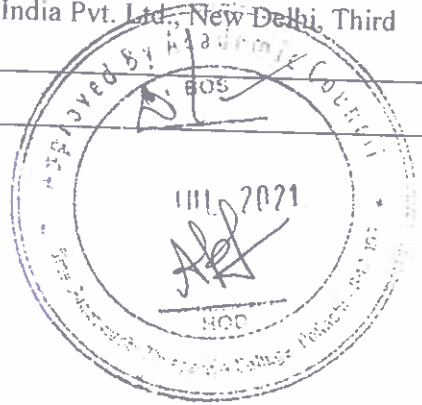
SEMESTER – I


Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BCAGCA0	Core 1	Digital Fundamentals and Computer Organization (Common to B.Sc (CS), B.Sc (IT), BCA, B.Sc (DSA))	Concept	45	5	-	4
<p>Preamble : To make the students to understand the basic concepts of number theory, Boolean algebra, combinational and sequential circuits and to acquire the knowledge on the principles of computer organization</p>							
<p>Prerequisite: Knowledge in Number Systems and Fundamental Electronics</p>							
<p>Syllabus:</p>							

Unit	Course Contents	Hours
I	Binary Systems: Digital Computers and Digital Systems – Binary Numbers – Number Base Conversion – Octal and Hexadecimal Numbers – Complements: 1’s Complements and 2’s Complements. 9’s Complements and 10’s Complements. Boolean algebra and Logic Gates: Boolean Function – Canonical and Standard Forms: Minterms – Maxterms– Digital Logic Gates.	13
II	Simplification of Boolean Functions: The Map Method – Two Variables Maps – Three Variables Maps – Four Variables Maps – Product of Sums Simplification – Don’t Care Conditions. Combinational Logic: Introduction – Design Procedure – Adders-Full Adder-Half Adder.	10
III	Combinational Logic with MSI and LSI:– Decoders – Encoders – Multiplexers– Demultiplexer. Sequential Logic: Introduction – Flip Flops – Basic Flip Flop Circuit – D Flip Flop – JK Flip Flop – T Flip Flop.	9
IV	Central Processing Unit: Introduction – General Register Organization – Instruction Formats. Input and Output Organization: Peripheral Device – ASCII Alpha Numeric Characters – Input and Output Interface – I/O Bus and Interface Modules – I/O versus Memory Bus – Isolated versus Memory Mapped I/O – Modes of transfer.	9
V	Memory Organization: Memory Hierarchy – Main Memory – RAM and ROM Chips – Memory Address Map – Memory Connection to CPU – Auxiliary Memory – Magnetic Disks – Magnetic Tape – Cache Memory.	9
Total		50

Text Book :
 1. M.Morris Mano – “Digital Logic & Computer Design”, Prentice Hall of India Pvt. Ltd., New Delhi, 2013. (UNIT I, II, III).
 2. M.Morris Mano – “Computer System Architecture”, Prentice Hall of India Pvt. Ltd., New Delhi, Third Edition, 2013. (UNIT IV, V).

Reference Book :



<ol style="list-style-type: none"> 1. Donald P. Leach, Albert Paul Malvino, Goutam Saha, "Digital Principles & Applications", Tata McGraw Hill, Six Edition, 2008. 2. R.P. Jain, "Modern Digital Electronics", Tata McGraw Hill, Fourth Edition, 2012. 3. Poornachandra.S, "Digital Computer Fundamentals", Tata McGraw Hill, First Edition, 2009. <p>William Stallings, "Computer Organization and Architecture", Pearson Education, Eighth Edition, 2010.</p>	
Focus of Course :- Employability	
e-Resources/e-Content URL : <ol style="list-style-type: none"> 1. You Tube: https://www.allaboutcircuits.com/video-lectures/jk-flip-flop 2. You Tube: https://www.coursera.org/learn/introduction-embedded-systems/lecture/Wx9oI/1-introduction-to-memory-organization 	
Course Designer: Ms. C.Akila HOD Dept of IT	 BOS - Chairman Ms.D.Geetha HOD Dept of BCA

CO Number	Course Outcome(CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Define number systems with digital circuits and basic computer organization	K1
CO2	Outline the map method for circuit design.	K2
CO3	Summarizes the digital components – Combinational and sequential circuits.	K2
CO4	Make use of the concept of Boolean Algebra, Circuits, Processors and Memory Management	K3

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes:

COs / POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	M	M	M	M	L	M	M	M
CO2	L	L	M	M	M	M	L	M	M	M
CO3	L	M	M	M	M	M	M	S	M	M
CO4	L	M	S	M	S	S	M	S	M	S

S – Strong; L – Low; M – Medium



SEMESTER – I

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA1C10	Core 2	Introduction to C Programming	Application	45	5	-	4

Preamble: This course provides the student with strong foundation on programming concepts and its application.

Prerequisite: Mathematical and logical skills.

Syllabus:

Unit	Course contents	Hours
I	Introduction to Programming- Programming Domain -Categories of Programming Languages: Machine Level Languages, Assembly Level Languages, High Level Languages - Programming Design Methodologies: Top Down and Bottom UP-Program Development Cycle. Introduction to C: Structure of a C Program - Programming Rules - The C Character Set - The C Keywords - Identifiers - Constants	9
II	Variables: Rules for Defining Variables - Declaring Variables - Data Types - Type Conversion - Operators. Input and Output in C: Formatted Functions - Unformatted Functions. Decision Statements -The Switch Statement-Looping Statements: For Loops - The While Loop - The Do-While Loop.	11
III	Arrays: Array Initialization - Definition of Array - Characteristic of Array - Two-Dimensional Array - Three or Multi-Dimensional Arrays. Functions: Basics of a function – Function Definition – The return statement - Types of Functions - Call by Value - Call by Reference - Recursion. Strings: Introduction - String Standard Functions.	10
IV	Pointers: Introduction - Features of Pointers – Pointer and Address - Pointer Declaration - Array of Pointers - Pointers to Pointers. Structure and Union: Introduction - Features of Structures - Declaration & Initialization of Structures - Array of Structures - Pointer to Structures - Union - Typedef.	10
V	Files: Introduction - Streams & File Types - Steps for File Operations - File I/O - Structures Read & Write - Other File Functions - Command Line Arguments – Application of Command Line Arguments - Environment Variables - I/O Redirection.	10
Total		50

Text Book(s):

1. Ashok N.Kamthane, Amit Ashok Kamthane, “**Programming in C**”, Pearson India Education Services Pvt, Ltd, Third Edition, 2019.



Reference book(s):

1. Yaeshwant Kanitkar, "Let Us C", BPB publications, New Delhi, 16th Edition, 2018.
2. E. Balagurusamy, "Programming in ANSI C", TMH Publishing Pvt., Ltd., 6th Edition, 2013.
3. Byron S. Gottfried, "Programming with C", TMH Publishing Pvt., Ltd., 3rd Edition, 2013.
4. Paul Deitel, Harvey Deitel, "C How to Program", Pearson India Education Services Pvt, Ltd, 6th Edition, 2010.

Focus of Course: Employability

e-Resource/e-Content URL:

<https://nptel.ac.in/courses/106104128/>

<https://www.udemy.com/c-programming-for-beginners>


Course Designer :
Mr. M. Premkumar
 Dept. of CS


BOS Chairman
Ms. D. Geetha
 HOD Dept of BCA

Course Outcomes (COs)

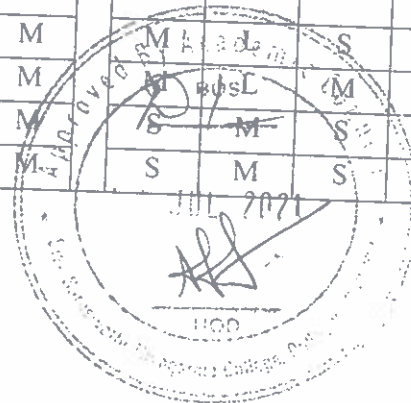
On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Define the structure and fundamental concept of C programming.	K1
CO2	Demonstrate various control statements.	K2
CO3	Construct program using arrays, functions, structures and union.	K3
CO4	Implement pointer and file operations for any given application.	K3

Mapping with Programme Outcomes and Programme Specific Outcomes:

COs / POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	M	M	S	M	M
CO2	L	M	M	M	M	M	M	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S – Strong; L – Low; M – Medium



SEMESTER – I

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BCT1C30	Core 3	Programming In C Lab (Common to B.Sc (CS), B.Sc (IT), BCA, B.Sc (DSA))	Practical	-	5	30	2

Preamble: Students will be able to apply logic which helps to develop programs, applications in C.

Prerequisite: Basic programming skills and logical thinking.

Syllabus:

Ex. No	Course contents	Hours
1	Develop a C Program to find the sum and average of N marks of a student.	2
2	Develop a C program to find the Fibonacci series for a given limit.	3
3	Develop a C program to check whether the given number is prime or not and display the n range of prime numbers.	3
4	Develop a C program to illustrate recursive function.	3
5	Develop a C program to find the number of palindromes in a given sentence.	3
6	Develop a C program to manipulate strings using string functions.	3
7	Develop a C program to swap two integers using pointers.	3
8	Develop a C program using Array of Pointers.	3
9	Develop a C program using the structures.	3
10	Develop a C program using Array of Structures.	3
11	Develop a C program to calculate electricity bill using files.	3
12	Develop a C program to copy the contents of one file to another file using Command Line Arguments.	3
Total		35

Reference Book:

1. Ashok N.Kamthane, Amit Ashok Kamthane, "Programming in C", Pearson India Education Services Pvt, Ltd, Third Edition, 2019.

Recommended Tools to be used: C Editor

Focus of Course: Employability



M.P.S
Course Designer :
Mr. M. Premkumar
 Dept. of CS

D/G
BOS - Chairman
Mrs.D.Geetha
 HOD Dept of BCA

CO Number	Course Outcome(CO)Statement	Blooms Taxonomy Knowledge Level
CO1	Apply the fundamental concepts of C programming & Data Structures	K3
CO2	Implement various control statements	K3
CO3	Develop C programs to implement arrays, function, structures, pointers	K3
CO4	Solve analytical problems using Data Structure programming paradigm	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes:

COs / POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S - Strong; L - Low; M - Medium



SEMESTER I

Course Code	Course Name	Category	Lecture (L)	Tutorial(T)	Practical (P)	Credit
21BMAGAB0	Vector Calculus & Analytical Geometry Of 3-Dimension	Allied	50	10	-	4

Preamble: To teach the student about Vector Differentiation & integration, coplanar lines, skew lines and coincides.

Prerequisite: After the completion of this course the students will gain knowledge about line integral, surface integral, volume integral, to apply properties of spheres, cylinder and cone to solve problems.

SYLLABUS: VECTOR CALCULUS & ANALYTICAL GEOMETRY OF 3-DIMENSION

Unit	Course contents	Instructional hours
I	Vector Differentiation: Vector Point functions, Scalar point functions .Differentiation of vectors - Meaning of dr/dt- Physical applications- Level surfaces – Gradient f, Curl f, and div f - angle between two level surfaces - Equations of normal lines – tangent plane to a level surface- Laplace operator ∇^2 vector identities- Proof- Problems.	12
II	Vector Integration: Line integral, Conservative field, Volume integral, surface integral - Problems –Verifications of Gauss Divergence Theorem, Stokes theorem, and Green's theorem.	12
III	Equation of lines in symmetrical form, non-symmetrical form – conversion to symmetrical form – coplanar lines both in symmetrical form ; one line in SF and the other in NSF - skew lines – shortest distance between skew lines – problems – both lines in SF; one line in SF other in NSF	12
IV	Sphere – equations of sphere in centre – radius form – diameter form – standard equation of sphere – spheres touching a plane – point of contact – length of tangent to a sphere – plane section of a sphere – small circle – great circle – problems – tangent at (x_1, y_1, z_1) to the sphere – problems –tangent planes.	12
V	Cylinder: Definitions equation of cylinder whose generators are parallel to $\frac{x-a}{l} = \frac{y-b}{m} = \frac{z-c}{n}$ and whose guiding curve is $f(x, y, z) = 0$ - problems. Equation of right circular cylinder – bookwork – problems.	12
Total		60
Text Book:		
<ol style="list-style-type: none"> 1. Kandasamy. P, Thilagavathi. K, Mathematics for B.Sc – Branch I Volume IV, S. Chand and Company Ltd, New Delhi, 2004(For Unit – I & II) 2. T.K. M. Pillai and Others, Analytical Geometry of 3D, Viswanathan Publications, 2004 (For Unit – III, IV & V) 		
Reference Book(s):		
<ol style="list-style-type: none"> 1. P. Durai Pandian & others, Analytical Geometry, 2004. 2. N.P. Bali, Solid Geometry, Laxmi Publications (P) Ltd, 2004. 3. M.L. Khanna, Solid Geometry, Jainath & Co Publishers, Meerut, 2004 		
Learning Methods (*):		
Assignment/Seminar/ Self-Study/etc.,		
Focus of Course: Employability		
e-Resource/e-Content URL:		



Course Designer: Prof. K.Sivasamy
Dean Mathematics, STC




BoS Chairman

Course Outcomes (COs)

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

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Find and interpret the gradient curl, divergence for a function at a given point.	K3
CO2	Evaluate integrals by using Green's Theorem, Stokes theorem, Gauss's Theorem.	K3
CO3	Calculate the Shortest distance between two skew lines	K3
CO4	Describe the various forms of equation of a plane, straight line, Sphere, Cone and cylinder	K2
CO5	Find the angle between planes, Bisector planes, Perpendicular distance from a point to a plane, Image of a line on a plane, Intersection of two lines	K1

Mapping the Programme Outcomes (For B.Sc DSA)

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	S	M	S	S	M	S	S	M
CO2	S	S	S	M	S	S	M	M	S	M
CO3	S	S	M	S	S	S	S	M	S	M
CO4	S	S	M	S	M	S	S	M	S	M
CO5	M	M	S	S	M	M	S	S	S	M

S – Strong; L – Low; M – Medium



SEMESTER I

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
18DHE1V10	VBC1	Environmental Studies	-	27	-	-	2

- 1.1. Definition, scope and importance
- 1.2. Need for public awareness
- 1.3. Natural resources

1.3.1. NATURAL RESOURCES AND ASSOCIATED PROBLEMS

6 Instructional Hours

- a. Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- b. Water resources: use and over- utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems
- c. Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d. Food resources: world food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- e. Energy resources: growing energy needs, renewable and non-renewable energy sources, use of alternate sources. case studies.
- f. Land resources: land as a resource, land degradation, man induced landslides, soil erosion and desertification.

1.3.2. Role of an individual in conservation of natural resources.

1.3.3. Equitable use of resources for sustainable lifestyles.

2. ECOSYSTEMS

5 Instructional

Hours

- 2.1 Concept of an ecosystem.
- 2.2 Structure and function of an ecosystem.
- 2.3 Producers, consumers and decomposers.
- 2.4 Energy flow in the ecosystem.
- 2.5 Ecological succession.
- 2.6 Food chains, food webs and ecological pyramids.
- 2.7 Introduction, types, characteristic features, structure and function of the following ecosystem: -
 - a. Forest ecosystem.
 - b. Grassland ecosystem.
 - c. Desert ecosystem.
 - d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

3. BIODIVERSITY AND ITS CONSERVATION

5 Instructional Hours

- 3.1 Introduction – Definition: genetic, species and ecosystem diversity.
- 3.2 Biogeographical classification of India.



- 3.3 Value of biodiversity: consumptive use, productive use, social, ethical. Aesthetic and option values
- 3.4 Biodiversity at global, National and local levels.
- 3.5 India as a mega –diversity nation.
- 3.6 Hot-spots of biodiversity.
- 3.7 Threats to biodiversity: habitat loss, poaching of wildlife man-wildlife conflicts.
- 3.8 Endangered and endemic species of India.
- 3.9 Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

4. ENVIRONMENTAL POLLUTION

5 Instructional Hours

4.1 Definition

Causes, effects and control measures of: -

1. Air pollution
2. Water pollution
3. Soil pollution
4. Noise pollution
5. Thermal pollution

4.2 Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.

4.3 Role of an individual in Prevention of Pollution.

4.4 Pollution Case Studies.

4.5 Disaster Management: Floods, Earthquake, Cyclone and Landslides.

5. SOCIAL ISSUES AND THE ENVIRONMENT

6 Instructional Hours

5.1 Sustainable development

5.2 Urban problems related to energy.

5.3 Water conservation, rainwater harvesting, watershed management.

5.4 Resettlement and rehabilitation of people; its problems and concerns. Case studies.

5.5 Environmental ethics: issues and possible solutions.

5.6 Climate change, global warming, ozone layer, depletion, acid rain, nuclear accidents and holocaust. Case studies

5.7 Consumerism and waste products.

5.8 Environmental protection Act.

5.9 Air (Prevention and Control of Pollution) Act.

5.10 Water (Prevention and Control of Pollution) Act.

5.11 Wildlife Protection Act.

5.12 Forest Conservation Act.

5.13 Issues involved in enforcement of environmental legislation.

5.14 Public awareness.

5.15 Human population and the environment.

5.15.1 Population growth and distribution.

5.15.2 Population explosion – Family Welfare Programme.

5.15.3 Environment and human health.

5.15.4 Human rights.

5.15.5 Value Education.

5.15.6 HIV/ AIDS

5.15.7 Women and Child Welfare



5.15.8 Role of Information Technology in Environment and Human Health
5.15.9 Medical Transcription and Bioinformatics

TEXT BOOKS:

1. Balu V, "Environmental Studies", Sri Venkateshwara Publications, 2004
2. Arumugam N, Kumaresan V, "Environmental Studies", Saras Publication, 2004
3. Rajagopalan R, "Environmental Studies", Oxford University Press, 2005

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	To remember key concepts from environmental studies, political and social studies	K1
CO2	To understand the concepts and methods from renewable and non-renewable sources and their applications in environmental problem solving	K2
CO3	To acquire knowledge on concept of environment issues and links between human and natural system	K3
CO4	To demonstrate the general understanding of the breadth and inter disciplinary nature of environmental issues	K3

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes:

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	S	S	M	S	L	S	S	M	S	S
CO2	S	S	M	S	L	S	S	M	S	S
CO3	S	S	M	S	L	S	S	M	S	S
CO4	S	S	M	S	M	S	S	M	S	M

S – Strong; L – Low; M – Medium

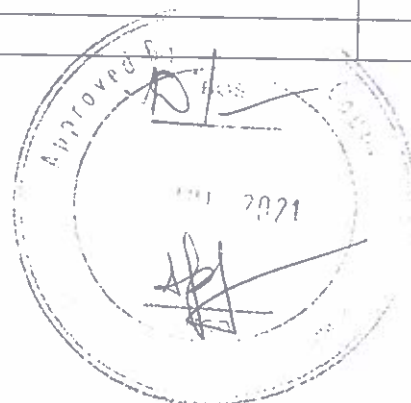


SEMESTER I

Course Code	Course Name	Category	Lecture(L)	Tutorial(T)	Practical(P)	Credit
21GEN1Z10	Professional English for Physical Sciences-I	Language	55	5	-	4
Preamble: The course aims to Develop students' competence in the use of English with particular reference to the workplace situation						
Prerequisite: Basic knowledge in English						

Syllabus:

Unit	Course contents	Instr. Hrs
I	COMMUNICATION Listening: Listening to audio text and answering questions- Listening to Instructions. Speaking: Pair work and small group work. Reading: Comprehension passages –Differentiate between facts and opinion. Writing: Developing a story with pictures. Vocabulary: Register specific - Incorporated into the LSRW tasks	12
II	DESCRIPTION Listening: Listening to process description.-Drawing a flow chart. Speaking: Role play (formal context). Reading: Skimming/Scanning Reading passages on products, equipment and gadgets. Writing: Process Description – Compare and Contrast Paragraph-Sentence Definition and Extended definition-Free Writing. Vocabulary: Register specific -Incorporated into the LSRW tasks.	12
III	NEGOTIATION STRATEGIES Listening: Listening to interviews of specialists / Inventors in fields (Subject specific). Speaking: Brainstorming. (Mind mapping). Small group discussions (Subject- Specific). Reading: Longer Reading text. Writing: Essay Writing (250 words). Vocabulary: Register specific - Incorporated into the LSRW tasks	12
IV	PRESENTATION SKILLS Listening: Listening to lectures. Speaking: Short talks. Reading: Reading Comprehension passages. Writing: Writing Recommendations Interpreting Visuals inputs. Vocabulary: Register specific - Incorporated into the LSRW tasks	12
V	CRITICAL THINKING SKILLS Listening: Listening comprehension- Listening for information. Speaking: Making presentations (with PPT- practice). Reading: Comprehension passages –Note making. Comprehension: Motivational article on Professional Competence, Professional Ethics and Life Skills. Writing: Problem and Solution essay– Creative writing –Summary writing. Vocabulary: Register specific - Incorporated into the LSRW tasks	12
		60



Text Books: Tamil Nadu State Council for Higher Education(TANSICHE)
Reference Books: Tamil Nadu State Council for Higher Education(TANSICHE)
Focus of Course: Employability (Employability/Skill Development)
e-Resource/e-Content URL: Vidya-MitraPortal: http://vidyamidra.inflibnet.ac.in/index.php/search
Course Designer TANSICHE
BoS Chairman Assistant Professor of English

COURSE OUTCOMES:

On successful completion of the course the students will be able to:

CO Number	Course Outcome (CO) Statement	Bloom's Taxonomy Knowledge Level
CO1	Enhance the creativity of the students, which will enable them to think of innovative ways to solve issues in the workplace.	K1
CO2	Develop students' competence and competitiveness and thereby improve their employability skills.	K2
CO3	Attend interviews with boldness and confidence	K3
CO4	Adapt easily into the workplace context, having become communicatively competent	K4
CO5	Apply to the Research and Development organizations / sections in companies and offices with winning proposals	K5

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	S	M	M	S	S	S
CO2	M	M	M	S	S	S	M	S	S	S
CO3	M	M	M	S	S	S	S	S	S	S
CO4	M	S	S	S	S	S	M	S	S	S
CO5	M	S	S	S	S	S	M	S	S	S



SEMESTER – II

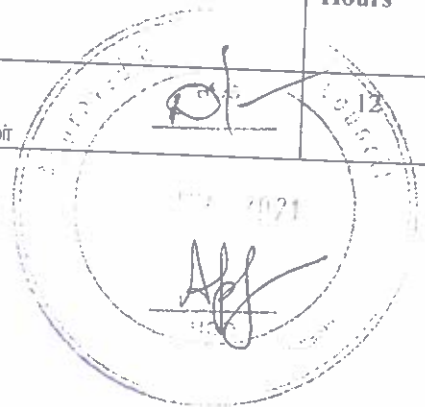
Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21TAM2L20	Tamil	Part I Tamil Paper II	60			3
<p>PPreamble: தொன்மையானதமிழ்ச் சமூகத்தின் பண்பாடுவாயிலாகளடுத்துக் கொள்ளப்படவேண்டியஅம்சங்களைவிளக்குதலையும், வாழ்க்கையைநெறிப்படுத்துவதையும் சமூகநோக்கமாகக் கொண்டிருக்கும் இலக்கியங்களின் வழியேமானிடமதிப்புகளைஅறிந்துகொள்ளும் வகையில் தமிழ்ப்பாடம் அமைக்கப்பட்டுள்ளது. மாணவர்களுக்குப் பயன்பாட்டுநோக்கில் மொழிபெயர்ப்புப் பயிற்சிவைக்கப்பட்டுள்ளது.</p>						
<p>Prerequisite:</p> <p>1. மேனிலைப்பள்ளிமுடியகற்றவற்றைப் பகுத்துதொகுத்துஆராயும் போக்கில் பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.</p> <p>2. மானிடமதிப்புகளைஉணரும் வகையிலும், போட்டித்தேர்வுகளைஎதிர்கொள்ளும் நிலையிலும் <input type="checkbox"/> தமிழ் <input type="checkbox"/> - பகுதி - ஐ அமைக்கப்பட்டுள்ளது.</p> <p>3. பிழையின்றிப் பேச, எழுதஆராயும் முயற்சிக்குப் பயிற்சிதரப்படுகிறது.</p>						
<p>Course Outcomes (COs)</p> <p>On successful completion of this course the students will be able to:</p>						
CO Number	Course Outcome (CO) Statement					Blooms Taxonomy Knowledge Level
CO1	தமிழ்ப்பண்பாடு, சமூகஅமைப்பு, குறிக்கோள் அமைந்த இனவாழ்க்கையைப் பற்றியசெய்திகளைஉணர்ந்துகொள்ளுதல்.					K1
CO2	பக்தி இயக்கம் வளர்ந்தவரலாறு, தமிழ் உரைநடைகாலந்தோறும் மாறிவந்தநிலைஆகியவைசார்ந்தகருத்துகளைப் புரியவைத்தல்.					K2
CO3	நடைமுறையில் தமிழைப் பிழையின்றிஎழுதஉதவுதல். மொழிபெயர்ப்புக் கலை, கதைஎழுதும் திறமையைவளர்த்தல்.					K3

Mapping the Programme Outcomes

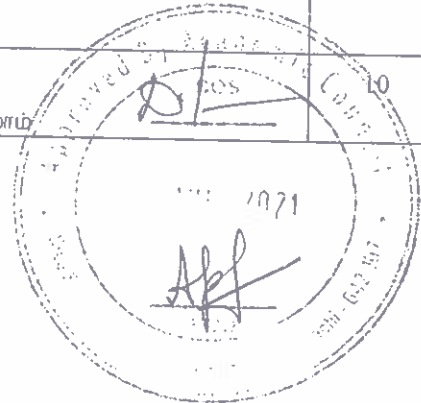
COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M			S	S			
CO2	S	S	M			S	S			
CO3	M	M	S			S	M			

S- Strong; L- Low; M-Medium

Unit	Course contents	Hours	e-Resources/ e-Content
I	<p>அலகு ஐ சங்க இலக்கியம்</p> <p>நற்றிணை - நின்றசொல்லர் (1) <input type="checkbox"/> கபிலர்</p> <p>ஐங்குறுநூறு - அன்னாய் வாழிவேண்டன்னை (203) - கபிலர்</p>	12	YouTube



	<p>மறுவல்தாவிச் சிறுகருங்காக்கை (391) - ஓதலாந்தையார் கலித்தொகை - அரிதாயஅறன்எய்தி (11) - பாலையாடிய பெருங்கடுங்கோ அகநானூறு - கிளியும் பந்தும் கழங்கும் (49) - வண்ணப்பறக்கந்தரத்தனார் சிறுகருபிடவின் வெண்தலை (34) □ மருதனிளநாகனார் புறநானூறு - பல்சான்றிரேபல்சான்றிரே (246) - பெருங்கோப்பெண்டு குழவி இறப்பினும் ஊந்தடிபிறப்பினும் (74) □ சேரமான் கணைக்கால் இரும்பொறை</p>		Videos & PPT
II	<p>அலகு ஐஐ பக்தி இலக்கியங்கள் ருசிறுறிலக்கியங்கள்</p> <p>தேவாரம் - சுந்தரர்</p> <ol style="list-style-type: none"> 1. மேலைவிதியேவினையின் பயனே (419) 2. பிறவாய் இறவாய் பேணாய் மூவாய் (420) 3. பொய்யே உன்னைப் புகழ்வார் புகழ்ந்தால் அடியேன் (421) 4. ஊனைப் பெருக்கி உன்னைநினையாது (422) 5. காதல்செய்துகளித்துப் பிதற்றி (423) <p>திருக்கோவையார் - மாணிக்கவாசகர்</p> <ol style="list-style-type: none"> 1. முனிவரும் மன்னரும் பொன்னான் முடியுமென (332) 2. மூவாநின் நேத்தமுதலவன் ஆடமுப் பத்துமும்மைத் (337) 3. பிரியா ரெனவிகழ்ந் தேன் முன்னம் யான்பின்னைஎற்பிரியின (340) <p>கருவூர்த்தேவர் - தஞ்சைராசராசேச்சரம்</p> <ol style="list-style-type: none"> 1. உலகெலாம் தொழுவந்துஎழுகதிர்ப் பருதி (162) 2. நெற்றியிற் கண்என் கண்ணின்நின் றகலா (163) 3. எவரும்மா மறைகள் எவையும் வானவர்கள் (166) 4. தனிப்பெருந் தாமேமுமுதறப் பிறப்பின் (168) <p>திருமந்திரம் - திருமூலர்</p> <ol style="list-style-type: none"> 1. என்பே விறகாகி இறைச்சிஅறுத்திட்டு (272) 2. தூய்மைஅருள் ஊண் சுருக்கம் பொறை (556) 3. உள்ளத்தும் உள்ளன் புறத்துள்ளன் (1532) 4. தானே தனக்குப் பகைவனும் நடடானும் (2228) 5. அவமும் சிவமும் அறியார் அறியார் (2340) <p>சித்தர் பாடல்கள் - சிவவாக்கியர் (2 பாடல்கள்) பாம்பாட்டிச்சித்தர் (2 பாடல்கள்) இடைக்காட்டுச்சித்தர் (2 பாடல்கள்) கடுவெளிச்சித்தர் (2 பாடல்கள்) அழகணிச்சித்தர் (2 பாடல்கள்) சிறுறிலக்கியங்கள் - தமிழ்விடுதாது □ தமிழ்மொழியின் சிறப்பு, சிவபெருமானின் சிறப்பு (20 வரிகள்)</p> <p>அற்புத்ததிருவந்தாதி - அரனென்கோநான்முகன், இன்றுநமக்கெளிதே,</p> <p>நேரந்தரவங் கொள்ளச், திறத்தான் மடநெஞ்சே, அடிபேறியாதாளம் (5 பாடல்கள்)</p> <p>திருவரங்கக் கலம்பகம் - பெருமானின் அவதாரச் சிறப்பு, புயவகுப்பு (இரண்டாம் பாடல்)</p>	18	YouTube Videos & PPT
III	<p>அலகு ஐஐஐ உரைநடை</p> <ol style="list-style-type: none"> 1. நேரம் கடிக்காரத்தில் இல்லை - வெ. இறையன்பு 2. நான் தோல்வியைத் தழுவிப்போது - ஏ.பி. ஜே. அப்துல்கலாம் 	10	PPT



	3.தமிழகத்தில் இதழியல் வளர்ச்சி <input type="checkbox"/> மா. பா. குருசாமி 4. மனிதனும் சுற்றுச்சூழலும் - பேராசிரியர் ஜே. தர்மராஜ் 5. எதையும் தீர்மானிக்கும் சக்தி <input type="checkbox"/> சி. எஸ்.தேவநாதன்		
IV	அலகு ஐ இலக்கியவரலாறு 1. சங்க இலக்கியத்தின் சிறப்புகள் 2. பக்தி இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் 3. சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும் 4. உரைநடையின் தோற்றமும் வளர்ச்சியும்	10	YouTube Videos & PPT
V	அலகு ஏ இலக்கணம் பயிற்சிஅளித்தல் - மொழித்திறன் வளர்த்தல் - மொழிஆளுமை 1. ஒருமை,பன்மைமயக்கங்கள் 2. வழுவச்சொற்களைநீக்குதல் 3. பிறமொழிச் சொற்களைநீக்குதல் 4. சொற்பிரிப்புபிழைகளைநீக்குதல் 5. ஒலிவேறுபாடுஅறிந்துசரியானபொருள் அறிதல் 6. மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்துதமிழுக்கு) 7. சிறுகதைஎழுதுதல்.	10	YouTube Videos & PPT
Total		60	

Text Book(s): பாட நூல்கள்

1. சங்க,பக்தி இலக்கிய,உரைநடைத்திரட்டு - தமிழ்த்துறைவெளியீடு.
ஸ்ரீ சரஸ்வதிதியாகராஜா கல்லூரி
2021 ஜூன் பதிப்பு

2. தமிழ் இலக்கியவரலாறு - முனைவர் கா. வாகதேவன்
தேவன் பதிப்பகம்.
16 : 43,திருநகர்,திருவானைக்கோவில்.

திருச்சிராப்பள்ளி - 620 005
பன்னிரெண்டாம் பதிப்பு - 2017.

3. தமிழ் இலக்கியவரலாறு - மு. வரதராசன்
சாகித்யஅகாடமிவெளியீடு,புதுதில்லி.
மறுபதிப்பு 2012

Reference Book(s): பார்வை நூல்கள்

1. சங்க இலக்கியத் தொகுப்புகள் - நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
41 - டி.சி.டீகோ இண்டஸ்ட்ரியல் எஸ்டேட்,
அம்பத்தூர்,சென்னை - 600 098
இரண்டாம் பதிப்பு - 2004.

2. பத்தாயிரம் மைல் பயணம் - வெ. இறையன்பு
புதிய தலைமறை பதிப்பகம்,
24, ஜி.என். செட்டி சாலை,
தியாகராயநகர்,சென்னை - 600 017,
ஆறாம்பதிப்பு - 2015.

3. இந்தியக் கலைகள் - பி. கோதண்டராமன்
நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட்,
41 - டி.சி.டீகோ இண்டஸ்ட்ரியல் எஸ்டேட்,
அம்பத்தூர்,சென்னை - 600 098
இரண்டாம் பதிப்பு - 2009.



4. அலைகடலுக்கப்பால் அருந்தமிழ் - முனைவர் ஆ. கார்த்திகேயன்
அகரம், மனை எண்.1,நிர்மலாநகர்
தஞ்சாவூர் - 613 007. முதல் பதிப்பு - 2007.

5. பக்தி இலக்கியம்
நூற்பதிப்புக்கழகம்

- ப. அருணாசலம்

சைவசித்தாந்த

சென்னை - 06,பதிப்பு - 1900.

6. சைவமும் சமணமும்
102 எண் 57 பி.எம்.ஜி.காம்ளெக்ஸ்

- வேலுப்பிள்ளை
எனி இந்தியன் பதிப்பகம்

தெற்கு உஸ்மான் சாலை
தி.நகர்,சென்னை -17,பதிப்பு -1900

7. தமிழில் தவறின்றிஎழுத,பேச
கற்க!
முத்தமிழ் பதிப்பகம்

- நல்லாமூர். முனைவர் கோ. பெரியண்ணன்

9எ மேக்மில்லன் காலனி,நங்கைநல்லூர்,

சென்னை - 61,பதிப்பு - 2006.

Focus of Course: தமிழ் வரலாறு,சமூகவரலாறுகுறித்தகாலத்தின் செய்திகள் தரப்பட்டுள்ளன.
பிழையின்றிஎழுத,பேச,கட்டுரை,கதைஎழுதுதலுக்குப் பயன்படும் வகையில் பயிற்சிதரப்பட்டுள்ளது.

Course Designer:

Dr.T. Radhika Lakshmi

Associate Professor, Dept. of Tamil, STC

For E. ...
BoS Chairman



SEMESTER – II

HINDI PAPER - II

Course Code: 21HIN2L20

PART I -HINDI II		
UnitNo.		Hours
I	MODERNPOETRY: PANCHVATI by MYTHLISHARANGUPT	18
II	ONEACT PLAY:EKANIKIPIYUSH 1. Owrangjebki aakirirath–Ramkumarvarma 2. Ek din -LakshminarayanMisra 3. Vapasi -Vishnuprabhakar 4. Badsurathrajkumari-Krishnachandra 5. Aakket -Harijeeth	18
III	LETTERWRITING (Leave Letter, Job Application, Ordering Books, Letter to Publisher,Personal Letter)	10
IV	CONVERSATION: (Doctor&Patient, Teacher&Student, Storekeeper&Buyer, TwoFriends,Booking Clerk&PassengeratRailwayStation,Autorickshawdriver and Passenger)Ref : Bolchal Ki Hindi Aur Sanchar by Dr. Madhu Dhavan VaniPrakashan, NewDelhi.	12
V	TRANSLATION:HINDI-ENGLISHONLY Lessons –1- 15onlyANUVADHABYAS-III	14
	TOTAL	72



TextBook:

Panchvati, MythilisharanGupt,
2015, RajkamalPrakashan, 1BNethajiSubashMarg, NewDelhi.

Ekanikipiyush, SrimathiUshamehra, 1999, HindusahithyaBhandar, 55choupattyanrode, Lackn
ow226003

ReferenceBooks:

BolchalKiHindiAurSanchar, 2015, Dr.MadhuDhavanVaniPrakashan, NewDelhi.

WebLink:

[https://hi.wikipedia.org/wiki/https://en.wikipedia.org/wiki/Pre
mchandhttp://hindigrammar.in/](https://hi.wikipedia.org/wiki/https://en.wikipedia.org/wiki/Pre
mchandhttp://hindigrammar.in/)



SEMESTER – II

MALAYALAM PAPER - II

Course Code: 21MAL2L20

PARTI- MALAYALAM II		
UnitNo.		Hours
I	Novel-Enmakaje	18
II	Novel-Enmakaje	18
III	Memories-NeermaathalamPoothakaalam	10
IV	Memories-NeermaathalamPoothakaalam	12
V	Translation (English to Malayalam)	14
	TOTAL	72

TextBooks:

Emakaje-AmbikasuthanMangad -DCBooksKottayam,Kerala

NeermaathalamPoothakaalam-Madhavikutty-DCBooksKottayam,Kerala

ReferenceBooks:

1. AthmakathasahithyamMalayalathil-Dr.VijayalamJayakumar(N.B.S.Kottayam)
2. MalayalaNovelSahithyaCharitram-K.M.Tharakan(N.B.S.Kottayam)
3. SahithyaCharitramPrasthanangalilude-
Dr.K.MGeorge,(D.C.BooksKottayam)
4. MalayalaSahithyavimarsam-SukumarAzheekode(D.C.books)



SEMESTER – II
FRENCH PAPER - II

Course Code: 21FRE2L20

Part1 -French2	
UnitNo.	Topics
1	Etape 5(Lecons 1 -3)
2	Etape 6(Lecons 1 -3)
3	Etape 7-Leçons 1 -2
4	Etape 7–Leçon3
	Etape 8–Leçon1
5	Etape 8–Leçons 2 -3
Etapas5to8,Pages63-114	

Text Book Prescribed: Adomania 1 – Methode de francais Authors: Céline Himber, Corina Brillant, Sophie Erlich Publisher: HACHETTE FLE

Available at: GOYAL Publishers and Distributors Pvt Ltd, New Delhi (9810322459)

Reference: Latitudes 1

Author: Yves Loiseau, RégineMerieux Publisher: French and European Publications Inc
Available at: GOYAL publishers and distributors Pvt Ltd, New Delhi (9810322459)

SWAYAM :https://swayam.gov.in/nd2_cec19_lg04/preview

by Prof. Nirupama Rastogi (Retd) English and Foreign Languages University, Hyderabad



SEMESTER II

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21GEN2L20	Communicative English-II	Language	70	5	-	3

Preamble: This course aims to provide a better understanding on the various aspects of communicative skills through a keen focus on LSRW.

Prerequisite: Basic knowledge in Communicative English and Skills

Unit	Course Contents	Hours
I	<p>1. Listening and Speaking a. Listening and responding to complaints (formal situation) b. Listening to problems and offering solutions (informal)</p> <p>2. Reading and writing a. Reading aloud (brief motivational anecdotes) b. Writing a paragraph on a proverbial expression/motivational idea.</p> <p>3. Word Power/Vocabulary a. Synonyms & Antonyms</p> <p>4. Grammar in Context • Adverbs Prepositions</p>	15
II	<p>1. Listening and Speaking: a. Listening to famous speeches and poems b. Making short speeches- Formal: welcome speech and vote of thanks. Informal occasions- Farewell party, graduation speech</p> <p>2. Reading and Writing: a. Writing opinion pieces (could be on travel, food, film / book reviews or on any contemporary topic) b. Reading poetry b .i. Reading aloud: (Intonation and Voice Modulation) b .ii. Identifying and using figures of speech - simile, metaphor, personification etc.</p> <p>3. Word Power : a. Idioms & Phrases</p> <p>4. Grammar in Context: Conjunctions and Interjections</p>	15
III	<p>1. Listening and Speaking a. Listening to Ted talks b. Making short presentations – Formal presentation with PPT, analytical presentation of graphs and 3 reports of multiple kinds c. Interactions during and after the presentations</p> <p>2. Reading and writing a. Writing emails of complaint b. Reading aloud famous speeches</p> <p>3. Word Power a. One Word Substitution 4. Grammar in Context: Sentence Patterns</p>	15
IV	<p>1. Listening and Speaking a. Participating in a meeting: face to face and online b. Listening with courtesy and adding ideas and giving opinions during the meeting and making concluding remarks.</p> <p>2. Reading and Writing a. Reading visual texts – advertisements b. Preparing first drafts of short assignments</p> <p>3. Word Power a. Denotation and Connotation</p> <p>4. Grammar in Context: Sentence Types</p>	15
V	<p>1. Listening and Speaking a. Informal interview for feature writing b. Listening and responding to questions at a formal interview</p> <p>2. Reading and Writing a. Writing letters of application b. Readers' Theatre (Script Reading) c. Dramatizing everyday situations/social issues through skits. (writing scripts and performing)</p> <p>3. Word Power a. Collocation</p> <p>4. Grammar in Context: Working With Clauses</p>	15
Total		75



Text Book: Communicative English Text Book		
Reference Book(s): a. Books by Penny Ur b. The Oxford English-English-Tamil dictionary (for pronunciation) c. https://www.esolcourses.com/ d. For Readers' Theatre: https://www.youtube.com/watch?v=JaLQJt8orSw&t=469s (the link to the performance; refer scripts by Aaron Shepherd)		
Focus of the Course: Skill Development		
Course Designer TANSCHÉ	BoS Chairman	
Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Gain mastery in LSRW Skills	K1
CO2	Understand the fundamentals of grammar	K1
CO3	Apply LSRW skills and practice it	K3
CO4	Comprehend the nuances of English Language	K3

Mapping with programme Outcome

COs/POs	P O1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	M	S	S	S	S	S	M
CO2	M	S	S	M	M	S	M	S	L	M
CO3	M	S	S	S	L	S	M	S	S	S
CO4	M	S	S	M	M	S	M	S	S	M

S – Strong; L – Low; M – Medium



SEMESTER – II

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BCS2C10	Core 4	Data Structures and Algorithms	Concept	45	5	-	4

Preamble: To facilitate the students to gain knowledge in the ways of organizing the data

Prerequisite: Data Types, Representation of Data.

Syllabus:

Unit	Course contents	Hours
I	Introduction: Overview - How to create programs – Recursion - How to analyze the programs – simple programs - - Arrays: Axiomatization - Ordered Lists – Representation of Arrays	13
II	Stacks and Queues: Fundamentals - Evaluation of Expressions – Multiple Stacks and Queues. Linked Lists: Singly Linked List-Linked Stacks and Queues-The Storage Pool-Doubly Linked List	10
III	Trees: Basic Terminology-Binary Trees-Binary Tree Representations - Binary Tree Traversal. Graphs: Terminology and representations: Definitions – Graph Representations – Traversals: BFS – DFS – Spanning Tree – Shortest Paths.	9
IV	Internal Sorting: Searching: Sequential Search-Binary Search- Sorting: Bubble sort-Quick Sort-Heap sort-Merge Sort	9
V	Files: Files,Queries and Sequential Organizations-File Organizations: Sequential Organizations-Random Organizations-Linked Organizations-Inverted Files-Cellular Partitions	9
Total		50

Text Book(s):

1. Ellriz Horowitz, S artajSahni -“**Fundamentals of Data Structures**”, Galgothia Book Source (P) Ltd, RP, 2012.

Reference book(s):

1. Narasimha Karumanchi- “**Data Structures and Algorithms Made Easy:Data Structures and Algorithmic Puzzles**”,CareerMonkPlublications,Fifth Edition, 2016.
2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein –“ **Introduction to Algorithms**”, 3rd Edition ,The MIT Press, 2009.
3. Aditya Bhargava -“**Grokking Algorithms: An illustrated guide for programmers and other curious people**“, Manning Publications, 1st Edition, 2015.
4. **Adnan Aziz,Amit Prakash** –“**Algorithms For Interviews**”, **CreateSpace Independent Publishing Platform, 1st Edition, 2010.**

Focus of Course: Skill Development

e-Resource/e-Content URL:

Vidya-Mitra Portal:<http://vidyamitra.inflibnet.ac.in/index.php/search>

Tutorials point :https://www.tutorialspoint.com/data_structures_algorithms/



Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Define the program and describe the ways to create and analyze it	K1
CO2	Categorize the ways to organize the data	K2
CO3	Illustrate the different methods of searching and Sorting.	K2
CO4	Employ the different ways of organizing the files	K3

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
							CO1	L	M	M	S
CO2	L	M	M	M	M		M	L	M	M	M
CO3	M	M	M	S	M		S	M	S	M	M
CO4	M	M	S	M	M		S	M	S	M	M

S-Strong; L-Low; M-Medium



SEMESTER II

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA2C20	Core-5	Object Oriented Programming with Java	Application	45	5	-	4
Preamble: This course provides the student with strong foundation in object oriented programming and JAVA							
Prerequisite: Programming knowledge							

Syllabus:

Unit	Course contents	Hours
I	OOPS: Fundamentals of Object Oriented Programming – Introduction- Object Oriented Paradigm–Basic Concepts of Object Oriented Programming– Benefits of OOP-Applications of OOP. Java Evolution: Java History – Java Features - How java differs from C and C++. Overview of Java Language - Constants, Variables and Data types.	10
II	Classes and Objects: Operators and Expressions- Decision Making and Branching, Decision Making and Looping- Classes, Objects and Methods- Arrays, Strings and Vectors.	10
III	Interfaces: Multiple Inheritances. Packages: Putting classes together- Multithreaded Programming- Creating threads -Life Cycle of a Thread – Implementing the ‘Runnable’ Interface- Managing Errors and Exceptions.	10
IV	Applet and AWT: Applet programming- Introduction- Applet Lifecycle- Adding Applet to HTML File-Graphics Programming. Frames and Windows: Frame class-Creating and displaying a Frame – Displaying messages in a window-Button and Label- Events Handling.	10
V	I/O Package: Managing Input / Output Files in Java: Introduction- Concepts of Streams- Stream Classes – Using streams - Input/Output Exceptions – Creation of files – Reading / Writing Characters, Reading /Writing Bytes - Handling Primitive Data types.	10
Total		50
Text Book(s):		
1. E. Balagurusamy, “ Programming With Java – A Primer ”, TMH publication 4 th Edition, 2011. (UNIT I, II, III, IV, V).		
2. C.Xavier, “ Programming With Java 2 ”, Scitech Publications (INDIA) Pvt. Ltd.2010 (UNIT IV).		
Reference Book(s):		
1. Patrick Naughton & Hebert Schildt, “The Complete Reference Java 2”, 6 th Edition, TMH Publication, 2012.		
2. Herbert Schildt, “Java: A Beginner's Guide”, TMH Publication, 6 th Edition, 2014.		
3. D.T. Editorial Services , “Java 8 Programming Black Book”, Dream Tech Publication, 2015 edition.		
4. John R. Hubbard, “ Programming with Java ”, McGraw Hill Publication, 2 nd Edition, 2012		



Focus of Course: Employability	
Course Designer : Mr. M.Premkumar <i>M.P.</i> Dept of CS	BoS Chairman <i>D</i> Ms.D.Geetha HoD -Dept of BCA

Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the fundamentals of Object Oriented Programming	K1
CO2	Outline the major concepts like inheritance, packages to implement in Java Programming	K2
CO3	Make use of exception handling and Input/Output operations in programming	K3
CO4	Develop Programs using event handling and abstract window tool kit	K3

Mapping with programme Outcomes and programme Specific Outcomes:

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M		M	L	S	M	M
CO2	L	M	M	M	M		M	L	M	M	M
CO3	M	M	M	S	M		S	M	S	M	M
CO4	M	M	S	M	M		S	M	S	M	M


S -Strong; *L* -Low; *M* -Medium

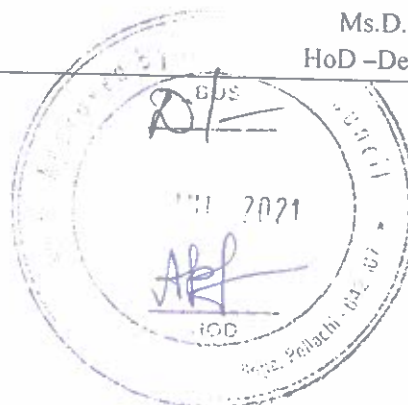


SEMESTER II

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA2C30	Core 6	Object Oriented Programming Lab	Practical	-	5	30	2
Preamble: Students will be able to apply logic which helps to develop programs using OOPS concepts							
Prerequisite: Basic programming skills and logical thinking.							

Syllabus

Ex. No	Course contents	Hours
1	Develop a Java program to implement Method Overloading.	2
2	Develop a Java Applications to implement String class methods.	3
3	Develop a Java program to implement Vectors.	3
4	Develop a Java program to create package.	3
5	Develop a Java Program to implement the concept of multiple inheritance using Interfaces.	3
6	Develop a Java Program to implement the concept of multithreading.	3
7	Develop a Java Program to create an user defined exception.	3
8	Develop a Java Program to draw gridlines using Applets.	3
9	Develop a Java Program to create an Applet with three text fields for name, age and qualification and a text field for multiple line for address.	3
10	Develop a Java Program to demonstrate the Multiple Selection List-box.	3
11	Develop a Java Program to create Menu Bars and pull down menus.	3
12	Develop a Java Program to perform file operations.	3
Total		35
Focus of Course: Employability		
Course Designer : Mr. M.Premkumar Dept of CS		 BoS Chairman Ms.D.Geetha HoD -Dept of BCA



Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Illustrate the basic features of OOPs concepts in various programs	K2
CO2	Demonstrate interfaces and packages using JAVA programs	K2
CO3	Apply the concepts of multithreading and exception handling in programming.	K3
CO4	Develop applets and implement the concepts of file handling.	K3

Mapping Course Outcomes with Programme Outcomes and Programme Specific Outcomes:

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S –Strong; L –Low; M –Medium



SEMESTER – II

Class: I B.Sc (AI&ML), I B.Sc (DSA)

ACADEMIC YEAR: 2021-22

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BMAGAO0	Introduction to Linear Algebra	Allied	60		-	4
Preamble: To make the students to understand the basic concepts of linear algebra (systems of linear equations, matrix calculus, basic vector operations)						
Prerequisite: Knowledge in Basic Mathematics						

SYLLABUS: INTRODUCTION TO LINEAR ALGEBRA

Unit	Course contents	Hours
I	Systems of Linear equations – Row Reduction and Echelon forms – Vector Equations – Vector Equation - The matrix Equation $Ax = b$ - Solution sets of Linear systems	12
II	Matrix Operations – The Inverse of a Matrix – Characterizations of Invertible Matrices – Partitioned Matrices – Matrix Factorizations.	12
III	Vector Spaces and Subspaces- Null spaces, Column Spaces and Linear Transformations – Linearly Independent Sets, Bases – coordinate systems – The Dimension of a vector space – Rank.	12
IV	Eigen vectors and Eigen values – The Characteristic Equation – Diagonalization – Eigen vectors and Linear transformations.	12
V	Innerproduct, Length and Orthogonality – Orthogonal sets – Orthogonal Projections- The Gram – Schmidt Process.	12
Total		60
Text Book(s):		
1. David C. Lay Steven R. Lay and Judi J. McDonald, "Linear Algebra and Its Applications," Pearsons Publications 5 th edition 2016		
Unit I : Chapter 1, Section 1.1-1.5 Pg.No 2-9, 13-21, 24-31, 35-40		
Unit II : Chapter 2, Section 2.1-2.5 Pg.No 94-102, 105-111, 114-116, 119-123, 125-131		
Unit III: Chapter 4, Section 4.1-4.5 Pg.No 192-197, 200-207, 210-215, 218-224, 227-238		



Unit IV: Chapter 5, Section 5.1-5.4 Pg.No 268-273, 276-288, 290-295
 Unit V : Chapter 6, Section 6.1-6.4 Pg.No 332-338, 340-354, 356-360

Reference book(s):

5. Surjeetsingh, QaziZameeruddin, "Modern Algebra", Vikas Publishing House, 8th edition, 2006
6. Seymorelipsechutz, "Beginning Linear Algebra", Tata Mcgraw hill, 2005.
7. S.G. Venkatachalapathy, "Modern Algebra" Margham Publications, 2008.
8. Ward ChenayDEwid Kincaid. Linear Algebra Theory and Applications, I edition 2010.
5. Gilbert Strang, "Linear Algebra and its Applications", Cengage Learning, IV edition, India, 2015.

Focus of Course: Skill development

e-Resource/e-Content URL: <https://www.youtube.com/watch?v=0C0wKICC9Ac>

Course Designer:
Dr.R.Senthil Amutha,
 Asso.Prof & Head Department of Mathematics

R. Senthil Amutha
 BoS Chairman

Course Outcomes (COs)

On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Define basic terms and concepts of matrices.	K1
CO2	Comprehend the use of various matrix operations	K2
CO3	Understand the concept of Vector spaces and Basis	K2
CO4	Determine Eigen values and Eigen Vectors	K3

Mapping Course Outcomes with Programme Outcomes and Programme Specific Outcomes:

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	M	M	M	M	L	M	M	M
CO2	L	L	M	M	M	M	L	M	M	M
CO3	L	M	M	M	M	M	M	S	M	M
CO4	L	M	S	M	S	S	M	S	M	S

S – Strong; L – Low; M – Medium



SEMESTER – II

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
18DHE2V20	VBC	Value Education & Human Rights	-	27	-	-	2

Preamble: In order to promote and encourage interest in Value Education and Human rights, we, teach the noble purpose of education, life and living standards- Create patriotism and awareness in the national interest by teaching the history of the country's freedom struggle – Make a good citizen imbued with the knowledge of Indian constitution and human rights.

Prerequisite:

- The curriculum has been setup in the course of the classroom with the study of the lessons learned from the higher Secondary school.
- The syllabus is setup, to realize human values, to promote patriotism and to compete with competitive exams.

Syllabus:

Unit	Course contents	Hours
I	Education – Definition –The purpose of education – Important values of life – The excellence of family and family relations – The significance and the necessity of culture – The role of individual in a society – The art of complete life.	05
II	History of Indian freedom struggle – East India Company and its rule in India 1757 -1858 – Its unlawful practices and atrocities – Direct rule by British Government – Sepoy mutiny – Indians revolt against British Raj – The massacre of Jallionwalah Bagh – Indians' non-cooperation movement. Short notes: Pandit Jawaharlal Nehru, Patel, Subash Chandra Bose, V.O.Chithambarampillai, Baghat Sing.	05
III	Indian Constitution – The birth and the significance of Indian Constitution – Indian citizenship – Equality of rights – The right to freedom – Right to arts, culture and education –Right to property – Basic responsibilities of every Indian – The rights and the Acts concerned.	06
IV	Gandhian thoughts – Gandhi and his principle of Sathyagraha – Sarvodaya – concept and meaning – Swami Vivekananda and his teachings to the students – Dr. Abdul Kalam and the students.	05
V	Human rights – Definition – Classification of human rights – Rights to live – Rights to Equality – Traditional and cultural rights – Social, political and economic rights – Rights of women – Rights of children – Exploitation and cruelty to women – Organization protecting women's rights – Human rights organizations – Courts of justice – Safety of women rights.	06
Total		27



Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Define the purpose of education, role of a person in a family relationship, culture and society.	K1
CO2	Understand the history of Indian independence and the Indian constitution.	K2
CO3	Develop Gandhian ideas, Vivekananda's norms, Abdulkalam's languages, need for human rights and feminism.	K3

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M	S	L	S	S	M	M	M
CO2	S	M	M	L	L	S	S	L	L	L
CO3	S	S	M	M	M	S	S	M	M	L

S- Strong; L- Low; M-Medium



SEMESTER – II

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21GEN2Z10	English	Professional English II	Language	55	5	-	4

PreambleThe course aims to Develop students' competence in the use of English with particular reference to the workplace situation

Prerequisite:Basic knowledge in English

SYLLABUS

Unit	COURSE CONTENTS	HOURS
I	Unit 1- Communicative Competence Listening – Listening to two talks/lectures by specialists on selected subject specific topics and answering comprehension exercises (inferential questions) Speaking: Small group discussions (the discussions could be based on the listening and reading passages- open ended questions Reading: Two subject-based reading texts followed by comprehension activities/exercises Writing: Summary writing based on the reading passages. Grammar and vocabulary exercises/tasks to be designed based on the discourse patterns of the listening and reading texts in the book. This is applicable for all the units.	12
II	Unit 2 - Persuasive Communication Listening: listening to a product launch-sensitizing learners to the nuances of persuasive communication Speaking: debates – Just-A Minute Activities Reading: reading texts on advertisements (on products relevant to the subject areas) and answering inferential questions Writing: dialogue writing- writing an argumentative /persuasive essay.	12
III	Unit 3- Digital Competence Listening to interviews (subject related) Speaking: Interviews with subject specialists (using video conferencing skills) Creating Vlogs (How to become a vlogger and use vlogging to nurture interests – subject related) Reading: Selected sample of Web Page (subject area) Writing: Creating Web Pages Reading Comprehension: Essay on Digital Competence for Academic and Professional Life. The essay will address all aspects of digital competence in relation to MS Office and how they can be utilized in relation to work in the subject area	12
IV	Unit 4 - Creativity and Imagination Listening to short (2 to 5 minutes) academic videos (prepared by EMRC/ other MOOC videos on Indian academic sites – E.g. https://www.youtube.com/watch?v=tpvicScuDy0) Speaking: Making oral presentations through short films – subject based Reading: Essay on Creativity and Imagination (subject based) Writing – Basic Script Writing for short films (subject based) - Creating webpages, blogs, flyers and brochures (subject based) - Poster making – writing slogans/captions(subject based)	12
V	Writing – Basic Script Writing for short films (subject based) - Creating webpages, blogs, flyers and brochures (subject based) - Poster making – writing slogans/captions(subject based) Unit 5- Workplace Communication & Basics of Academic Writing Speaking: Short academic presentation using Power Point Reading & Writing: Product Profiles, Circulars, Minutes of Meeting, Writing an	12



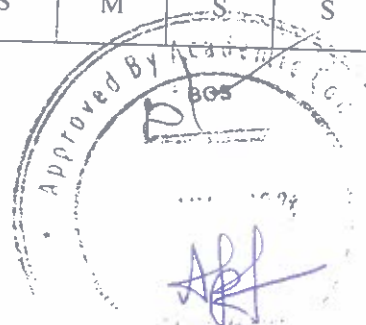
introduction, paraphrasing Punctuation(period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, quotation marks, and ellipsis) Capitalization (use of upper case)	
Total	60
Text Books: Tamil Nadu State Council for Higher Education(TANSICHE)	
Reference Books: Tamil Nadu State Council for Higher Education(TANSICHE)	
Focus of Course: Employability (Employability/Skill Development)	
e-Resource/e-Content URL:	
<ul style="list-style-type: none"> • Vidya-MitraPortal:http://vidyamidra.inflibnet.ac.in/index.php/search • e-PG Pathshala:http://epgp.inflibnet.ac.in/ahl.php?csr 	
Course Designer: TANSICHE	
BoS Chairman Assistant Professor of English	

Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Enhance the creativity of the students, which will enable them to think of innovative ways to solve issues in the workplace.	K1
CO2	Develop students' competence and competitiveness and thereby improve their employability skills.	K2
CO3	Attend interviews with boldness and confidence	K3
CO4	Adapt easily into the workplace context, having become communicatively competent	K4
CO5	Apply to the Research & Development organisations/ sections in companies and offices with winning proposals	K5

Mapping Course Outcomes with Programme Outcomes and Programme Specific Outcomes:

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	S	S	S	S	M	M	S	S	S
CO2	M	M	M	S	S	S	M	S	S	S
CO3	M	M	M	S	S	S	S	S	S	S
CO4	M	S	S	S	S	S	M	S	S	S
CO5	M	S	S	S	S	S	M	S	S	S

S-Strong; L-Low; M-Medium

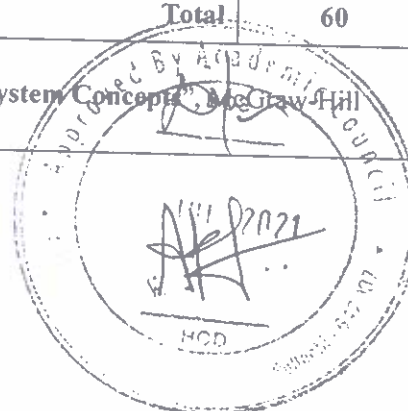


SEMESTER – III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA3C10	Core 7	Introduction to Database Management System	Concept	55	5	-	5
Preamble: This course aims at facilitating the student to understand the DBMS concepts and apply it in real time situation							
Prerequisite: Basic Knowledge of Computer Concepts, Data Structures							

Syllabus:

Unit	Course contents	Hours
I	Introduction to Database System: What is Database system- Purpose of Database System-View of Data -Database Languages- Database Design- Database Engine-Database and Application architecture-Database users- History of Database- Exercise.	12
II	Introduction to Relational Model: Structure of relational database- Database schema- Keys-Schema Diagrams-Relational Query Language -The Relational Algebra. Introduction to SQL : Overview of SQL Query Language- SQL Data Definition- Basic Structure of SQL Queries-Additional Basic Operations-Set operations-Null Values-Aggregation functions-Nested Sub Queries- Modification of Database-Joins- Views-Constraints-Exercise.	12
III	Database Design Using ER Model: Overview of Design Process- The Entity Relationship Model- Entity Sets-Relationship sets- Complex attributes- Mapping cardinalities- Primary Key- Extended ER features. Relational Database Design: Features of good relational design-Normal Forms- Exercise	12
IV	Storage Management and Indexing: Overview of physical storage media- Database storage architecture- File Organization-Organization of records in file- Heap File Organization- Sequential File Organization- Clustering File Organization- Partitioning. Indexing: Basic Concepts-Dense and sparse indices-Multilevel Indices-Structure of B+-tree index	12
V	Transaction Management: What is Transaction- ACID Properties- Serializability-Equivalenceschedules- States of Transactions. Concurrency Control: Overview of Lock based protocol and Timestamp based protocol. Database backup and Recovery: Remote backup- Crash recovery- Storage Structure-Recovery and Atomicity	12
Total		60
Text Book(s): Abraham Silberschatz, Henry F. Korth,S. Sudarshan, "Database System Concepts", McGraw-Hill publication 7 th Edition, 2011. (UNIT I, II, III, IV, V).		



Reference Book(s):

- Raghu Ramakrishnan, Johannes Gehrke, "Database Management System" Third Edition
- Bipin C Desai "An Introduction to Database System" Galgotia Publication
- J.Keerthika "Database Management Systems", Excellent Publishers, 1st Edition, 2014.
- C. J Date, A. Kannan, S. Swamynathan "Introduction to Database Systems", Pearson Publication, 8th Edition, 2012.

Focus of Course: Employability

e-Resource/e-Content URL:

- VidyamithraPortal : <http://vidyamitra.inflibnet.ac.in/>
- NPTEL
- <https://www.tutorialspoint.com/dbms/index.htm>

Course Designer :
Mrs.A.Reshma Parveen
Programme Coordinator,
Dept of Data Science and Analytics

BOS Chairman
Mrs.D.Geetha
HOD Dept of BCA

Course Outcomes (COs)

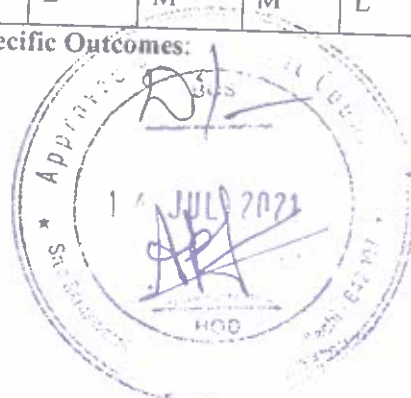
On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the basic concepts of relational data model, entity-relationship model, relational database design and SQL	K1
CO2	Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data	K2
CO3	Improve the database design by normalization	K3
CO4	Familiar with database storage structures and access techniques	K3

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	L	S	M	M	L	M	M	L
CO2	L	M	S	S	M	M	M	M	M	L
CO3	L	M	M	S	M	M	M	M	M	L
CO4	L	M	M	S	M	M	L	M	M	L

Mapping with programme Outcomes and programme Specific Outcomes:

S - Strong; L - Low; M - Medium



SEMESTER – III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA3C20	Core8	Principles of Data Science	Concept	55	5	-	5
Preamble: This course provides the fundamental concepts in data science. It includes Data Classification, Sources of Data, Data Science user- roles and skills, Process of big data technology, Security and Intelligence, Basics of R and statistical measures.							
Prerequisite: Basic knowledge of Mathematics / Statistics and Java							

Syllabus:

Unit	CourseContent	Number of Sessions
I	Data Evolution: Understanding data: Introduction – Type of Data: Numeric – Categorical – Graphical – High Dimensional Data — Data Classification – Hot Data – Cold Data – Warm Data – Thick Data – Thin Data - Classification of digital Data: Structured, Semi-Structured and Un-Structured. Sources of Data: Time Series – Transactional Data – Biological Data – Spatial Data – Social Network Data – Data Evolution – Data Sources	12
II	Data Science: Data Science-A Discipline – Data Science vs Statistics – Mathematics - Programming Language - Database, - Machine Learning. Data Analytics Relation: Data Science, Analytics, Big Data Analytics. Data Science Components: Data Engineering, Data Analytics-Methods and Algorithm, Data Visualization Big Data: Introduction To Big Data: - Evolution What is Big Data – Sources of Big Data. Characteristics of Big Data 6Vs – Big data, Big Data Technology: Big Data Exploration	12
III	Data science basic terminology- data science Venn diagram-computer programming-why python-domain knowledge- flavors of data (types of data with example)-overview of five steps(ask an interesting question,obtaindata,exploredata,model, communicate and visualize the result. Explore a data with some example dataset(yelp, titanic, bike)-data frames- series-exploration for qualitative and quantitative data.	12
IV	Introduction to Machine learning – Examples and Applications - Perspectives and Issues in Machinelearning - Input: Concepts, Instances, and Attributes - Output: Knowledge Representation- Credibility: Evaluating What’s Been Learned: Training and Testing - Predicting Performance - Cross Validation - Other Estimates - Counting the cost.	12
V	Big Data Usecases –Big Data Technology Potentials – Limitations of Big Data and Challenges- Big Data Roles Data Scientist , Data Architect, Data Analyst – Skills – Case Study : Big Data – Customer Insights – Behavioral Analysis – Big Data Applications - Marketing – Retails – Insurance – Risk and Security – Health care	12
	Total	60



ReferenceBook(s):

1. V. Bhuvanewari, T. Devi, "Big Data Analytics: A Practitioner's Approach" 2016.
2. Seema Acharya, Subhashni Chellappan, "Big Data Analytics", Wiley, 2015.
3. Han Hu, Yonggang Wen, Tat-Seng Chua, Xuelong Li, "Toward Scalable Systems for Big Data Analytics: A Technology Tutorial", IEEE, 2014

Focus of Course: Employability**e-Resource/e-Content URL:**

- Vidyamithra Portal : <http://vidyamitra.inflibnet.ac.in/>
- NPTEL <https://data.berkeley.edu/education/courses/data-100>

Course Designer :

Dr.P.Sudha
Assistant Professor,
Dept of Data Science and Analytics

BOS Chairman

Mrs.D.Geetha
HOD
Dept of BCA

Course Outcomes (COs)

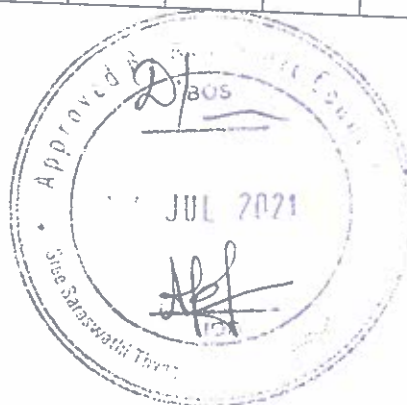
On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand data classification, process of big data technology, user roles and skills in data science.	K1
CO2	Apply the fundamental concepts and techniques of data science in 360 view of Customer	K3
CO3	Analyse the methodologies of data science	K4
CO4	Detect myths in big data	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO2	L	M	M	S	M	M	M	M	M	S	
CO3	L	M	S	S	M	S	M	S	M	S	
CO4	L	M	S	M	M	S	M	S	M	S	

S- Strong; L- Low; M-Medium



SEMESTER – III

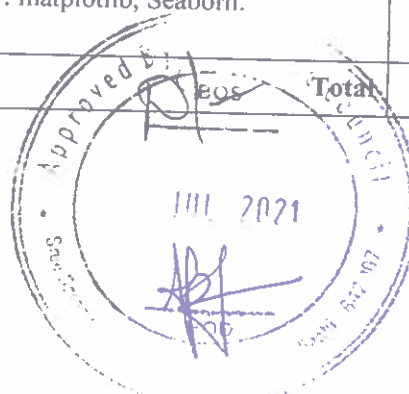
Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA3C30	Core9	Python Programming for Data Science	Application	45	5	-	3

Preamble: This course aims at facilitating the student to understand the basics of Python Data structures, Programming constructs and apply Python Libraries for Data Science

Prerequisite: Basic Knowledge of Programming Concepts

Syllabus:

Unit	Course contents	Hours
I	Introduction to Python: What is Python-History of Python-Features of Python-Downloading and Installing Python-Running Python- Getting started with Python-Data types-Program input and output-Variables and Assignment-Identifiers and Keywords- Basic operators: Arithmetic Operators ,Comparison Operators, Logical (or Relational) Operators, Assignment Operators, Conditional (or ternary) Operators -Numbers.	10
II	Control Structures: Branching (if, else-if, nested),Looping : while statement, for statements, Control Statements: break, continue and pass Statements. Functions: What are functions-Calling Functions-Creating Functions-Passing Values to Functions-Function Arguments	8
III	Advanced Data Types: Python Strings- Strings and Operators-String only operators-Built in functions-String build in methods-Special features of String- Python List: Create and assign list-Access value in List-Update List-Remove list-List operators-Built in functions-List type build in methods-Special features of List- Python Dictionary: Introduction, Accessing values, Properties, Functions in Dictionary- Python Tuples: Create and access tuple-Tuple operators- Special features of Tuple. Python Set: Create and access Set- Set operators	10
IV	Modules: What are Modules-Modules and Files-Namespaces-Importing Modules-Module build in functions- Packages- Classes -Class Attributes-Instances-Binding and Method invocation-Static Methods-Class Methods-Inheritance- Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions	8
V	Python Libraries for Data Science:NumPy [Arrays and matrices]: N-dimensional data structure, Creating array, Indexing array, Reshaping, Vectorized operations, Pandas [Data Manipulation]: Create Data Frame, Combining Data Frames, Summarizing, Columns selection, Rows selection (basic) , Rows selection (filtering) , Sorting. SciPy Introduction, Basic functions, Special functions(scipy.special), Visualization libraries : matplotlib, Seaborn.	14
	Total:	50




Reference Book(s):


1. Core Python Programming by Wesley J. Chun, 2nd Edition ,Pearson Education
2. An Introduction to Python by Guido Van Russom, Fred L.Drake, Network Theory Limited.
3. Beginning Python: From Novice To Professional By Magnus Lie Hetland, Second Edition.
4. Programming in Python 3 by Mark Summerfield, Pearson Education

Focus of Course: Employability

e-Resource/e-Content URL:

- VidyamithraPortal : <http://vidyamitra.inflibnet.ac.in/>
- NPTEL
- https://www.tutorialspoint.com/python_data_science
- <https://towardsdatascience.com/>

Course Designer :

 Mrs.A.Reshma Parveen
 Programme Coordinator,
 Dept of Data Science and Analytics


Mrs.D.Geetha
 BOS Chairman
 HOD Dept of BCA

Course Outcomes (COs)

On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the fundamentals of Python programming language	K1
CO2	Acquire knowledge on Advanced Data types used in python	K2
CO3	Apply the knowledge on File and Modules	K3
CO4	Analyzethe Python libraries and visualization	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

Cos/Pos/ PSOs	PO1	PO2	PO3	PO4	PO5					
						PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	L	S	M	M	L	L	S	M
CO2	L	M	L	S	M	M	L	L	S	M
CO3	L	M	L	S	M	M	L	L	S	M
CO4	L	M	M	S	M	M	M	M	S	M

S- Strong; L- Low; M-Medium



SEMESTER – III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA3C40	Core10	Database Management System Lab	Practical	-	5	55	4
Preamble: This course aims at facilitating the student to understand the basics of DBMS							
Prerequisite: Basic Knowledge of computing Concepts and DBMS concepts							

Syllabus:

Sno	Course contents	Hours
1	To work with DDL and DML Commands for a scenario	3
2	To use Select Command to do below operations to Data extract, retrieval of specific columns from table, Elimination of duplicates from the select statement (distinct), Sorting of data in a table, Use arithmetic operators and relational operators	3
3	To use formatting in Query output for a scenario	3
4	To work with SQL Querying on Multiple Tables	3
5	To work with Constraints such as Not NULL, Primary key , Unique key, ForeignKey , Check	3
6	To work with Logical Operators such as AND, OR, NOT, BETWEEN	3
7	To work with Pattern Matching such as LIKE, NOT LIKE, IN, NOT IN	3
8	To work with Aggregate functions such AVG, COUNT, MIN, MAX, SUM	3
9	To work with Grouping of Data such as GROUP BY, HAVING	4
10	To work with Date Functions such as SYSDATE, ADD_MONTHS, LAST_DAY, NEXT DAY	4
11	Creation of Views and selecting data from the view	4
12	To work with Joins (EQUI JOIN, SELF JOIN)	4
13	To work with Unions	4
14	To work with Sub Queries	4
15	Commit, Rollback and Save point	4
16	Construct trigger for the entity.	4
17	To implement Cursor concept	4
Total		60

Reference Book:

1. Abraham Silberschatz, Henry F.Korth, S. Sudharshan “**Database System Concepts**”, McGraw-Hill India Pvt Ltd, 6th Edition, Reprint - 2014.
2. J.Keerthika “**Database Management Systems**”, Excellent Publishers, 1st Edition, 2014.
3. C. J Date, A. Kannan, S. Swamynathan “**Introduction to Database Systems**”, Pearson Publication, 8th Edition, 2012.
4. Ivan Bayross “**Commercial Application Development using ORACLE Developer 2000 forms 6i**”, BPB Publication, 2009.


Recommended Tools to be used: Oracle

Focus of Course: Employability

e-Resource/e-Content URL:

- VidyamithraPortal : <http://vidyamitra.inflibnet.ac.in/>
- NPTEL
- <https://www.w3school.com/dbms/index.htm>
- <https://www.w3schools.com/sql/>



Course Designer : Mrs.A.Reshma Parveen Programme Coordinator, Dept of Data Science and Analytics	 Mrs.D.Geetha BOS Chairman HOD Dept of BCA
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Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the various DDL and DML Queries	K1
CO2	Understand various advanced queries execution such as relational constraints, joins, set operations, aggregate functions, views	K2
CO3	Apply the Joins ,Union, Subquery concepts	K3
CO4	Design and implement database applications	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

CO/PO1/ PSO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	L	S	L	M	M
CO2	L	M	M	S	M	L	M	L	M	M
CO3	L	M	M	S	M	L	S	L	M	M
CO4	L	M	M	S	M	M	S	M	M	M

S- Strong; L- Low; M-Medium



SEMESTER – III

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
22BMAGAM0	Fundamentals of Statistics	Allied	60	-	-	4

Preamble: To facilitate the learner to have sound knowledge of various measures of central tendency & Dispersion application of correlation & Regression, importance of Index numbers and Time series

Prerequisite: Basic knowledge of statistics taught at HSC level

SYLLABUS:

Unit	Course contents	Hours
I	Measure of Central Tendency : Averages- Introduction- Requisites of a good average or Measure of Central Tendency – Various Measure of Central Tendency- Arithmetic Mean: Step Deviation Method for Computing Arithmetic Mean – Merits and Demerits of Arithmetic Mean – Median: Calculation of Median – Merits and Demerits of Median Mode : Computation of Mode – Merits and Demerits of Mode.	12
II	Measures of Dispersion : Introduction-Range-Quartile deviation or Semi Quartile deviation- Mean Deviation -Standard Deviation-Standard Deviation of the combined Series –Coefficient of Variation (Derivations excluded)	12
III	Correlation : Introduction- Types of Correlation-Methods of studying Correlation - Scatter Diagram – Karl Pearson’s Coefficient of Correlation – Properties of Correlation Coefficient - Rank Correlation method –Computation of Rank Correlation Coefficient (Derivations excluded)	12
IV	Linear Regression Analysis : Introduction-Linear and nonlinear Regression – Lines of Regression-Derivation of line of Regression of y on x- line of Regression of x on y- Theorems on Regression Coefficients-To find the Mean values(\bar{X} , \bar{Y}) from the Two lines of Regression-To find the Regression Coefficients and The Correlation Coefficient from the Two lines of Regression (Derivations excluded)	12
V	Time Series Analysis: Introduction -components of time series– Secular Trend-Short Term Variations – Random or Irregular Variations-Analysis of Time series-Mathematical Models for Time series-Measurement of Trend – Graphic or free Hand Curve fitting by the principle of Least squares-Conversion of Trend -Method of Moving Averages-Measurement of Seasonal Variations –Method of Simple Averages-Ratio to Trend Method-Ratio to Moving Average Method (Derivations excluded)	12
Total		60

Text Book:

S.C.Gupta ,Indira Gupta., "Business Statistics " Himalaya Publishing House Mumbai Reprint 2007

Unit I : Page No 5.1-5.12,5.20-5.24,5.33-5.36

Unit II : Page No 6.1-6.7,6.9-6.13,6.16-6.27

Unit III : Page No 8.1-8.5, 8.6-8.10,8.30-8.36

Unit IV : Page No 9.1-9.5, 9.6-9.14,9.18-9.21



Reference Book(s):

1. Gupta, S.C., Kapoor, V.K., "Elements of Mathematical Statistics", Sultan Chand & Sons, New Delhi.
2. Gupta C.B, Vijay Gupta, "An introduction to Statistical Methods", Vikas publishing house private limited.
3. R.S.N.Pillai, Bagavathi, Statistics theory & Practice, S. Chand company PVT Ltd, New Delhi , Reprint 2015.
4. P.R. Vittal, Mathematical Statistics, MarghamPublications, 2004.

Learning Methods (*):

Assignment/Seminar/Quiz/Group Discussion/Case-Study/Self-Study/etc.,

Focus of Course: Employability

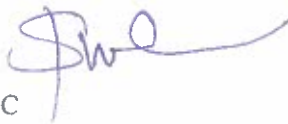
e-Resource/e-Content URL:

YouTube Videos:<https://www.youtube.com/watch?v=PftpOYCGxt8> ,
<https://www.youtube.com/watch?v=TU2tIHDwVuA>
PPT:[https://www.google.co.in/search?q=Correlation+ppt&dcr=0&ei=wE-WqTREIrSvATXxY64Aw&start=0&sa=N&biw=1242&bih=579,](https://www.google.co.in/search?q=Correlation+ppt&dcr=0&ei=wE-WqTREIrSvATXxY64Aw&start=0&sa=N&biw=1242&bih=579,stat.rutgers.edu/~yhung/HW586/Timeseries%20586.ppt)
[cms.gcg11.ac.in/attachements/article/92/index%20no-2.pptx](https://www.google.co.in/attachements/article/92/index%20no-2.pptx)

Course Designer:

Prof. K. Sivaswamy

Dean Mathematics, STC




 BoS Chairman

Course Outcomes (COs)

On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO 1	Compute various measures of central tendency	K1
CO 2	Familiarize various measures of dispersion and coefficient of variation.	K1
CO 3	Develop skill to calculate correlation coefficient and rank correlation coefficient.	K2
CO 4	Apply Regression lines in estimation	K3
CO 5	Understand and apply Time series analysis	K3



Mapping with Program Outcomes:

Cos/POs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO3	PSO 4	PSO5
CO1	L	L	S	M	S	S	L	S	S	M
CO2	M	M	S	M	M	S	M	M	M	L
CO3	M	M	M	L	L	M	L	S	M	S
CO4	L	M	S	M	S	S	M	M	L	S
CO5	L	S	S	M	M	S	S	M	M	L

S – Strong; L – Low; M – Medium




SEMESTER – III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA3S10	SBC1	Python Programming Lab	Practical		5	45	2
Preamble: This course aims at facilitating the student to understand the basics of Python							
Prerequisite: Basic Knowledge of Python programming Concepts							

Syllabus:

Sno	Course contents	Hours
Exercise programs on basic control structures & Loops:		
1	Write a Python program for displaying reversal of a number	2
2	Write a program using while loop that asks the user for a number and prints a countdown from that number to zero	2
Exercise programs on Operators & IO operations:		
3	Implement Python script to read a person's age from keyboard and display whether he is eligible for voting or not	2
4	Implement Python script to check whether the given year is leap or not.	2
Exercise programs on Python Script IDE:		
5	Implement Python script to print sum of N natural numbers	2
6	Implement Python script to check given number is Armstrong or not	2
Exercise programs on Lists, Strings, Tuples:		
7	Finding the minimum and maximum elements in the List	2
8	Implement Python script to accept line of text and find the number of characters, number of vowels and number of blank spaces in it.	3
9	With a Given Tuple of (1,2,3,4,5,6,7,8,9,10), write a program to print the first half values in one line and last half values in one line	3
Exercise programs on Functions:		
10	Define a function max_of_three() that takes three numbers as arguments and returns the largest of them	3
11	Write a program which makes use of function to display all such numbers which are divisible by 7 but are not a multiple of 5 for given range n.	3
Exercise programs on Array, Searching and Sorting using PyCharm/Spider		
12	Write a program to get the number of occurrences of the specified element in an array	3
13	Write a Program for Linear search	3
14	Write a Program for Binary search	3
15	Write a Program for Bubble sort	3
Exercise programs on using Python Libraries using Jupiter		
16	Write a program for using NumPy Library functions	4
17	Write a program for using Pandas Library functions	4
18	Write a program for using Matplotlib Library functions	4
Total		50



Reference Book: 1. Wesley J.Chun – “Core Python Programming”, 2 nd Edition, Prentice Hall	
Recommended Tools to be used: Python IDLE ,PyCharm,Spider, Jupiter	
Focus of Course: Skill Development	
e-Resource/e-Content URL: • VidyamithraPortal : http://vidyamitra.inflibnet.ac.in/ • NPTEL • https://www.w3school.com/python-exercises	
Course Designer : Mrs.A.Reshma Parveen Programme Coordinator, Dept of Data Science and Analytics	 BOS Chairman Mrs.D.Geetha HOD Dept of BCA

Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Illustrate the basic control structures and operations	K1
CO2	Demonstrate the advanced Data type functionality of python	K2
CO3	Develop programs on functions	K3
CO4	Apply the sorting and searching operations	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5			PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	L	S	M			M	L	L	S	M
CO2	L	M	L	S	M			M	L	L	S	M
CO3	L	M	L	S	M			M	L	L	S	M
CO4	L	M	M	S	M			M	M	M	S	M

S- Strong; L- Low; M-Medium



SEMESTER IV

CourseCode	Type	CourseName	Category	Lecture (L)	Tutorial (T)	Practical (P)	Cred:
22BDA4C10	Core11	Exploratory Data Analysis	Theory	70	5	-	5

Preamble: This course enable the students to learn the different exploratory data analysis concepts using python programming

Unit	CourseContent	Number of Sessions
I	Exploratory Data Analysis Fundamentals: Understanding Data Science-Steps in EDA-Numerical Data-Categorical Data-Measurement Scale. Comparing EDA with classical and Bayesian analysis-EDA Tools-Numpy-Pandas-Scipy-Matplotlib- Visual Aid for EDA: Line Charts-Bar chart-scatter plot-Area plot and stacked plot-pie chart-table chart-polar chart-Histogram-Lollipop chart-Best chart-Other libraries.	15
II	EDA Real time case study Email:Loading Dataset-Data Transformation:Data Cleaning-Loadind CSV file-converting date-removing NAN values-Applying statistics-Data Refactoring-Dropping columns-Refactoring timezone-Data Analysis:Number of emails-time of day-average emails per day,per hour- number of email per day-most frequent words. Data Transformation Techniques: Merging Database style dataframes - Transformation Techniques-Benefits of data transformation	15
III	Descriptive Statistics: Understanding Statistics: Distribution function- cumulative Distribution function - descriptive statistics-Measures of central tendency-Measures of dispersion. Grouping Datasets: Group by mechanics-Data aggregation-Pivot table and cross tabulation.	15
IV	Correlation: Introducing correlation-Types of analysis-Multivariant analysis-outlining Simpson's paradox-correlation doesnot imply causation- Time series: understanding time series dataset-fundamentals of TSA-characteristics of Time series data-TSA with open power system data.	15
V	Hypothesis testing: Principle-statsmodel library-average reading time-types of hypothesis testing-T test. Understanding Regression: Types of Regression-simple linear regression-Multiple linear regression- Non linear regression. Model Development and evaluation: Constructing Linear regression model - implementing a multiple linear regression model	15
	Total	75

Text Book:

1. Suresh Kumar Mukhiya, Usman Ahmed - Hands on Exploratory data analysis using python 2020-Packt



publication

ReferenceBook(s):

1. Serene Dalati, Measurement and Measurement Scales, March 2018, DOI: 10.1007/978-3-319-74173-4_5
2. V. Bhuvanewari, T. Devi, "Big Data Analytics: A Practitioner's Approach" 2016.
3. ABC's of EDA – classic by Velleman and Hoaglin ,1981
4. Ask Dr. Math – an illustration of how to produce a box and whiskers plot.

Focus of Course:Employability

e-Resource/e-ContentURL:<https://www.analyticsvidhya.com/blog/2021/08/how-to-perform-exploratory-data-analysis-a-guide-for-beginners/>

Course Designer

Mrs.A.ReshmaParveen

Dept of DSA

BOS Chairman

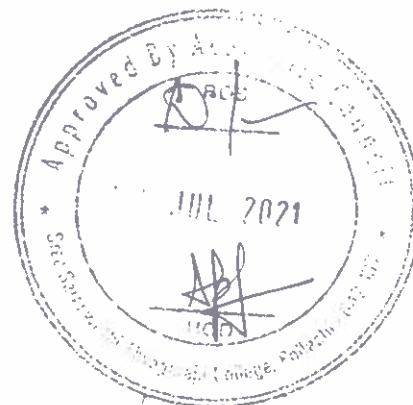
Mrs.D.Geetha

HOD Dept of BCA

CourseOutcomes(COs):

On Successful completion of this course the students will able to:

CO Number	CourseOutcome(CO)Statement	Blooms Taxonomy Knowledge Level
CO1	Identify data sources and types, and data sets and Libraries in python	K1
CO2	Explain the purpose of performing data transformation techniques	K2
CO3	Plan for and perform exploratory data analysis using descriptive statistics	K3
CO4	Perform exploratory data analysis for Grouping and correlation, time series	K3
CO5	Interpret, verify and validate the model using hypothesis testing and evaluation of model	K4



Mapping with Programme Outcomes and Programme Specific Outcomes:

Cos/POs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M		L	S	L	M	M
CO2	L	M	M	S	M		L	M	L	M	M
CO3	L	M	M	S	M		L	S	L	M	M
CO4	L	M	M	S	M		M	S	M	M	M
CO5	L	M	M	S	M		M	S	M	M	M

S- Strong;L -Low;M-Medium



SEMESTER – IV

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA4C20	Core12	R Programming	Application	55	5	-	4

Preamble: To understand the basics constructs of R Programming and Visualization. Apply Exploring variables using Visualization, Inferential Statistics and Regression Models

Prerequisite: Basics of Statistics

Syllabus:

Unit	Course contents	Number of Sessions
I	Introduction: What is R–Downloading and Installing R–Concatenating Data with c Function – Combining Variables with the c, cbind, rbind Functions - Vector Function –Matrix - Data frame – List - Importing Excel Data – Accessing Data from other Statistical Packages – Accessing the Database. Functions - The Attach Function – Exporting Data - The T apply Function – The sapply and lapply Function – The Summary and Table Function.	12
II	Importing Data – Csv, Excel, Table, Xml- Databases Conditional – Control flow – Loops – A Function with Multiple Arguments - Cleaning Data : Exploring raw data –Missing values - Zeros and NAs - String Manipulation – Filling Missing values – Packages – R Visualization Packages -ggplot2 – understanding plots – statistical function - Histogram – Box Plot – Scatter Plots–Pie Chart – The Bar Chart – Box Plot	12
III	Variable Analysis – One variable – Understanding outliers through – histogram , box plot. density plot – dataset – pseudo dataset of face book Exploring two variables – Understanding Variables and relationships – scatter plots – correlations – condition means – Explore multivariate variables – Visualization of variables using aesthetics in R – Case study – Explore Diamond dataset for prize prediction	12
IV	Data types – Categorical – Binary – ordinal – Nominal – Continuous – Discrete – Data Dimensions – Univariate – bivariate – multivariate – Numerical Measures – Central Tendency – Mean – Median – Mode - Understanding data using central tendency – plotting histogram – density plots and inference of plot - Variability Measure – Variance - Range - IQC - and Standard Deviation – Sum of squares – Squared Deviations – Absolute Deviations - Identify outlier using Inter Quartile Range – Visualization using box plot	12
V	Data standardizing – Z Score – Negative Z Score – Continuous Distributions - Compute proportions – Relative Frequency histogram - Normalized Distribution using Ztable – Probability Distributions - Probability of mean – location of mean distribution - Sampling Distributions– Understanding Shape of Distribution – Standard Error - Standard Deviation of sampling distribution — Mean of sample means Advanced Analytics Regression Analysis – Simple Regression Analysis	12
Total		60





ReferenceBook(s):

1. Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, "A Beginner's Guide to R Springer,
2. Roger D. Peng, "R Programming for Data Science" Lean Publishing, 2014
3. R Data camp – Online Course Contents - <https://campus.datacamp.com/courses/>

Focus of Course:Employability

e-Resource/e-Content URL: <https://www.youtube.com/watch?v=V8eKsto3Ug>


Course Designer :
 Dr.P.Sudha,
 Assistant Professor,
 Dept of Data Science and Analytics


BOS Chairman
 Mrs.D.Geetha
 HOD Dept of BCA

Course Outcomes (COs)

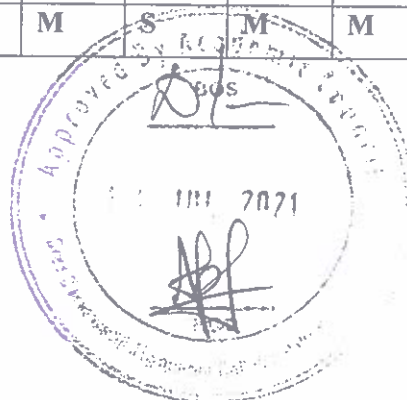
On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the basic programming structure of R– Data frame, Matrix, List, Packages and Functions	K1
CO2	Understand various visualization models and their inference – Scatter plots, histogram, boxplot	K2
CO3	Implement outliers concept using various data	K3
CO4	Apply statistical functions, models and their Inferences – Central tendency measure, Range, Variance, Standard Deviation	K3
CO5	Design data model for Sampling Distributions and Regression	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M
CO5	M	M	S	M	M	S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER – IV

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA4C30	Core13	R Programming Lab	Practical	-	5	55	4

Preamble: The course deals with the implementation of linear algebra and statistical functions using R studio.

Prerequisite: Basics of Statistics

Syllabus:

Unit	Course contents	Hours
1	R programming basic exercise	4
2	Practicing R programming using array	4
3	Practicing r programming using dataframe	4
4	Practicing r programming using matrix	4
5	Practicing r programming using list	4
6	Practicing r programming using factors	4
7	Exercise to implement the concept of classification in R	4
8	Exercise to implement the concept of clustering in R	4
9	Exercise to find associated items in dataset using R	4
10	Exercise to perform text classification using the movie review dataset in R.	4
11	Exercises to visualize data using Bar chart, Line chart, Pie chart, Scatterplot and Histogram.	4
12	Exercises to create Dashboard, analytics report for a dataset	4
13	Exercises to draw a scatter diagram, residual plots, outliers leverage and influential data points in R	4
14	Exercises to calculate correlation using R .	4
15	Exercises to implement Time series Analysis using R	4
Total		60

REFERENCE

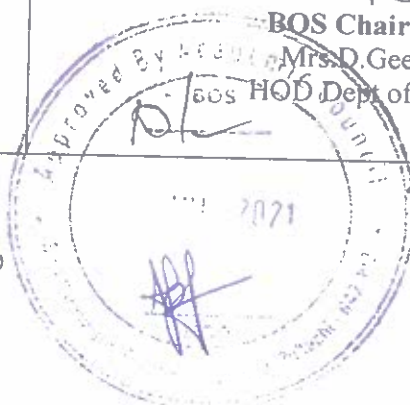
1. Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, "A Beginner's Guide to R Springer,
2. Roger D. Peng, "R Programming for Data Science" Lean Publishing, 2014

Focus of Course: Employability

e-Resource/e-Content URL: https://www.youtube.com/watch?v=_V8eKsto3Ug

Course Designer :
Dr.P.Sudha
Assistant Professor,
Dept of Data Science and Analytics

BOS Chairman
Mrs.D.Geetha
BOS HOD Dept of BCA



Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the basic programming structure of R- Data frame, Matrix, List, Packages and Functions	K1
CO2	Understand various visualization models and their inference – Scatter plots, histogram, boxplot	K2
CO3	Apply the Classification and clustering concepts	K3
CO4	Analyse real time data using various statistical measures with Dashboards	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER – IV

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA4C40	Core14	Data Mining and Visualization	Concept	45	5	-	4



Preamble: This course aims at facilitating the student to understand the basics of data mining and visualization for Data Science

Prerequisite: Basic Knowledge of Data Concepts

Syllabus:

Unit	Course contents	Hours
I	INTRODUCTION -Why Data Mining-What is Data mining and Data Warehouse -What kind of Data can be mined-What kind of patterns can be mined-Which technologies can be used-Which kinds of applications targeted Mining Frequent Patterns, Association and Correlations: Basic Concepts-Market Basket Analysis-Frequent Itemsets, Closed Itemsets, and Association Rules-Frequent Itemset Mining Methods: Apriori Algorithm: Finding Frequent Itemsets by Confined Candidate Generation-Generating Association Rules from Frequent Itemsets-Improving the Efficiency of Apriori-A Pattern-Growth Approach for Mining Frequent Itemsets	10
II	CLASSIFICATION: Basic Concepts-What is Classification-General Approach of classification-Decision Tree Induction-Tree Pruning-Scalability and Decision Tree Induction-Bayes Classification Methods: Bayes' Theorem-Naive Bayesian Classification-Rule-Based Classification: Using IF-THEN Rules for Classification-Rule Extraction from a Decision Tree	10
III	CLUSTER ANALYSIS: Basic Concepts and Methods-What Is Cluster Analysis- Requirements for Cluster Analysis-Overview of Basic Clustering Methods-partitioned methods - hierarchical methods - density based methods - dealing with large databases - quality and validity of cluster analysis methods - cluster analysis software	10
IV	VISUALIZATION INTRODUCTION: Context of data visualization – Definition, Methodology, Visualization design objectives. Key Factors – Purpose, visualization function and tone, visualization design options – Data representation, Data Presentation, Seven stages of data visualization, widgets, data visualization tools.	10
V	VISUALIZING DATA METHODS: Mapping - Time series - Connections and correlations - Scatter plot maps - Trees, Hierarchies and Recursion Networks and Graphs, Info graphics. TABLEAU INTRODUCTION: Environment Setup – Navigation – File	



	& Data Types. DATA SOURCE: Custom Data View – Extracting Data – Fields Operations – Editing Meta Data – Data Joining – Data Blending. Worksheets TABLEAUE CHARTS: Bar Chart – Line Chart – Pie Chart – Scatter Plot – Bubble Chart –Gantt Chart – Histograms - Waterfall Charts-Dashboards.	
	Total	50
Reference Book(s):		
<ol style="list-style-type: none"> 1. Data Mining. Concepts and Techniques, 3rd Edition, Jiawei Han, Micheline Kamber Jian Pei 2. Arun K Pujari, "Data Mining Techniques", 10th impression, University Press, 2008 3. Ben Fry, "Visualizing Data", O'Reilly Media, Inc., 2007 		
Focus of Course: Employability		
e-Resource/e-Content URL:		
<ul style="list-style-type: none"> • VidyamithraPortal : http://vidyamitra.inflibnet.ac.in/ • NPTEL • https://www.tutorialspoint.com/tableau/index.htm • https://www.tableau.com/learn/training. 		
Course Designer :  Mrs.A.Reshma Parveen Programme Coordinator, Dept of Data Science and Analytics		 BOS Chairman Mrs.D.Geetha HOD- Dept of BCA

Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the basic Data mining concepts	K1
CO2	Describe the Classification and clustering of data	K2
CO3	Illustrate the Data Visualizations	K3
CO4	Analyse various visualization using TABLEAUE	K4



Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	M	S	S		M	L	S	M	M
CO2	L	M	M	S	S		M	L	M	M	M
CO3	L	M	S	S	S		S	M	S	M	M
CO4	L	M	S	S	S		S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER – IV

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA4S20	SBC2	Data Mining and Visualization Lab	Practical	-	5	45	2

Preamble: This course aims at facilitating the student to understand the basics of Data Mining and Visualization

Prerequisite: Basic Knowledge of Data Mining and Visualization Concepts

Syllabus:

Sno	Course contents	Hours
Exercise on Data Mining:		
1	Demonstration of pre-processing on dataset student.arff	3
2	Demonstration of pre-processing on dataset labor.arff	3
3	Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm	3
4	Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm	3
5	Demonstration of clustering rule process on dataset student.arff using simple kmeans	3
Exercise on Data Visualization using Tableau:		
6	To connect with Data Source, Extract, Edit and Blend data using Tableau	3
7	To create a new worksheet and use various functions and calculations in Tableau	3
8	To work with various sort and filters available in Tableau	3
9	To create Bar chart, Line chart, Pie chart using Tableau	3
10	To create Crosstab, Scatterplot, Bubble chart using Tableau	3
11	To create Bullet graph, Box plot, Tree Map using Tableau	4
12	To create Bump chart, Gantt chart, Histogram using Tableau	4
13	To create Motion chart, Waterfall chart using Tableau	4
14	To create a Superstore Dashboard using Tableau	4
15	To create COVID-19 Dashboard using Tableau	4
Total		50

Reference Book(s):

1. Data Mining. Concepts and Techniques, 3rd Edition, Jiawei Han, Micheline Kamber Jian Pei
2. Arun K Pujari, "Data Mining Techniques", 10th impression, University Press, 2008
3. Ben Fry, "Visualizing Data", O'Reilly Media, Inc., 2007


Recommended Tools to be used: WEKA , Tableau public Desktop

Focus of Course: Skill Development

e-Resource/e-Content URL:

- VidyamithraPortal : <http://vidyamitra.inflibnet.ac.in/>
- <https://www.tutorialspoint.com/tableau/index.htm>
- <https://www.tableau.com/learn/training>.



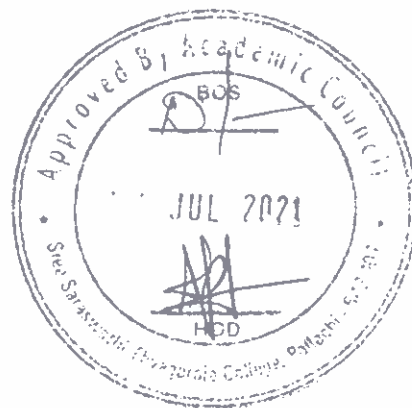
Course Designer : Mrs.A.Reshma Parveen Programme Coordinator, Dept of Data Science and Analytics	 BOS Chairman Mrs.D.Geetha HOD Dept of BCA
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Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Demonstrate the Data mining pre-processing and apply various algorithm using WEKA	K1
CO2	Illustrate data source connectivity and functions using Tableau	K2
CO3	Apply various type of charts and graphs using Tableau	K3
CO4	Analyse using the Dashboard in Tableau	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	M	S	S		M	L	S	M	M
CO2	L	M	M	S	S		M	L	M	M	M
CO3	L	M	S	S	S		S	M	S	M	M
CO4	L	M	S	S	S		S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER IV

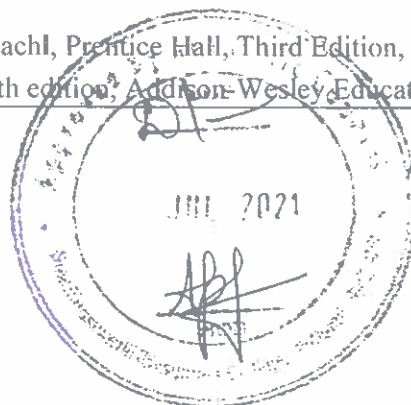
CourseCode	Type	CourseName	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
22BDA4A10	Allied	Introduction to Artificial Intelligence & Machine Learning	Theory	55	5	-	4

Preamble: This course enable the students to learn the basics of artificial intelligence concepts

Unit	Course Content	Number of Sessions
I	INTRODUCTION : Introduction–Definition - Future of Artificial Intelligence – Characteristics of Intelligent Agents– Typical Intelligent Agents – Problem Solving Approach to Typical AI problems.	12
II	PROBLEM SOLVING METHODS: Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics - Local Search Algorithms and Optimization Problems- APPLICATIONS: AI applications – Language Models – Information Retrieval- Information Extraction – Natural Language Processing - Machine Translation – Speech Recognition – Robot	12
III	INTRODUCTION : Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search	12
IV	BAYESIAN AND COMPUTATIONAL LEARNING: Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier- INSTANT BASED LEARNING: K- Nearest Neighbour Learning – Locally weighted Regression	12
V	ADVANCED LEARNING: Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning	12
	Total	60

Text Book:

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition, 2009.
2. I. Bratko, —Prolog: Programming for Artificial Intelligence, Fourth edition, Addison-Wesley Educational



Publishers Inc., 2011.

ReferenceBook(s):

1. M. Tim Jones, —Artificial Intelligence: A Systems Approach(Computer Science)I, Jones and Bartlett Publishers, Inc.; First Edition, 2008
2. Nils J. Nilsson, —The Quest for Artificial IntelligenceI, Cambridge University Press, 2009.
3. William F. Clocksin and Christopher S. Mellish,I Programming in Prolog: Using the ISO StandardI, Fifth Edition, Springer, 2003.
4. Gerhard Weiss, —Multi Agent SystemsI, Second Edition, MIT Press, 2013.
5. David L. Poole and Alan K. Mackworth, —Artificial Intelligence: Foundations of Computational AgentsI, Cambridge University Press, 2010.

Focus of Course: Employability

e-Resource/e-ContentURL:

<https://www.analyticsvidhya.com/blog/2021/09/introduction-to-artificial-intelligence-for-beginners/>

Course Designer :

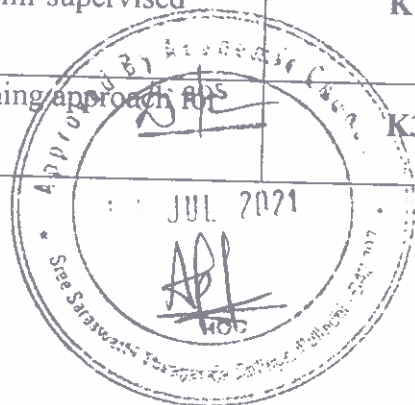
Mrs.A.Reshma Parveen
Programme Coordinator,
Dept of Data Science and Analytics

BOS Chairman
Mrs.D.Geetha
HOD Dept of BCA

CourseOutcomes(COs):

OnSuccessfulcompletionofthiscoursethestudentswillableto:

CO Number	CourseOutcome(CO)Statement	Blooms Taxonomy KnowledgeLevel
CO1	Use appropriate search algorithms for any AI problem	K1
CO2	Represent a problem based on real time applications	K2
CO3	Differentiate between supervised, unsupervised, semi-supervised machine learning approaches	K1
CO4	Analyze and suggest the appropriate machine learning approach for the various types of problem	K3



CO5	Design and make modifications to existing machine learning algorithms to suit an individual application	K4
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Mapping with Programme Outcomes and Programme Specific Outcomes:

Cos/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	L	S	M	M	L	L	S	M
CO2	L	M	L	S	M	M	L	L	S	M
CO3	L	M	L	S	M	M	L	L	S	M
CO4	L	M	S	S	S	M	M	M	S	M
CO5	L	M	S	S	S	S	M	S	M	M

S- Strong;L -Low;M-Medium



SEMESTER – V

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA5C10	Core15	Business Analytics	Concept	70	5	-	5
Preamble: This course aims at facilitating the student to understand the basics of Business analysis and decision making							
Prerequisite: Basic Knowledge of Business areas							

Syllabus:

Unit	Course contents	Hours
I	Introduction to Business Analytics and Decision making: What is Business Analytics- History of Business analysis- Overview of Business Analytics, Intelligence and Decision support: Concept of Decision support system-A Framework for Business Intelligence- Business analytics overview-Decision making introduction and definition-Phases of Decision making process-components of Decision support system.	15
II	Descriptive Analytics: Data warehousing-Definition and concepts-Data warehouse process overview-Data warehouse architectures-Data integration and ETL processes-Data warehouse development-Business reporting definitions and concepts-Data and information visualization-Different types of charts and graphs-Visual Analytics- Performance Dashboards- Business performance management-Performance measurement.	15
III	Predictive Analytics: Data mining-Concepts and applications-Data mining process and methods-Data mining software tools- Techniques for predictive modeling: Basic concepts of Neural networks-Developing Neural network based systems-Support vector machines- Text mining concepts and Applications-Text mining process and Tool- Sentimental analysis overview- Web mining overview- Web Analytics- Social Media Analytics.	15
IV	Prescriptive Analytics: Decision support system modeling- Mathematical models for decision support-Mathematical programming Optimization-Decision analysis using Decision tree- Problem solving search methods-Genetic Algorithms and applications-Simulation-Automated Decision system-Expert systems and applications	15
V	Business Analytics Applications: Accounting and Financial Management, Marketing Management, Human Resources Management, Production, Operations and Project Management, Logistics and Supply Chain Management, Retail Management, Banking and Financial Services Management, Healthcare Management-Case Studies.	15
	Total	75




Reference Book(s):

1. Ramesh Sharda, DursunDelen, EfraimTurban "Business Intelligence and Analytics- system for decision support" – 10th Edition Pearson publication
2. Albright, Winston "Business Analytics – Data Analysis and Decision Making" Cengage Learning

Focus of Course:Entrepreneurship**e-Resource/e-Content URL:**

- VidyamithraPortal : <http://vidyamitra.inflibnet.ac.in/>
- NPTEL
- <https://towardsdatascience.com/>

Course Designer :


Mrs.A.Reshma Parveen
Programme Coordinator,
Dept of Data Science and Analytics


BOS Chairman
Mrs.D.Geetha
HOD Dept of BCA

Course Outcomes (COs)

On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the basics of Business analytics and decision making	K1
CO2	Describe the Descriptive analytics for business	K2
CO3	Apply the Predictive and Prescriptive analytics for business	K3
CO4	Analyse various applications of Business analytics	K4



Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	S	L		L	S	L	L	M
CO2	M	M	M	M	M		L	S	L	L	M
CO3	M	M	L	S	M		L	S	L	L	M
CO4	M	M	S	M	M		L	S	L	L	M

S- Strong; L- Low; M-Medium



SEMESTER – V

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA5C20	Core16	Big Data analytics	Application	70	5	-	5
<p>Preamble: This course introduces big data framework, technologies, storage and Hadoop ecosystem. It also deals with the concepts of MapReduce, Spark and Scala programming</p> <p>Prerequisite: Database Management systems and Programming concepts</p>							

Syllabus:

Unit	Course contents	Hours
I	Introduction to Big data: Introduction – Big Data- Characteristics of Big Data – Big data management architecture- Examining Big Data Types – Big Data Technology Components – Big data analytics –Big data analytics examples - Web Data Overview – Web Data in Action.	15
II	Hadoop : Introduction – History of Hadoop - Hadoop Ecosystem- Analyzing data with Hadoop - Hadoop Distributed File System- Design - HDFS concepts - Hadoop filesystem –Data flow – Hadoop I/ O - Data integrity – Serialization - Setting up a Hadoop cluster - Cluster specification - cluster setup and installation – YARN	15
III	MapReduce: Introduction – Understanding Map, Reduce functions - Scaling out - Anatomy of a MapReduce Job Run - Failures – Shuffle and sort - MapReduce types and formats - features – counters - sorting - MapReduce Applications – Configuring and setting the environment - Unit test with MR unit- local test	15
IV	Spark: – Installing spark – Spark applications, Jobs, Stages and Tasks – Resilient Distributed databases- Anatomy of a Spark Job Run – Spark on YARN- SCALA: Introduction- Classes and objects- Basic types and operators- built-in control structures- functions and closures- inheritance	15
V	NoSQL Databases: Introduction to NoSQL- MongoDB: Introduction – Data types – Creating, Updating and deleting documents -Querying – Introduction to indexing – Capped collections. Hbase: Concepts - Hbase Vs RDBMS - Creating records- Accessing data – Updating and deleting data – Modifying data-exporting and importing data.	15
Total		75

Reference Books

1. Bill Franks (2012). Taming the Big Data Tidal wave, John Wiley & Sons
2. Tom White (2012). Hadoop: The Definitive Guide, Third Edition, O'Reilly Media
3. Martin Odersky, Lex Spoon, Bill Venners (2010), Programming in Scala, Second Edition, Artima Press, California.
4. Shashank Tiwari (2011). Professional NoSQL, John Wiley & Sons



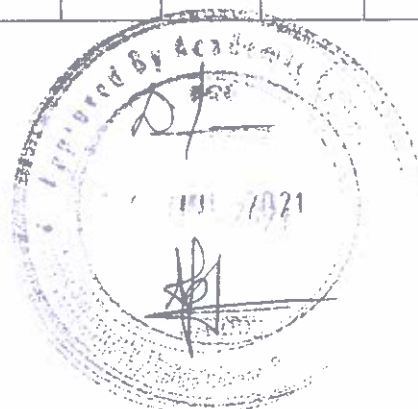
5. Boris lublinsky, Kevin t. Smith, Alexey, Yakubovich (2015). Professional Hadoop Solutions, Wiley
6. Chris Eaton, Dirk deroos et al. (2012). Understanding Big data, McGraw Hill
7. Min Chen (2014). Big Data: Related Technologies, Challenges and Future Prospects, Springer
8. Judith Hurwitz (2013). Big Data for Dummies, John Wiley & Sons
e-Resource/e-Content URL: https://www.youtube.com/watch?v=aRReF-lvyPQ https://www.youtube.com/watch?v=k7zu3NXEiGY
Focus of Course: Employability
<p>Course Designer : Dr.P.Sudha, Assistant Professor, Dept of Data Science and Analytics</p> <p>BOS Chairman Mrs.D.Geetha HOD Dept of BCA</p>

Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the characteristics of big data and concepts of Hadoop ecosystem	K1
CO2	Understand the concepts of Scala programming	K2
CO3	Apply Mapreduce programming model to process big data	K3
CO4	Analyze Spark and its uses for big data processing	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO4	PSO5
CO1	L	M	M	S	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER – V

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA5C30	Core17	Big Data Analytics Lab	Practical	-	5	55	3

Preamble: This course provides implementation of the Hadoop components like Hive and Spark. This course also provides various exercises to implement the components in the distributed environment through mapreduce programming

Prerequisite: Big data framework NoSQL concepts

Syllabus:

Unit	Course contents	Hours
1	Setting up a Hadoop environment	6
2	Exercises to implement file management tasks using Hadoop	6
3	Exercises to implement partitioning and bucketing in Hive	6
4	Exercises to create joins, views and indexes in Hive	6
5	Exercises to transfer the contents of XML, JSON and ORC files into Hive for processing	6
6	Exercises to implement HiveQL to sort, order, group, distribute and cluster.	6
7	Exercises to implement simple processing tasks in Spark.	6
8	Exercises to implement basic operations in Spark SQL.	6
9	Exercises to implement concepts of probability and distributions in R	6
10	Exercises to implement concepts of clustering using R	6
Total		60

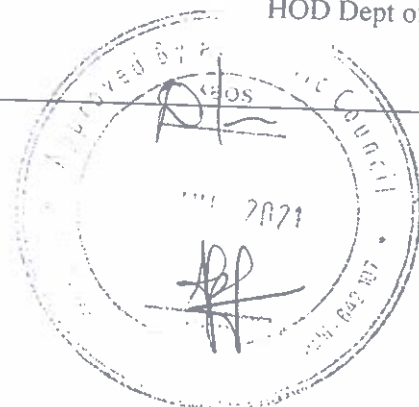
e-Resource/e-Content URL:

<https://www.youtube.com/watch?v=aRReF-lvyPQ>
<https://www.youtube.com/watch?v=k7zu3NXEiGY>

Focus of Course: Employability

PS
Course Designer :
 Dr.P.Sudha
 Assistant Professor,
 Dept of Data Science and Analytics

DL
BOS Chairman
 Mrs.D.Geetha
 HOD Dept of BCA



Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand Hadoop components for big data processing.	K1
CO2	Design and build a Hadoop cluster	K2
CO3	Apply simple processing operations in Spark and Develop Spark SQL for data processing	K3
CO4	Analyse big data applications using Hadoop using Hive commands	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER V

Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA5C40	Core 18	Mini Project Work Lab	Project			4	2

GUIDELINES FOR PROJECT

SREE SARASWATHI THYAGARAJA COLLEGE (Autonomous)
An ISO 21001:2018 Certified and NAAC Accredited Institution
(Affiliated to Bharathiar University, Coimbatore), Pollachi – 642 107

1. OBJECTIVE OF THE PROJECT

The primary objective of the Mini Project is to gain knowledge through practical experience, a sound appreciation and understanding of the theoretical principles learnt in four semesters. Project is oriented towards developing the skills, knowledge and attitudes needed to make an effective start as a member of the Data Science profession.

Some of the many expected advantages to be gained by an UG graduates are

- } Systematic introduction to the ways of industry and developing talent and attitudes, so that he / she can enjoy fully, a career in IT industry (as a Data Engineer / Data Scientist / Data Analyst/ Database administrator etc.).
- } Recognizing his / her responsibilities as a professional of the future.
- } Understanding real life situations in industrial organizations and their related environments and accelerating the learning process of how his / her knowledge could be used in a realistic way.
- } Understanding that the problems encountered in the industry rarely have unique solutions and gaining experience to select the optimal solution from the many alternatives available.

2. PROCEDURE

The following procedure will be adopted for the process:

- 2.1 For Mini Project students have to select a basic data analysis project and implement the same in any one of the tools learned from previous four semesters.
- 2.2 No Company certification is required for Mini Project work Lab

3. RULES

All the students must follow the following rules & regulations.

- a. All the communication must be in writing. No verbal communication will be accepted.
- b. Students should follow the procedures as mentioned in guidelines.
- c. All the reports and forms must be submitted in the prescribed formats.
- d. Student must be in regular touch with his/her project in charge.

5. FIELDS FOR PROJECTS

Following is the list of fields under which projects can be undertaken. Students are required to select only one project from the category listed below and get it approved from their project in charge.

- } *Exploratory Data Analysis using Python R Programming*
- } *Exploratory Data Analysis using R Programming*
- } *Data Analytics Projects using Spreadsheet*



- } *Data Visualization projects using Tableau*
- } *Data mining Projects using WEKA*

6. RULES FOR PRESENTATION

- } Students **should use LCD** for Presentation and Demonstration.
- } The presentation **should not be paper reading** and **duration** of the project will be of **10 minutes to 20 minutes** for each presentation.

7. GUIDELINE FOR PRESENTATION OF PROJECT REPORT

7.1. NUMBER OF COPIES TO BE SUBMITTED

Students should submit two copies to the Head of the Department concerned on or before the specified date. The Head of the Department should send one and one copy to the student concerned.

7.2. SIZE OF PROJECT REPORT

The size of project report should not exceed 100 pages of typed matter reckoned from the first page of Chapter 1 to the last page.

7.3. ARRANGEMENT OF CONTENTS OF PROJECT REPORT

The sequence in which the project report material should be arranged and bound should be as follows

7.4. PROJECT REPORT FORMAT: Refer Appendix 1

7.5. PAGE DIMENSIONS AND MARGIN

The dimensions of the final bound copies of the project report should be 290mm x 205mm. Standard A4 size (297mm x 210mm) paper may be used for preparing the copies.

The final two copies of the project report (at the time of submission) should have the following page margins:

Top edge	:	30 to 35 mm
Bottom edge	:	25 to 30 mm
Left side	:	35 to 40 mm
Right side	:	20 to 25 mm

The project report should be prepared on good quality white paper preferably not lower than 80gms /Sq. Meter.

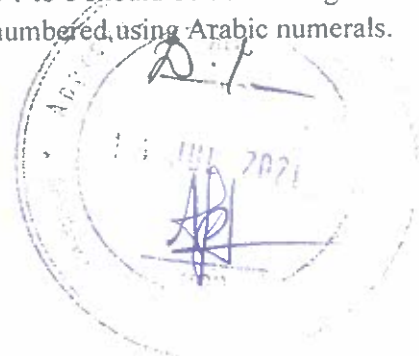
Tables and figures should conform to the margin specifications. Large size figures should be photographically or otherwise reduced to the appropriate size before insertion.

7.6. MANUSCRIPT PREPARATION:

The candidates shall supply a typed copy of the manuscript to the guide for the purpose of approval. In the preparation of the manuscript, care should be taken to ensure that all textual matter is typed to the extent possible in the same format as may be required for the final project report.

Hence, some of the information required for the final typing of the project report is included also in this section.

The headings of all items 2 to 11 listed section 4 should be typed in capital letters without punctuation and centered 50mm below the top of the page. The text should commence 4 spaces below this heading. The page numbering for all items 1 to 8 should be done using lower case Roman numerals and the pages thereafter should be numbered using Arabic numerals.



7.6.1. Title page – A specimen copy of the title page for respective UG programmes for project report is given in Appendix 2.

7.6.2. Bonafide Certificate – Using double spacing for typing the Bonafide Certificate should be in this format as given in Appendix 3.

7.6.3. Synopsis – Synopsis should be an essay type of narrative not exceeding 200 words, outlining the problem, the methodology used for tackling it and a summary of the project.

7.6.4. Acknowledgement – It should be brief and should not exceed one page when typed double spacing.

7.6.5. Table of contents – The table of contents should list all material following it as well as any material which precedes it. The title page, bonafide Certificate and acknowledgement will not find a place among the items listed in the table of contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head.

7.6.6. List of Tables and Figures – The list should use exactly the same captions as they appear above the tables/Figures in the text. One and a half spacing should be adopted for typing the matter under this head.

7.6.7. Parts – The Project may be broadly divided into 3 parts (i) Introduction (ii) Development of the main theme of the project report, (iii) Results, Discussion and Conclusion.

7.6.8. Appendices – Appendices are provided to give supplementary information, which if included in the main text may serve as a distraction and cloud the central theme under discussion.

7.6.9. Bibliography

Books: AUTHOR NAME, TITLE, PUBLICATION, EDITION.

Web Reference: URL/Web Address.

8. TYPING INSTRUCTIONS

8.1. General

This section includes additional information for final typing of the project report. Some information given earlier under 'Manuscript preparation' shall also be referred.

- The impressions on the typed copies should be black in colour.
- Uniformity in the font of letters in the same project report shall be observed.
- A sub-heading at the bottom of a page must have at least two full lines below it or else it should be carried over to the next page.
- The last word of any page should not be split using a hyphen.
- One and a half spacing should be used for typing the general text.
- Single spacing should be used for typing:
 - a. Long Tables
 - b. Long quotations
 - c. Foot notes
 - d. Multiline captions
 - e. References

All quotations exceeding one line should be typed in an indented space – the indentation being 15mm from either margin.

Double spacing should be used for typing the Bonafide Certificate and Acknowledgement.

8.2. Chapters

The format for typing chapter headings, division's headings and sub division headings are explained through the following illustrative examples.



Chapter heading	: CHAPTER 1
Division heading	: INTRODUCTION
Division heading	: 1.1 OUTLINE OF PROJECT REPORT
Sub-division heading	: 1.1.2. Literature Review

The word CHAPTER without punctuation should be centered 50mm down from the top of the page. Two spaces below, the title of the chapter should be typed centrally in capital letters. The text should commence 4 spaces below this title, the first letter of the text starting 20mm, inside from the left hand margin.

The division and sub-division captions along with their numberings should be left-justified. The typed material directly below division or sub-division heading should commence 2 spaces below it and should be offset 20mm from the left hand margin. Within a division or sub-division, paragraphs are permitted. Even paragraph should commence 3 spaces below the last line of the preceding paragraph, the first letter in the paragraph being offset from the left hand margin by 20mm.

9. NUMBERING INSTRUCTIONS

9.1. Page Numbering

All pages numbers (whether it be in Roman or Arabic numbers) should be typed without punctuation on the upper right hand corner 20mm from top with the last digit in line with the right hand margin. The preliminary pages of the project report (such as Title page, Acknowledgement, Table of Contents etc.) should be numbered in lower case Roman numerals. The title page will be numbered as (i) but this should not be typed. The page immediately following the title page shall be numbered (ii) and it should appear at the top right hand corner as already specified. Pages of main text, starting with Chapter 1 should be consecutively numbered using Arabic numerals.

9.2. Numbering of Chapters, Divisions and Sub-Divisions

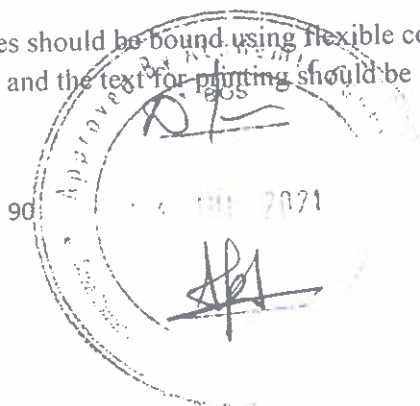
The numbering of chapters, divisions and sub-divisions should be done, using Arabic numerals only and further decimal notation should be used for numbering the divisions and sub-divisions within a chapter. For example, sub-division 4 under division 3 belonging to chapter 2 should be numbered as 2.3.4. The caption for the sub-division should immediately follow the number assigned to it. Every chapter beginning with the first chapter should be serially numbered using Arabic numerals. Appendices included should also be numbered in an identical manner starting with Appendix 1.

9.3. Numbering of Tables and Figures

Tables and Figures appearing anywhere in the project report should bear appropriate numbers. The rule for assigning such numbers is illustrated through an example. Thus if as figure in Chapter 3, happens to be the fourth then assign 3.4 to that figure. Identical rules apply for tables except that the word Figures is replaced by the word Table. If figures (or tables) appear in appendices then figure 3 in Appendix 2 will be designated as Figure A 2.3. If a table to be continued into the next page this may be done, but no line should be drawn underneath an unfinished table. The top line of the table continued into the next page should, for example read Table 2.1 (continued) placed centrally and underlined.

10. BINDING SPECIFICATIONS

Project report submitted for UG Programmes should be bound using flexible cover of Silver white. The cover should be printed in black letters and the text for printing should be identical to what has been prescribed for the title page.



APPENDIX 1

Project Report Format

- *Acknowledgement*
- *Organization Certificate*
- *Synopsis*
- *Table of Contents*
- *Abstract*

1. Introduction

- 1.1. Organization Profile
- 1.2. Overview of the Project

2. System Study

- 2.1. Existing System
 - 2.1.1 Drawbacks of Existing System
- 2.2. Proposed System
 - 2.2.1 Advantages of Proposed System

3. System Specification

- 3.1. Hardware specification
- 3.2. Software specification

4. System Design

- 4.1. DFD (Level 0, 1, 2)
- 4.2. ER Diagram
- 4.3. SFD
- 4.4. Table Design

5. Testing

- 5.1. Testing Methodologies

6. Implementation

- 6.1. Modules and its Descriptions (with Screen Shots)

7. Conclusion and Future Enhancement

8. Source Code

9. Bibliography



APPENDIX 2

PROJECT TITLE

A Project report submitted in partial fulfilment of the requirements for the award of the degree of
BACHELOR OF DATA SCIENCE AND ANALYTICS

Submitted by

NAME OF THE STUDENT
(REG_NO.)

Guide
GUIDE NAME



(DEPARTMENT OF UG DATA SCIENCE AND ANALYTICS)

Sree Saraswathi Thyagaraja College, (Autonomous)
(Affiliated to BHARATHIAR UNIVERSITY, Coimbatore),
Pollachi .

(MONTH AND YEAR)



APPENDIX 3

DECLARATION

I <Student Name> hereby declare that the project report entitled <“NAME OF THE PROJECT”> submitted to Sree Saraswathi Thyagaraja College (Autonomous), Pollachi, affiliated to Bharathiar University, Coimbatore in partial fulfilment of the requirements for the award of the degree of BACHELOR OF DATA SCIENCE AND ANALYTICS is a record of original work done by me under the guidance of <Guide Name>, Assistant Professor, Department of B.SCDATA SCIENCE AND ANALYTICS and it has not previously formed the basis for the award of any Degree / Diploma / Associate ship / Fellowship or other similar title to any candidate of any University.

Place :

Signature

Date :

(STUDENT NAME)



APPENDIX 4

**Sree Saraswathi Thyagaraja College (Autonomous)
(Affiliated to Bharathiar University, Coimbatore),
Pollachi.**

CERTIFICATE

This is to certify that the project report entitled <"PROJECT TITLE"> submitted to **Sree Saraswathi Thyagaraja College (Autonomous), Pollachi**, affiliated to **Bharathiar University, Coimbatore** in partial fulfilment of the requirements for the award of the degree of **BACHELOR OF DATA SCIENCE AND ANALYTICS** is a record of original work done by <STUDENT NAME> under my supervision and guidance and the report has not previously formed the basis for the award of any Degree / Diploma / Associate ship / Fellowship or other similar title to any candidate of any University.

Date:

Place:

Guide

(Guide Name)

Counter Signed by

**HOD
(HOD NAME)**

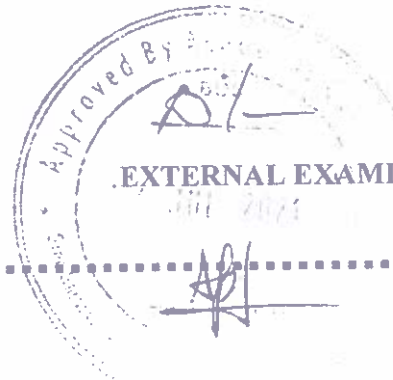
**DIRECTOR
(DIRECTOR NAME)**

**PRINCIPAL
(PRINCIPAL NAME)**

Viva-voce Examination held on -----

INTERNAL EXAMINER

EXTERNAL EXAMINER



SEMESTER – V

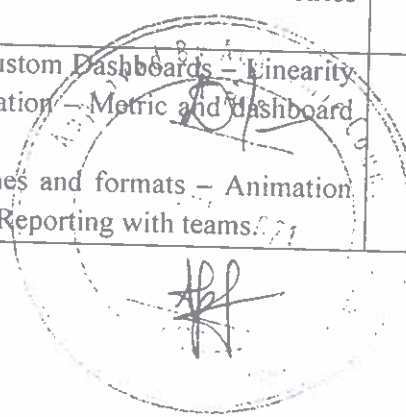
Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA5EA0	CE1	Social media Analytics	Concept	55	5	-	5



Preamble: The course covers concepts and techniques for retrieving, exploring, visualizing, and analyzing social network and social media data. Students learn the key metrics to assess social media goals, perform social network analysis to apply social media analytics process and formulate effective strategies based on the analytics.

Prerequisite: Basic knowledge of Data Science



Syllabus:

Unit	Course contents	Hours
I	<p>Foundation for Analytics: – Digital Gap – Social Media Data Sources – Defining Social Media Data – Data Sources – Estimated vs. Factual Data Sources – Data Gathering in Social Media Analytics.</p> <p>From Data to Insights: Actionable Analytics – Focus on objective – Plan to shape data to insights – Choosing a good analytics tool – Data Aggregation calculations and display – Data display – Social media and Big data – Potential Challenges. 72</p> <p>Data Identification: Professional networking sites - social sites – information sharing sites – microblogging sites – blogs /wikis</p>	12
II	<p>Analytics in Social Media: Types of analytics. Dedicated Vs. Hybrid Tools – Dedicated tools – Hybrid tools – Data Integration Tools – Best Setup.</p> <p>Social Network Landscape: Concept and UX on social networks – Interactivity of social network – Content flow on social network – Interaction Pattern between users – Social Media as a two way channel.</p>	12
III	<p>Analytics Process: Analysis – Insight – Investigation beyond social analytics – Shaping a method – analysis cycle – Community Activity – Resources – Attention span – Dynamic cycles – Short Periods – Long Periods – Analyst Mindset –</p> <p>Instinctive Analyst.</p> <p>Metrics: Introduction – Default and custom metrics – Metrics Categories – Graph Types – Metric Capabilities – Metrics and Strategy – Estimated Metrics – Metrics and Tactics.</p>	12
IV	<p>Dashboards: Purpose and Objectives – Default Vs. Custom Dashboards – Linearity and order of metrics – Metrics Positioning and Correlation – Metric and dashboard layout – Graphic design – Data Integration dashboards.</p> <p>Reports: Elements of reporting – Reporting approaches and formats – Animation and effects in reporting – Stake holders and feedback – Reporting with teams.</p>	12



V	<p>Strategy: Strategy in social media analytics – Strategic planning – Data availability and data sources – Knowledge beyond social media – Tools and technology preparation – Team Preparation – Goals and objectives – Contingency plans – application of social media analytics strategy – Strategy and tactics – Evaluation of a strategic analytics cycle.</p> <p>Tactics: Tactics for analytics strategies. Prescriptive analytics – Three stages of analytics – competitive advantage as a goal. Future of social media analytics – Need for more data and Digital transformation – Social Integration – Using artificial intelligence in social media analytics – Behavioural changes.</p>	12
Total		60
Text Book		
<ul style="list-style-type: none"> Alex Goncalves (2017). Social Media Analytics Strategy - Using Data to Optimize Business Performance. Alex Goncalves. APress 		
Reference Books		
<ol style="list-style-type: none"> Ganis, Kohirkar (2016). Social media Analytics, IBM Press PTG, 1st Edition Nancy Flynn (2012). The Social Media Hand book Policies, and Best Practices, Wiley 		
e-Resource/e-Content URL:		
https://www.youtube.com/watch?v=1fg58Kjkme4 https://www.youtube.com/watch?v=OOorJb1AfYA		
Focus of Course: Employability		
 Course Designer Mrs.A.Reshma Parveen Programme Coordinator, Dept of Data Science and Analytics		 BOS Chairman Mrs.D.Geetha HOD Dept of BCA

Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand sources and limitations of social media data.	K1
CO2	Apply social media analytics process and evaluate metrics.	K2
CO3	Examine different social media platforms and their associated tools	K3
CO4	Apply social media information to create dashboards and reports for visualization.	K4

Approved By



Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER – V

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA5S30	SBC3	Spreadsheet computation Lab	Practical	-	5	45	2
Preamble: This course aims at facilitating the student to understand from basics to advanced spreadsheet computation for Data Science							
Prerequisite: Basic Knowledge of Data collection							

Syllabus:

Sno	Course contents	Hours
Spreadsheet – Basic Level		
1	To work with Text and formulas in Microsoft Excel	3
2	To use functions like Sum(), Min(),Average(), Count() in Microsoft Excel	3
3	To create worksheet, Modify worksheet and format data in Microsoft Excel	3
4	To create basic charts using Microsoft Excel	3
Spreadsheet - Intermediate Level		
5	To work with List and its functions in Microsoft Excel	3
6	To work with Data Validation in Microsoft Excel	3
7	To import and Export data using Microsoft Excel	3
8	To create Pivot table for a given worksheet in Microsoft Excel	3
9	To work with large data set in Microsoft Excel	3
Spreadsheet - Advanced Level		
10	To use Conditional functions – IF(), AND(), COUNTIF(), SUMIF(), IFERROR() in Microsoft Excel	3
11	To use Lookup Functions – VLOOKUP(), HLOOKUP(), INDEX(), MATCH() in Microsoft Excel	4
12	To use Text based functions – LEFT(), RIGHT(),SERACH(), COUNT() in Microsoft Excel	4
13	To Create and Run a basic Macro for swapping values using Microsoft Excel	4
14	To Create and Run a Macro for Changing the chart type using Microsoft Excel	4
15	To Create and Run a Macro for Reverse Text function using Microsoft Excel	4
Total		50

Reference Book(s):

1. Greg Harvey “Excel 2019 for Dummies”, Wiley publishers

Recommended Tools to be used: Microsoft Excel 2019

Focus of Course: Skill Development

e-Resource/e-Content URL:

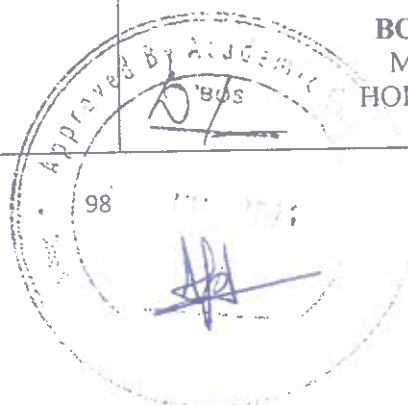
- VidyamithraPortal : <http://vidyamitra.inflibnet.ac.in/>
- NPTEL
- <https://www.tutorialspoint.com/excel/index.htm>
- <https://www.excel-easy.com/>

Course Designer :

Mrs.A.Reshma Parveen
Programme Coordinator,
Dept of Data Science and Analytics

BOS Chairman

Mrs.D.Geetha
HOD Dept of BCA



Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Demonstrate Basic Text and formatting functions of Excel	K1
CO2	Illustrate the Pivot Table and Data Validation using Excel	K2
CO3	Apply the Advanced Lookup and Text functions	K3
CO4	Analyse using the Macros in Excel	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	S	S	M	M	S	S	M	M
CO2	L	M	S	M	M	M	S	M	M	M
CO3	M	M	S	S	M	S	S	S	M	M
CO4	M	M	S	M	M	S	S	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER – VI

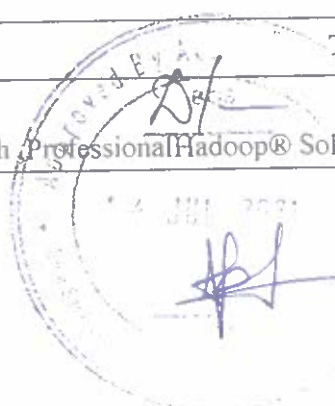
Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA6C10	Core19	MapReduce Programming	Concept	55	5	-	4
Preamble: To understand MapReduce programming architecture, processing models, design MapReduce Programming using PIG and Hive and also compare the architectural and processing of MapReduce Programming languages Kafka, Hive and SPARK							
Prerequisite: Basics of Programming							

Syllabus:

Unit	Course contents	Hours
I	Introduction to Big Data – Distributed file system – Map Reduce Algorithm - Hadoop Storage [HDFS], Common Hadoop Shell commands - Anatomy of File Write and Read, NameNode, Secondary Name Node, and Data Node - Hadoop Configuration – SPARK Configuration - Pig Configuration – Hive Configuration	12
II	Apache Kafka Introduction :Messaging System-What is Kafka- Kafka fundamentals- Cluster Architecture- Workflow-Basic Operations-Simple Producer-Consumer Group- Integration with Storm- Integration with Spark-Kafka Tools- Applications and Case studies.	12
III	Introduction of Hive - Hive Features - Hive architecture -Hive Meta store - Hive data types – Hive Tables - Table types - Creating database , Altering database, Create table, alter table, Drop table, - Built-In Functions - Built-In Operators, User defined functions, - View – Pig Vs Hive	12
IV	HiveQL -Introduction to HiveQL, HiveQL Select, HiveQL – MapReduce using HiveQLOrderBy,Group By Joins, LIMIT, Distribute By , Cluster By - Sorting And Aggregation – Partitioning – Static –Dynamic – Index Creation - Bucketing – Analysis of MapReduce execution – Hive Optimization – Setting Hivng Parameters. – Usecase :MapReduce using Hive QL – HiveQLVs SQL	12
V	SPARK – MapReduce - RDD Transformations – SPARK Operations – Usecase with SPARK and Comparison - MapReduce – Python – R – Pig – Spark – Hadoop - Limitations – Advantage – SPARK vsHadoop – SPARK Vs Pig and Hive – MapReduce	12
Total		60

REFERENCES

1. Boris Lublinsky Kevin T. Smith Alexey Yakubovich Professional Hadoop® Solutions,





Wiley, ISBN: 9788126551071, 2015.

2. Chris Eaton, Dirk derooet al. , “Understanding Big data ”, McGraw Hill, 2012.
3. Tom White , “Hadoop: The Definitive Guide”, O'Reilly Media 3rd Edition, May6, 2012
4. Donald Miner, Adam Shook, “MapReduce Design Patterns”, O'Reilly Media November 22, 2012
5. Edward Capriolo ,DeanWampler ,Jason Rutherglen, “Programming Hive”, O'Reilly Media; 1 edition , October, 2012
6. Alan Gates , “Programming Pig”, O'Reilly Media; 1st Edition ,October, 2011
7. https://www.tutorialspoint.com/apache_spark

e-Resource/e-Content URL:
<https://www.youtube.com/watch?v=SqvAaB3vK8U>
<https://www.youtube.com/watch?v=rll6EnW95R8>
https://www.tutorialspoint.com/apache_kafka/

Focus of Course: Employability

 Course Designer : Dr.P.Sudha, Assistant Professor, Dept of Data Science and Analytics	 BOS Chairman Mrs.D.Geetha HOD Dept of BCA
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Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand MapReduce Processing architectures	K1
CO2	Configure and setup MapReduce Processing architectures Ecosystem – Hadoop, Spark ,Kafka and Hive	K2
CO3	Understand and write MapReduce program using Kafka and Hive, spark	K3
CO4	Analyse dataset using Kafka and Hive	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes



COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M		M	L	S	M	M
CO2	L	M	M	M	M		M	L	M	M	M
CO3	M	M	M	S	M		S	M	S	M	M
CO4	M	M	S	M	M		S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER – VI

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA6C20	Core20	Map Reduce programming Lab	Practical	-	5	45	4

Preamble: This course also provides various exercises to implement in the distributed environment through map reduce programming.

Prerequisite: Basics of Map reduce Programming

Syllabus:

Unit	Course contents	Hours
1	Setting up a Hadoop environment	7
2	Exercises to implement Stock count Map reduce program	7
3	Exercises to implement Map reduce program that mines weather data	7
4	Exercises for implementing two different map reduce programs using joins	7
5	Exercises to implement Map reduce program using log files	7
6	Exercises to implement file management tasks using Hadoop	7
7	Exercises for implementing sorting technique using Map reduce	8
Total		50

REFERENCES

1. Boris Lublinsky Kevin T. Smith Alexey Yakubovich ,ProfessionalHadoop® Solutions, Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk derooset al. , “Understanding Big data ”, McGraw Hill, 2012.
3. Tom White ,“Hadoop: The Definitive Guide”, O'Reilly Media 3rd Edition,May6, 2012
4. Donald Miner, Adam Shook, “MapReduce Design Patterns”, O'Reilly Media November 22, 2012
5. Edward Capriolo ,DeanWampler ,Jason Rutherglen, “Programming Hive”, O'Reilly Media; 1 edition , October, 2012
6. Alan Gates , “Programming Pig”, O'Reilly Media; 1st Edition ,October, 2011
7. https://www.tutorialspoint.com/apache_spark

Focus of Course: Employability

Course Designer :
Dr.P.Sudha,
Assistant Professor,
Dept of Data Science and Analytics

Dr. Geetha
BOS Chairman
Mrs.D.Geetha
HOD Dept of BCA



Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Demonstrate the Basic MapReduce Programs in Hadoop environment	K1
CO2	Design and build a Hadoop cluster	K2
CO3	Construct the concepts of MapReduce for data analytics	K3
CO4	Apply specific Mapper and reducer functions for different situations	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	S	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S- Strong; L- Low; M-Medium



SEMESTER VI

Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
22BDA6C30	Core 21	Main Project Work Lab	Project			4	4

GUIDELINES FOR PROJECT

SREE SARASWATHI THYAGARAJA COLLEGE (Autonomous)
An ISO 21001:2018 Certified and NAAC Accredited Institution
(Affiliated to Bharathiar University, Coimbatore), Pollachi – 642 107

1. OBJECTIVE OF THE PROJECT

The primary objective of the Project is to gain through practical experience, a sound appreciation and understanding of the theoretical principles learnt in four semesters. Project is oriented towards developing the skills, knowledge and attitudes needed to make an effective start as a member of the Data Science profession.

Some of the many expected advantages to be gained by an UG graduates are

- 1) Systematic introduction to the ways of industry and developing talent and attitudes, so that he / she can enjoy fully, a career in IT industry (as a Data Engineer / Data Scientist / Data Analyst/ Database administrator etc.).
- 1) Recognizing his / her responsibilities as a professional of the future.
- 1) Understanding real life situations in industrial organizations and their related environments and accelerating the learning process of how his / her knowledge could be used in a realistic way.
- 1) Understanding that the problems encountered in the industry rarely have unique solutions and gaining experience to select the optimal solution from the many alternatives available.

2. PROCEDURE

The following procedure will be adopted for the process:

- 2.3 Before the training actually starts, profile of the company / organization must be submitted for the evaluation purposes.
- 2.4 The letter of the training will be issued only by the Centre Head or Project incharge.
- 2.5 No student will change organization/Project during the training period. However, for the betterment of students case will be put up by Project Incharge approved by the Centre Head.
- 2.6 After the student joins the training, a joining report must be submitted within stipulated time.
- 2.7 No project will be accepted unless it is done in consultation with the faculty and signed by him/her.

3. RULES

All the students must follow the following rules & regulations.

- e. All the communication must be in writing. No verbal communication will be accepted.
- f. Students should follow the procedures as mentioned in guidelines.
- g. All the reports and forms must be submitted in the prescribed formats.
- h. Student must be in regular touch with his/her project in charge.



4. TYPES OF ORGANIZATIONS

Students can opt for various types of institutes / organizations for their summer project. But before the training actually starts, profile of the company / organization must be submitted. A group of students not exceeding four may choose one organization / institution for project.

5. FIELDS FOR PROJECTS

Following is the list of fields under which projects can be undertaken. Students are required to select only one project from the category listed below and get it approved from their project in charge.

- } *Big Data Projects*
- } *Exploratory Data Analysis projects*
- } *Data Visualization projects*
- } *Machine Learning projects*
- } *Data mining and Text mining Projects*

6. RULES FOR PRESENTATION

- } Students **should use LCD** for Presentation and Demonstration.
- } The presentation **should not be paper reading** and **duration** of the project will be of **10 minutes to 20 minutes** for each presentation.

7. GUIDELINE FOR PRESENTATION OF PROJECT REPORT

7.1. NUMBER OF COPIES TO BE SUBMITTED

Students should submit two copies to the Head of the Department concerned on or before the specified date. The Head of the Department should send one and one copy to the student concerned.

7.2. SIZE OF PROJECT REPORT

The size of project report should not exceed 100 pages of typed matter reckoned from the first page of Chapter 1 to the last page.

7.3. ARRANGEMENT OF CONTENTS OF PROJECT REPORT

The sequence in which the project report material should be arranged and bound should be as follows

7.4. PROJECT REPORT FORMAT: Refer Appendix 1

7.5. PAGE DIMENSIONS AND MARGIN

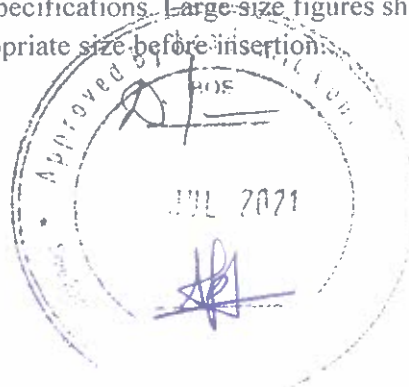
The dimensions of the final bound copies of the project report should be 290mm x 205mm. Standard A4 size (297mm x 210mm) paper may be used for preparing the copies.

The final two copies of the project report (at the time of submission) should have the following page margins:

Top edge	:	30 to 35 mm
Bottom edge	:	25 to 30 mm
Left side	:	35 to 40 mm
Right side	:	20 to 25 mm

The project report should be prepared on good quality white paper preferably not lower than 80gms /Sq. Meter.

Tables and figures should conform to the margin specifications. Large size figures should be photographically or otherwise reduced to the appropriate size before insertion.



7.6. MANUSCRIPT PREPARATION:

The candidates shall supply a typed copy of the manuscript to the guide for the purpose of approval. In the preparation of the manuscript, care should be taken to ensure that all textual matter is typed to the extent possible in the same format as may be required for the final project report.

Hence, some of the information required for the final typing of the project report is included also in this section.

The headings of all items 2 to 11 listed section 4 should be typed in capital letters without punctuation and centered 50mm below the top of the page. The text should commence 4 spaces below this heading. The page numbering for all items 1 to 8 should be done using lower case Roman numerals and the pages thereafter should be numbered using Arabic numerals.

7.6.1. Title page – A specimen copy of the title page for respective UG programmes for project report is given in Appendix 2.

7.6.2. Bonafide Certificate – Using double spacing for typing the Bonafide Certificate should be in this format as given in Appendix 3.

7.6.3. Synopsis – Synopsis should be an essay type of narrative not exceeding 200 words, outlining the problem, the methodology used for tackling it and a summary of the project.

7.6.4. Acknowledgement – It should be brief and should not exceed one page when typed double spacing.

7.6.5. Table of contents – The table of contents should list all material following it as well as any material which precedes it. The title page, bonafide Certificate and acknowledgement will not find a place among the items listed in the table of contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head.

7.6.6. List of Tables and Figures – The list should use exactly the same captions as they appear above the tables/Figures in the text. One and a half spacing should be adopted for typing the matter under this head.

7.6.7. Parts – The Project may be broadly divided into 3 parts (i) Introduction (ii) Development of the main theme of the project report, (iii) Results, Discussion and Conclusion.

7.6.8. Appendices – Appendices are provided to give supplementary information, which if included in the main text may serve as a distraction and cloud the central theme under discussion.

7.6.9. Bibliography

Books: AUTHOR NAME, TITLE, PUBLICATION, EDITION.

Web Reference: URL/Web Address.

8. TYPING INSTRUCTIONS

8.1. General

This section includes additional information for final typing of the project report. Some information given earlier under 'Manuscript preparation' shall also be referred.

- The impressions on the typed copies should be black in colour.
- Uniformity in the font of letters in the same project report shall be observed.
- A sub-heading at the bottom of a page must have at least two full lines below it or else it should be carried over to the next page.
- The last word of any page should not be split using a hyphen.
- One and a half spacing should be used for typing the general text.



- Single spacing should be used for typing:
 - f. Long Tables
 - g. Long quotations
 - h. Foot notes
 - i. Multiline captions
 - j. References

All quotations exceeding one line should be typed in an indented space – the indentation being 15mm from either margin.

Double spacing should be used for typing the Bonafide Certificate and Acknowledgement.

8.2. Chapters

The format for typing chapter headings, division's headings and sub division headings are explained through the following illustrative examples.

Chapter heading	: CHAPTER 1
Division heading	: INTRODUCTION
Division heading	: 1.1 OUTLINE OF PROJECT REPORT
Sub-division heading	: 1.1.2. Literature Review

The word CHAPTER without punctuation should be centered 50mm down from the top of the page. Two spaces below, the title of the chapter should be typed centrally in capital letters. The text should commence 4 spaces below this title, the first letter of the text starting 20mm, inside from the left hand margin.

The division and sub-division captions along with their numberings should be left-justified. The typed material directly below division or sub-division heading should commence 2 spaces below it and should be offset 20mm from the left hand margin. Within a division or sub-division, paragraphs are permitted. Even paragraph should commence 3 spaces below the last line of the preceding paragraph, the first letter in the paragraph being offset from the left hand margin by 20mm.

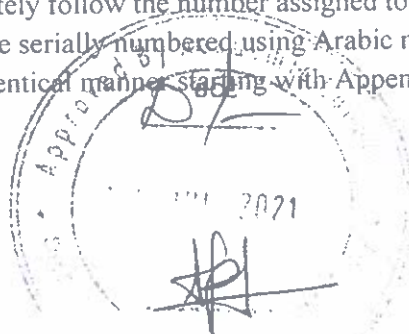
9. NUMBERING INSTRUCTIONS

9.1. Page Numbering

All pages numbers (whether it be in Roman or Arabic numbers) should be typed without punctuation on the upper right hand corner 20mm from top with the last digit in line with the right hand margin. The preliminary pages of the project report (such as Title page, Acknowledgement, Table of Contents etc.) should be numbered in lower case Roman numerals. The title page will be numbered as (i) but this should not be typed. The page immediately following the title page shall be numbered (ii) and it should appear at the top right hand corner as already specified. Pages of main text, starting with Chapter 1 should be consecutively numbered using Arabic numerals.

9.2. Numbering of Chapters, Divisions and Sub-Divisions

The numbering of chapters, divisions and sub-divisions should be done, using Arabic numerals only and further decimal notation should be used for numbering the divisions and sub-divisions within a chapter. For example, sub-division 4 under division 3 belonging to chapter 2 should be numbered as 2.3.4. The caption for the sub-division should immediately follow the number assigned to it. Every chapter beginning with the first chapter should be serially numbered using Arabic numerals. Appendices included should also be numbered in an identical manner starting with Appendix 1.



9.3. Numbering of Tables and Figures

Tables and Figures appearing anywhere in the project report should bear appropriate numbers. The rule for assigning such numbers is illustrated through an example. Thus if as figure in Chapter 3, happens to be the fourth then assign 3.4 to that figure. Identical rules apply for tables except that the word Figures is replaced by the word Table. If figures (or tables) appear in appendices then figure 3 in Appendix 2 will be designated as Figure A 2.3. If a table to be continued into the next page this may be done, but no line should be drawn underneath an unfinished table. The top line of the table continued into the next page should, for example read Table 2.1 (continued) placed centrally and underlined.

10. BINDING SPECIFICATIONS

Project report submitted for UG Programmes should be bound using flexible cover of Silver white. The cover should be printed in black letters and the text for printing should be identical to what has been prescribed for the title page.



APPENDIX 1

Project Report Format

- *Acknowledgement*
- *Organization Certificate*
- *Synopsis*
- *Table of Contents*
- *Abstract*

1. Introduction

- 1.1. Organization Profile
- 1.2. Overview of the Project

2. System Study

- 2.1. Existing System
 - 2.1.1 Drawbacks of Existing System
- 2.2. Proposed System
 - 2.2.1 Advantages of Proposed System

3. System Specification

- 3.1. Hardware specification
- 3.2. Software specification

4. System Design

- 4.1. DFD (Level 0, 1, 2)
- 4.2. ER Diagram
- 4.3. SFD
- 4.4. Table Design

5. Testing

- 5.1. Testing Methodologies

6. Implementation

- 6.1. Modules and its Descriptions (with Screen Shots)

7. Conclusion and Future Enhancement

8. Source Code

9. Bibliography



APPENDIX 2

PROJECT TITLE

A Project report submitted in partial fulfilment of the requirements for the award of the degree of
BACHELOR OF DATA SCIENCE AND ANALYTICS

Submitted by

NAME OF THE STUDENT
(REG_NO.)

Guide
GUIDE NAME



(DEPARTMENT OF UG DATA SCIENCE AND ANALYTICS)

Sree Saraswathi Thyagaraja College, (Autonomous)
(Affiliated to BHARATHIAR UNIVERSITY, Coimbatore),
Pollachi .

(MONTH AND YEAR)



APPENDIX 3

DECLARATION

I <Student Name> hereby declare that the project report entitled <“NAME OF THE PROJECT”> submitted to Sree Saraswathi Thyagaraja College (Autonomous), Pollachi , affiliated to Bharathiar University, Coimbatore in partial fulfilment of the requirements for the award of the degree of BACHELOR OF DATA SCIENCE AND ANALYTICS is a record of original work done by me under the guidance of <Guide Name>, Assistant Professor, Department of B.SCDATA SCIENCE AND ANALYTICS and it has not previously formed the basis for the award of any Degree / Diploma / Associate ship / Fellowship or other similar title to any candidate of any University.

Place :

Signature

Date :

(STUDENT NAME)



APPENDIX 4

Sree Saraswathi Thyagaraja College (Autonomous)
(Affiliated to Bharathiar University, Coimbatore),
Pollachi.

CERTIFICATE

This is to certify that the project report entitled <"PROJECT TITLE"> submitted to Sree Saraswathi Thyagaraja College (Autonomous), Pollachi, affiliated to Bharathiar University, Coimbatore in partial fulfilment of the requirements for the award of the degree of BACHELOR OF DATA SCIENCE AND ANALYTICS is a record of original work done by <STUDENT NAME> under my supervision and guidance and the report has not previously formed the basis for the award of any Degree / Diploma / Associate ship / Fellowship or other similar title to any candidate of any University.

Date:

Place:

Guide
(Guide Name)

Counter Signed by

HOD
(HOD NAME)

DIRECTOR
(DIRECTOR NAME)

PRINCIPAL
(PRINCIPAL NAME)

Viva-voce Examination held on -----

INTERNAL EXAMINER

EXTERNAL EXAMINER



SEMESTER – VI

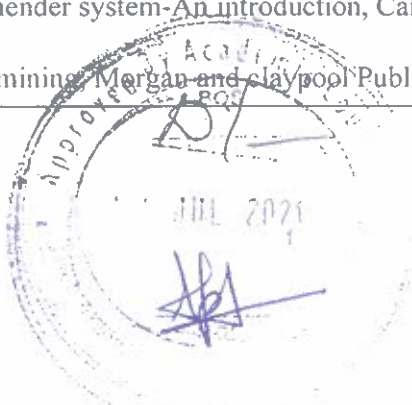
Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA6EA0	CE2	Web Analytics (Common to B.Sc (CS), B.Sc (IT) & BCA, B.Sc (DSA), B.Sc (AIML))	Concept	55	5	-	5
<p>Preamble: This course gives insights about leveraging web data to achieve strategic business objectives. It deals with the various techniques for analyzing web data like click stream analysis. The course also provides ways to execute competitive intelligence analysis and to analyze emerging social, mobile and video data.</p> <p>Prerequisite: Foundations of Data Science , Data Mining</p>							



Syllabus:

Unit	Course contents	Hours
I	Introduction: Web Analytics 2.0 – Clickstream - multiple outcome analysis - experimentation and testing - voice of customer – competitive intelligence - the tactical shift - Optimal strategy for choosing web analytics	12
II	Clickstream analysis: Metrics-Eight critical web metrics-web metrics demystified – strategically aligned tactics for impactful web – Web analytics report - Foundational analytical strategies - clickstream analysis made actionable -challenges	12
III	Measuring Success - Actionable Outcome KPIs - Moving beyond conversion rates - Micro and Macro Conversion - Measuring success for a non–ecommerce website - Leveraging qualitative data: Surveys - Web enabled emerging user research options	12
IV	A/B Testing - Multivariate testing - Actionable testing ideas - Controlled experiments - Competitive intelligence analysis - CI data source, types, secrets - website traffic analysis - Search and keyword analysis - audience identification and segmentation analysis	12
V	Emerging analytics: Social. mobile, video: Measuring social web - the data challenge - analyzing mobile customer experiences-measuring the success of blogs- quantifying the impact of Twitter – Analyzing the performance of videos	12
Total		60

Text Books

1. Avinash Kaushik (2010), Web Analytics 2.0: The Art of Online Accountability and Science of Customer Centricity, 1st Edition, Wiley Publishing.
2. Dietmar Jannach, Markus Zanker (2011), Recommender system-An introduction, Cambridge University Press
3. Bing Liu (2012), Sentiment Analysis and opinion mining, Morgan and claypool Publishing



Reference Books	
1. Eric Enge, Stephan Spencer, Jessie Stricchiola, The Art of SEO: Mastering Search Engine Optimization, 3rd Edition.	
2. Kristina Halvors, Content Strategy for the Web, 1st Edition.	
e-Resource/e-Content URL: https://www.youtube.com/watch?v=KL76-LsuV-8	
Focus of Course: Employability	
Course Designer :  Mrs.A.Reshma Parveen Programme Coordinator, Dept of Data Science and Analytics	 BOS Chairman Mrs.D.Geetha HOD Dept of BCA

Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the techniques of web data analytics	K1
CO2	Apply web data analytics on social, mobile and video data	K2
CO3	Analyze techniques for measuring the success of a website	K3
CO4	Assess the various cases to apply web data analytics	K4

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
							CO1	L	M	M	S
CO2	L	M	M	M	M	M	L	M	M	M	
CO3	M	M	M	S	M	S	M	S	M	M	
CO4	M	M	S	M	M	S	M	S	M	M	

S- Strong; L- Low; M-Medium

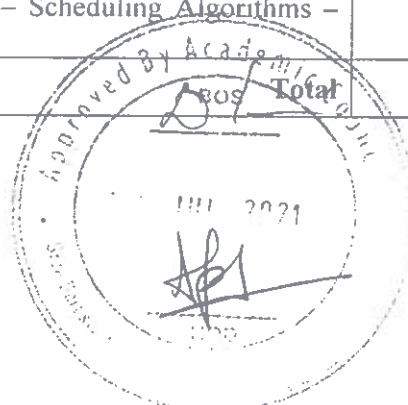


SEMESTER – VI

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA6EB0	CE3	Information Retrieval (Common to B.Sc (CS), B.Sc (IT) & BCA, B.Sc (DSA), B.Sc (AIML)	Concept	55	5	-	5
Preamble: This course aims at facilitating the student to understand the basics of Information Retrieval							
Prerequisite: Basic Knowledge of Information							

Syllabus:

Unit	Course contents	Hours
I	Introduction: Overview of text retrieval systems-Basic Concepts-Retrieval Process-Architecture- Boolean retrieval- Dictionaries and tolerant retrieval- Retrieval Evaluation- Open source IR systems- History of Web search- Characteristics of Web-Impact of web in information retrieval- Web search Versus Information Retrieval- Search engine components.	12
II	Retrieval models and implementation: Characterization of IR Models- Vector Space Model- Boolean Model- Term weighting- Scoring and Ranking-Language Models-Set Theoretic Model- Probabilistic model- Algebraic Model- Structured Text retrieval model- Models for browsing.	12
III	Indexing: Static and Dynamic inverted indices- Index construction and Index compression- Searching- Sequential search and pattern matching- Query operations- Query languages- Query Processing-Relevance feedback and Query Expansion-Automatic local and global analysis-Measuring effectiveness and efficiency.	12
IV	Classification and Clustering: Text Classification and Naïve Bayes- Vector space classification- Support vector Machines and Machine learning on document-Flat Clustering-Hierarchical clustering- Matrix decompositions and latent semantic indexing-Fusion and meta learning.	12
V	Web Retrieval and Web crawling: The Web – Search Engine Architectures – Cluster based Architecture – Distributed Architectures – Search Engine Ranking – Link based Ranking – Simple Ranking Functions – Learning to Rank – Evaluations – Search Engine Ranking – Search Engine User Interaction – Browsing – Applications of a Web Crawler – Taxonomy – Architecture and Implementation – Scheduling Algorithms – Evaluation.	12
		Total 60





Reference Book(s):

1. C. Manning, P. Raghavan, and H. Schütze, —Introduction to Information Retrieval, Cambridge University Press, 2008.
2. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, —Modern Information Retrieval: The Concepts and Technology behind Search, Second Edition, ACM Press Books, 2011.
3. Stefan Buettcher, Charles L. A. Clarke and Gordon V. Cormack, —Information Retrieval: Implementing and Evaluating Search Engines, The MIT Press, 2010.

Focus of Course: Employability**e-Resource/e-Content URL:**

- VidyamithraPortal : <http://vidyamitra.inflibnet.ac.in/>
- NPTEL
- <https://towardsdatascience.com/>

Course Designer : 
 Mrs. A. Reshma Parveen
 Programme Coordinator,
 Dept of Data Science and Analytics


BOS Chairman
 Mrs. D. Geetha
 HOD Dept of BCA

Course Outcomes (COs)

On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Introduces the need for information retrieval for decision making.	K1
CO2	Define the different models in retrieval of information	K2
CO3	Emphasizes the role Clustering and classification in information retrieval.	K3
CO4	Introduce the needs for information retrieval using web.	K4



Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	M	S	M		M	L	S	M	M
CO2	M	M	M	M	M		M	L	M	M	M
CO3	M	M	M	S	M		S	M	S	M	M
CO4	M	M	S	M	M		S	M	S	M	S

S- Strong; L- Low; M-Medium



SEMESTER – VI

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BDA6S40	SBC4	Cloud and Data Security	Concept	45	5	-	2

Preamble: This course aims at facilitating the student to understand the need of Data Security in cloud computing

Prerequisite: Basic Knowledge of Data

Syllabus:

Unit	Course contents	Hours
I	INTRODUCTION TO ARCHITECTURE AND SECURITY OF CLOUD: Understanding Cloud Computing –The IT foundation for Cloud – A Brief Primer on Security –Security Architecture – Cloud Reference Architecture - Control over Security in the Cloud Model –Making sense of Cloud Deployment – Real world Cloud Usage Scenarios	10
II	Cloud Computing: Security Concerns - Assessing your risk tolerance in Cloud Computing – Legal and Regulatory issues - Securing the Cloud: Architecture – Security Requirements for the Architecture - Security Patterns and Architectural elements – Cloud Security Architecture -Planning Key Strategies for Secure Operation	10
III	DATA SECURITY: Overview of Data Security in Cloud Computing - Data Encryption: Applications and Limits – Cloud Data Security: Sensitive Data Categorization - Cloud Data Storage	10
IV	Overall Strategy: Effectively Managing Risk - Overview of Security Controls - Limits of Security Controls - Security Monitoring-Case studies	10
V	Building an Internal Cloud - Private Clouds: Motivation and Overview - Security Criteria for Ensuring a Private Cloud – Selecting an External Cloud Provider - Evaluating Cloud Security: An Information Security Framework – Checklists for Evaluating Cloud Security	10
Total		50

Reference Book(s):

1. J.R. ("Vic") Winkler, "Securing the Cloud: Cloud Computer Security Techniques and Tactics", Syngress, 2011.
2. Greg Schulz, "Cloud and Virtual Data Storage Networking", CRC Press, 2012.
3. Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A Comprehensive Guide to Secure Cloud Computing", Wiley Publishing, 2010.
4. Tim Mather, Subra Kumaraswamy, ShahedLatif, "Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance", O'Reilly Media, First edition, 2009.



5. Lee Newcombe, "Securing Cloud Services", IT Governance Publishing, 2012.	
Focus of Course: Skill Development	
e-Resource/e-Content URL: <ul style="list-style-type: none"> • VidyamithraPortal : http://vidyamitra.inflibnet.ac.in/ • NPTEL • https://towardsdatascience.com/ 	
Course Designer : Mrs.A.Reshma Parveen Programme Coordinator, Dept of Data Science and Analytics	 BOS Chairman Mrs.D.Geetha HOD Dept of BCA

Course Outcomes (COs)		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Describe the fundamentals of cloud computing and its security.	K2
CO2	Analyse risk issues and legal aspects in cloud computing	K3
CO3	Illustrate various data security methods in cloud computing.	K2
CO4	Explore security controls and monitoring in cloud computing.	K2
CO5	Investigate security and evaluation criteria in internal and external cloud.	K3

Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5		PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	M	S	M		M	L	S	M	M
CO2	L	M	M	S	M		M	L	M	M	M
CO3	L	M	M	S	M		S	M	S	M	M
CO4	L	M	S	S	M		S	M	S	M	M

S- Strong; L- Low; M-Medium



EXAMINATIONS SYSTEM UNDER AUTONOMY

1. OBE ASSESSMENT COMPONENT MATRIX

Theory

Course Category	UG	UG/PG			UG	UG	PG
	Language	Concept	Application	Analysis	Skill Based Course	Value Based Course	IDC
Component -1 CIA – Test	30	30	30	30	15	45	50
Component -2 UG – Attendance / PG – Seminar	5	5	5	5	5	5	-
Component -3 Assignments	5	5	5	5	5	-	-
Component -4 Skill Based Task	10*	10*	10*	10*	5#	-	-
Total Marks	50	50	50	50	30	50	50

Note:

- Skill based task – 1 task

* - Skill based tasks – 2 tasks for UG, – 3 tasks for PG

Practical

Course Category	UG/PG		Skill Based
	UG	PG	
Component -1 CIA – Test	30	15	15
Component -2 Lab Performance	5	2.5	5
Component -3 Observation	5	2.5	5
Component -4 Skill Based Task	10*	5#	5#
Total Marks	50	25	30

Note:

- Skill based task – 1 task

* - Skill based tasks – 2 tasks for UG, – 3 tasks for PG

Project & Internship

Course Category	Project	Summer Internship	Project
Component -1 Review I	15	25	30
Component -2 Review II	15	25	30
Component -3 Report Submission	10	-	20
Component -4 Model Viva voce	10	-	20
Total Marks	50	50	100



Internship & Field Work for Psychology/Social Work

Course Category	Internship
Assessment Components	
Component -1 Attendance	10
Component -2 Work Diary/IC	10
Component -3 Report/Record	10
Component -4 Prof. Knowledge & Initiatives/ Viva voce	20
Total Marks	50

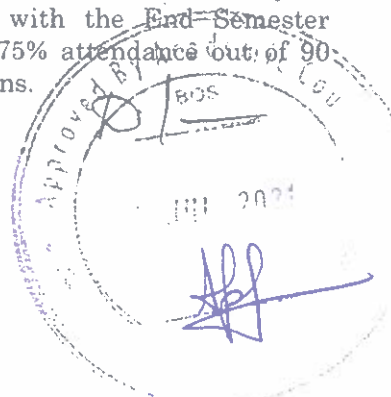
SKILL BASED TASKS FOR THEORY / PRACTICAL COURSES:

- FLOWCHARTS
- MINIATURES
- DEMONSTRATION
- SNAP TALK
- VIVA VOCE
- CLASS PRESENTATION [ORAL/POSTER]
- BUSINESS PLAN
- GROUP DISCUSSION
- SIMULATION EXERCISE
- CASE STUDY
- GAMES
- PUZZLES
- MODELS
- PAPER PRESENTATION
- ARTICLE REVIEW
- DEBATE
- SEMINAR
- REPORTS
- PORTFOLIOS
- QUESTIONNAIRE
- PUBLICATION
- SURVEY
- MINI PROJECT [INDIVIDUAL / GROUP]
- USP COMPONENT [UNIQUE TO THE COURSE]

2. Mark Preparation Format

Sl.No.	Name	Reg.No.	Rubrics Evaluation				Total
			Component 1	Component 2	Component 3	Component 4	

3. Pattern of Examinations: The college follows semester pattern. Each academic year consists of two semesters and each semester ends with the End Semester Examinations. A student should have a minimum of 75% attendance out of 90 working days to become eligible to sit for the examinations.



4. **Internal Examinations:** The questions for every examination shall have equal representation from the units of syllabus covered. The question paper pattern and coverage of syllabus for each of the internal (CIA) tests for UG programs are as follows.

Internal Assessment Test

i. First Internal Assessment Test

Syllabus : First Two Units
 Working Days : On completion of 30 working days, approximately
 Duration : Two Hours
 Max. Marks : 50

ii. Second Internal Assessment Test

Syllabus : Third and Fourth Units
 Working Days : On completion of 65 working days, approximately
 Duration : Two Hours
 Max. Marks : 50

iii. Model Examinations

Syllabus : All Five Units
 Working Days : On completion of 85 working days, approximately
 Duration : Three Hours
 Max. Marks : 100 (or) 75

CIA Assessment (for CIA-I and CIA-II) – UG

Bloom's Category Level	Sections	Marks			Description
K1= Remember	Section A 5 Questions * 1 Marks	5			Multi choice Questions
K1= Remember K2= Understand K3= Apply	Section B 3 Questions (out of 5 questions) * 5 Marks (Open choice type)	15			Open choice type Questions (250 words)
		K1	K2	K3	
K1= Remember K2= Understand K3= Apply	Sections C 3 Questions * 10 Marks (either or type)	30			Either or types Questions (500 words)
		K1	K2	K3	
	Total	2	2	1	
		50			

For the internal assessment test, the question paper pattern shall be as given below



UG: CIA TEST – I & II
[FOR 2 UNITS - 2 HOURS – 50 MARKS]
[FOR CORE/ELECTIVE/ALLIED/SKILL BASED COURSES]
SECTION A

[05 MULTIPLE CHOICE QUESTIONS]
 [ALL 5 FROM K1 LEVEL]:
 (MINIMUM TWO QUESTION SHALL BE ASKED FROM EACH UNIT)

05 x 01= 05 MARKS

SECTION B

[250 WORDS – OPEN CHOICE TYPE – 3 OUT OF 5 QUESTIONS]
 [2 QUESTIONS FROM K1 LEVEL]
 [2 QUESTIONS FROM K2 LEVEL]
 [1 QUESTION FROM K3 LEVEL]:
 (MINIMUM TWO QUESTION SHALL BE ASKED FROM EACH UNIT)

03 x 05 = 15 MARKS

SECTION C

[500 WORDS – EITHER OR TYPE – 3 QUESTIONS]
 [ALL 3 ARE FROM K1,K2& K3 LEVEL RESPECTIVELY]:
 (MINIMUM TWO QUESTION SHALL BE ASKED FROM EACH UNIT)

03 x 10 = 30 MARKS

Model & Semester Examinations Assessment - UG for 100 marks

Bloom's Category Level	Sections	Marks	Description	
K1= Remember	Section A 10 Questions * 1 Marks	10	Multi choice Questions	
K1= Remember K2= Understand K3= Apply	Section B 5 Questions (out of 7 questions)* 6 Marks (Open choice type)	30	Open choice type Questions (250 words)	
		K1		K2
		2	3	2
K1= Remember K2= Understand K3= Apply	Sections C 5 Questions * 12 Marks (either or type)	60	Either or types Questions (500 words)	
		K1		K2
		4	4	2
	Total	100		



Model & Semester Examinations Assessment - UG for 75 marks

Bloom's Category Level	Sections	Marks	Description
K1= Remember	Section A 10 Questions * 1 Marks	10	Multi choice Questions
K1= Remember K2= Understand K3= Apply	Section B 5 Questions (out of 7 questions)* 5 Marks (Open choice type)	25	Open choice types Questions (250 words)
		K1 K2 K3	
		2 3 2	
K1= Remember K2= Understand K3= Apply	Sections C 5 Questions * 8 Marks (either or type)	40	Either or types Questio (500 words)
		K1 K2 K3	
		4 4 2	
	Total	75	

UG: MODEL & SEMESTER EXAMINATIONS
[FOR CORE/ELECTIVE/ ALLIED COURSES]
[FOR 5 UNITS – 3 HOURS – 100 MARKS]

SECTION A

[10 MULTIPLE CHOICE QUESTIONS]
[ALL 10 FROM K1 LEVEL]:
(Two each from all units)

10x01= 10 MARKS

SECTION B

[250 WORDS – OPEN CHOICE TYPE – 5 OUT OF 7 QUESTIONS]
[2 QUESTIONS FROM K1 LEVEL]
[3 QUESTIONS FROM K2 LEVEL]
[2 QUESTIONS FROM K3 LEVEL]:
(Minimum One question shall be asked from each unit)

05 x 06 = 30 MARKS

SECTION C

[500 WORDS – EITHER OR TYPE – 5 QUESTIONS]
[2 QUESTIONS FROM K1 LEVEL]
[2 QUESTIONS FROM K2 LEVEL]
[1 QUESTION FROM K3 LEVEL]:
(Two each from all units)

05 x 12 = 60 MARKS

UG: MODEL & END SEMESTER EXAMINATIONS
[FOR SKILL BASED COURSES / ALLIED & NME]
[FOR 5 UNITS – 3 HOURS – 75 MARKS]

SECTION A

[10 MULTIPLE CHOICE QUESTIONS]
[ALL 10 FROM K1 LEVEL]:
(Two each from all units)

10x01= 10 MARKS

SECTION B

[250 WORDS – OPEN CHOICE TYPE – 5 OUT OF 7 QUESTIONS]



[2 QUESTIONS FROM K1 LEVEL]
[3 QUESTIONS FROM K2 LEVEL]
[2 QUESTIONS FROM K3 LEVEL]:
(Minimum One question shall be asked from each unit)

05 x 05 = 25 MARKS

SECTION C

[500 WORDS – EITHER OR TYPE – 5 QUESTIONS]
[2 QUESTIONS FROM K1 LEVEL]
[2 QUESTIONS FROM K2 LEVEL]
[1 QUESTION FROM K3 LEVEL]:
(Two each from all units)

05 x 08 = 40 MARKS

The following is the Question Paper Pattern for the courses Environmental Studies and Value Education and Human Rights,.

Syllabus : All Five Units

Duration : Three Hours

Max. Marks : 50

Question Paper Pattern

Section A (5 x 10 = 50 marks)

Five Questions of "either / or" type. Each question carries 10 marks.

Answer all questions

- Q.1 (a) _____ or (b) _____
Q.2 (a) _____ or (b) _____
Q.3 (a) _____ or (b) _____
Q.4 (a) _____ or (b) _____
Q.5 (a) _____ or (b) _____

Assignments

Each student is expected to submit at least two assignments per course. The assignment topics will be allocated by the course teacher. The students are expected to submit the first assignment before the commencement of first CIA and the second assignment before the commencement of second CIA.

Scoring pattern for Assignments

Punctual Submission : 2 Marks

Contents : 4 Marks

Originality/Presentation skill : 4 Marks

Maximum : 10 Marks x 2 Assignments = 20 marks

(Reduce these marks to a maximum of 5 i.e., (Marks obtained / 20) X 5)

Attendance Mark

Attendance Range Marks

96 % and above - 5 Marks

91 % & up to 95 % - 4 Marks

86% & up to 90 % - 3 Marks

81% & up to 85 % - 2 Marks

From 75 % to 80% - 1 Mark

Maximum - 5 Marks



**Outcome Based Education Assessment Pattern (Internals)
2021-22 batch onwards**

Internals Setup : Theory – 50 marks (UG/PG)

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
CIA Test – I	50	7.5
CIA Test – II	50	7.5
Model Examination	100	15
Assignment	5	5
Attendance	5	5
Skill Based Task	5	10
Total Marks		50

Internals Setup : Theory – 30 marks (UG)

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
CIA Test – I	50	3
CIA Test – II	50	3
Model Examination	100	9
Assignment	5	5
Attendance	5	5
Skill Based Task	5	5
Total Marks		30

Internals Setup : Value Based Course – 50 marks (UG)

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
CIA Test – I	50	10
CIA Test – II	50	10
Model Examination	100	25



Assignment	-	-
Attendance	5	5
Skill Based Task	-	-
Total Marks		50

Internals Setup : IDC – 50 marks (PG)

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
CIA Test – I	50	15
CIA Test – II	50	15
Model Examination	100	20
Assignment	-	-
Attendance	-	-
Skill Based Task	-	-
Total Marks		50

Internals Setup : *Practical – 50 marks*

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
CIA Test - I	50	7.5
CIA Test – II	50	7.5
Model Examination	100	15
Lab Performance	5	5
Observation	5	5
Skill Based Task	10	10
Total Marks		50



Internals Setup : Practical – 25 marks

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
CIA Test – I	50	3.5
CIA Test – II	50	3.5
Model Examination	100	8
Lab Performance	2.5	2.5
Observation	2.5	2.5
Skill Based Task	5	5
Total Marks		25

Internals Setup : Practical – 30 marks

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
CIA Test – I	50	3
CIA Test – II	50	3
Model Examination	100	9
Lab Performance	5	5
Observation	5	5
Skill Based Task	5	5
Total Marks		30

Internals Setup : Project – 50 marks

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
Review – I	15	15
Review – II	15	15
Report Submission	10	10



Model Viva-voce	10	10
Total Marks		50

Internals Setup : Summer Internship – 50 marks

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
Review – I	25	25
Review – II	25	25
Total Marks		50

Internals Setup : Project– 100 marks

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
Review – I	30	30
Review – II	30	30
Report Submission	20	20
Model Viva-voce	20	20
Total Marks		100

Internals Setup : Internship and Field Work – 50 marks

Name of the Examinations	Examination Conduction Marks	Marks to convert as Final Mark
Work diary/IC	10	10
Report/Record	10	10
Professional Knowledge & Initiatives / Viva-voce	20	20
Attendance	10	10
Total Marks		50

External Examinations:

The external examinations for theory courses will be conducted for 50% marks for all UG and PG degree programs, (In case of Total mark is 75, External will be 45 marks). The external theory examinations will be conducted only after the completion of 90 working days in each semester.

Normally, the external practical examinations will be conducted before the commencement of theory examinations. Under exceptional conditions these examinations may be



conducted after theory examinations are over. The external evaluation will be for 50% (In case of Total mark is 75, External will be 45 marks) of each practical course.

The External Assessment marks for Practical Examinations are based on the following criteria. The assessment is for 50 % marks of each practical course.

Programmes (2*20)	40
(Algorithm 10 marks, Key and execution 10 marks)	
Record	10

Total	50

The External Assessment marks for Skill Based Practical Examinations are based on the following criteria. The assessment is for 45 marks of each practical course.

Programmes (2*20)	40
(Algorithm 08 marks, Key and execution 12 marks)	
Record	05

Total	45

The External Assessment marks for Non Major Elective Practical Examinations are based on the following criteria. The assessment is for 50 marks.

Programmes (2*21)	42
(Algorithm 7 marks, Key and execution 14 marks)	
Record	8

Total	50

The External Assessment marks for Project and Summer Internship [Inclusive of Psychology & Social Work] are based on the following criteria. The assessment is for 50 marks.

a) Evaluation	30
b) Viva	20

Total	50

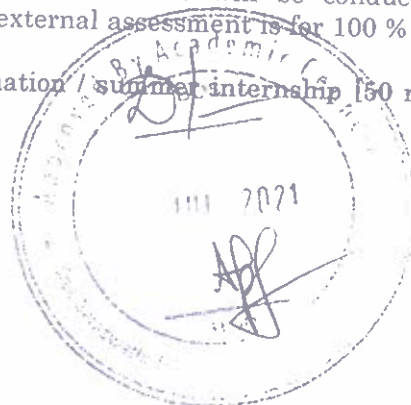
The External Assessment marks for Project are based on the following criteria. The assessment is for 100 marks.

a) Evaluation	60
b) Viva	40

Total	100

The external viva voce examinations for project works also will be conducted after completion of theory examinations. The external assessment is for 100 % marks of the project work.

The External Assessment mark for project evaluation / summer internship [50 marks] is based



on the following criteria.

a)Assessment	30
b)Viva	20

Total	50

The External Assessment mark for project evaluation / summer internship [100 marks] is based on the following criteria.

a)Assessment	60
b)Viva	40

Total	100

End Semester Examinations Question Paper Pattern - I

Syllabus	: All Five Units
Working Days	: On completion of a minimum of 90 working days.
Duration	: Three Hours
Max. Marks	: 100

Question Paper Pattern

For the End Semester External Theory Examinations for 100 marks the question paper pattern shall be the same for all UG & PG programmes.

Section – A (10 X 1 = 10 Marks)

Answer the following questions

Multiple Choice questions

- 1 Unit I
- 2 Unit I
- 3 Unit II
- 4 Unit II
- 5 Unit III
- 6 Unit III
- 7 Unit IV
- 8 Unit IV



9 Unit V

10 Unit V

Section – B (5 X 6 = 30 Marks)

Answer any 5 out of 7 of the following questions

Answers should not exceed 250 words

11. Unit – I/II/III/IV/V

12. Unit – I/II/III/IV/V

13. Unit – I/II/III/IV/V

14. Unit – I/II/III/IV/V

15. Unit – I/II/III/IV/V

16. Unit – I/II/III/IV/V

17. Unit – I/II/III/IV/V

Section – C (5 X 12 = 60 Marks)

Answer either (a) or (b) from all questions

Answers should not exceed 500 words

18. a) Unit – I Or

b) Unit – I

19. a) Unit II Or

b) Unit II

20. a) Unit III Or

b) Unit III

21. a) Unit IV Or

b) Unit IV

22. a) Unit V Or

b) Unit V

End Semester Examinations Question Paper Pattern - II

Syllabus : All Five Units

Working Days : On completion of a minimum of 90 working days.

Duration : Three Hours

Max. Marks : 75



Question Paper Pattern

For the End Semester External Theory Examinations (for 75 marks), the question paper pattern shall be the same for all UG programmes [Skill Based Courses & NME].

Section – A (10 X 1 = 10 Marks)

Answer the following questions

Multiple Choice questions

- 1 Unit I
- 2 Unit I
- 3 Unit II
- 4 Unit II
- 5 Unit III
- 6 Unit III
- 7 Unit IV
- 8 Unit IV
- 9 Unit V
- 10 Unit V

Section – B (5 X 5 = 25 Marks)

Answer any 5 out of 7 of the following questions

Answers should not exceed 250 words

11. Unit – I/II/III/IV/V
12. Unit – I/II/III/IV/V
13. Unit – I/II/III/IV/V
14. Unit – I/II/III/IV/V
15. Unit – I/II/III/IV/V
16. Unit – I/II/III/IV/V
17. Unit – I/II/III/IV/V

Section – C (5 X 8 = 40 Marks)

Answer either (a) or (b) from all questions

Answers should not exceed 500 words

- 16.a) Unit I Or
b) Unit I
- 17.a) Unit II Or
b) Unit II
- 18.a) Unit III Or
b) Unit III
19. a) Unit IV Or



b)Unit IV

20.a)Unit V Or

b)Unit V

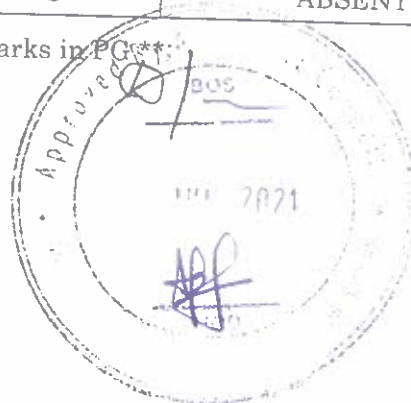
Essential conditions for the Award of Degree / Diploma / Certificates:

1. Pass in all components of the degree, i.e., Part-I, Part-II, Part-III, Part - IV and Part-V individually is essential for the award of degree.
2. First class with Distinction and above will be awarded for part III only. Ranking will be based on marks obtained in Part - III only.
3. GPA (Grade Point Average) will be calculated every semester separately. If a candidate has arrears in a course, then GPA for that particular course will not be calculated. The CGPA will be calculated for those candidates who have no arrears at all. The ranking also will be done for those candidates without arrears only.
4. The improvement marks will not be taken for calculating the rank. In the case of courses which lead to extra credits also, they will neither be considered essential for passing the degree nor will be included for computing ranking, GPA, CGPA etc.
5. The grading will be awarded for the total marks of each course.
6. Fees shall be paid for all arrears courses compulsorily.
7. There is provision for re-totalling, Xerox copy and revaluation for UG and PG Programmes on payment of prescribed fees.

Classification of Successful Candidates [Course-wise]

RANGE OF MARKS (In percent)	GRADE POINTS	GRADE	DESCRIPTION
90 - 100	9.0 - 10.0	O	OUTSTANDING
80 - 89	8.0 - 8.9	D+	EXCELLENT
75 - 79	7.5 - 7.9	D	DISTINCTION
70 - 74	7.0 - 7.4	A+	VERY GOOD
60 - 69	6.0 - 6.9	A	GOOD
50 - 59	5.0 - 5.9	B	AVERAGE
40 - 49 #	4.0 - 4.9	C	SATISFACTORY
00 - 39	0.0	U	RE-APPEAR
ABSENT	0.0	U	ABSENT

Reappearance is necessary for those who score below 50% Marks in PG**:
those who score below 40% Marks in UG*:



/ # only applicable for UG programs

Individual Courses

C_i = Credits earned for course "i" in any semester
 G_i = Grade Point obtained for course "i" in any semester
 'n' refers to the semester in which such courses were credited.

$$\text{GRADE POINT AVERAGE [GPA]} = \frac{\sum C_i G_i}{\sum C_i}$$

Sum of the multiplication of grade points by the credits of the courses

GPA =

Sum of the credits of the courses in a semester

Classification of Successful Candidates (Overall):

CGPA	GRADE	CLASSIFICATION OF FINAL RESULT
9.5 to 10.0	O+	First Class - Exemplary *
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction *
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C+ #	Third Class
4.0 and above but below 4.5	C #	
0.0 and above but below 4.0	U	Re-appear

“*” The candidates who have passed in the first appearance and within the prescribed semester of the Programme (Major, Allied, Inter Departmental and Elective Course alone) are eligible.

“#” Only applicable to U.G. Programme



$$\text{CUMULATIVE GRADE POINT AVERAGE [CGPA]} = \frac{\sum C_n G_n}{\sum C_n}$$

Sum of the multiplication of grade points by the credits of entire program

CGPA = $\frac{\sum C_n G_n}{\sum C_n}$

Sum of the credits of the Courses of the entire Program

In order to get through the examination, each student has to earn the minimum marks prescribed in the internal (wherever applicable) and external examinations in each of the theory course, practical course and project viva.

Normally, the ratio between internal and external marks is 50:50. There is no passing minimum for internal component. The following are the minimum percentage and marks for passing of each course, at UG and PG levels for external and aggregate is as follows:

S.No	Program	Passing Minimum in Percent	
		External (50)	Aggregate (100)
1	UG Degree	40% (20)	40% (40)
2	PG Degree	50% (25)	50% (50)

However, the passing minimum marks may vary depending up on the maximum marks of each course. The passing minimum at different levels of marks is given in the following table:

S	UG & PG Maximum Marks			Passing minimum for UG			Passing minimum for PG		
	I	E	T	I	E	A	I	E	Agg. 50%
1	5	5	1		2	4			50
2	3	4	7		1	3			



3	5	-	5	2	-	2	2	-	25
4	2	2	5	-	1	2	-	1	13
5	-	5	5	-	2	2	-	2	25
6	1	1	2	-	4	8	-	5	100
7	-	1	1	-	4	4	-	5	50

Reappearance

The students having arrears shall appear in the subsequent semester (external) examinations compulsorily. The candidates may be allowed to write the examination in the same syllabus for 3 years only. Thereafter, the candidates shall be permitted to write the examination in the revised / current syllabus depending on various administrative factors. There is no re-examination for internals.

Criteria for Ranking of Students:

1. Marks secured in core, elective and Inter Disciplinary Course (Part III) courses will be considered for PG Programs and marks secured in Core, Elective, Inter Departmental and Allied Courses (Part-III) will be considered for UG programs, for ranking of students.
2. Candidate must have passed all courses prescribed chosen / opted in the first attempt itself.
3. Improvement marks will not be considered for ranking but will be considered for classification.

External Examination Grievances Committee:

Those students who have grievances in connection with examinations may represent their grievances, in writing, to the chairman of examination grievance committee in the prescribed Performa. The Principal will be chairman of this committee.





**SREE SARASWATHI THYAGARAJA COLLEGE (AUTONOMOUS)
THIPPAMPATTI, POLLACHI - 642 107**

**Student Grievance Form
(Forms Available at Utility Stores)**

Date:
Place:

From

Register No :
Name :
Class :

SreeSaraswathiThyagarajaCollege,
Pollachi - 642 107

To

The Principal / Examination-in-charge,
SreeSaraswathiThyagarajaCollege,
Pollachi - 642 107

Through:

1. Head of the Department,
Department of
SreeSaraswathiThyagaraja College,
Pollachi - 642 107
2. Dean of the Department
Faculty of
SreeSaraswathiThyagaraja College,
Pollachi - 642 107

Respected Sir / Madam,

Sub: - reg.

NATURE OF GRIEVANCE

.....
.....
.....

Thanking you,

Yours Truly,

Signature

Forwarded by:

HOD with comments / recommendation

2. Dean with comments / recommendation

3. Signature and Directions of the Principal

4. Controller of Examinations:

