

Curriculum Framework under Choice Based Credit System (CBCS) and  
Syllabus for Outcome Based Education (OBE) in  
**BACHELOR OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**  
**(BSc AI&ML) Degree Programme**  
for the students admitted from the academic year 2021 -2022



**SREE SARASWATHI THYAGARAJA COLLEGE**  
An Autonomous, NAAC Re – 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 (AI&ML) Degree Programme PEO, PO and PSO**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

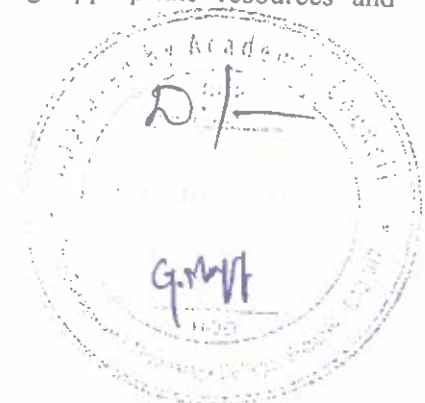
Within a few years of obtaining B.Sc. degree in Artificial Intelligence and Machine Learning, the Graduate will be able to

- PEO1:** Excel in professional career with IT and related industries or pursue higher education and research by applying the knowledge of Artificial Intelligence and Machine Learning
- PEO2:** Analyse the problem by applying the technical skills and implement industry accepted solutions using technologies in Artificial intelligence and Machine learning
- PEO3:** Adapt themselves to organizational needs by understanding the dynamically changing technologies.
- PEO4:** Work productively in supportive and leadership roles on multidisciplinary teams with effective communication and team work skills with high regard to legal and ethical responsibilities

**PROGRAMME OUTCOMES (POS)**

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

- PO1:** Investigate the real time problems with professional and ethical responsibility as an individual as well as in multifaceted team with positive attitude
- PO2:** Embrace lifelong learning and up skilling independently to adapt and sustain in emerging technology era
- PO3:** Professionally handles complex concepts by adapting appropriate resources and modern tools



**PO4:** Design, develop models and provide solutions to cater the needs and to develop the skills to take up research and higher studies

**PO5:** Inculcate skills to excel in the respective fields and in Teaching and Research.

**PROGRAMME SPECIFIC OUTCOMES (PSOs)**

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

**PSO1:** Apply the computing knowledge gained during the course of the program with the ability to apply diverse information to solve a real time problem.

**PSO2:** Apply the knowledge of ethical and management principles required to work in a team with stewardship of the society.

**PSO3:** Able to apply the computing knowledge gained during the course of the programme for analysis, critical thinking and finding optimal solutions

**PSO4:** Design and develop computer systems based on the domains of Artificial intelligence, Machine Learning, Robotics, Expert systems.

**PSO5:** Evolve as globally competent professionals possessing leadership skills and domain knowledge for developing innovative solutions in multi-disciplinary domains.

**Mapping the POs with PEO**

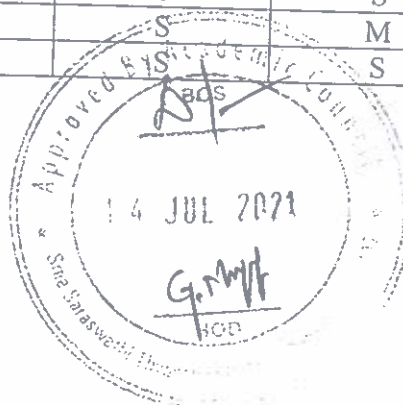
POs/PEOs	PEO1	PEO2	PEO3	PEO4
PO1	S	M	M	S
PO2	M	S	S	M
PO3	L	M	S	M
PO4	S	S	M	M
PO5	L	M	S	S

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	S
PSO3	M	S	S	S
PSO4	M	S	S	M
PSO5	M	S	S	S

S- Strong; L- Low; M-Medium



**Curriculum Framework with Choice Based Credit System (CBCS) and Syllabus for  
Outcome Based Education (OBE) in Bachelor of Science ( Artificial Intelligence and  
Machine Learning) 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

**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

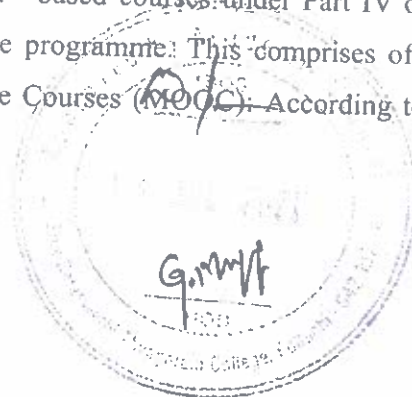
Part – II: English: Part – 2 comprises of the category namely English

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.

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.

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.



For BSc (AI&ML) programme, a student must earn 140 credits as mentioned in the below table.

**B.Sc (AI&ML) 2021-2022**

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

Part	Curriculum Structure	No. of Courses	Credits to be earn
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
<b>Total</b>		<b>41</b>	<b>140</b>
<b>Extra Credit Courses :</b>			
	Extra Credit Course – 1 (MOOC)	2	4
	Extra Credit Course – 2 (PROFESSIONAL ENGLISH)	2	8
<b>GRANDTOTAL:</b>			<b>152</b>



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

PART	TYPE OF COURSE	COURSE CODE	NAME OF THE COURSE	HR	CIA	EXT	TOT	CR	
<b>SEMESTER – I</b>									
I	Language-1	Theory	21TAM1L10 21MAL1L10 21HIN1L10 21FRE1L10	Language-I (Tamil/Malayalam/Hindi/French)	6	50	50	100	3
II	English	Theory	21GEN1G10	Communicative English- I	6	50	50	100	3
III	Core 1	Theory	21BCAGCA0	Digital Fundamentals and Computer Organization	4	50	50	100	4
	Core 2	Theory	21BAM1C10	Problem Solving And Programming In C	4	50	50	100	4
	Core 3	Practical	21BAM1C30	Programming In C Lab	3	50	50	100	2
	Allied1	Theory	21BMAGAO0	Introduction To Linear Algebra	5	50	50	100	4
IV	Value Based Course - 1	Theory	18DHE1V10	Environmental Studies	2	50	-	50	2
IV	ECC	Theory	21GEN1Z10	Professional English for physical sciences - I	4*	50	50	100*	4*
				<b>Total for semester – I</b>	<b>30+ 4*</b>	-	-	<b>650+ 100*</b>	<b>22+ 4*</b>
<b>SEMESTER – II</b>									
I	Language-2	Theory	21TAM2L20 21MAL2L20 21HIN2L20 21FRE2L20	Language-II (Tamil/Malayalam/Hindi/French)	6	50	50	100	3
II	English	Theory	21GEN2L20	Communicative English-II	6	50	50	100	3
III	Core 4	Theory	21BAM2C10	Artificial Intelligence and Machine Learning Fundamentals	4	50	50	100	4
	Core 5	Theory	21BAM2C20	Object Oriented Programming with JAVA	4	50	50	100	4
	Core 6	Practical	21BAM2C30	Object Oriented Programming Lab	3	50	50	100	2
	Allied2	Theory	21BMAGAP0	Optimization Techniques	5	50	50	100	4
IV	Value Based	Theory	18DHE2V20	Value Education and Human Rights	2	50	0	50	2



	Course - 2								
IV	ECC	Theory	21GEN2Z10	Professional English for Physical Sciences II	4*	50	50	100*	4*
				<b>Total for Semester – II</b>	<b>30 +4*</b>	-	-	<b>650 +100*</b>	<b>22+4*</b>

### SEMESTER – III

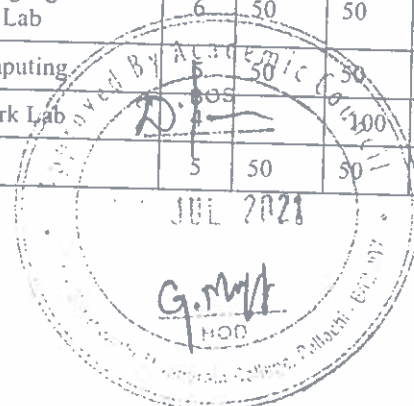
III	Core7	Theory	21BAM3C10	Advanced Database Management System	5	50	50	100	5
	Core8	Theory	21BAM3C20	Programming In Python	5	50	50	100	5
	Core9	Theory	21BAM3C30	Machine Learning Techniques	5	50	50	100	5
	Core10	Practical	21BAM3C40	Programming In Python Lab	4	50	50	100	2
	Allied3	Theory	21BMAGAQ1	Mathematics For Machine Learning	5	50	50	100	4
IV	SBC1	Practical	20BAM3S10	Computational Intelligence Lab	4	30	45	75	2
IV	NME1			<b>NME1</b>	2	0	50	50	2
				<b>Total for Semester – III</b>	<b>30</b>	<b>170</b>	<b>455</b>	<b>625</b>	<b>25</b>

### SEMESTER – IV

III	Core11	Theory	21BAM4C10	R-Programming	5	50	50	100	5
	Core12	Theory	21BAM4C20	Advanced Structures Data	5	50	50	100	5
	Core13	Theory	21BAM4C30	Deep Learning	5	50	50	100	5
	Core14	Practical	21BAM4C40	R-Programming Lab	4	50	50	100	2
	Allied4	Theory	21BMAGAN0	Discrete Structures and its applications	5	50	50	100	4
IV	SBC2	Theory	20BAM4S10	Soft Computing	4	30	45	75	2
IV	NME2			<b>NME2</b>	2	0	50	50	2
				<b>Total for Semester – IV</b>	<b>30</b>	<b>165</b>	<b>460</b>	<b>625</b>	<b>25</b>

### SEMESTER V

III	Core15	Theory	21BAM5C10	Natural Language Processing	6	50	50	100	5
	Core16	Practical	21BAM5C20	Natural Language Processing Lab	6	50	50	100	4
	Core17	Theory	21BAM5C30	Cloud Computing	5	50	50	100	4
	Core18	Project	21BAM5C40	Project Work Lab	5	50	50	100	2
	Elective1	Theory		Elective -I	5	50	50	100	5



IV	SBC3	Practical	20BAM5S10	Cloud Computing Lab	4	30	45	75	2
V			18ETN5x10	Extension Activities	-				Grade
				<b>Total for Semester – V</b>	<b>30</b>	<b>145</b>	<b>430</b>	<b>575</b>	<b>22</b>
<b>SEMESTER VI</b>									
III	Core19	Theory	21BAM6C10	Data Visualization	6	50	50	100	5
	Core20	Practical	21BAM6C20	Data Visualization lab	6	50	50	100	4
	Core21	Theory	21BAM6C30	Internet of Things	4	50	50	100	3
	<b>Elective2</b>	Theory		Core Elective – II	5	50	50	100	5
	<b>Elective3</b>	Theory		Core Elective – III	5	50	50	100	5
IV	SBC4	Practical	20BAM6S10	Internet of Things Lab	4	30	45	75	2
				<b>Total for Semester – VI</b>	<b>30</b>	<b>170</b>	<b>405</b>	<b>575</b>	<b>24</b>
				<b>Grand Total</b>	<b>180</b>			<b>3700</b>	<b>150</b>



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

**List of Part – 1 Language Courses**

S.No.	Semester	Type of course	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)**

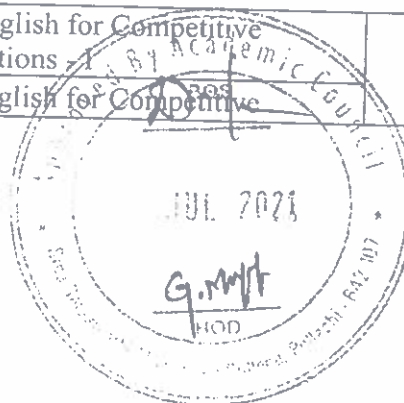
S.No.	Semester	Type of course	Course Code	Course Name
<b>Allied – I</b>				
1	I	Theory	21BMAGAO0	Introduction To Linear Algebra
<b>Allied – II</b>				
1	II	Theory	21BMAGAP0	Optimization Techniques
<b>Allied – III</b>				
1	III	Theory	21BMAGAQ1	Mathematics For Machine Learning
<b>Allied – IV</b>				
1	IV	Theory	21BMAGAN0	Discrete Structures and its applications

**List of Value Based Courses**

S.No.	Semester	Type of course	Course Code	Course Name
1	I	Theory	18DHE1V10	Environmental Studies
2	II	Theory	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	21TAM3N10	Basic Tamil – I	Tamil
2	III	Theory	21TAM3N20	Advanced Tamil – I	
3	IV	Theory	21TAM4N30	Basic Tamil II	
4	IV	Theory	21TAM4N40	Advanced Tamil II	
5	III	Theory	21BEN3N10	Basic English for Competitive Examinations – I	English
6	IV	Theory	21BEN4N20	Basic English for Competitive Examinations – II	



Examinations II					
7	III	Theory	21BMA3N10	Numerical Ability-I	Mathematics
8	IV	Theory	21BMA4N20	Numerical Ability-II	
9	III	Theory	21BPH3N10	Physics of Sports	Physics
10	IV	Theory	21BPH4N20	Physics of Music	
11	III	Theory	21BCH3N10	Chemistry for everyday life -1	Chemistry
12	IV	Theory	21BCH4N20	Chemistry for everyday life -2	
13	III	Theory	21BSY3N10	Psychology Life Skills-I	Psychology
14	IV	Theory	21BSY4N20	Psychology Life Skills-II	
15	III	Theory	21BCM3N10	Practical Banking	Commerce
16	IV	Theory	21BCM4N20	Capital Market	
19	III	Theory	21BBA3N10	Customer Relationship Management	Management
20	IV	Theory	21BBA4N10	Rural Marketing	
21	III	Practical	21BCS3N10	Excel Communications and Slide Logic	Computer Science
22	IV	Practical	21BCS4N20	Web Design for Non-Designers	
23	III	Theory	21BFS3N10	Risk & Threat Management	DCFS
24	IV	Theory	21BFS4N20	Forensics Auditing	

#### List of Core Elective Courses (CBCS)

S.No.	Semester	Elective	Type of course	Course Code	Course Name
<b>Electives of B.Sc (CS)</b>					
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
<b>Electives of BCA</b>					
1	V	I	Theory	21BCA5EA0	E- Commerce and M-Commerce
2	VI	II	Theory	21BCA6EA0	Business Intelligence
3	VI	III	Theory	21BCA6EB0	Cloud Computing

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Electives of B.Sc. (AI&ML)					
1	V	I	Theory	21BAM5EA0	Robotics & 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	20BAM3S10	R Programming Lab
2	III	Practical	20BAM3S10	Computational intelligence lab
2	IV	Theory	20BAM4S10	Soft computing
3	V	Practical	20BAM5S10	Cloud Computing Lab
4	VI	Practical	20BAM6S10	Internet of Things Lab



**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	21BAM1C10	Problem Solving And Programming In C
3	I	Core 3	Practical	21BAM1C30	Programming In C Lab
4	II	Core 4	Theory	21BAM2C10	Artificial Intelligence and Machine Learning Fundamentals
5	II	Core 5	Theory	21BAM2C20	Object Oriented Programming with JAVA
6	II	Core 6	Practical	21BAM2C30	Object Oriented Programming Lab
7	III	Core7	Theory	21BAM3C10	Advanced Database Management System
8	III	Core8	Theory	21BAM3C20	Programming In Python
9	III	Core9	Theory	21BAM3C30	Machine Learning Techniques
0	III	Core10	Practical	21BAM3C40	Programming In Python Lab- I
11	IV	Core11	Theory	21BAM4C10	R-Programming
12	IV	Core12	Theory	21BAM4C20	Advanced Data Structures
13	IV	Core13	Theory	21BAM4C30	Deep Learning
14	IV	Core14	Practical	21BAM4C40	R-Programming Programming Lab- I
15	V	Core15	Theory	21BAM5C10	Natural Language Processing
16	V	Core16	Practical	21BAM5C20	Natural Language Processing - Lab
17	V	Core17	Theory	21BAM5C30	Cloud Computing
18	V	Core18	Project	21BAM5C40	Project Work Lab
19	VI	Core19	Theory	21BAM6C10	Data Visualization
20	VI	Core20	Practical	21BAM6C20	Data Visualization Lab
21	VI	Core21	Theory	21BAM6C30	Internet of Things



SEMESTER - I

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21TAM1L10	Tamil	Part I Tamil Paper I	60	-	-	3

**Preamble:** தமிழ் இலக்கியத்தில் உள்ள நேரடித்தன்மை, நிகழ்கால சமூகஅசைவுகள், 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.

**Prerequisite:**

- மேனிலைப்பள்ளி முடிய கற்றவற்றைப் பகுத்து தொகுத்து ஆராயும் போக்கில் பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- மானிட மதிப்புகளை உணரும் வகையிலும், போட்டித்தேர்வுகளை எதிர்கொள்ளும் நிலையிலும் 'தமிழ்' - பகுதி - I அமைக்கப்பட்டுள்ளது.
- பிழையின்றிப் பேச, எழுத ஆராயும் முயற்சிக்குப் பயிற்சி தரப்படுகிறது.

**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	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**

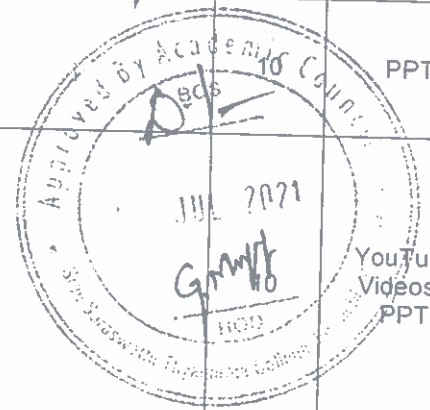
COs/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S	S	M			S	S			
CO2	S	S	M			S	S			
CO3	S	S	S			M	S			

S- Strong; L- Low; M-Medium

Unit	Course contents	Hours	Resources/ e-Content
		60	



	அலகு I கவிதைகள்			
	பாரதியார்	பொய்யோ மெய்யோ - நிற்பதுவே நடப்பதுவே		
	பாரதிதாசன்	மாண்டவன் மீண்டான் - ஆற்றோரம் தழைமரங்கள்		
	நாமக்கல் கவிஞர்	கண்டிலேன் - ஐயம் இல்லை தெய்வம்		
	வாணிதாசன்	மாலை - அங்கு இங்குமாய் சிதறிய		
	கண்ணதாசன்	தத்துவப்பாடல் - பரமசிவன் கழுத்திலிருந்து		
	நா.காமராசன்	சரித்திர கர்ப்பம் - அம்மா இருட்டுக்குள்		
	மேத்தா	வெளிச்சம் வெளியே இல்லை - வீட்டுக்கு வெளியே		
I	அப்துல் ரகுமான்	சுயப்பிரசவம் - தெரிந்துகொள்	15	YouTube Videos & PPT
	சிற்பி	பெல்ஜியம் கண்ணாடி - மரச்சட்ட தங்கரேக்குகள்		
	இளம்பிறை	அறுவடைக்காலம் - அல்லும்பகலும்		
	விஜயலட்சுமி	அற்புத ரகசியங்கள் - எந்தப்பாடலும்		
	கல்பனா	பறத்தல் அதன் சுதந்திரம் - ஓடி ஓடித் திரிந்து		
	ஹைக்கூ கவிதைகள்	கிழிந்தது சேலை - என்.டி.ராஜ்குமார் விடுமுறையேவேண்டாம் - சீனு, தமிழ்நெஞ்சன் புதுச்செருப்பு - தோழன் மஞ்சள் பூசி - புதுவை தமிழ்நெஞ்சன் ஐயனார் கை - மணிசண்முகம்		
	அலகு II சிறுகதைகள்			
II	புதுமைப்பித்தன்	சங்குத்தேவனின் தர்மம்	15	PPT
	கு.அழகிரிசாமி	பித்தளை வளையல்		
	வ.ரா.	கோட்டைவீடு		
	ஜெயகாந்தன்	இரண்டு குழந்தைகள்		
	பிரபஞ்சன்	அப்பாவின் வேஷ்டி		
	தனுஷ்கோடி ராமசாமி	தீம் தரிகிட		
	ஆதவன்	கனவுக்குமிழி		
	தமயந்தி	பஞ்சாயத்து		
III	அலகு III புதினம்	திலகவதி - கல்மரம்	10	PPT
IV	அலகு IV இலக்கிய வரலாறு			
	1. கவிதை இலக்கியத்தின் தோற்றமும் வளர்ச்சியும்			PPT
	2. சிறுகதையின் தோற்றமும் வளர்ச்சியும்			
	3. புதினத்தின் தோற்றமும் வளர்ச்சியும்			
V	அலகு V இலக்கணம்			
	பயிற்சி அளித்தல் - மொழித்திறன் வளர்த்தல்			
	1. எழுத்து மாற்றத்தால் ஏற்படும் பிழைகள்			
	2. வல்லினம் மிகும், மிகா இடங்கள்			
	3. மெல்லெழுத்து மிகும் இடங்கள்			
	4. வாக்கியங்களில் ஏற்படும் பிழைகள்			
	5. இலக்கணக் குறிப்பு			
	6. சரியான சொற்களைக் கண்டறிதல்			
	கவிதை எழுதுதல், கடிதம், விண்ணப்பம் வரைதல்.			YouTube Videos & PPT
	Total		60	





**Text Book(s): பாட நூல்கள்**

1. கவிதை, சிறுகதைத் திரட்டு - தமிழ்த்துறை வெளியீடு, ஸ்ரீ சரஸ்வதி தியாகராஜா கல்லூரி, 2021 ஜூன் பதிப்பு.
2. பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு - முனைவர் கா. வாசுதேவன், தேவன் பதிப்பகம், 16,43, திருநகர், திருவானைக்கோவில், திருச்சிராப்பள்ளி - 620 005 பன்னிரெண்டாம் பதிப்பு - 2017.
3. தமிழ் இலக்கிய வரலாறு - மு. வரதராசன் சாகித்ய அகாடமி வெளியீடு, புதுதில்லி. மறுபதிப்பு - 2012.

**Reference Book(s): பார்வை நூல்கள்**

- 1.கொங்குதேர் வாழ்க்கை - இ. இராஜமார்த்தாண்டன் யுனைடெட் ரைட்டர்ஸ், 67 - பீட்டர்ஸ் சாலை, இராயப்பேட்டை, சென்னை -14. முதல் பதிப்பு - 2003
- 2.சிறுகதையின் தோற்றமும் வளர்ச்சியும் - சிட்டி சிவபாத சுந்தரம், கரியா பதிப்பகம், சென்னை, முதல் பதிப்பு - 1989.
- 3.தமிழில் சிறுகதை பிறக்கிறது - சி.க.செல்லப்பா, காலச்சுவடு பதிப்பகம், நாகர்கோவில், பதிப்பு-2007
4. தமிழில் தவறின்றி எழுத, பேச, கற்க! - நல்லாமுர் முனைவர் கோ.பெரியண்ணன் முத்தமிழ் பதிப்பகம் 9 எ மேக்மில்லன் காலனி நங்கை நல்லூர், சென்னை - 61. பதிப்பு -2006.
- 5.தமிழ் நாவல் நூறாண்டு வரலாறும் வளர்ச்சியும் - பெ.கோ. சுந்தரராஜன்(சி.டி.கோ) சிவபாத சுந்தரம் கிறிஸ்தவ இலக்கிய சங்கம் அஞ்சல் பெட்டி எண் 591, பार्க் டவுன் சென்னை- 600 003.

**Focus of Course:** இக்கால இலக்கியங்களின் வகைமைகளை எடுத்துக்காட்டும் விதத்தில் பாடத்திட்டம் அமைக்கப்பட்டுள்ளன. பிழையின்றிப் பேச, எழுதப் பயிற்சி வழங்கப்படுகிறது. கடிதம், கதை, கவிதை எழுதுதலுக்குப் பயன்படும் வகையில் பயிற்சி தரப்படும்.

Course Designer: Dr. K.Ramganesh,  
Assistant Professor, Dept. of Tamil, STC

BoS Chairman

**SEMESTER – I  
HINDI PAPER - I**

**Course Code:21HIN1LT1**

(Prose, Non-detailed, Grammar & Translation, Comprehension)

**1. PROSE: NUTHAN GADYA SANGRAH**

Editor: Jayaprakash (Prescribed Lessons – only 6)

Lesson 1 – Bharathiya Sanskurthi

Lesson 3 – Razia

Lesson 4 – Makreal

Lesson 5 – Bahtha Pani Nirmala.

Lesson 6 – Rashtrapitha Mahathma Gandhi

Lesson 9 – Ninda Ras.

Publisher : Sumitra Prakashan Sumitravas,  
16/4, Hastings Road,  
Allahabad – 211 001.

**2. NON DETAILED TEXT : KAHANI KUNJ**

Editor : Dr. V.P. Amithab. (Stories 1-6 only)

Publisher : Govind Prakashan Sadhar Bagaar,  
Mathura, Uttar Pradesh – 281 001.

**3. GRAMMAR : SHABDHA VICHAR ONLY**

(NOUN, PRONOUN, ADJECTIVE, VERB, TENSE, CASE ENDINGS)

Theoretical & Applied.

Book for Reference : Vyakaran Pradeep by Ramdev

Publisher : Hindi Bhavan, 36, Tagore Town Allahabad – 211 002.

**4. TRANSLATION : English – Hindi only.**

ANUVADH ABHYAS – III (1-15 lessons only)

Publisher : DAKSHIN BHARAT HINDI PRACHAR SABHA CHENNAI – 17.

**5. COMPREHENSION : 1 Passage from ANUVADH ABHYAS – III (16-30)**

DAKSHIN BHARATH HINDI PRACHAR SABHA CHENNAI

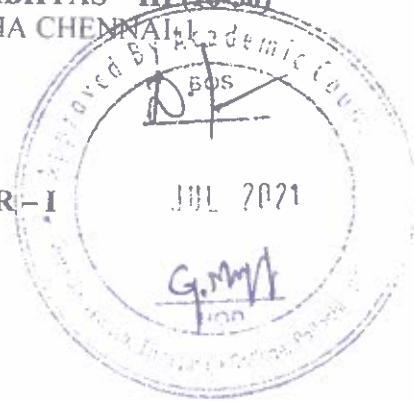
**SEMESTER – I**

**MALAYALAM PAPER – I**

**Course Code: 21MAL1LT1**

**Prose, Composition & Translation**

This paper will have the following five units:



Unit I & II Novel  
Unit III & IV Short story  
Unit V Composition & Translation

**Text books prescribed:**

**Unit I & II** - Pathummayude Aadu - Vaikam Muhammed Basheer (D.C.Books, Kottayam, Kerala)

**Unit III & IV** - Ente Priyappeta Kadhakal – Akbar Kakkattil (D.C. Books, Kottayam, Kerala)

**Unit V** - Expansion of ideas, General Eassay and Translation. (A simple passage from English about 100 works to Malayalam)

**Reference Books:**

1. Malayala Novel Sahithya Charitram-K.M.Tharakan (N.B.S.Kottayam)
2. Cherukatha Innale Innu-M.Achuyuthan (D.C Books, Kottayam)
3. Sahithya Charitram Prasthanangalilude- Dr.K.M George, (D.C.Books Kottayam)
4. Malayala Sahithya vimarsam-Sukumar Azhee kode (D.C.books)



**SEMESTER – I**  
**FRENCH PAPER – I**

**Course Code: 21FRE1LT1**

**PAPER I**

Prescribed text : LATITUDES I

Units : 1 – 4

Authors : Régine Mérieux Yves Loiseau

Available at : Goyal Publishers Pvt Ltd 86, University Block

Jawahar Nagar (Kamla Nagar) New Delhi – 110007

Tel : 011 – 23852986 / 9650597000

**SEMESTER - I**

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21GEN1L10	Communicative English-I	Language	70	5	-	3
<b>Preamble:</b> This course aims to provide a better understanding on the various aspects of communicative skills through a keen focus on LSRW.						
<b>Prerequisite:</b> Basic knowledge in Communicative English and Skills						
Unit	Course Contents					Hours
I	1. <b>Listening and Speaking</b> a. Listening and responding to complaints (formal situation) b. Listening to problems and offering solutions (informal) 2. <b>Reading and writing</b> a. Reading aloud (brief motivational anecdotes) b. Writing a paragraph on a proverbial expression/motivational idea. 3. <b>Word Power/Vocabulary</b> a. Synonyms & Antonyms 4. <b>Grammar in Context</b> • Adverbs Prepositions					15
II	1. <b>Listening and Speaking:</b> 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. <b>Reading and Writing:</b> 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. <b>Word Power :</b> a. Idioms & Phrases 4. <b>Grammar in Context:</b> Conjunctions and Interjections					15
III	1. <b>Listening and Speaking</b> 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. <b>Reading and writing</b> a. Writing emails of complaint b. Reading aloud famous speeches 3. <b>Word Power</b> a. One Word Substitution 4. <b>Grammar in Context:</b> Sentence Patterns					15

IV	1. <b>Listening and Speaking</b> 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. <b>Reading and Writing</b> a. Reading visual texts – advertisements b. Preparing first drafts of short assignments 3. <b>Word Power</b> a. Denotation and Connotation 4. <b>Grammar in Context:</b> Sentence Types	15
V	1. <b>Listening and Speaking</b> a. Informal interview for feature writing b. Listening and responding to questions at a formal interview 2. <b>Reading and Writing</b> a. Writing letters of application b. Readers' Theatre (Script Reading) c. Dramatizing everyday situations/social issues through skits. (writing scripts and performing) 3. <b>Word Power</b> a. Collocation 4. <b>Grammar in Context:</b> Working With Clauses	15
<b>Total</b>		<b>75</b>
<b>Text Book:</b> Communicative English Text Book		
<b>Reference Book(s):</b> a. Books by Penny Ur b. The Oxford English-English-Tamil dictionary (for pronunciation) c. <a href="https://www.esolcourses.com/">https://www.esolcourses.com/</a> d. For Readers' Theatre: <a href="https://www.youtube.com/watch?v=JaLQJt8orSw&amp;t=469s">https://www.youtube.com/watch?v=JaLQJt8orSw&amp;t=469s</a> (the link to the performance; refer scripts by Aaron Shepherd)		
Focus of the Course: Skill Development		
<b>Course Designer</b> TRANSCE		
<b>BoS Chairman</b>		
<b>Course Outcomes (COs)</b>		
On successful completion of this course the students will be able to:		
<b>CO Number</b>	<b>Course Outcome (CO) Statement</b>	<b>Blooms Taxonomy Knowledge Level</b>
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	S	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 I	Digital Fundamentals and Computer Organization	Concept	45	5	-	4
<p><b>Preamble :</b> 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><b>Prerequisite:</b> Knowledge in Number Systems and Fundamental Electronics</p>							

**Syllabus:**

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
<b>Total</b>		50
<p><b>Text Book :</b></p> <p>1. M.Morris Mano – “Digital Logic &amp; Computer Design”, Prentice Hall of India Pvt. Ltd., New Delhi, 2013. (UNIT I, II, III).</p> <p>2. M.Morris Mano – “Computer System Architecture”, Prentice Hall of India Pvt. Ltd., New Delhi, Third Edition, 2013. (UNIT IV, V).</p>		
<p><b>Reference Book :</b></p> <p>1. Donald P. Leach, Albert Paul Malvino, Goutam Saha, “Digital Principles &amp; Applications”, Tata McGraw Hill, Six Edition, 2008.</p> <p>2. R.P. Jain, “Modern Digital Electronics”, Tata McGraw Hill, Fourth Edition, 2012.</p> <p>3. Poornachandra.S, “Digital Computer Fundamentals”, Tata McGraw Hill, First Edition, 2009.</p>		

William Stallings, "Computer Organization and Architecture", Pearson Education, Eighth Edition, 2010.

**Focus of Course :-** Employability

**e-Resources/e-Content URL :**

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	Summaries the digital components – Combinational and sequential circuits.	K2
CO4	Make use of the concept of Boolean Algebra, Circuits, Processors and Memory Management	K3

**Mapping with Programme Outcomes and 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
21BAM1C10	Core-2	Problem Solving and Programming In C	Application	45	5	-	4
<b>Preamble:</b> This course provides the student with strong foundation on programming concepts and its application.							
<b>Prerequisite:</b> Mathematical and logical skills.							

### Syllabus:

Unit	Course contents	Hours
I	Introduction – The Problem-Solving aspect – Top-down Design – Implementation of Algorithms – Program Verification – Efficiency of Algorithms – Analysis of Algorithms	09
II	Exchanging the values – Counting – Factorial Computation – SINE computation – Base Conversion – Factoring Methods – Array Techniques	09
III	Overview of C – Constants, Variables and Data Types – Operators and Expressions – Managing Input/Output Operations – Formatted I/O – Decision Making – Branching – IF, Nested IF – Switch – goto – Looping- While, do, for statements.	11
IV	Arrays – dynamic and multi-dimensional arrays – Character arrays and Strings – String handling Functions – User defined Functions – Categories of Functions – Recursion – Structures and Unions – Array of Structures – Structures and Functions	11
V	Pointers: Introduction – Features of Pointers – Pointer Declaration – Array of Pointers – Pointers to Pointers – File Management – Introduction – Streams & File Types – Steps for File Operations – File I/O – Structures Read & Write in C- Other File Functions – Command Line Arguments – Environment Variables – I/O Redirection – Dynamic memory allocation.	10
<b>Total</b>		<b>50</b>
<b>Text Book(s):</b> <ol style="list-style-type: none"> <li>R.G.Dromey "How to Solve it by Computer", PHI, 1998</li> <li>Ashok N.Kamthane, Amit Ashok Kamthane, "Programming in C", Pearson India Education Services Pvt, Ltd, Third Edition, 2019.</li> </ol>		
<b>Reference book(s):</b> <ol style="list-style-type: none"> <li>YaeshwantKanitkar, "Let Us C", BPB publications, New Delhi, 16<sup>th</sup> Edition, 2018.</li> <li>E. Balagurusamy, "Programming in ANSI C", TMH Publishing Pvt., Ltd., 6<sup>th</sup> Edition, 2013.</li> <li>Byron S. Gottfried, "Programming with C", TMH Publishing Pvt., Ltd., 3<sup>rd</sup> Edition, 2013.</li> <li>Paul Deitel, Harvey Deitel, "C How to Program", Pearson India Education Services Pvt, Ltd, 6<sup>th</sup> Edition, 2010.</li> </ol>		
<b>Focus of Course:</b> Employability		
<b>e-Resource/e-Content URL:</b> <ol style="list-style-type: none"> <li><a href="https://nptel.ac.in/courses/106104128/">https://nptel.ac.in/courses/106104128/</a></li> </ol>		



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

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

for  
G.M.M

Ms.D.Geetha  
HoD – CS

**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 concept of algorithms and its implementation	K1
CO2	Define the structure and fundamental concept of C programming and 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	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 Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAMIC30	Core 3	Programming In C Lab	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:**

Unit	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
<b>Total</b>		<b>35</b>

**Reference Book:**

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

**Course Designer :**

Mr. M. Premkumar  
HOD, CS  
Dept of CS

  
Ms. D. Geetha,

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge
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 Cos with Pos and PSOs**

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

*S – Strong; L – Low; M – Medium*

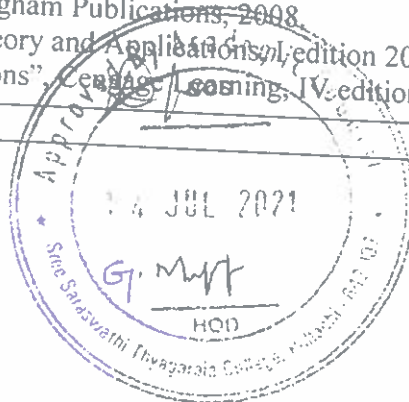


## SEMESTER – I

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

### Syllabus:

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
<b>Total</b>		<b>60</b>
<p><b>Text book</b>                      David C. Lay Steven R. Lay and Judi J. McDonald, “Linear Algebra and Its Applications,                      ”Pearsons Publications 5<sup>th</sup> 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</p>		
<p><b>Reference books</b></p> <ol style="list-style-type: none"> <li>1. Surjeetsingh, Qazi Zameeruddin, “ Modern Algebra”, Vikas Publishing House, 8<sup>th</sup> edition, 2006</li> <li>2. Seymore Lipschutz, “ Beginning Linear Algebra”, Tata Mcgraw hill, 2005.</li> <li>3. S.G. Venkatachalapathy, “ Modern Algebra” Margham Publications, 2008</li> <li>4. Ward Cheney DEwid Kincaid, Linear Algebra Theory and Applications, IV edition 2010.</li> <li>5. Gilbert Strang, “ Linear Algebra and its Applications”, Cengage Learning, IV edition, India,</li> </ol>		
<p><b>Focus of Course:</b> Skill development</p>		



Course Designer : *R. Senthil Amudha*  
 Dr. R. Senthil Amudha  
 Ass<sup>o</sup> Prof & Dept of Mathematics

*R. Senthil Amudha*  
 BoS Chairman

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 with programme Outcomes and 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	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21GENIZ10	Professional English I for Physical Sciences	Language	55	5	-	2
<b>Preamble:</b> The course aims to Develop students' competence in the use of English with particular reference to the workplace situation						
<b>Prerequisite:</b> Basic knowledge in English						

**Syllabus:**

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



<b>Text Books:</b> Tamil Nadu State Council for Higher Education(TANSICHE)	
<b>Reference Books:</b> Tamil Nadu State Council for Higher Education(TANSICHE)	
<b>Focus of Course:</b> Employability (Employability/Skill Development)	
<b>e-Resource/e-Content URL:</b> Vidya-MitraPortal: <a href="http://vidyamitra.inflibnet.ac.in/index.php/search">http://vidyamitra.inflibnet.ac.in/index.php/search</a>	
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 – I

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21TAMIVTI	Foundation Course-I	Enivronmental Studies	-	27	3	-	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 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 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 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 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 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	PSO5
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 – II

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21TAM2L20	Tamil	Part I Tamil Paper II	60			3
<p><b>PPreamble:</b> தொன்மையான தமிழ்ச் சமூகத்தின் பண்பாடு வாயிலாக எடுத்துக் கொள்ளப்பட வேண்டிய அம்சங்களை விளக்குதலையும், வாழ்க்கையை நெறிப்படுத்துவதையும் சமூக நோக்கமாகக் கொண்டிருக்கும் இலக்கியங்களின் வழியே மானிட மதிப்புகளை அறிந்து கொள்ளும் வகையில் தமிழ்ப்பாடம் அமைக்கப்பட்டுள்ளது. மாணவர்களுக்குப் பயன்பாட்டு நோக்கில் மொழிபெயர்ப்புப் பயிற்சி வைக்கப்பட்டுள்ளது.</p>						
<p><b>Prerequisite:</b></p> <ol style="list-style-type: none"> <li>மேனிலைப்பள்ளி முடிய கற்றவற்றைப் பகுத்து தொகுத்து ஆராயும் போக்கில் பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.</li> <li>மானிட மதிப்புகளை உணரும் வகையிலும், போட்டித்தேர்வுகளை எதிர்கொள்ளும் நிலையிலும் 'தமிழ்' - பகுதி - I அமைக்கப்பட்டுள்ளது.</li> <li>பிழையின்றிப் பேச, எழுத ஆராயும் முயற்சிக்குப் பயிற்சி தரப்படுகிறது.</li> </ol>						
<p><b>Course Outcomes (COs)</b></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 பற்றிய செய்திகளை உணர்ந்து கொள்ளுதல்.					K1
CO2	பக்தி இயக்கம் வளர்ந்த வரலாறு, தமிழ் உரைநடை காலந்தோறும் மாறிவந்த நிலை ஆகியவை சார்ந்த கருத்துகளைப் புரியவைத்தல்.					K2
CO3	நடைமுறையில் தமிழைப் பிழையின்றி எழுத உதவுதல். மொழிபெயர்ப்புக் கலை, கதை எழுதும் திறமையை வளர்த்தல்.					K3

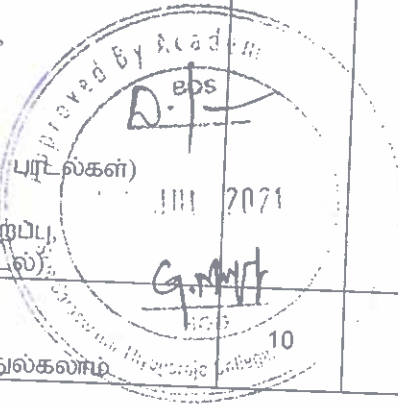
**Mapping the Programme Outcomes**

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	M	M	S			S	M			

S- Strong; L- Low; M-Medium

Unit	Course contents	Hours	e-Resources/ e-Content
I	<p>அலகு I சங்க இலக்கியம்</p> <p>நற்றிணை - நின்றசொல்லர் (1) - கபிலர்</p> <p>ஐங்குறுநூறு - அன்னாய் வாழி வேண்டன்னை (203) - கபிலர்</p> <p>மறுவல்தூவிச் சிறுகருங்காக்கை (391) - ஓதலாந்தையார்</p> <p>கலித்தொகை - அரிதாய அறன்எய்தி (11) - பாலை பாடிய பெருங்கடுங்கோ</p>	12	YouTube Videos & PPT

	<p>அகநானூறு - கினியும் பந்தும் கழங்கும் (49) - வண்ணப்புறக்கந்தரத்தனார்          சிறுகரு பிடவின் வெண்தலை (34) - மருதனிளநாகனார்</p> <p>புறநானூறு - பல்சான்றீரே பல்சான்றீரே (246) - பெருங்கோப்பெண்டு குழவி இறப்பினும் ஊன்தடி பிறப்பினும் (74) - சேரமான் கணைக்கால் இரும்பொறை</p>		
II	<p>அலகு II பக்தி இலக்கியங்கள் &amp; சிற்றிலக்கியங்கள்</p> <p>தேவாரம் - சுந்தரர்</p> <ol style="list-style-type: none"> <li>1. மேலைவிதியே வினையின் பயனே (419)</li> <li>2. பிறவாய் இறவாய் பேணாய் மூவாய் (420)</li> <li>3. பொய்யே உன்னைப் புகழ்வார் புகழ்ந்தால் அடியேன் (421)</li> <li>4. ஊனைப் பெருக்கி உன்னை நினையாது (422)</li> <li>5. காதல்செய்து களித்துப் பிதற்றி (423)</li> </ol> <p>திருக்கோவையார் - மாணிக்கவாசகர்</p> <ol style="list-style-type: none"> <li>1. முனிவரும் மன்னரும் பொன்னான் முடியுமென (332)</li> <li>2. மூவார்நின் நேத்த முதலவன் ஆடமுப் பத்து மும்மைத் (337)</li> <li>3. பிரியா ரெனவிகழ்ந் தேன் முன்னம் யான்பின்னை ஏற்பிரியின (340)</li> </ol> <p>கருவூர்த்தேவர் - தஞ்சை ராசராசேச்சரம்</p> <ol style="list-style-type: none"> <li>1. உலகெலாம் தொழுவந்து எழுகதிர்ப் பருதி (162)</li> <li>2. நெற்றியிற் கண்என் கண்ணின்நின் றகலா (163)</li> <li>3. எவரும்மா மறைகள் எனவயும் வானவர்கள் (166)</li> <li>4. தனிப்பெருந் தாமே முழுதுறப் பிறப்பின் (168)</li> </ol> <p>திருமந்திரம் - திருமூலர்</p> <ol style="list-style-type: none"> <li>1. என்பே விறகாகி இறைச்சி அறுத்திட்டு (272)</li> <li>2. தூய்மை அருள் ஊண் சுருக்கம் பொறை (556)</li> <li>3. உள்ளத்தும் உள்ளன் புறத்துள்ளன் (1532)</li> <li>4. தானே தனக்குப் பகைவனும் நடடானும் (2228)</li> <li>5. அவமும் சிவமும் அறியார் அறியார் (2340)</li> </ol> <p>சித்தர் பாடல்கள் - சிவவாக்கியர் (2 பாடல்கள்)          பாம்பாட்டிச்சித்தர் (2 பாடல்கள்)          இடைக்காட்டுச்சித்தர் (2 பாடல்கள்)          கடுவெளிச்சித்தர் (2 பாடல்கள்)          அழகணிச்சித்தர் (2 பாடல்கள்)</p> <p>சிற்றிலக்கியங்கள் - தமிழ்விடுதாது - தமிழ்மொழியின் சிறப்பு, சிவபெருமானின் சிறப்பு (20 வரிகள்)</p> <p>அற்புதத்திருவந்தாதி - அரனென்கோ நான்முகன், இன்று நமக்கெளிதே, நேர்ந்தரவங் கொள்ளச், திறத்தான் மடநெஞ்சே, அடிபேரிற் பாதாளம் (5 பாடல்கள்)</p> <p>திருவரங்கக் கலம்பகம் - பெருமானின் அவதாரச் சிறப்பு, புயவகுப்பு (இரண்டாம் பாடல்).</p>	18	YouTube Videos & PPT
III	<p>அலகு III உரைநடை</p> <ol style="list-style-type: none"> <li>1. நேரம் கடிக்காரத்தில் இல்லை - வெ. இறையன்பு</li> <li>2. நான் தோல்வியைத் தழுவின போது - ஏ.பி. ஜே. அப்துல்கலாம்</li> </ol>	10	PPT



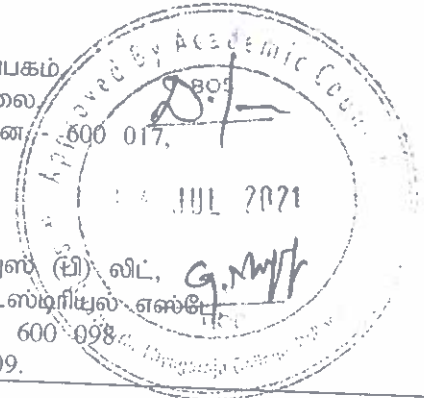
	3. தமிழகத்தில் இதழியல் வளர்ச்சி - மா. பா. குருசாமி 4. மனிதனும் சுற்றுச்சூழலும் - பேராசிரியர் ஜே. தர்மராஜ் 5. எதையும் தீர்மானிக்கும் சக்தி - சி. எஸ். தேவநாதன்		
IV	அலகு IV இலக்கிய வரலாறு 1. சங்க இலக்கியத்தின் சிறப்புகள் 2. பக்தி இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் 3. சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும் 4. உரைநடையின் தோற்றமும் வளர்ச்சியும்	10	YouTube Videos & PPT
V	அலகு V இலக்கணம் பயிற்சி அளித்தல் - மொழித்திறன் வளர்த்தல் - மொழி ஆளுமை 1. ஒருமை, பன்மை மயக்கங்கள் 2. வழுஉச்சொற்களை நீக்குதல் 3. பிறமொழிச் சொற்களை நீக்குதல் 4. சொற்பிரிப்பு பிழைகளை நீக்குதல் 5. ஒலி வேறுபாடு அறிந்து சரியான பொருள் அறிதல் 6. மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்து தமிழுக்கு) 7. சிறுகதை எழுதுதல்.	10	YouTube Videos & PPT
<b>Total</b>		<b>60</b>	

**Text Book(s): பாட நூல்கள்**

- சங்க, பக்தி இலக்கிய, உரைநடைத்திரட்டு - தமிழ்த்துறை வெளியீடு, ஸ்ரீ சரஸ்வதி தியாகராஜா கல்லூரி 2021 ஜூன் பதிப்பு
- தமிழ் இலக்கிய வரலாறு - முனைவர் கா. வாசுதேவன் தேவன் பதிப்பகம், 16/43, திருநகர், திருவானைக்கோவில், திருச்சிராப்பள்ளி - 620 005 பன்னிரெண்டாம் பதிப்பு - 2017.
- தமிழ் இலக்கிய வரலாறு - மு. வரதராசன் சாகித்ய அகாடமி வெளியீடு, புதுதில்லி. மறுபதிப்பு - 2012

**Reference Book(s): பார்வை நூல்கள்**

- சங்க இலக்கியத் தொகுப்புகள் - நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட், 41 - B, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட், அம்பத்தூர், சென்னை - 600 098 இரண்டாம் பதிப்பு - 2004.
- பத்தாயிரம் மைல் பயணம் - வெ. இறையன்பு புதிய தலைமறை பதிப்பகம், 24, ஜி.என். செட்டி சாலை தியாகராயநகர், சென்னை - 600 017, ஆறாம் பதிப்பு - 2015.
- இந்தியக் கலைகள் - பி. கோதண்டராமன் நியூ செஞ்சுரி புக் ஹவுஸ் (பி) லிட், 41 - B, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட், அம்பத்தூர், சென்னை - 600 098 இரண்டாம் பதிப்பு - 2009.



4. அலைகடலுக்கப்பால் அருந்தமிழ் - முனைவர் ஆ. கார்த்திகேயன்  
அகரம், மனை எண்.1, நிர்மலா நகர்  
தஞ்சாவூர் - 613 007. முதல் பதிப்பு - 2007.
5. பக்தி இலக்கியம் - ப. அருணாசலம்  
சைவ சித்தாந்த நூற்பதிப்புக்கழகம்  
சென்னை - 06, பதிப்பு - 1900.
6. சைவமும் சமணமும் - வேலுப்பிள்ளை  
எனி இந்தியன் பதிப்பகம்  
102 எண் 57 பி.எம்.ஐ.காமுளெக்ஸ்  
தெற்கு உஸ்மான் சாலை  
தி.நகர், சென்னை -17, பதிப்பு -1900
7. தமிழில் தவறின்றி எழுத,பேச  
கற்க! - நல்லாமூர். முனைவர் கோ. பெரியண்ணன்  
முத்தமிழ் பதிப்பகம்  
9எ மேக்மில்லன் காலனி, நங்கை நல்லூர்,  
சென்னை - 61, பதிப்பு - 2006.

**Focus of Course:** தமிழ் வரலாறு, சமூக வரலாறு குறித்த காலத்தின் செய்திகள் தரப்பட்டுள்ளன. பிழையின்றி எழுத, பேச, கட்டுரை, கதை எழுதுதலுக்குப் பயன்படும் வகையில் பயிற்சி தரப்பட்டுள்ளது.

Course Designer: Dr.T. Radhika lakshmi  
Associate Professor, Dept. of Tamil, STC

Fst  
G. Muthu

Fst G. Muthu  
BoS Chairman

## SEMESTER – II

### HINDI PAPER - II

Course Code: 21HIN1LT2

(Modern Poetry, One Act Play, Translation & Letter Writing, Conversation)

#### 1.MODERN POETRY :

BHOOMIJA by NAGARJUN

Publishers : Rajkamal Prakashan 1B Nethaji Subash Marg, New Delhi.



NAVEEN EKANKI SANGRAH By Dr. Smt. MALATI THIVARI SUMITHRA  
PRAKASHAN ASHOK NAGAR ALLAHABAD – 1.

**3. TRANSLATION :**

HINDI-ENGLISH ONLY (ANUVADH ABYAS-III) Lessons – 1-15 only  
PUBLISHER : DAKSHIN BHARATH HINDI PRACHAR SABHA CHENNAI – 600  
017.

**4. LETTER WRITING :**

(Leave Letter, Job Application, Ordering Books, Letter to Publisher, Personal Letter)

**5. CONVERSATION :**

(Doctor & Patient, Teacher & Student, Storekeeper & Buyer, Two Friends, Booking  
Clerk & Passenger at Railway Station, Autorickshaw driver and Passenger)

Ref : Bolchal Ki Hindi Aur Sanchar by Dr. Madhu Dhavan Vani Prakashan, New Delhi.

**SEMESTER – II**

**MALAYALAM PAPER - II**

**Course Code: 21MALILT2**

**Prose : Non-Fiction**

**This paper will have the following five units:**

Unit I & II Autobiography

Unit III, IV & V Travelogue

**Text Books prescribed:**

Unit I & II Vazhithiruvukal-Dr.A.P.J.Abdulkalam (D.C.Books, Kottayam)

Unit III, IV & V Alkoottathil Thaniyae - M.T Vasudhevan Nair (D.C.Books, Kottayam)

**Reference books:**

1. Athmakathasahithyam Malayalathil-Dr.Vijayalam Jayakumar (N.B.S.Kottayam)

2. Sancharasahithyam Malayalathil –Prof.Ramesh chandran. V,(Kerala Bhasha Institute,  
Trivandrum)

**SEMESTER – II**

**FRENCH PAPER - II**

**Course Code: 21FREILT2**

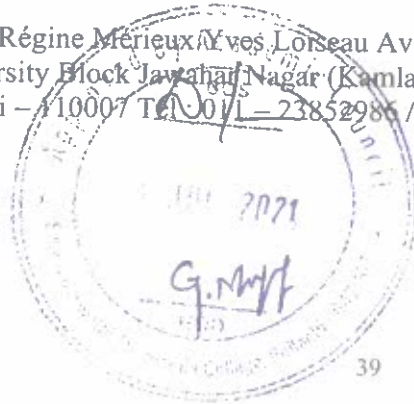
**Prescribed text : LATITUDES I**

**Units : 5 – 8**

Authors : Régine Mérieux Yves Lorseau Available at : Goyal Publishers Pvt Ltd

86, University Block Jawahar Nagar (Kamla Nagar)

New Delhi – 110007 TEL NO/L – 23852986 / 9650597000



**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. <b>Listening and Speaking</b> a. Listening and responding to complaints (formal situation) b. Listening to problems and offering solutions (informal)</p> <p>2. <b>Reading and writing</b> a. Reading aloud (brief motivational anecdotes) b. Writing a paragraph on a proverbial expression/motivational idea.</p> <p>3. <b>Word Power/Vocabulary</b> a. Synonyms &amp; Antonyms</p> <p>4. <b>Grammar in Context</b> • Adverbs Prepositions</p>	15
II	<p>1. <b>Listening and Speaking:</b> 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. <b>Reading and Writing:</b> 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. <b>Word Power</b> : a. Idioms &amp; Phrases</p> <p>4. <b>Grammar in Context:</b> Conjunctions and Interjections</p>	15
III	<p>1. <b>Listening and Speaking</b> 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. <b>Reading and writing</b> a. Writing emails of complaint b. Reading aloud famous speeches</p> <p>3. <b>Word Power</b> a. One Word Substitution 4. <b>Grammar in Context:</b> Sentence Patterns</p>	15
IV	<p>1. <b>Listening and Speaking</b> 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. <b>Reading and Writing</b> a. Reading visual texts – advertisements b. Preparing first drafts of short assignments</p> <p>3. <b>Word Power</b> a. Denotation and Connotation</p> <p>4. <b>Grammar in Context:</b> Sentence Types</p>	15
V	<p>1. <b>Listening and Speaking</b> a. Informal interview for feature writing b. Listening and responding to questions at a formal interview<sup>20/21</sup></p> <p>2. <b>Reading and Writing</b> 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. <b>Word Power</b> a. Collocation</p> <p>4. <b>Grammar in Context:</b> Working With Clauses</p>	15
<b>Total</b>		<b>75</b>

**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**

TRANSCE

**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	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

D./

G.M.V.

**Semester II**

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM2C10	Core 4	Artificial Intelligence and Machine Learning Fundamentals	Concept	45	5	-	4
<b>Preamble:</b> To understand the fundamental concepts in Artificial Intelligence and Machine Learning							
<b>Prerequisite:</b> Knowledge in Basic Math, Science and Computer programming							

**Syllabus**

Unit	Course contents	Hours
I	<b>Introduction:</b> Define AI - Acting humanly - Thinking humanly - Thinking rationally: The "laws of thought" approach - Acting rationally. The Foundations of Artificial Intelligence - The History of Artificial Intelligence. <b>Intelligent Agents I:</b> Agents and Environments - The Nature of Environments	11
II	<b>Intelligent Agents II:</b> The Structure of Agents- Agent programs - Simple reflex agents. <b>Problem-Solving:</b> Problems by Searching - Well-defined problems and solutions - Searching for Solutions -Measuring problem-solving performance.	10
III	<b>Uninformed Search Strategies</b> Breadth-first search - Depth-first search -Depth-limited search. <b>Informed Search and Exploration</b> Informed (Heuristic) Search Strategies - <b>Greedy best-first search</b> - progress of a greedy best-first search - A* search : Minimizing the total estimated solution cost.	9
IV	<b>Machine Learning: Applications of Machine Learning Tools and SVM</b> :Introduction - Hand writing recognition - Natural Language Processing - Computational Biology - Computer Vision - Text Mining - Drug Design - Continuous Speech Recognition and Translation - SVM for Damage Assessment of Bridges - Machinery Fault Diagnostics.	10
V	<b>Supervised Automatic Learning:</b> Introduction - Definitions and Notations: Universe, Objects, Attributes - Learning-Sample - Supervised Learning Problem. <b>Learning Algorithms:</b> Hypothesis Space - Empirical Risk Minimisation. <b>Main Classes of Supervised Learning Algorithms:</b> Linear Models - Artificial Neural Network - K nearest Neighbours - Decision and Regression Trees - Naïve Bayes	10
<b>Total</b>		<b>50</b>
<b>Text Book(s):</b>		
1. Stuart Russell and Peter Nowig ---Artificial Intelligence : A Modern Approach, Pearson Education, Inc., Upper Saddle River; New Jersey, Second Edition, 2013. (UNIT I, II, III).		

2.K.P.Soman, R.Loganathan and V.Ajay – —Machine Learning with SVM and Other Kernel Methods, PHI, New Delhi, India.2019.(UNIT IV, V).

**Reference book(s):**

1. N.P. Padhy – —Artificial Intelligence and Intelligent Systems, I, Pearson Education, Inc.,2012
2. Dan W.Patterson – —Introduction to Artificial Intelligence and Expert Systems, I, Pearson Education, Inc.,2012
3. Elaine Rich, Kevin Knight, Shiva Sankar B. Nair – —Artificial Intelligence, I, Pearson Education, Inc.,2010 .

**Focus of Course:** Employability

Course Designer: Ms. C.AkilaD.Geetha, HoD – CS  
Dept.of CS

**Course Outcomes (COs)**

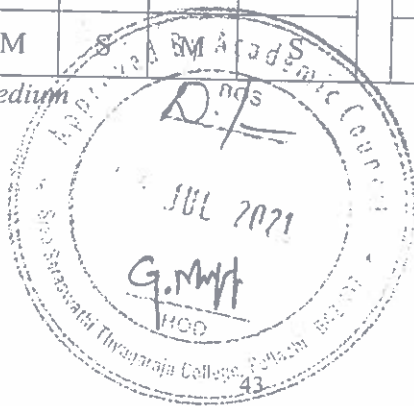
On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Understand the concept of Artificial Intelligence	K1
CO2	Comprehend the aspects of search strategies	K2
CO3	Familiarize with Knowledge of Intelligent agents	K2
CO4	Apply the concepts of Machine Learning and its deterministic tools	K3

**Mapping Course Outcomes with Programme Outcomes and Programme Specific Outcomes:**

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO 2	PSO 3	PSO 4	PSO 5
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	M	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
21BAM2C20	Core-5	Object Oriented Programming with JAVA	Application	45	5	-	4
<b>Preamble:</b> This course provides the student with strong foundation in object oriented programming and JAVA							
<b>Prerequisite:</b> Programming knowledge							

**Syllabus:**

Unit	Course contents	Hours
I	<b>OOPS:</b> Fundamentals of Object Oriented Programming – Introduction- Object Oriented Paradigm–Basic Concepts of Object Oriented Programming– Benefits of OOP-Applications of OOP. <b>Java Evolution:</b> Java History – Java Features - How java differs from C and C++. Overview of Java Language - Constants, Variables and Data types.	10
II	<b>Classes and Objects:</b> Operators and Expressions- Decision Making and Branching, Decision Making and Looping- Classes, Objects and Methods-Arrays, Strings and Vectors.	10
III	<b>Interfaces:</b> Multiple Inheritances. <b>Packages:</b> Putting classes together- Multithreaded Programming- Creating threads -Life Cycle of a Thread –Implementing the ‘Runnable’ Interface- Managing Errors and Exceptions.	10
IV	<b>Applet and AWT:</b> Applet programming- Introduction- Applet Lifecycle- Adding Applet to HTML File-Graphics Programming. <b>Frames and Windows:</b> Frame class-Creating and displaying a Frame – Displaying messages in a window-Button and Label- Events Handling.	10
V	<b>I/O Package:</b> 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
<b>Total</b>		<b>50</b>
<b>Text Book(s):</b> 1. E. Balagurusamy, “Programming With Java – A Primer”, TMH publication 4 <sup>th</sup> Edition, 2011. (UNIT I, II, III, IV, V). 2. C.Xavier, “Programming With Java 2”, Scitech Publications (INDIA) Pvt. Ltd.2010 (UNIT IV).		
<b>Reference Book(s):</b> 1. Patrick Naughton& Hebert Schildt, “The Complete Reference Java 2”, 6 <sup>th</sup> Edition, TMH Publication, 2012.		

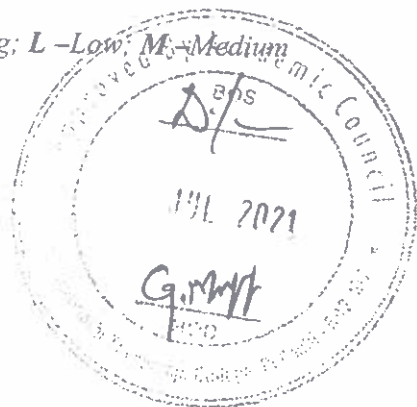
2. Herbert Schildt, "Java: A Beginner's Guide", TMH Publication, 6 <sup>th</sup> Edition, 2014.
3. D.T. Editorial Services, "Java 8 Programming Black Book", Dream Tech Publication, 2015 edition.
4. John R. Hubbard, "Programming with Java", McGraw Hill Publication, 2 <sup>nd</sup> Edition, 2012
<b>Focus of Course:</b> Employability
Course Designer : <i>for G.M.K</i> Mr. M. Premkumar Ms.D.Geetha Dept of CS
HoD – CS

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 Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5		PSO	PSO	PSO	PSO	PSO5
							1	2	3	4	
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

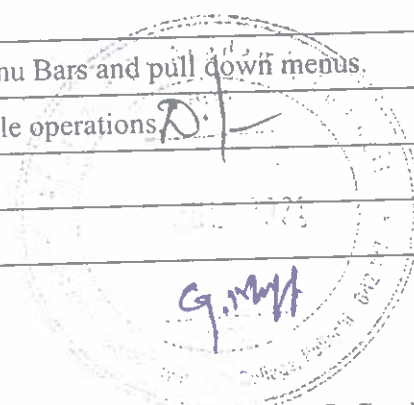

S – Strong; L – Low; M – Medium



## SEMESTER II

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM2C30	Core 6	Object Oriented Programming Lab	Practical	-	5	30	2
<p><b>Preamble:</b> Students will be able to apply logic which helps to develop programs using OOPS concepts</p>							
<p><b>Prerequisite:</b> Basic programming skills and logical thinking.</p>							

### 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
<b>Total</b>		<b>35</b>
<b>Focus of Course: Employability</b>		
		
Course Designer : Mr. M. Premkumar Dept of CS		Ms. D.Geetha, HOD, CS

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 & 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
21BMAGAP0	Allied 2	Optimization Techniques	Concept	60			4
<b>Preamble:</b> To make the students to understand the basic concepts of linear programming – Transportation Model – Sequencing & Machine Jobs. <b>Prerequisite:</b> Knowledge in Basic Mathematics							

### Syllabus

Unit	Course contents	Hours
I	Linear Programming: The Graphical Method – Introduction Important definitions – Graphical Solution Methods of LP Problems – Special Cases in Linear programming Linear Programming : The Simplex Method – Big - M Method.	12

II	Transportation Problem – Introduction- Mathematical Model of Transportation Problem – The Transportation Algorithm – Methods for Finding Initial Solution – Test for Optimality – Variations in Transportation Problem- Unbalanced supply and demand- Degeneracy and its resolution.	12
III	Assignment Problem – Introduction- Mathematical Models of Assignment Problem – Solution Methods of Assignment Problem – Variations of the Assignment Problem – A Typical Assignment Problem – Travelling Salesman Problem.	12
IV	Deterministic Inventory Control Models – Introduction – The Meaning of Inventory Control – Functional Role of Inventory – Reasons for Carrying Inventory – Factors Involved in Inventory Problem Analysis – Inventory Model Building – Single Item Inventory Control Models without Shortages – Single Item Inventory Control Models with Shortages.	12
V	Sequencing Problems – Introduction – Notations, Terminology and Assumptions – Processing n jobs through two machines – Processing n jobs through three machines – Processing n jobs through m machines – Processing two jobs through m machines.	12
<b>Total</b>		<b>60</b>
<b>Text Book(s):</b> 1.Sharma J.K.: “Operations Research Theory and Applications”, Macmillan Publishers India Ltd., Fifth Edition, 2013. Unit I : Chapter 3 & 4 Section 3.1 – 3.4, 4.1 Pg. No 69 – 113, 119 – 128 Unit II : Chapter 9, Section 9.1 – 9.6 (9.6.1, 9.6.2 only) Pg. No 257 - 286 Unit III : Chapter 10, Section 10.1 -10.6 Pg. No 311 – 336 Unit IV : Chapter 14, Section 14.1 – 14.8 Pg. No 475 - 502 Unit V : Chapter 20. Section 20.1 – 20.6 Pg. No 709 – 725		
<b>Reference book(s):</b> 1. Hamdy A. Taha: Operations Research –An Introduction”, Prentice Hall of India Pvt Ltd.. Eighth Edition, 2014. 2.Frederick & Hillies, Gerald I. Lieberman, Operations Research, Tata McGraw – Hill Publications company, 2009. 3.KantiSwarup, P.K.Gupta and Man Mohan “Operations Research”, Sultan Chand,2014		
<b>Focus of Course:</b> Skill development		
<b>Course Designer :</b> <b>Dr. R. Senthil Amutha</b>  Ass <sup>o</sup> Prof & Dept of Mathematics		 <b>BoS Chairman</b>

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 concepts of optimization of mathematics models in machine	K1
CO2	Implement various problem solving techniques using mathematical models	K2
CO3	Summarize the concepts of machine scheduling and Evaluation	



	Evaluation	
CO4	Calculate various Inventory Methods and Queuing Model	K3

**Mapping Course Outcomes with Programme Outcomes and Programme Specific Outcomes:**

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PS O1	PS O2	PS O3	PS O4	PS O5
CO1	M	L	M	M	M	L	L	M	M	M
CO2	M	L	M	M	M	L	L	M	M	M
CO3	M	M	S	M	M	L	M	M	M	M
CO4	S	M	S	M	S	L	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
1	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	05

	society – The art of complete life.	
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. <b>Short notes:</b> Pandit Jawaharlal Nehru, Patel, Subash Chandra Bose,V.O.Chithambaram pillai, 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
<b>Total</b>		<b>27</b>

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	Course Name	Category	Lecture(L)	Tutorial(T)	Practical(P)	Credit
21GEN2Z10	Professional English II	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

UNITS	COURSE CONTENTS	HOURS
I	<b>Unit 1</b> <b>Communicative Competence</b> <b>Listening</b> – Listening to two talks/lectures by specialists on selected subject specific topics and answering comprehension exercises (inferential questions) eg://youtu.be/moJkKqkn_Xs. <b>Speaking:</b> Small group discussions and narrating stories. <b>Reading:</b> Two subject-based reading texts followed by comprehension activities/exercises <b>Writing:</b> 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	<b>Unit 2</b> <b>Persuasive Communication</b> <b>Listening:</b> listening to a product launch sensitizing learners to the nuances of persuasive communication <b>Speaking:</b> Debates and Just a Minute Activities <b>Reading:</b> investigate a topic by answering inferential questions <b>Writing:</b> dialogue writing- Writing an argumentative /persuasive essay. eg: Watch a youtube video on Natural Language Processing and draft a report based on the	12

	following link: <a href="https://youtu.be/5ctbvKAMQO4">https://youtu.be/5ctbvKAMQO4</a> .	
III	<p><b>Unit 3</b>  <b>Digital Competence</b>  <b>Listening</b> to you tube video and doing exercises in comprehension e.g. <a href="https://youtu.be/nt2OIMAJj6o">https://youtu.be/nt2OIMAJj6o</a>.  <b>Speaking:</b> Interviews with subject specialists (using video conferencing skills) group discussion regarding drastic industrial disasters. eg: Vishakhapatnam gas leak disaster on 7 May, 2020  <b>Reading:</b> Selected sample of Web Page (subject area) and discuss the benefits of multilingualism and prepare a presentation based on discussion.  <b>Writing:</b> Creating Web Pages. Essay Writing - Digital Competence for Academic and Professional Life. This essay must 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.</p>	12
IV	<p><b>Unit 4</b>  <b>Creativity and Imagination</b>  <b>Listening</b> to short (2 to 5 minutes) academic videos (prepared by EMRC/ other MOOC videos on Indian academic sites – E.g. <a href="https://www.youtube.com/watch?v=4WZTzKu3CsY">https://www.youtube.com/watch?v=4WZTzKu3CsY</a>)  <b>Speaking:</b> Talk about a script on Analytical Engine – subject based.  <b>Reading:</b> Essay on Creativity and Imagination  <b>Writing:</b> Basic Script writing imagining your floating (individual). Role play of considering one's own self as a water molecule (group discussion).</p>	12
V	<p><b>Unit 5</b>  <b>Workplace Communication and Basics of Academic Writing</b>  <b>Listening:</b> Pronunciation Practice (Collins Dictionary) and Listening Comprehension.  <b>Speaking:</b> Short academic presentations using PowerPoint, e.g. How man interferes with nature to console his greed.  <b>Reading:</b> comprehension and reading activity Product Profiles, Circulars, Minutes of Meeting, Imagine a meeting to decide if you can invest a research product related to artificial photosynthesis.  <b>Writing:</b> Introduction, Paraphrase and Summary, Creating webpages, Blogs, Flyers and brochures - Poster making writing slogans/captions Punctuation(period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, Capitalization (use of upper case quotation marks, and ellipsis)</p>	12
		60

<b>Text Books:</b> Tamil Nadu State Council for Higher Education(TANSCHE)
<b>Reference Books:</b> Tamil Nadu State Council for Higher Education(TANSCHE)
<b>Focus of Course:</b> Employability (Employability/Skill Development)
<b>e-Resource/e-Content URL:</b> <ul style="list-style-type: none"> <li>• <b>Vidya-MitraPortal:</b><a href="http://vidyamitra.inflibnet.ac.in/index.php/search">http://vidyamitra.inflibnet.ac.in/index.php/search</a></li> <li>• <b>e-PG Pathshala:</b><a href="http://epgp.inflibnet.ac.in/ahl.php?csr">http://epgp.inflibnet.ac.in/ahl.php?csr</a></li> </ul>
Course Designer: TANSCHE
<b>BoS Chairman</b> Assistant Professor of English

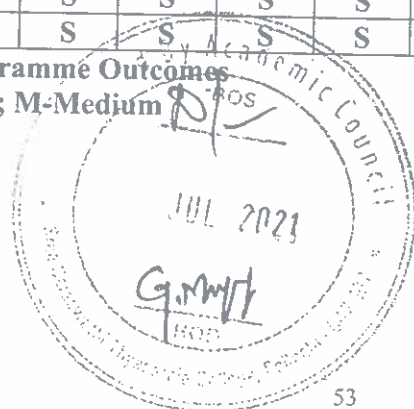
### COURSE OUTCOMES

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 organisations / sections in companies and offices with winning proposals	K5

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

Mapping the Programme Outcomes  
S- Strong; L- Low; M-Medium



### SEMESTER III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM3C10	Core7	Advanced Database Management System	Theory	60	-	-	5
<b>Preamble: we need to redo it</b>							
<b>Prerequisite: nil</b>							

**Syllabus:**

Unit	Course contents	Hours
I	<b>BASIC CONCEPTS:</b> Introduction to databases – Conventional file Processing – Data Modeling for a database – Three level architecture – Data Independency – Components of a Database Management System (DBMS) – Advantages and disadvantages of a DBMS – System Environment – Users of DBMS – Transaction Management.	12
II	<b>DATA MODELS:</b> Introduction – Conceptual data modeling – Motivation - Entities, entity types, various types of attributes, relationships, relationship types - E/R Diagram (ERD) notation - Generalization – Aggregation – Conversion of ERD into relational schema – Introduction to Network data model and Hierarchical data model.	12
III	<b>RELATIONAL DATA MODEL:</b> Introduction – Keys, relational algebra operators: selection, projection, cross product, various types of joins, division, examples, tuple relation calculus, domain relational calculus. <b>RELATIONAL DATABASE MANIPULATION:</b> Structured Query Language (SQL) - Basic data retrieval – nested queries - correlated and uncorrelated - SQL Join – Views	12
IV	<b>DATABASE DESIGN THEORY:</b> Functional dependencies – Normal forms - Dependency theory - Functional Dependencies (FD) – Armstrong's axioms for FDs - Closure of a set of FDs, Minimal covers – 1NF, 2NF, 3NF and BCNF - Join dependencies and definition of 5NF – Examples. <b>DATA STORAGE AND INDEXING:</b> Storage device Characteristics – Operations on file - Sequential files - Index Sequential files – Direct files – Indexing using Tree structures.	12
V	<b>SECURITY, INTEGRITY AND CONTROL:</b> Security and Integrity threats – Defense mechanisms - Transaction processing – concepts - ACID properties - concurrency control - recovery methods.	12
<b>Total</b>		<b>60</b>

**Text Book(s):** 1. Silberschatz A., Korth H. and Sudarshan S., "Database System Concepts", McGraw Hill, 2011.

2. Elmasri R. and Navathe S.B., "Fundamentals of Database Systems", Pearson Education, 2011.  
 3. Raghu Ramakrishnan and Johannes Gehrke, "Database Management System", McGraw Hill, 2010.

**Reference Book(s):**

1. Bipin C.Desai, "An Introduction to Database System ,,", Galgotia Publishers, 2012.

**Focus of Course:** Database admin

Course Designer :  
 Mrs. A. Priyadarshini  
 Dept of AI

*for the*

*D. Geetha*  
 Ms. D. Geetha  
 HoD – CS

**Course Outcomes (COs)**

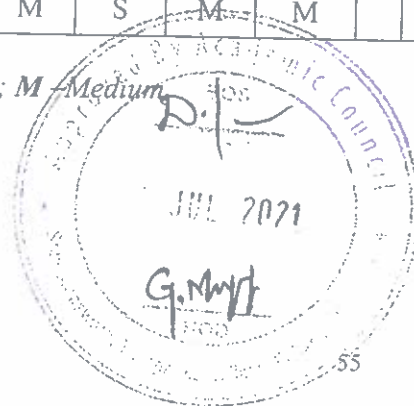
On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	To understand storage media and their basic properties.	K1
CO2	To understand how data is stored using storage media in a DBMS.	K2
CO3	To understand how different indexing techniques work.	K3
CO4	To understand why and how data needs to be indexed	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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 III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM3C20	Core8	Programming in Python	Application	45	5	-	50
<b>Preamble:</b> This course provides the student with to know the strong foundation of algorithmic problem-solving using python							
<b>Prerequisite:</b> Programming knowledge							

**Syllabus:**

Unit	Course contents	Hours
I	ALGORITHMIC PROBLEM SOLVING: Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi	10
II	DATA, EXPRESSIONS, STATEMENTS: Python interpreter and interactive mode; values and types: int, float, Boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.	10
III	CONTROL FLOW, FUNCTIONS: Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-else if-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.	10
IV	LISTS, TUPLES, DICTIONARIES: Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, merge sort, histogram.	10
V	FILES, MODULES, PACKAGES: Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.	10
<b>Total</b>		<b>50</b>
<b>Text Book(s):</b> 1. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 ( <a href="http://greenteapress.com/wp/think-python/">http://greenteapress.com/wp/think-python/</a> ) 2. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated		



for Python 3.2, Network Theory Ltd., 2011.

**Reference Book(s):**

1. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.
2. John V Guttag, "Introduction to Computation and Programming Using Python", Revised and expanded Edition, MIT Press, 2013
3. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
4. Paul Gries, Jennifer Campbell and Jason Montojo, "Practical Programming: An Introduction to Computer Science using Python 3", Second edition, Pragmatic Programmers, LLC, 2013

**Focus of Course:** Employability

Course Designer:  
Mr.T.Anandhakrishnan *TAMF*  
Dept of AI

*[Signature]*  
Ms.D.Geetha  
HoD – CS

**Course Outcomes (COs)**

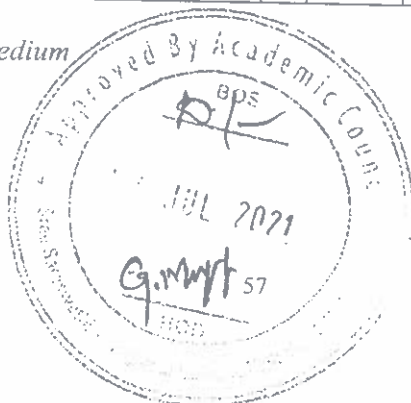
On successful completion of this course the students will be able to:

CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Develop algorithmic solutions to simple computational problems	K1
CO2	Read, write, execute by hand simple Python programs	K2
CO3	Structure simple Python programs for solving problems.	K3
CO4	Represent compound data using Python lists, tuples, dictionaries files	K3

**Mapping Course Outcomes with Program me Outcomes & program me Specific Outcomes**

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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 III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM3C30	Core9	Machine learning Techniques	Theory	60	-	-	5
<b>Preamble:</b> This course provides the student with to know the strong foundation of Machine learning Techniques.							
<b>Prerequisite:</b> ML knowledge							

#### Syllabus:

Unit	Course contents	Hours
I	<b>INTRODUCTION:</b> Learning, Types of Machine Learning –, Supervised Learning, The Brain and the Neuron, design a Learning System –, Perspectives and Issues in Machine Learning, Concept Learning Task, Concept Learning as Search, Finding a Maximally Specific Hypothesis –, Version Spaces and the Candidate Elimination Algorithm, Linear Discriminants, Perceptron, Linear Separability, Linear Regression	12
II	<b>LINEAR MODELS:</b> Multi-layer Perceptron, Going Forwards, Going Backwards: Back Propagation Error Multilayer Perceptron in Practice, Examples of using the MLP, Overview, Deriving Backpropagation, Radial Basis Functions and Splines, Concepts, RBF Network, Curse of Dimensionality, Interpolations and Basis Functions, Support Vector Machines.	12
III	<b>TREE AND PROBABILISTIC MODELS:</b> Learning with Trees, Decision Trees, Constructing Decision Trees, Classification and Regression Trees, Ensemble Learning, Boosting, Bagging, Different ways to Combine Classifiers, Probability and Learning, Data into Probabilities, Basic Statistics, Gaussian Mixture Models, Nearest Neighbor Methods, Unsupervised Learning, K means Algorithms, Vector Quantization, Self-Organizing Feature Map.	12
IV	<b>DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS:</b> Dimensionality Reduction, Linear Discriminant Analysis, Principal Component Analysis, Factor Analysis, Independent Component Analysis, Locally Linear Embedding, Isomap, Least Squares Optimization, Evolutionary Learning, Genetic algorithms, Genetic Offspring: - Genetic Operators, Using Genetic Algorithms, Reinforcement Learning, Markov Decision Process	12
V	<b>MACHINE LEARNING IN PRACTICE:</b> Machine learning in practice: Design and analysis of machine learning experiments, Balanced, unbalanced datasets	12
<b>Total</b>		<b>60</b>

<b>Text Book(s):</b>	
1. EthemAlpaydin, —Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press, 2014	
2. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.	
3. Stephen Marsland, —Machine Learning – An Algorithmic Perspective, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.	
<b>Reference Book(s):</b>	
Tom M Mitchell, —Machine Learning, First Edition, McGraw Hill Education, 2013.	
<b>Focus of Course:</b> Data scientist	
Course Designer:	
Mrs. A. Priyadarshini <i>for TA's</i>	<i>D.G.</i> Ms. D. Geetha HoD – CS
PC-Dept of AI	

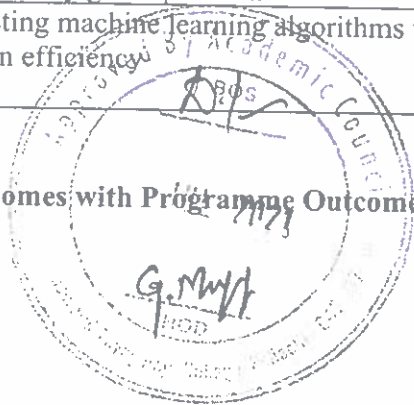
**OPEN SOURCES**

**URLS:**

<a href="http://www.cs.cmu.edu/~tom/pubs/MachineLearning.pdf">http://www.cs.cmu.edu/~tom/pubs/MachineLearning.pdf</a> <a href="https://www.udacity.com/course/intro-to-machine-learning-ud120">https://www.udacity.com/course/intro-to-machine-learning-ud120</a> <a href="https://towardsdatascience.com/types-of-machine-learning-algorithms-you-should-know-953a08248861">https://towardsdatascience.com/types-of-machine-learning-algorithms-you-should-know-953a08248861</a> <a href="https://www.forbes.com/sites/peterhigh/2017/10/30/carnegie-mellon-dean-of-computer-science-on-the-future-of-ai">https://www.forbes.com/sites/peterhigh/2017/10/30/carnegie-mellon-dean-of-computer-science-on-the-future-of-ai</a>
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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	Distinguish between, supervised, unsupervised and semi-supervised learning	K1
CO2	Apply the appropriate machine learning strategy for any given problem	K2 K3
CO3	Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem	K4
CO4	Modify existing machine learning algorithms to improve classification efficiency	K4

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**



COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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* –Mediu

### SEMESTER III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM3C40	Core10	Programming in Python Lab	Practical	-	5	30	2
<p><b>Preamble:</b> To apply the basic knowledge of Mathematics, Science and engineering fundamentals in Computer Science and Engineering field</p>							
<p><b>Prerequisite:</b> Basic programming skills and logical thinking.</p>							

#### Syllabus:

Ex. No	Course contents	Hours
1	Compute the GCD of two numbers.	2
2	Find the square root of a number (Newton's method)	3
3	Exponentiation (power of a number)	3
4	Find the maximum of a list of numbers	3
5	Linear search and Binary search	3
6	Selection sort, Insertion sort	3
7	Merge sort	3
8	First n prime numbers	3
9	Multiply matrices	3
10	Programs that take command line arguments (word count)	3
11	Find the most frequent words in a text read from a file	3
12	Simulate elliptical orbits in Pygame	3
<b>Total</b>		<b>35</b>

<b>Focus of Course:</b> IT employee	
Course Designer: Mr.T.Anandhakrishnan Dept of AI	Ms.D.Geetha HoD – CS

<b>Course Outcomes (COs)</b>		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms Taxonomy Knowledge Level
CO1	Write, test, and debug simple Python programs.	K2
CO2	Implement Python programs with conditionals and loops.	K2
CO3	Use Python lists, tuples, dictionaries for representing compound data.	K3
CO4	Read and write data from/to files in Python.	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO 4	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 – III**

**For B.Sc AI & ML**

Course Code	Course Name	Type	Course Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BMAGAQ1	Mathematics for Machine Learning	Allied		50	10	-	4

**Preamble:** This course aims to

- ✓ Provide a fundamental statistical concepts and skills presented in the context of real-world applications.
- ✓ Gain a working knowledge of core techniques behind statistics and develop a basic ability to quantify certain phenomena associated with the statistics

**Prerequisites:** Basics of statistics, Logics of discrete mathematics

**Syllabus:**

Unit	Course Contents	Hours
I	Introduction – Population – Sample – Parameter and Statistic - Sampling distribution - Null hypothesis – alternate hypothesis – Type I & II errors – Size of Type I & Type II errors – Critical region - One tail and Two tail test – <b>Large Sample tests</b> for : Specified Mean, Equality of Population Means, Specified Proportions – Equality of two Proportions – Confidence Interval – definition - Simple Problems	12
II	<b>Small Samples:</b> t – test. Test for Specified mean, Test for equality of Population means - Test for paired observations – <b>Chi – Square Test:</b> Test for significance of difference between observed and expected frequencies – Test for independence of attributes – 2 X 2, 2 X 3 and 3 X 2 contingency table - Simple Problems.	12
III	<b>Analysis of Variance:</b> Definition – One way classification – Two way classification - related problems.	12
IV	Finite Automata: Definition – Representation of a Finite Automaton – Acceptability of a string by a Finite Automaton – Language accepted by a Finite Automaton – Nondeterministic Finite Automata – Acceptability of a string by NFA – Procedure for finding an FA equivalent to a given NFA – Problems	12
V	Phrase – Structure Grammars – Derivations in a grammar G – Chomsky Hierarchy of Languages – Finite Automata and Regular Languages – Derivation trees for context free Grammars – Normal Forms for Context free Grammars – Worked examples	12
	<b>Total</b>	<b>60</b>

**Text Book(s):**

1. P.R. Vittal, **Mathematical Statistics**, Margham Publications, Chennai 2015.  
**Unit I** Pages: 24.1 – 24.41, 24.45 – 24.50.  
**Unit II** Pages 25.1 – 25.40, 27.18 – 27.33  
**Unit III** Pages: 26.14 – 26.19
2. Dr.M.K.Venkataraman, Dr.N.Sridharan and N.Chandrasekaran, **Discrete Mathematics**, The National Publishing Company, Chennai, 2006.  
**Unit IV** Chapter –12: Sections 2 – 8, 10, PP 12.1 – 12.18, 12.20 – 12.25.

<b>Unit V Chapter – 12: Sections 16 - 20, PP 12.43 – 12.68.</b>
<b>Reference Book(s):</b>
<ol style="list-style-type: none"> <li>1. S.P.Gupta Statistical Methods Sultan Chand &amp; Sons, New Delhi, 44<sup>th</sup> Revised Edition, 2014.</li> <li>2. Gupta, S.C. and Kapoor V.K., Fundamentals of Mathematical Statistics, S. Chand &amp; Sons, 2016.</li> <li>3. R.S.Bharadwaj, Business Statistics, Excel Book, 2006.</li> <li>4. Dr.N.Murugesan, Principles of Automata Theory and Computation, Sahithi Publication, Coimbatore, First Edition, 2004</li> </ol>
<b>Learning Methods (*):</b> • Assignment/Seminar/Quiz/ etc.,
<b>Focus of Course:</b> Research and CSIR/NET Exams
<b>Course Designer:</b> Prof, K.Sivasamy / Dr. O.V. Shanmuga Sundaram, <b>Dr. R. SenthilAmutha</b>
Dean Maths / Associate Professor & Programme Coordinator / PG Mathematics Chairman

### SEMESTER III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
20BAM3S10	SBC1	Computational Intelligence Lab	Practical	-	-	35	2

**Preamble:** To apply the basic knowledge of Mathematics, Science and engineering fundamentals in Computer Science and Engineering field

**Prerequisite:** Basic programming skills and logical thinking.

### Syllabus:

Ex. No	Course contents	Hours
1	Implement Decision Tree learning	2
2	Implement Logistic Regression	3
3	Implement classification using Multilayer perceptron	3
4	Implement classification using SVM	3
5	Implement Ada boost	3
6	Implement Bagging using Random Forests	3
7	Implement Kmeans Clustering to Find Natural Patterns in Data	3
8	Evaluating ML algorithm with balanced and unbalanced datasets	3
9	Implement 'nearest neighbors' algorithm	3
10	Implement Hierarchical clustering	3
11	Implement KNN algorithm	3

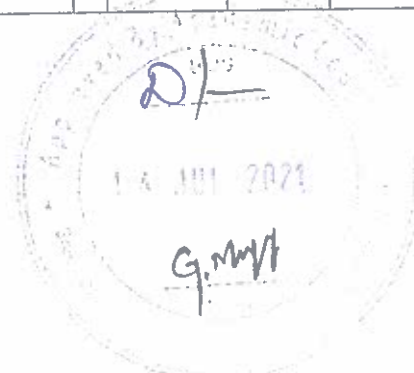
12	Implement Linear Regression	3
<b>Total</b>		<b>35</b>
<b>Focus of Course: Data Architect</b>		
Course Designer: Mr. T. Anandha Krishnan <i>TAK</i> Dept of AI		Ms.D.Geetha HoD – CS

<b>Course Outcomes (COs)</b>		
On successful completion of this course the students will be able to:		
<b>CO Number</b>	<b>Course Outcome (CO) Statement</b>	<b>Blooms Taxonomy Knowledge Level</b>
<b>CO1</b>	Identify real-world applications of machine learning.	K2
<b>CO2</b>	Identify and apply appropriate machine learning algorithms for analyzing the data for variety of problems	K2
<b>CO3</b>	Implement different machine learning algorithms for analyzing the data.	K3
<b>CO4</b>	Design test procedures in order to evaluate a model	K3

#### Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

<b>COs/POs / PSOs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO 4</b>	<b>PSO5</b>
<b>CO1</b>	L	M	M	S	M	M	L	S	M	M
<b>CO2</b>	L	M	M	M	M	M	L	M	M	M
<b>CO3</b>	M	M	M	S	M	S	M	S	M	M
<b>CO4</b>	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
21BAM4C10	Core 11	R PROGRAMMING	Theory	45	5	-	5
<b>Preamble:</b> This course provides the student with to know the strong foundation of algorithmic problem-solving using R							
<b>Prerequisite:</b> R Language							

#### Syllabus:

Unit	Course contents	Hours
I	<b>Introduction:</b> Introducing to R – R Data Structures – Help functions in R – Vectors – Scalars – Declarations – recycling – Common Vector operations – Using all and any – Vectorized operations – NA and NULL values – Filtering – Vectorized if-then else – Vector Equality – Vector Element names	10
II	<b>Matrices, Arrays and Lists:</b> Creating matrices – Matrix operations – Applying Functions to Matrix Rows and Columns – Adding and deleting rows and columns – Vector/Matrix Distinction – Avoiding Dimension Reduction – Higher Dimensional arrays – lists – Creating lists – General list operations – Accessing list components and values – applying functions to lists – recursive lists	10
III	<b>Data Frames:</b> Creating Data Frames – Matrix-like operations in frames – Merging Data Frames – Applying functions to Data frames – Factors and Tables – factors and levels – Common functions used with factors – Working with tables - Other factors and table related functions - Control statements – Arithmetic and Boolean operators and values – Default values for arguments - Returning Boolean values – functions are objects – Environment and Scope issues – Writing Upstairs - Recursion – Replacement functions – Tools for composing function code – Math and Simulations in R	10
IV	<b>OOP:</b> S3 Classes – S4 Classes – Managing your objects – Input/Output – accessing keyboard and monitor – reading and writing files – accessing the internet – String Manipulation – Graphics – Creating Graphs – Customizing Graphs – Saving graphs to files – Creating three-dimensional plots	10
V	<b>Interfacing: Interfacing R to other languages</b> – Parallel R – Basic Statistics – Linear Model – Generalized Linear models – Non-linear models – Time Series and Auto-correlation – Clustering	10
<b>Total</b>		<b>50</b>
<b>Text Book(s):</b> 1. Norman Matloff, "The Art of R Programming: A Tour of Statistical Software Design", No Starch Press, 2011 2. Jared P. Lander, "R for Everyone: Advanced Analytics and Graphics", Addison-Wesley Data & Analytics Series, 2013		

<b>Reference Book(s):</b> 1.Mark Gardener, “Beginning R – The Statistical Programming Language”, Wiley, 2013 2 Robert Knell, “Introductory R: A Beginner's Guide to Data Visualization, Statistical Analysis and Programming in R”, Amazon Digital South Asia Services Inc, 2013.	
<b>Focus of Course:</b> Data scientist	
Course Designer: Mrs. A. Priyadarshini, PC-Dept of AI	Ms.D. Geetha HoD – CS

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 in R programming in terms of constructs, control statements, string functions	K1
CO2	Learn to apply R programming for Text processing	K2
CO3	Able to appreciate and apply the R programming from a statistical perspective	K3
CO4	Understand the use of R for Big Data analytics	K3

#### Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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**  
**SYLLABUS: Discrete Structures and Applications**

Course Code	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BMAGAN0	Discrete Structures and Applications	Employability	50	10	-	4
<p><b>Preamble:</b> This course aims at facilitating the student to learn the concepts in Discrete Mathematics and apply the fundamental concepts in graph theory and apply the fundamental concepts in Number theory</p> <p><b>Prerequisite:</b> Basic concepts in Mathematics at HSC level and know the concept of number theory, matrices and basic set operations in Mathematics</p>						

Unit	Course contents	Hours
I	<b>Relations:</b> Cartesian product of two sets – Relations – Representation of Relation – Operations on Relations – Equivalence of Relation – Closures and Warshall's Algorithm – Partitions and equivalence classes	12
II	<b>Coding Theory:</b> Introduction – Hamming distance – Encoding a Message – Group codes – Procedure for Generating Group Codes – Decoding and error correction – An example of Simple Error Correcting Code.	12
III	<b>Mathematical Logic:</b> Introduction – True / False - Statements – Connectives – Atomic and Compound Statements – Well Formed (Statement) Formulae – The truth table of a formula – Tautology – Tautological implications and equivalence of a formula – Normal forms – Principal Normal Forms.	12
IV	<b>Graph Theory :</b> Graphs and sub graphs - Operations on Graphs - Isomorphism of Graphs - Walks, paths and cycles - Trees - spanning trees of graph - Algorithm for finding a spanning tree of a connected graph - Krushkal's algorithm to find an optimal tree of a weighted graph.	12
V	<b>Number Theory:</b> Divisibility: Divisibility of integer – Division algorithm – Common divisor – Greatest common divisor – The Euclidean algorithm – <b>Primes and Composite Number:</b> Definition of Prime, Composite, Twin prime – Euclid's theorem – Unique factorization theorem – To find GCD & LCM of two integers – Positional representation of on integers – Worked examples	12
<b>Total</b>		<b>60</b>

**Text Book:****Unit – I, II, III**

1. Dr. M. K. Venkataraman, Dr. N. Sridharan, N. Chandarasekaran, Discrete Mathematics, The National Publishing Company Chennai, 2006.

Unit – I Chapter 2: 2.1, 2.6., 2.10, 2.13, 2.21, 2.29, 2.40

Unit –II Chapter 8: 8.1, 8.2, 8.3, 8.5, 8.6, 8.8, 8.11

Unit – III Chapter 9: 9.1, 9.4, 9.13, 9.14, 9.21, 9.25, 9.30, 9.34, 9.40, 9.42,9,49

**Unit – IV**

2. S. Kumaravelu & Susheela Kumaravelu, Graph Theory, Janki Calender Corporation, Sivakasi, 1999

Page No. 1 to 54, 56 to 64, 66 to 77, 88 to 90

**Unit – V**

3. Kumaravelu and Suseela Kumaravelu, Elements of Number Theory, Raja Sankar offset Printers, 2002.

Unit – V Number Theory Chapter 3 Page no 45-57 Chapter 4 Page no 60-75

**Theory -40%, Problems -60%**

**Reference Book(s):**

1. J.P. Tremblay, R Manohar, Discrete Mathematical Structures with Applications to Computer Science, McGraw Hill International Edition, 2007.

2. Dr. A. Singaravelu, Dr. V. Ravichandran, Dr. T.N. Shanmugam, Discrete Mathematics, Meenakshi agency 2008, 5<sup>th</sup> edition

3. Narsingh Deo, Graph Theory with applications to engineering and computer science, Prentice hall of India, New Delhi, 2003

4. Ivan Nivan and Herbert S. Zuckerman, An introduction to the Theory of Numbers, Third Edition Wiley Easter Ltd. 1972

**Learning Methods (\*):**

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

**Focus of Course: Employability**

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

Course Designer:

**Prof. K. Sivaswamy, R. Karpagam,**

Dean Mathematics, STC, Asst. Prof Department of Mathematics

  
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	Understand the concepts of sets and relations Know the concepts of mathematical logic.	K1
CO 2	Know the concepts of mathematical coding theory	K1
CO 3	Know the concepts of mathematical logic	K2
CO 4	Know the basic concept of graph theory and the types of graphs and Relate connectedness, connectivity and various matrices	K3
CO 5	Find results involving divisibility and greatest common divisors and Find integral solution to specified linear Diophantine equations	K3

**Mapping with Program Outcomes: (For DCFS)**

Cos/POs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	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 IV

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM4C20	Core12	Advanced Data structures	Theory	45	5	-	5
<p><b>Preamble:</b> This course provides the student to know the strong Data structure programming skills using updated computing knowledge to program in various fields</p>							
<p><b>Prerequisite:</b> Data structures</p>							

### Syllabus:

Unit	Course contents	Hours
I	<b>FUNDAMENTALS:</b> Review of order rotation & growth of functions, recurrences, probability distributions, Average case analysis of algorithms, Basic data structures such as stacks, queues, linked lists, and applications.	10
II	<b>TABLES &amp; TREES:</b> Direct access tables and hash tables, hash functions and relates analysis, Binary Search trees and Operations, AVL Trees and balancing operations, R B Trees, properties, operations	10
III	<b>ADVANCED TREES &amp; GRAPH :</b> B – Trees – definition – properties, operations, data structures for disjoint sets, Graph algorithms, MST single source all pair shortest paths, BFS, DFS, topological sort, strongly connected components.	10
IV	<b>SORTING:</b> Quick sort randomized version, searching in linear time, More graph algorithms – maximal independent sets, coloring vertex cover, introduction to perfect graphs.	10
V	<b>ALGORITHMS:</b> Algorithmic paradigms Greedy Strategy, Dynamic programming, Backtracking, Branch-and-Bound, Randomized algorithms.	10
<b>Total</b>		<b>50</b>
<p>Text Book(s):</p> <ol style="list-style-type: none"> <li>1. H. S. Wilf, Algorithms and complexity, Prentice hall.</li> <li>2. T. H. Cormen, C. E. Leiserson, R. L. Rivest, Introduction to Algorithms, Prentice hall.</li> <li>3. K. Vishwanathan Iyer, Lecture notes for classroom use.</li> </ol>		
<p>Reference Book(s):</p> <p>T. H. Cromen, C. E. Leiserson and R. L. Rivest, Introduction to Algorithms, MIT Press and McGraw-Hill Book Company, 1992</p>		
<p>Focus of Course: System administrator</p>		

Course Designer: *Dr*  
 Mrs. A. Priyadarshini  
 PC-Dept of AI

*D.*  
 Ms. D. Geetha  
 HoD - CS

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	Students are familiar with algorithmic techniques such as brute force, greedy, and divide and conquer.	K1
CO2	Application of advanced abstract data type (ADT) and data structures in solving real world problems.	K2
CO3	Effectively combine fundamental data structures and algorithmic techniques in building a complete algorithmic solution to a given problem	K3
CO4	To introduce and practice advanced algorithms and programming techniques necessary for developing sophisticated computer application programs	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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
21BAM4C30	Core13	Deep Learning	Theory	45	5	-	5
<b>Preamble:</b> This course provides the student to know the strong data science working methodologies using deep learning.							
<b>Prerequisite:</b> Deep Learning							

**Syllabus:**

Unit	Course contents	Hours
I	Introduction to machine learning- Linear models (SVMs and Perceptron's, logistic regression)- Intro to Neural Nets: What a shallow network computes- Training a network: loss functions, back propagation and stochastic gradient descent- Neural networks as universal function approximates	10
II	History of Deep Learning- A Probabilistic Theory of Deep Learning- Backpropagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Vs Shallow Networks, Convolutional Networks- Generative Adversarial Networks (GAN), Semi-supervised Learning	10
III	Linear (PCA, LDA) and manifolds, metric learning - Auto encoders and dimensionality reduction in networks - Introduction to Convnet - Architectures – Alex Net, VGG, Inception, Res Net - Training a Convnet: weights initialization, batch normalization, hyperparameter optimization	10
IV	Optimization in deep learning- Non-convex optimization for deep networks- Stochastic Optimization Generalization in neural networks- Spatial Transformer Networks- Recurrent networks, LSTM - Recurrent Neural Network Language Models- Word-Level RNNs & Deep Reinforcement Learning - Computational & Artificial Neuroscience.	10
V	Real time image applications –Deep learning in agriculture, face recognition object detection etc.	10
<b>Total</b>		<b>50</b>
<b>Text Book(s):</b> 1. Deng & Yu, Deep Learning: Methods and Applications, Now Publishers, 2013. 2. Ian Goodfellow, Yoshua Bengio, Aaron Courville, Deep Learning, MIT Press, 2016. 4. Michael Nielsen, Neural Networks and Deep Learning, Determination Press, 2015.		
<b>Reference Book(s):</b> 1. Deep Learning (Adaptive Computation and Machine Learning Series) by Ian Goodfellow, Yoshua Bengio and Aaron Courville, MIT Press, 2016		
<b>Focus of Course:</b> Data scientist		



Course Designer:  
Mr. T. Anandhakrishnan  
Dept of AI

*D. Geetha*  
Ms .D. Geetha  
HoD – CS

**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 basics of deep learning Implement various deep learning models	K1
CO2	Realign high dimensional data using reduction techniques	K2
CO3	Analyze optimization and generalization in deep learning	K3
CO4	Explore the deep learning applications	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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
21BAM4C40	Core14	R PROGRAMMING Lab	Practical	-	-	35	2
<p><b>Preamble:</b> To apply the basic knowledge of Mathematics, Science and engineering fundamentals in Computer Science and Engineering field</p>							
<p><b>Prerequisite:</b> Basic programming skills and logical thinking.</p>							

**Syllabus:**

Ex. No	Course contents	Hours
1	Introduction to R software	2
2	Implement graphs and diagrams and measures central tendency using R	3
3	Implement Measures of dispersion	3
4	Implement correlation, regression, curve fitting	3
5	Implement Time series and forecasting using R	3
6	Implement Statical tests using R	3
7	Implement Stratified random sampling using R	3
8	Evaluating Analysis of variance using R	3
9	Implement sampling distribution and central limit theorem	3
10	Implement probability distributions using R	3
11	Implement Theory of estimation using R	3
12	Implement Financial functions using R	3
<b>Total</b>		<b>35</b>
<p><b>Focus of Course:</b> Data analyst</p>		
<p>Course Designer: Mr. T. Anandha Krishnan Dept of AI</p>		
<p>Ms. D. Geetha HoD - CS</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	Identify statistical applications of R.	K2
CO2	Identify and apply appropriate R learning algorithms for analyzing the data for variety of problems	K2
CO3	Implement different statisticalfor analyzing the data	K3
CO4	Design test procedures in order to evaluate a model	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs / PSOs	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO 4	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

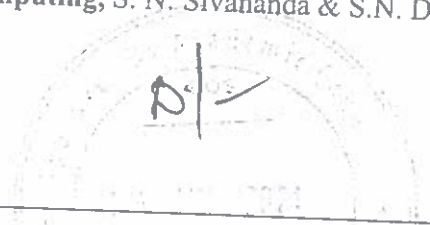
*S –Strong; L –Low; M –Medium*



### SEMESTER IV

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
20BAM4S10	SBC	Soft Computing	Theory	45	5	-	5
<p><b>Preamble:</b> To implement soft computing-based solutions for real world problems. To give students knowledge about non-traditional techniques and fundamentals of artificial neural networks, fuzzy logic and genetic algorithms.</p> <p><b>Prerequisite:</b> Basic Knowledge of Mathematics</p>							

**Syllabus:**

Unit	Course contents	Hours
I	<b>INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS:</b> Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics	10
II	<b>FUZZY LOGIC:</b> Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.	10
III	<b>NEURAL NETWORKS:</b> Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, Radial Basis Function Networks: Reinforcement Learning, Unsupervised Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks	10
IV	<b>GENETIC ALGORITHMS:</b> Goals of optimization, comparison with traditional methods, schemata, Terminology in GA – strings, structure, parameter string, data structures, operators, coding fitness function, algorithm, applications of GA in Machine Learning: Machine Learning Approach to Knowledge Acquisition.	10
V	<b>MATLAB /PYTHON LIB:</b> Introduction to MATLAB/Python, Arrays and array operations, Functions and Files, Study of neural network toolbox and fuzzy logic toolbox, Simple implementation of Artificial Neural Network and Fuzzy Logic	10
<b>Total</b>		<b>50</b>
<p><b>Text Book(s):</b> 1. Principles of Soft Computing, S. N. Sivananda &amp; S.N. Deepa, Wiley India Pvt. Limited, 2007.</p> <div style="text-align: center; margin-top: 10px;">  </div>		
<p><b>Reference Book(s):</b></p> <p>1. Jyh Shing Roger Jang, Chuen Tsai Sun, Eiji Mizutani, Neuro-Fuzzy and Soft Computing, Prentice Hall of India, 2003.</p> <p>2. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic: Theory and Applications,</p>		

Prentice Hall, 1995. 3. MATLAB Toolkit Manual  
 4. Timothy J. Ross, Fuzzy Logic with Engineering Applications, McGraw-Hill  
 5. Goldberg, D. E, Genetic algorithm in search, optimization and machine learning, Addison Wesley, Reading Mass  
 6. S.N. Sivanandam, S.N. Deepa, Principles of Soft Computing, 2e, Wiley India Pvt. Ltd. 7.  
 S. RAJASEKARAN, G. A. VIJAYALAKSHMI PAI, NEURAL NETWORKS, FUZZY LOGIC AND GENETIC ALGORITHM: SYNTHESIS AND APPLICATIONS, PHI Learning Pvt. Ltd

**Focus of Course:** Language translator

Course Designer:  
 Mr. A. Priyadarshini  
 Dept of AI

Ms. D. Geetha  
 HoD – CS

**OPEN SOURCES:**

List of Open-Source Software/learning website

1. <http://www.iitk.ac.in/kangal/codes.shtml>
2. <http://lancet.mit.edu/ga/dist/galibdoc.pdf>
3. [https://books.google.co.in/books?hl=en&lr=&id=W5SAhUqBVYoC&oi=fnd&pg=PR11&dq=SOft+computing+course+&ots=et\\_2Nvjy\\_4&sig=jDXLrGleD3zc4QUxvcEvC5FrFY#v=onepa ge& q=SOft%20computing%20course&f=false](https://books.google.co.in/books?hl=en&lr=&id=W5SAhUqBVYoC&oi=fnd&pg=PR11&dq=SOft+computing+course+&ots=et_2Nvjy_4&sig=jDXLrGleD3zc4QUxvcEvC5FrFY#v=onepa ge& q=SOft%20computing%20course&f=false)

**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	Identify and describe soft computing techniques and their roles in building intelligent machines	K1
CO2	Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.	K2
CO3	Apply genetic algorithms to combinatorial optimization problems.	K3
CO4	Evaluate and compare solutions by various soft computing approaches for a given problem.	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**





## SEMESTER -V

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM5C10	Core15	Natural language processing	Theory	45	5	-	5
<b>Preamble:</b> This course provides the students to know the strong NLP using hard and soft computing engineering fields							
<b>Prerequisite:</b> NLP							

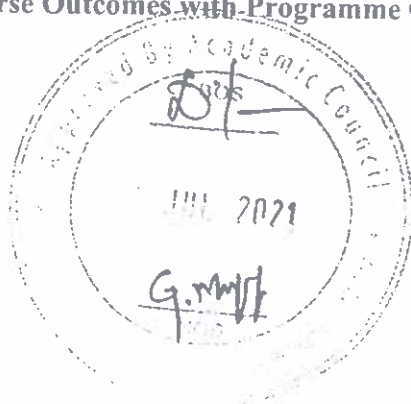
### Syllabus:

Unit	Course contents	Hours
I	<b>INTRODUCTION:</b> Applications of NLP techniques and key issues - MT – grammar checkers – dictation - document generation - NL interfaces - Natural Language Processing key issues - The different analysis levels used for NLP: morpho-lexical - syntactic – semantic - pragmatic - markup (TEI, UNICODE) - finite state automata - Recursive and augmented transition networks – open problems	10
II	<b>LEXICAL LEVEL:</b> Error-tolerant lexical processing (spelling error correction) - Transducers for the design of morphologic analyzers Features - Towards syntax: Part-of-speech tagging (Brill, HMM) – Efficient representations for linguistic resources (lexica, grammars,) tries and finite-state automata.	10
III	<b>SYNTACTIC LEVEL:</b> Grammars (e.g. Formal/Chomsky hierarchy, DCGs, systemic, case, unification, stochastic) - Parsing (top- down, bottom-up, chart (Earley algorithm), CYK algorithm) - Automated estimation of probabilistic model parameters (inside-outside algorithm) - Data Oriented Parsing - Grammar formalisms and treebanks - Efficient parsing for context-free grammars (CFGs) - Statistical parsing and probabilistic CFGs (PCFGs) - Lexicalized PCFGs. <b>SEMANTIC LEVEL:</b> Logical forms – Ambiguity resolution - Semantic networks and parsers - Procedural semantics - Montague semantics - Vector Space approaches - Distributional Semantics - Lexical semantics and Word Sense Disambiguation - Compositional semantics. Semantic Role Labeling and Semantic parsing	12
IV	<b>PRAGMATIC LEVEL:</b> Knowledge representation – Reasoning - Plan/goal recognition - speech acts/intentions - belief models- discourse – reference. <b>NATURAL LANGUAGE GENERATION:</b> content determination - sentence planning - surface realization.	10
V	<b>SUBJECTIVITY AND SENTIMENT ANALYSIS:</b> Information extraction – Automatic summarization - Information retrieval and Question answering - Named entity recognition and relation extraction - IE using sequence labeling - Machine translation: Basic	08

issues in MT - Statistical translation - word alignment - phrase-based translation and synchronous grammars		
	<b>Total</b>	<b>50</b>
<b>Text Book(s):</b>		
1. Daniel Jurafsky and James H. Martin, "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition", Prentice Hall, 2009. 2. Ian H. Witten and Eibe Frank, Mark A. Hall, "Data Mining: Practical Machine Learning Tools and Techniques", Morgan Kaufmann, 2013.		
<b>Reference Book(s):</b>		
1. Christopher Manning and Hinrich Schütze, "Foundations of Statistical Natural Language Processing", MIT Press, 2008. 2. James Allen, "Natural Language Understanding", Addison Wesley, 1995. Steven Bird, Ewan Klein, and Edward Loper, "Natural Language Processing with Python - Analyzing Text with the Natural Language Toolkit", O'Reilly Media, Sebastopol, 2009.		
<b>Focus of Course:</b> Language translator		
Course Designer: Mr. T. Anandha Krishnan Dept of AI		 Ms. D. Geetha HoD - CS

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 approaches to syntax and semantics in NLP	K1
CO2	Understand approaches to discourse, generation, dialogue and summarization within NLP.	K2
CO3	Understand current methods for statistical approaches to machine translation	K3
CO4	To provide students with the knowledge on designing procedures for natural language resource annotation and the use of related tools for text analysis	K3

### Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes



COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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
21BAM5C20	Core16	Natural language processing Lab	Practical	-	-	35	4
<p><b>Preamble:</b> To apply the upgrade knowledge of, Science and engineering NLP techniques in Computer Science and Engineering field</p> <p><b>Prerequisite:</b> understand the neural functions and NLP techniques</p>							

### Syllabus:

Ex. No	Course contents	Hours
1	Paragraph tokenizer	2
2	Chunk parsing	3
3	Sentence tokenizer	3
4	Stemming and tokenization process	3
5	Tokenization	3
6	Wordlist corpus	3
7	Sentence parsing	3
8	Connectors and prepositions	3
9	Word analysis and word generation	3
10	N-grams	3
11	Building chuker	3
12	Dependency Parsing	3
<b>Total</b>		<b>35</b>



<b>Focus of Course:</b> Data analyst	
Course Designer: Mr.T. Anandha Krishnan Dept of AI	Ms. D. Geetha HoD – CS

<b>Course Outcomes (COs)</b>		
On successful completion of this course the students will be able to:		
<b>CO Number</b>	<b>Course Outcome (CO) Statement</b>	<b>Blooms Taxonomy Knowledge Level</b>
<b>CO1</b>	Understand components of NLP and differentiate between hard and soft computing engineering fields and other domains	K2
<b>CO2</b>	The students will gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information.	K2
<b>CO3</b>	To analyze and appreciate the applications which can use NLP	K3
<b>CO4</b>	To understand NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

<b>COs/POs / PSO<sub>s</sub></b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO<sub>4</sub></b>	<b>PSO5</b>
<b>CO1</b>	L	M	M	S	M	M	L	S	M	M
<b>CO2</b>	L	M	M	M	M	M	L	M	M	M
<b>CO3</b>	M	M	M	S	M	S	M	S	M	M
<b>CO4</b>	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
21BAM5C30	Core17	Cloud Computing	Theory	45	5	-	5
<b>Preamble:</b> The aim of the course is to make students understand syntactic and semantic elements.							
<b>Prerequisite:</b> 19DS530 - Computer Networks							

### Syllabus:

Unit	Course contents	Hours
I	Virtualization for Cloud: Need for Virtualization, Pros and cons of Virtualization, Types of Virtualizations, System VM, Process VM, Virtual Machine monitor, Virtual machine properties, Interpretation and binary translation, HLL VM, Hypervisors: Xen, KVM, VMWare, VirtualBox, Hyper-V.	10
II	Cloud Architecture: Definition, Characteristics, Service models, Deployment models, Types, Challenges, Three-layer architecture, Concepts & Terminologies -Virtualization, Load balancing, Scalability and elasticity, Deployment, Replication, Monitoring, Software defined networking, Network function virtualization, Service level agreement, Billing	10
III	Service Models: SaaS – Multitenant, Open SaaS, SOA. PaaS – IT Evolution, Benefits, Disadvantages. IaaS – Improving performance, System and storage redundancy, Cloud based NAS devices, Advantages, Server types. IDaaS – Single Sign-on, OpenID. Database as a Service, Monitoring as a Service, Communication as Services.	10
IV	Service providers - Google, Amazon, Microsoft Azure, IBM, Sales force. Cloud Storage: Overview of cloud storage, cloud storage providers, Cloud file system, MapReduce. Case study: Walrus, Amazon S3, Hadoop.	10
V	Securing the Cloud: Identity and access management, Data loss prevention, Web security, E-mail security, Security assessments, Intrusion management, Security information and event management, Encryption and BCDR implementation, Network Security. Deployment Tools: Eucalyptus, Nimbus, Open stack, Cloud stack, Open Nebula.	10
<b>Total</b>		<b>50</b>

*G. Math*

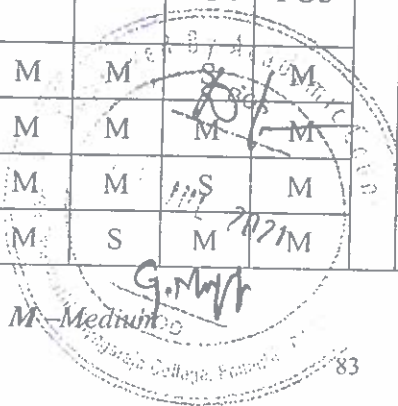
Text Book(s): 1. Cloud Computing: Principles and Paradigms – Rajkumar buyya 2013 wiley publications.	
<b>Reference Book(s):</b> 1. James E Smith, Ravi Nair, “Virtual Machines”, Morgan Kaufmann Publishers, 2006. 2. John Rittinghouse & James Ransome, “Cloud Computing, Implementation, Management and Strategy”, CRC Press, 2010. 3. T. Velte, A. Velte, R. Elsenpeter, “Cloud Computing, A Practical Approach”, McGrawHill, 2009. 4. Cloud Security Alliance, “Providing greater clarity in Security as a Service”, 2013. 5. RajkumarBuyya, Christian Vecchiola, S.ThamaraiSelvi, “Mastering cloud computing”, Morgan Kaufman, 2013.	
<b>Focus of Course:</b> Language translator	
Course Designer: Mrs. A. Priyadarshini PC-Dept of AI	 Ms. D. Geetha HoD – CS

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 approaches to syntax and semantics in cloud computing	K1
CO2	Understand approaches to discourse, generation, dialogue and summarization within cloud environment.	K2
CO3	Understand current methods for statistical approaches to machine translation	K3
CO4	To provide students with the knowledge on designing procedures for natural language resource annotation and the use of related tools for text analysis	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	L	M	M	M	M	M	L	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	M	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
20BAM5S10	SBC3	Cloud Computing Lab	Practical	-	-	35	4
<p><b>Preamble:</b> To apply the upgrade knowledge of webservices, cloud platform based techniques in Computer Science and Engineering field</p>							
<p><b>Prerequisite:</b> understand the cloudcomputing deployment and service models and cloud techniques</p>							

### Syllabus:

Ex. No	Course contents	Hours
1	Study and implementation of Infrastructure as a Service.	2
2	Study of Cloud Computing & Architecture	3
3	Installation and Configuration of virtualization using KVM.	3
4	Study and implementation of Infrastructure as a Service	3
5	Study and implementation of Storage as a Service	3
6	Study and implementation of identity management	3
7	Study Cloud Security management	3
8	Write a program for web feed.	3
9	Study and implementation of Single-Sing-On.	3
10	User Management in Cloud.	3
11	Case study Amazon EC2/Microsoft Azure/google cloud platform	3
12	Install hypervisor on cloudsim	3
<b>Total</b>		<b>35</b>
<p><b>Focus of Course:</b> Data analyst</p>		
<p>Course Designer: Mr.T. Anandha Krishnan Dept of AI</p>		<p style="text-align: right;">                       Ms. D. Geetha                      HoD - CS                 </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 components of cloud infrastructures and platforms in engineering fields and other domains	K2
CO2	The students will gain an in-depth understanding of the computational cloud scenarios and process for today's technological information.	K2
CO3	analyze the local and global impact of computing on individuals, organizations, and society	K3
CO4	To understand cloud models and working models using cloudsim.	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	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**

**ELECTIVE-I**

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM5EA0	Elective-1	ROBOTICS AND ITS APPLICATIONS	Theory	45	5	-	5
<p><b>Preamble:</b> The aim of the course to introduce basic concepts, parts of robots and types of robots. To make the students familiar with. various drive systems of robots, sensors and their applications in programming of robots</p>							
<p><b>Prerequisite:</b> NIL</p>							

**Syllabus:**

Unit	Course contents	Hours
I	Introduction, brief history, types, classification and usage, science and technology of robots, Artificial Intelligence in Robotics, some useful websites, textbooks and research journals	10
II	<b>Elements of Robots-Joints, Links, Actuators, and Sensors:</b> Representation of joints, link representation using D-H parameters, Examples of D-H parameters and link transforms, different kind of actuators, stepper-DC-servo-and brushless motors- model of a DC servo motor-types of transmissions-purpose of sensor-internal and external sensor-common sensors-encoders-tachometers-strain gauge-based force torque sensor-proximity and distance measuring sensors-and vision	10
III	<b>End Effectors:</b> Classification of end effectors-tools as end effectors-drive system for grippers-mechanical adhesive- vacuum magnetic-grippers-hooks and scoops-gripper force analysis-and gripper design- active and passive grippers	10
IV	<b>Planning and Navigation:</b> Introduction, path planning-overview-road map path planning-cell decomposition path planning- potential field path planning-obstacle avoidance-case studies	10
V	<b>Vision system:</b> Robotic vision systems-image representation-object recognition- and categorization-depth measurement- image data compression-visual inspection-software considerations. <b>Robot Programming:</b> Introduction to robot languages-VAL-RAPID-language-basic commands-motion instructions.- pick and place operation using industrial robot manual mode-automatic mode-subroutine command based programming-move master command language-introduction-syntax-simple problems.	10
<b>Total</b>		<b>50</b>

Text Book(s): 1.Richard D.Klafter.Thomas Achmielewski and Mickael Negin, Robotic Engineering an Integrated approach prentice hall India- newdelhi-2001. 2.Saeed B.Nikku, Introduction to Robotics, analysis, control and applications Wiley-India 2nd edition-2011
Reference Books: 1.Industrial robotic technology-programming and application by M.P. Groover etal, McGrawhill 2008 2.Robotics technology and flexible automation by S.R. Deb, TMH2009
Course Designer: Mrs.A.Priyadarshini PC-Dept of AI
 Ms.D.Geetha HoD - CS

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	To make the students familiar with various drive systems of robots, sensors and their applications in programming of robots, and implementations of robots Understand approaches in Robotics	K1
CO2	Understand approaches to discourse, generation, dialogue and summarization of robotics. To discuss, and implementations of robots.	K2
CO3	Conduct and design the experiments for various robot operations.	K3
CO4	To provide students with the knowledge on designing procedures to use the advanced techniques for robot processing.	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	L	M	M	S	M	M	M	S	M	M
CO2	L	M	M	M	M	M	L	M	M	M
CO3	M	M	M	S	M	M	M	S	M	M
CO4	M	M	S	M	M	S	M	S	M	M

S-Strong; L-Low; M-Medium

Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM5C40	Core18	Project Work Lab	Project			4	2

## GUIDELINES FOR PROJECT

### 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 Computer / IT 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 S/W developer / Trainee / Software Engineer/ 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:

Before the training actually starts, profile of the company / organization must be submitted for the evaluation purposes.

The letter of the training will be issued only by the Centre Head or Project incharge.

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.

After the student joins the training, a joining report must be submitted within stipulated time.

No project will be accepted unless it is done in consultation with the faculty and signed by him/her.

### RULES

All the students must follow the following rules & regulations.

- a. All the communication must be in writing. No verbal communications 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 incharge.

### 3. 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.

### 4. 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.

- ✓ Databaseprojects
- ✓ Networkprojects
- ✓ Web basedprojects
- ✓ ApplicationOriented
- ✓ System sideprojects

#### 5. RULES FORPRESENTATION

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

#### 6. GUIDELINE FOR PRESENTATION OF PROJECTREPORT

##### NUMBER OF COPIES TO BESUBMITTED

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.

##### SIZE OF PROJECTREPORT

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.

##### ARRANGEMENT OF CONTENTS OF PROJECTREPORT

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

##### PROJECT REPORT FORMAT: Refer Appendix I

##### PAGE DIMENSIONS ANDMARGIN

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:

Topedge	:	30 to 35 mm
Bottomedge	:	25 to 30 mm
Leftside	:	35 to 40 mm
Rightside	:	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.

##### 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 projectreport.

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.

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

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

**Acknowledgement** – It should be brief and should not exceed one page when typed doublespacing.

**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 thishead.

**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 thishead.

**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.

**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.

#### **Bibliography**

**Books:** AUTHOR NAME, TITLE, PUBLICATION, EDITION.

**Web Reference:** URL/Web Address.

## 7. TYPING INSTRUCTIONS

### **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 incolour.
- Uniformity in the font of letters in the same project report shall beobserved.
- 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 nextpage.
- The last word of any page should not be split using ahyphen.
- One and a half spacing should be used for typing the generaltext.
- Single spacing should be used for typing:
  - a. LongTables
  - b. Longquotations
  - c. Footnotes
  - d. Multilinecaptions
  - 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.

### Chapters

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

**Chapterheading** : CHAPTER 1  
**Division heading** :INTRODUCTION  
**Division heading** : 1.1 OUTLINE OF PROJECTREPORT  
**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 handmargin.

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.

## 8. NUMBERING INSTRUCTIONS

### 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.

### 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.

### 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.

**9. BINDINGSPECIFICATIONS**

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 titlepage.



## APPENDIX 1

### Project Report Format

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

#### 1. Introduction

- Organization Profile
- Overview of the Project

#### 2. System Study

- Existing System
- Drawbacks of Existing System
- Proposed System
- Advantages of Proposed System

#### 3. System Specification

- Hardware specification
- Software specification

#### 4. System Design

- DFD (Level 0, 1,2)
- ER Diagram
- SFD
- Table Design

#### 5. Testing

- Testing Methodologies

#### 6. Implementation

- 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 fulfillment of the requirements for the award of the degree of  
**BACHELOR OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING**

Submitted by

**STUDENT NAME  
(REG\_NO)**

Guide

**GUIDE NAME**



**(BACHELOR OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)**

**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 fulfillment of the requirements for the award of the degree of BACHELOR OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING is a record of original work done by me under the guidance of <Guide Name>, Assistant Professor, Department of ARTIFICIAL INTELLIGENCE & MACHINE LEARNING 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 :

Date :

Signature

(STUDENTNAME)



**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 fulfillment of the requirements for the award of the degree of **BACHELOR OF ARTIFICIAL INTELLIGENCE & MACHINE LEARNING** 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

(GuideName)

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
21BAM6C10	Core19	<b>Data Visualization</b>	Theory	45	5	-	3
<b>Preamble:</b> Enable students to know the basics of data visualization and understand the importance of data visualization and the design and use of visual components and basic algorithms.							
<b>Prerequisite:</b> Data visualization tools							

**Syllabus:**

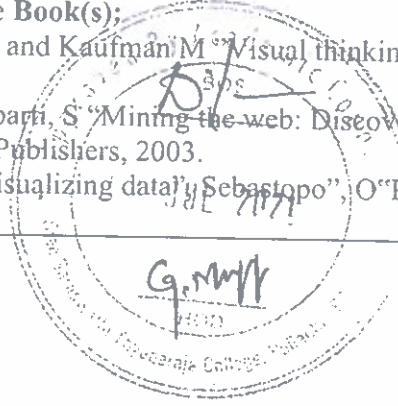
Unit	Course contents	Hours
I	<b>INTRODUCTION:</b> Information visualization – Theoretical foundations – Information visualization types – Design principles - A framework for producing data visualization	10
II	<b>STATIC DATA VISUALIZATION</b> – tools – working with various data formats. <b>DYNAMIC DATA DISPLAYS:</b> Introduction to web based visual displays – deep visualization – collecting sensor data – visualization D3 framework - Introduction to Many eyes and bubble charts.	10
III	<b>MAPS</b> – Introduction to building choropleth maps. <b>TREES</b> – Network visualizations – Displaying behavior through network graphs.	10
IV	<b>BIG DATA VISUALIZATION</b> – Visualizations to present and explore big data – visualization of text data and Protein Sequences	10
V	Introduction to predictive data analysis- Predictive analytics -Data modeling, Predictive models and forecasting	10
<b>Total</b>		<b>50</b>


**Text Book(s):**

1. Chakrabarti, S “Mining the web: Discovering knowledge from hypertext data “, Morgan Kaufman Publishers, 2003.

**Reference Book(s):**

1. Ware C and Kaufman M “Visual thinking for design”, Morgan Kaufmann Publishers, 2008.
2. Chakrabarti, S “Mining the web: Discovering knowledge from hypertext data “, Morgan Kaufman Publishers, 2003.
3. Fry ,”Visualizing data”, Sebastopo”, O”Reily, 2007.



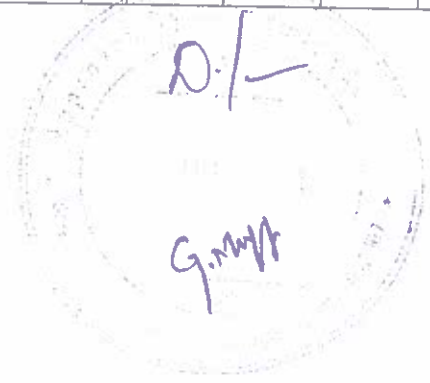
<b>Focus of Course:</b> Visual Architect	
Course Designer: Mr.T. Anandhakrishnan Dept of AI	 Ms.D.Geetha HoD – CS

<b>Course Outcomes (COs)</b>		
On successful completion of this course the students will be able to:		
<b>CO Number</b>	<b>Course Outcome (CO) Statement</b>	<b>Blooms Taxonomy Knowledge Level</b>
CO1	Present data with visual representations for your target audience, task, and data.	K1
CO2	Identify appropriate data visualization techniques given particular requirements imposed by the data.	K2
CO3	Apply appropriate design principles in the creation of presentations and visualizations; and Analyze, critique, and revise data visualizations.	K3
CO4	Experiment with and compare different visualization tools.	K3

**Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes**

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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
21BAM6C20	Core20	Data visualization lab	Practical	-	-	35	4
<p><b>Preamble:</b> To apply the upgraded knowledge of, Science and engineering data visualization techniques in Computer Science and Engineering field</p>							
<p><b>Prerequisite:</b> understand the data view and able to interpret the new technologies</p>							

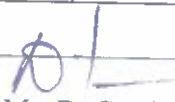
**Syllabus:**

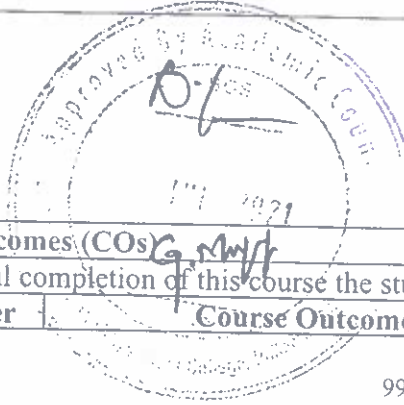
Ex. No	Course contents	Hours
1	Visualization of Static Data using weather forecasting using	2
2	Visualization of Web Data.	3
3	Visualization of Sensor Data.	3
4	Visualization of Protein Data.	3
5	Data Pre-Processing and Data Cube	3
6	Data Cleaning	3
7	Exploratory Analysis	3
8	Association Analysis	3
9	Hypothesis Generation	3
10	Transformation Techniques	3
11	Clusters Assessment	3
12	Data Visualization	3
<b>Total</b>		<b>35</b>

**Focus of Course:** Data analyst

Course Designer:

Mr. T. Anandhakrishnan  
Dept of AI

  
 Ms. D. Geetha  
 HoD – CS



<b>Course Outcomes (COs)</b>		
On successful completion of this course the students will be able to:		
CO Number	Course Outcome (CO) Statement	Blooms

		Taxonomy Knowledge Level
CO1	Learn pre-processing method for multi-dimensional data	K2
CO2	Practice on data cleaning mechanisms	K2
CO3	Learn various data exploratory analysis	K3
CO4	Develop the visualizations for clusters or partitions	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	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
21BAM6C30	Core21	Internet of Things	Theory	45	5	-	3
<b>Preamble:</b> This course provides the student to know the strong IoT skills using updated computing knowledge							
<b>Prerequisite:</b> IoT							

**Syllabus:**

Unit	Course contents	Hours
I	<b>INTRODUCTION:</b> Definitions and Functional Requirements – Motivation – Architecture - Web 3.0 View of IoT– Ubiquitous IoT Applications – Four Pillars of IoT – DNA of IoT - The Toolkit Approach for End-user Participation in the Internet of Things. Middleware for IoT: Overview – Communication middleware for IoT –IoT Information Security.	10

II	<b>IOT PROTOCOLS &amp; PROTOCOL STANDARDS FOR IOT:</b> Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Issues with IoT Standardization – Unified Data Standards – Protocols – IEEE 802.15.4 – BAC Net Protocol – Modbus – KNX – Zigbee Architecture – Network layer – APS layer – Security.	10
III	<b>IOT DESIGN METHODOLOGY</b> IoT and M2M- difference between IoT and M2M - Software defined networks, network function virtualization– Needs- IoT design methodology.	10
IV	<b>IOT COMPONENTS</b> Sensors and actuators - Communication modules - Zig bee- RFID - Wi-Fi- Power sources <b>BUILDING IOT WITH HARDWARE PLATFORMS</b> Platform – Arduino /Raspberry Pi- Physical devices - Interfaces - Programming – APIs /Packages.	10
V	<b>CASE STUDY</b> Various Real time applications of IoT- Home Automation-Automatic Lighting-Home intrusion detection- Cities-Smart Parking- Environment-Weather monitoring system- Agriculture- Smart irrigation	10
<b>Total</b>		<b>50</b>
<b>Text Book(s):</b>		
1. ArshdeepBahga, Vijay Madiseti, "Internet of Things-A hands-on approach", Universities Press, 2015.		
<b>Reference Book(s):</b>		
1. Manoel Carlos Ramon, —Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers, Apress, 2014.		
2. Marco Schwartz, —Internet of Things with the Arduino Yun, Packt Publishing, 2014.		
3. Adrian McEwen, Hakim Cassimally, "Designing the Internet of Things", Wiley Publications, 2012.		
4. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things: Key applications and Protocols", Wiley Publications 2nd edition, 2013.		
5. The Internet of Things in the Cloud: A Middleware Perspective - Honbo Zhou – CRC Press – 2012		
6. Architecting the Internet of Things - Dieter Uckelmann; Mark Harrison; Florian Michahelles- (Eds.) – Springer – 2011		
7. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010		
8. The Internet of Things: Applications to the Smart Grid and Building Automation by - Olivier Hersent, Omar Elloumi and David Boswarthick - Wiley -2012		
5. Olivier Hersent, David Boswarthick, Omar Elloumi, "The Internet of Things – Key applications and Protocols", Wiley, 2012		
<b>Focus of Course:</b> IoT Architect		
Course Designer: Mr. T. Anandhkrishnan Dept of AI		Ms. D. Geetha HoD – CS

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 definition and significance of the <b>Internet of Things</b> .	K1
CO2	Discuss the architecture, operation, and business benefits of an <b>IoT</b> solution.	K2
CO3	Examine the potential business opportunities that <b>IoT</b> can uncover	K3
CO4	Explore the relationship between <b>IoT</b> , cloud computing, and big data.	K3

### Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes


COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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
20BAM6S10	SBC4	Internet of Things lab	Practical	30		30	2
<b>Preamble:</b> To apply the upgrade knowledge of, Science and engineering IOT techniques in Computer Science and Engineering field							
<b>Prerequisite:</b> understand the neural functions and IOT techniques							

**Syllabus:**

Ex. No	Course contents	Hours
1	Program to develop Turn on and off LED lights	2
2	To identify objects IR and PIR sensor	3
3	Measure moisture using level sensor	3
4	Distance between ultra-sonic sensor	3
5	Leakage of gas sensor	3
6	Humidity and moisture level sensor	3
7	LED using relay switch	3
8	Smart lighting system	3
9	Smart parking system	3
10	Smart weather monitoring system	3
11	To design a traffic control system using IOT	3
12	To design a home automation control system using IOT	3
<b>Total</b>		<b>35</b>
<b>Focus of Course: IoT Developer</b>		
Course Designer: Mr.T. Anandhakrishnan Dept of AI		 Ms.D.Geetha HoD – CS

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	Ability to build real-time IoT applications by interfacing the sensors with minimal programming.	K2
CO2	Ability to associate sensor networks and communication modules for building IoT systems	K2
CO3	To understand the process of thinking capability of IoT working process	K3
CO4	Learn real time scenario of IoT principles	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	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


#### ELECTIVE -II

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM6EA0	Elective II	Mobile Application Development	Theory	45	5	-	3
<p><b>Preamble:</b> This course provides knowledge and skill on recent technologies in native mobile application development frameworks such as Android, IOS, Windows Mobile</p> <p><b>Prerequisite:</b> Mobile Application Development tools</p>							

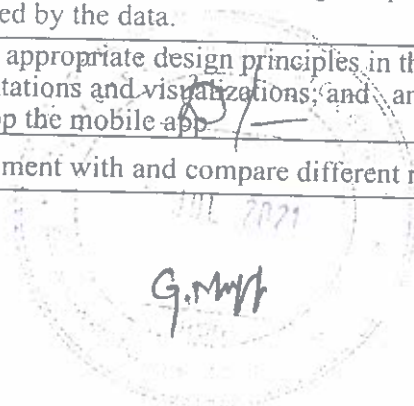
#### Syllabus:

Unit	Course contents	Hours
I	Mobile Application Development Framework: Types- Features- challenge. Android: Introduction – Architecture -Installation and configuration- ADE- APIs User Interfaces:	10
II	Components-views-Layouts and its types- Menus and its types – Dialogues and its types- Notifications and its types.	10
III	Data Storage: SQLite database-Files- shared preferences-Content Providers Location Based Services: Location Provider- Geo Coder-	10



	Map Multimedia	
IV	Audio- Video- Animations- Drawing. Phone Gap and HTML5: Phone Gap Introduction – Architecture- Installation and configuration, HTML5 Introduction - Data list control- Validation feature -Application Cache in HTML 5.	10
V	Events: Listener and its types-handler and its types. Geo location, Media, Storage.	10
<b>Total</b>		<b>50</b>
<b>Reference Book(s):</b>		
1. Reto Meier, “Professional Android Application Development”, Wrox, 2010. 2. Thomas Myer, “Beginning PhoneGap”, Wrox, 2012. 3. Mark Murphy, “Beginning Android”, Apress, 2009. 4. Rick Rogers et.al, “Android – Application Development”, O’Reilly, 2009. 5. Jochen Schiller, “Mobile Communications”, Addison Wesley, 2011.		
<b>Focus of Course: Mobile app development</b>		
Course Designer: Mrs .A. Priyadarshini PC-. Dept of AI		 Ms.D.Geetha HoD – CS

<b>Course Outcomes (COs)</b>		
On successful completion of this course the students will be able to:		
<b>CO Number</b>	<b>Course Outcome (CO) Statement</b>	<b>Blooms Taxonomy Knowledge Level</b>
CO1	Present data with representations for your target audience, task, and data.	K1
CO2	Identify appropriate techniques given particular requirements imposed by the data.	K2
CO3	Apply appropriate design principles in the creation of presentations and visualizations; and analyze, critique, and develop the mobile app.	K3
CO4	Experiment with and compare different mobile applications	K3

  
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### Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/ PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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

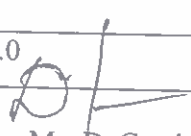
### SEMESTER -VI

#### ELECTIVE -III

Course Code	Type	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21BAM6EB0	Core Elective III	Embedded Systems	Theory	45	5	-	3
<p><b>Preamble:</b> The aim of the course is to provide knowledge of Embedded systems design, Embedded programming and their operating systems with suitable case studies.</p> <p><b>Prerequisite:</b> Nil</p>							

#### Syllabus:

Unit	Course contents	Hours
I	Embedded Computing Need for embedded systems, Challenges of Embedded Systems, Embedded system design process, Introduction to microprocessors and microcontrollers, embedded processors, 8051 Microcontroller, ARM processor, Architecture, Instruction sets and programming.	10
II	Real – Time Operating System; Introduction to RTOS; RTOS - Inter Process communication, Interrupt driven Input and Output –Non maskable interrupt, Software interrupt; Thread - Single, Multithread Concept.	10
III	Interface with Communication Protocol Design methodologies and tools, design flows, designing hardware and software Interface, RTC interfacing and programming. Embedded Software Software abstraction using Mealy-Moore FSM controller, Layered software development.	10
IV	Basic concepts of developing device driver, Programming embedded systems in assembly, C and Java, Meeting real time constraints.	10

V	Embedded software development tools – Emulators and debuggers. Embedded System Development Design issues and techniques – Hands On, Case studies – Robot, Complete design of embedded systems – digital camera, smart card.	10
<b>Total</b>		<b>50</b>
<b>Reference Book(s):</b>		
1. Wayne Wolf, —Computers as Components: Principles of Embedded Computer System Designl, 2nd edition, 2008.		
2. Raj Kamal, —Embedded Systems- Architecture, Programming and Designl, Tata McGraw Hill, 2nd edition, 2009.		
<b>Focus of Course:</b> To Understand the various robot programming languages.0		
Course Designer: Mr. A. Priyadarshini Dept of AI		 Ms. D. Geetha HoD – CS

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	Present data with representations for your target audience, task, and data.	K1
CO2	Identify appropriate techniques given particular requirements imposed by the data.	K2
CO3	Apply appropriate design principles in the creation of presentations and visualizations; and analyze, critique, and develop the operating system concepts in an experimental manner.	K3
CO4	Experiment with and compare different applications using Robotics.	K3

### Mapping Course Outcomes with Programme Outcomes & Programme Specific Outcomes

COs/POs/PSOs	PO1	PO2	PO3	PO4	PO5	PSO 1	PSO 2	PSO 3	PSO 4	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

## EXAMINATION SYSTEM UNDER AUTONOMY

### 1. OBE ASSESSMENT COMPONENT MATRIX

Course Category	Language	Concept	Application	Analysis	Practical (Regular)	Practical (MSW)	Practical (Skill Based)	Training / Project	Training / Project
Assessment Components								UG	PG
<b>Component -1</b> CIA – Test	10	10	10	10	20		10	(No internal marks)	
<b>Component -2</b> Attendance	5	5	5	5	5	10	5		5
<b>Component -3</b> Assignments	5	5	5	5	-				
<b>Component -4</b> List of evaluation components given below based on the course scope whichever conducted (any three)	5	5	5	5	15	30 *	5		35 *
<b>Total Marks</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>40</b>	<b>40</b>	<b>20</b>		<b>40</b>

\* no. of evaluation components may vary

<b>Component – 4</b> 1. Puzzles (Word / Logic / Math) 2. Games 3. Simulation Exercises 4. Reports 5. Group Discussion 6. Article Review 7. Flowcharts 8. Miniatures 9. Models 10. Portfolios 11. Demonstration 12. Business Plan	13. Snap Talk 14. Questionnaire 15. Class Presentation (Oral / Poster) 16. Debate 17. Seminar 18. Paper Presentation 19. Publication 20. Viva-voce 21. Case Study 22. Survey 23. Mini Project (Group / Individual) 24. USP Component (Unique to the Course)
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### 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 Examination. 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.

**i) First Internal Assessment Test**

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

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

**CIA Assessment (For CIA - I and CIA - II)**

Bloom's Category Level	Sections	Marks			Description
K1=Remember K2= Understand	Section A 6 Questions * 1 Mark	6			Multiple choice Questions
K1=Remember K2= Understand K3= Apply	Section B 4 Questions * 5 Marks	20			Either or type Questions (250 words)
		K1 2	K2 4	K3 2	
K1=Remember K2= Understand K3= Apply	Sections C 3 Questions * 8 Marks	24			Either or type Questions (500 words)
		K1 2	K2 2	K3 2	
<b>Total</b>		<b>50</b>			

(Both the either or choice must be in same level)

K1= Remember Level, K2= Understand Level, K3= Apply Level.

**Question Paper Pattern**

**Section A**

Attempt all questions (three each from both units)

06 questions – each carrying one mark

Multiple Choice

$06 \times 01 = 06$

**Section B**

Attempt all questions (two each from both units)

04 questions – each carrying five marks

Inbuilt Choice [Either / Or]

$04 \times 05 = 20$

**Section C**

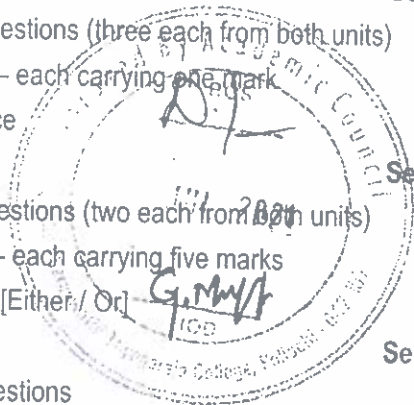
Attempt all questions

(Minimum one question shall be asked from each unit)

03 questions - each carrying eight marks

Inbuilt Choice [Either / Or]

$03 \times 08 = 24$



**(IDC- General Intelligence and Reasoning)**

**Section A**

Attempt all questions (Minimum 22 questions from each unit)

50 questions – each carrying one mark

Multiple Choice

**50X 01 = 50**

Convert this marks to a maximum of 5 i.e., (Marks obtained/50) X 0.5 ==> A

**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

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

**Question Paper Pattern**

**Section A**

Attempt all questions (three each from both units)

06 questions – each carrying one mark

**06 X 01 = 06**

Multiple Choice

**Section B**

Attempt all questions (two each from both units)

04 questions – each carrying five marks

**04 X 05 = 20**

Inbuilt Choice [Either / Or]

**Section C**

Attempt all questions

(Minimum one question shall be asked from each unit)

03 questions - each carrying eight marks

**03 X 08 = 24**

Inbuilt Choice [Either / Or]

**(IDC - General Intelligence and Reasoning)**

**Section A**

Attempt all questions (Minimum 22 questions from each unit)

50 questions – each carrying one mark

Multiple Choice

**50X 01 = 50**

Convert this marks to a maximum of 5 i.e., (Marks obtained/50) X 0.5 ==> B

Average of CIA I & II i.e., A & B is to be taken.

**iii) Model Examination**

Syllabus : All Five Units

Working Days : On completion of 85 working days approximately,

Examination : Commences any day from 86<sup>th</sup> working day to 90<sup>th</sup> working day.  
 Duration : Three Hours  
 Max. Marks : 75

For the model examinations, the question paper pattern shall be the same for all UG programmes, as given below.

**Model and Semester Exam**

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 * 5 Marks (either or type)	25			Either or types Questions (250 words)
		K1	K2	K3	
		4	4	2	
K1= Remember K2= Understand K3= Apply K4 = Analyze	Sections C 5 Questions * 8 Marks (either or type)	40			Either or types Questions (500 words)
		K1	K2	K3 / K4	
		4	4	2	
	<b>Total</b>	<b>75</b>			

(Both the either or choice must be in same level)

K1= Remember Level, K2= Understand Level, K3= Apply Level, K4= Analyze Level.

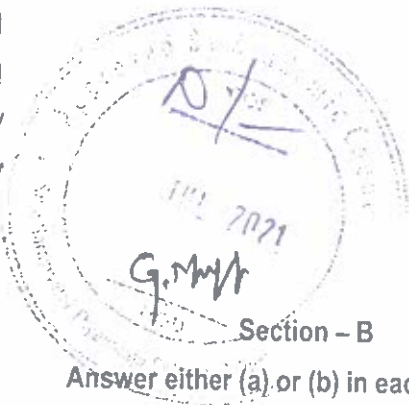
**Question Paper Pattern**

**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 either (a) or (b) in each unit of the following questions**

11. a) Unit – I Or

12. b) Unit – I  
 a) Unit II Or
13. b) Unit II  
 a) Unit III Or
14. b) Unit III  
 a) Unit IV Or
15. b) Unit IV  
 a) Unit V Or
- b) Unit V

**Section – C (5 X 8 = 40 Marks)**

Answer either (a) or (b) in each unit of the following questions

16. a) Unit – I  
 b) Unit – I Or
17. a) Unit II  
 b) Unit II Or
18. a) Unit III  
 b) Unit III Or
19. a) Unit IV  
 b) Unit IV Or
20. a) Unit V  
 b) Unit V Or

**(IDC - General Intelligence and Reasoning)**

**Section A**

Attempt all questions (Minimum 12 questions from each unit)

75 questions – each carrying one mark

Multiple Choice

Reduce these marks to a maximum of 05 i.e., (Marks obtained / 75) X 05 → C

75X 01 = 75

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

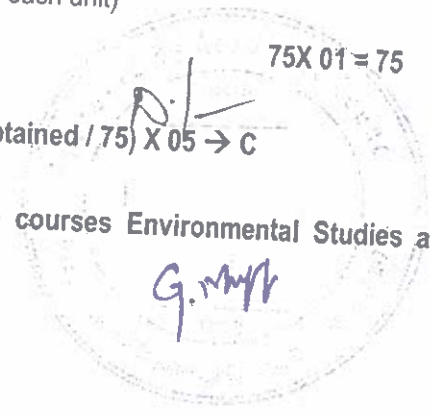
Syllabus : All Five Units  
 Duration : Three Hours  
 Max. Marks : 50

**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 ===== D)

**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 (===== E)

**Outcome Based Education Assessment Pattern (Internals)  
 2019 – 20 batch onwards**

Internals Setup : UG I (25) + E (75) – Type 1

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test – I	50	5	Average of CIA I & II (5)	5
CIA Test – II	50	5		
Model Examination	75	5		5
Assignment	5	5		5
Attendance	5	-		5
OBE Component	30	5		5
<b>Total Marks</b>				<b>25</b>

Internals Setup : UG I (20) + E (55) – Type 2 (Maths/Phy/Chem/Psy)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test – I	50	4	Average of CIA I & II (4)	4
CIA Test – II	50	4		
Model Examination	75	4		4

Assignment	10	4	4
Attendance	4	-	4
OBE Component	30	4	4
<b>Total Marks</b>			<b>20</b>

Internals Setup : UG (I-50) - Type 3

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test - I	50	20	Average of CIA I & II (20)	20
CIA Test - II	50	20		
Model Examination	75	25		25
Attendance	5	-		5
<b>Total Marks</b>				<b>50</b>

Internals Setup : UG (I-100) - Type 4

Name of the Examination	Mark Entry In CAMU		Conversion Calculation	Final Mark Generated by (CAMU)
CIA Test - I	50	25	Average of CIA I & II (25)	25
CIA Test - II	50	25		
Model Examination	75		50	50
Assignment	5		-	5
Attendance	10		-	10
Quiz	10		-	10
<b>Total Marks</b>				<b>100</b>

Internals Setup : UG IP (40) + EP (60) - Type 5

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test - I	50	10	Average of CIA I & II (10)	10
CIA Test - II	50	10		
Model Examination	75	10		10
Record	8	-		8
Lab Performance / OBE Component	30	12		12
<b>Total Marks</b>				<b>40</b>

Internals Setup : UG IP (40) + EP (60) - Type 6

Name of the Examination	Mark Entry In CAMU	Conversion Calculation	Final Mark Generated by (CAMU)
Active participation and Learning	20		20
Record	15		15
<b>Total Marks</b>			<b>40</b>

Internals Setup : UG IP (20) + EP (30) – Type 7 (Practicals)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test – I	50	4	Average of CIA I & II (5)	4
CIA Test – II	50	4		
Model Examination	75	4		4
Record	4	-		4
Lab Performance/ OBE Component	30	8		8
<b>Total Marks</b>				<b>20</b>

Internals Setup : UG IP (30) + EP (45) – Type 8 (Psy Practical)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test – I	50	5	Average of CIA I & II (5)	5
CIA Test – II	50	5		
Model Examination	75	5		5
Record/ Observation	8	-		8
Lab Performance/ OBE Component	30	12		12
<b>Total Marks</b>				<b>30</b>

Internals Setup : UG IP (80) + EP (120) – Type 9 (Chemistry Practical)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test – I	50	20	Average of CIA I & II (20)	20
CIA Test – II	50	20		
Model Examination	75	20		20
Record	16	-		16
Lab Performance/ OBE Component (3)	60	24		24
<b>Total Marks</b>				<b>80</b>

Internals Setup : UG (IR-20) – Type 10 (Internship)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation	Final Mark Generated by (CAMU)
Attendance	10	-	10
Active participation and Learning	10	-	10
<b>Total Marks</b>			<b>20</b>

Internals Setup : UG (IR-40) – Type 11 (Project)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation	Final Mark Generated by (CAMU)
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Review I / Active Participation	10	-	10
Review II / Learning Outcome	10	-	10
Review III / Attendance	10	-	10
Report / Work Diary	10	-	10
<b>Total Marks</b>			<b>40</b>

Internals Setup : PG (I - 25) – Type 12

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test – I	50	5	Average of CIA I & II (5)	5
CIA Test – II	50	5		
Model Examination	75	5		5
Assignment	10	5		5
Seminar	10	5		5
OBE Component	40	5		5
<b>Total Marks</b>				<b>25</b>

Internals Setup : PG (I - 50) – Type 13

(Self Study Paper / IDC)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation	Final Mark Generated by (CAMU)
CIA Test – I	50	15	15
CIA Test – II	50	15	15
Model Examination	75	20	20
<b>Total Marks</b>			<b>50</b>

Internals Setup : PG (IR - 40) – Type 14

(Project / Internship)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation	Final Mark Generated by (CAMU)
Review I	10	-	10
Review II	15	-	15
Review III	15	-	15
<b>Total Marks</b>			<b>40</b>

Internals Setup : PG (IR - 80) – Type 15

(Project / Internship)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation	Final Mark Generated by (CAMU)
Review I	20	-	20
Review II	30	-	30
Review III	30	-	30
<b>Total Marks</b>			<b>80</b>

Internals Setup : PG IP (40) + EP (60) – Type 16 (Practicals)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation		Final Mark Generated by (CAMU)
CIA Test – I	50	10	Average of CIA I & II (10)	10
CIA Test – II	50	10		
Model Examination	75	10		10
Record	8	-		8
Lab Performance / OBE Component	40	12		12
<b>Total Marks</b>				<b>40</b>

Internals Setup: PG IP (40) + EP (60 – Type 17 (Concurrent Field Work Practical Viva-Voce)

Name of the Examination	Mark Entry In CAMU	Conversion Calculation	Final Mark Generated by (CAMU)
Attendance	10	-	10
Field Work Diary and Report	10	-	10
Group project / Rural Camp/Community Outreach Programme	05	-	05
No. of Visits (attended)	10	-	10
IC attendance	05	-	05
<b>Total Marks</b>			<b>40</b>

### 5. External Examinations:

The external examinations for theory courses will be conducted for 75 % marks, for all UG and PG degree programs. 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 60 % marks of each practical course.

The External Assessment marks for Practical Examinations are based on the following criteria. The assessment is for 60 % marks of each practical course.

Programmes (2*24)	48
(Algorithm: 12 marks, Key and execution: 12 marks)	
Record	12
<b>Total</b>	<b>60</b>

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
	-----
<b>Total</b>	<b>50</b>

The external viva voce examinations Research / project works also will be conducted after completion of theory examinations. The external assessment is for 60 % marks of the project / research work / Dissertation.

The **External Assessment mark for project evaluation** is based on the following criteria.

a) Assessment (80%)	48
b) Viva (20%)	12
	-----
<b>Total</b>	<b>60</b>

a. Methodology	10
b. Application Skill / Tools & Techniques / Analysis	10
c. Logical Presentation & result / Future enhancement / Suggestion	10
d. Regularity with Punctuality	10
	-----
<b>Total</b>	<b>40</b>

#### End Semester Examination Question Paper Pattern

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 (including Part IV - Non Major Elective & Inter Disciplinary Courses)**, the question paper pattern shall be the same for all UG 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 5 = 25 Marks)**

**Answer either (a) or (b) in each unit of the following questions**

**Answers should not exceed 250 words**

- 11. a) Unit – I Or  
b) Unit – I
- 12. a) Unit II Or  
b) Unit II
- 13. a) Unit III Or  
b) Unit III
- 14. a) Unit IV Or  
b) Unit IV
- 15. a) Unit V Or  
b) Unit 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  
b) Unit – I
- 17. a) Unit II  
b) Unit II
- 18. a) Unit III  
b) Unit III
- 19. a) Unit IV  
b) Unit IV
- 20. a) Unit V  
b) Unit V



Or

**Part IV-Non Major Elective/Inter Disciplinary Courses**

## IDC - General Intelligence and Reasoning

### Section A

Attempt all questions (Minimum 12 questions from each unit)

75 questions – each carrying one mark

75X 01 = 75

Multiple Choice

(Reduce these marks to a maximum of 55 i.e., (Marks obtained / 75) X 55)

## NME - Numerical Ability-I, Numerical Ability-II

### Section A

Attempt all questions (Minimum 12 questions from each unit)

75 questions – each carrying one mark

75X 01 = 75

Multiple Choice

(Reduce these marks to a maximum of 50 i.e., (Marks obtained / 75) X 50)

### 6. 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-totaling and revaluation for UG and PG Programmes on payment of prescribed fees.

### 7. Grade system for extra credit courses

S.No	Marks	Grade
1	90 - 100	O - Outstanding
2	75 - 89	D - Distinction
3	70 - 74	A - Very Good
4	60 - 69	B - Good



5	50 – 59	C – Average
6	Less than 50	R – Reappear

### 8. 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

$$\text{GPA} = \frac{\text{Sum of the multiplication of grade points by the credits of the courses}}{\text{Sum of the credits of the courses in a semester}}$$

#### Classification of Successful Candidates (Overall):

CGPA	GRADE	CLASSIFICATION OF FINAL RESULT
9.5 to 10.0		First Class - Exemplary *
9.0 and above but below 9.5		
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	Second Class
5.5 and above but below 6.0	B+	
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

$$\text{CUMULATIVE GRADE POINT AVERAGE [CGPA]} = \frac{\sum n \sum_i Cn_i G n_i}{\sum n \sum_i Cn_i}$$

$$\text{CGPA} = \frac{\text{Sum of the multiplication of grade points by the credits of entire program}}{\text{Sum of the Courses of entire Program}}$$

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 25:75. 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 (75)	Aggregate (100)
1	UG Degree	40% (30)	40% (40)
2	PG Degree	50% (38)	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. No	UG & PG Maximum Marks			Passing minimum for UG			Passing minimum for PG		
	Int.	Ext.	Total	Int.	Ext.	Agg. 40%	Int.	Ext.	Agg. 50%
1	25	75	100	-	30	40	-	38	50
2	50	150	200	-	60	80	-	75	100
3	40	60	100	-	24	40	-	30	50
4	80	120	200	-	48	80	-	60	100
5	80	20	100	-	8	40	-	10	50
6	160	40	200	-	16	80	-	20	100
7	15	60	75	-	24	30	-	30	38
8	50	-	50	20	-	20	25	-	25
9	-	50	50	-	20	20	-	25	25
10	-	-	100	-	-	-	-	50	50
11	20	30	50	-	-	-	-	15	25
12	-	-	200	-	-	-	-	100	100
13	10	40	50	-	-	-	-	20	25

### **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 : .....  
Sree Saraswathi Thyagaraja College,  
Pollachi - 642 107

**To**  
The Principal / Examination-in-charge,  
Sree Saraswathi Thyagaraja College,  
Pollachi - 642 107

**Through:**  
1. Head of the Department,  
Department of .....,  
Sree Saraswathi Thyagaraja College,  
Pollachi - 642 107  
2. Dean of the Department  
Faculty of .....,  
Sree Saraswathi Thyagaraja College,  
Pollachi - 642 107

**Respected Sir / Madam,**

Sub: ..... - reg.

**NATURE OF GRIEVANCE**

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

Thanking you,

Yours Truly,

**Forwarded by:**

Signature

1. HOD with comments / recommendation  
.....

2. Dean with comments / recommendation  
.....

3. Signature and Directions of the Principal  
.....

4. Controller of Examinations:  
.....



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 with programme Outcomes and 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	Course Name	Category	Lecture (L)	Tutorial (T)	Practical (P)	Credit
21GENIZ10	Professional English I for Physical Sciences	Language	55	5	-	2
<b>Preamble:</b> The course aims to Develop students' competence in the use of English with particular reference to the workplace situation						
<b>Prerequisite:</b> Basic knowledge in English						

**Syllabus:**

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

