Dr. N.G.P. ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore
Approved by Government of Tamilnadu and Accredited by NAAC with 'A++' Grade (3rdCycle)
Dr. N.G.P.- Kalapatti Road, Coimbatore-641048, Tamilnadu, India
Web: www.drngpasc.ac.in |Email: info@drngpasc.ac.in| Phone:+91-422-2369100

REGULATIONS 2022-23 for Under Graduate Programme
(Outcome Based Education model with Choice Based Credit System)

Bachelor of Science in Computer Science Degree

(For the students admitted during the academic year 2022-23)

Programme:B.Sc. Computer Science

Eligibility

Candidates for admission to the first year of the **Bachelor of Science (Computer Science)** Degree Programme shall be required to have passed in the Higher Secondary Examinations conducted by the Government of Tamil Nadu in the relevant subjects or an Examination accepted as equivalent thereto by the Academic Council. Subject to such other conditions as may be prescribed there to are permitted to appear and qualify with any one of the following subjects: Mathematics / Computer Science / Statistics / Business Mathematics and wherever the students have not studied Mathematics, the necessary Mathematics knowledge be imparted through Tutorial/ Bridge Course.

Programme Educational Objectives

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

1. To provide adequate basic understanding about Computer Science and its applications.
2. To exploit emerging technologies in Computer Science and its related discipline.
3. To expose adequate training to the computing environment in Software Development, Graphics, Data Mining etc.
4. To inculcate training & practical approach, internship is given to be trained among the students in the field of Computer Science.
5. To equip the students with sufficient exposure and skills to enable them in attaining a deserving position in Software Industry.

PROGRAMME OUTCOMES

On the successful completion of the program, the following are the expected outcomes.

PO Number	PO Statement
PO1	An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline.
PO2	An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
PO3	An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
PO4	An understanding of professional, ethical, legal, security and social issues and responsibilities.
PO5	An ability to communicate effectively with a range of audiences.

B.Sc. Computer Science
Credit Distribution

Part	Subjects	No. of Papers	Credit	Semester No.
I (12 Credits)	Tamil / Hindi / French/Malayalam	4	4 x 3 = 12	I to IV
II (12 Credits)	English	4	4 x 3 = 12	I to IV
III (108 Credits)	Core (Credits 4)	11	11 x4= 44	I to VI
	Core (Credits 3)	2	2 x 3 = 6	I to VI
	Core (Credits 5) (Embedded- Core)	2	2 x 5 = 10	III to IV
	Core Project (Credits 2)	1	1 x 2 = 2	VI
	Core Practical (Credits 2)	4	4 x 2 = 8	I to VI
	Inter Departmental Course (IDC)	4	4 x 4 = 16	I to IV
	Discipline Specific Elective (DSE)	3	3 x 4 =12	V & VI
	Skill Enhancement Course (SEC)	4	4 x 2 = 8	III, IV, V&VI
	Industrial Training	1	1 x 2=2	V
IV (8 Credits)	Environmental Studies (AECC)	1	2	I
	Basic Tamil/Advance Tamil/Human Rights, & Women's Rights (AECC)	1	2	II
	Generic Elective (GE)	1	1 x 2=2	V
	Innovation & IPR/ Innovation, IPR & Entrepreneurship (AECC)	1	2	VI
V (2 Credits)	NSS/NCC/YRC/RRC/Yoga/Sports/ Clubs	-	2	I - II
TOTAL CREDITS			142	

CURRICULUM
B. Sc. COMPUTER SCIENCE

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
First Semester										
Part– I										
221TL1A1TA	Language-I	Tamil–I : Ikkala Ilakkiyam	4	1	-	3	50	50	100	3
221TL1A1HA		Hindi-I : Modern Literature								
221TL1A1MA		Malayalam-I : Modern Literature								
221TL1A1FA		French –I: Grammar, Translation and Civilization								
Part– II										
221EL1A1EA	Language-II	Professional English -I	4	-	1	3	50	50	100	3
Part– III										
224AI1A1CA	Core I	Problem Solving and Programming in C	4	1	-	3	50	50	100	4
224CS1A1CP	Core Practical I	C Programming	-	-	4	3	50	50	100	2
224IT1A1CA	Core II	Digital Computer Fundamentals	4	-	-	3	50	50	100	4
222MT1A1IC	IDC- I	Numerical Methods and Statistics	4	1	-	3	50	50	100	4
Part-IV										
223MB1A1AA	AECC-I	Environmental Studies	2	-	-	-	50	-	50	2
Part-V										
224CS1A1XA	NSS/NCC/ YRC/RRC/ Yoga/Sports/ Clubs	Extension Activity	-	-	-	-	50	-	50	1
		Total	22	3	5	-	-	-	700	23

Dr.NGPASC
COIMBATORE | INDIA
29/7/22

Chairman/HoD
Department of Computer Science
Dr. N. G. P. Arts and Science College
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BoS- 13th	AC - 13th	GB - 18th
29.7.22	6.9.22	10.9.22

Academic Council
Dr.V. Rajendran
CHAIRMAN
Dr. N.G.P. Arts and Science College

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Second Semester										
Part-I										
221TL1A2TA	Language-I	Tamil–II: Ara Ilakkiyam	4	1	-	3	50	50	100	3
221TL1A2HA		Hindi-II: Modern Literature								
221TL1A2MA		Malayalam-II: Modern Literature								
221TL1A2FA		French –II: Grammar, Translation and Civilization								
Part– II										
221EL1A2EA	Language-II	Professional English -II	4	-	1	3	50	50	100	3
Part– III										
224CA1A2CA	Core III	Data Structures	4	1	-	3	50	50	100	4
224CS1A2CA	Core IV	Object Oriented Programming with C++	4	-	-	3	50	50	100	4
224CS1A2CP	Core Practical II	Data Structures and C++	-	-	4	3	50	50	100	2
222MT1A2IC	IDC- II	Discrete Mathematics	4	1	-	3	50	50	100	4
Part-IV										
221TL1A2AA	AECC-II	Basic Tamil	2	-	-	-	50	-	50	2
221TL1A2AB		Advanced Tamil								
225CR1A2AA		Human Rights and Women's Rights								
Part-V										
224CS1A2XA	NSS/NCC/ YRC/RRC/ Yoga/Sports /Clubs	Extension Activity	-	-	-	-	50	-	50	1
		Total	22	3	5	-	-	-	700	23

29/11/22

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BoS- 14th	AC - 14th	GB - 19th
29.11.2022	19.01.23	30.01.23

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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Third Semester										
Part – I										
221TL1A3TA	Language-I	Tamil -III	3	1	-	3	50	50	100	3
221TL1A3HA		Hindi-III								
221TL1A3MA		Malayalam-III								
221TL1A3FA		French –III								
Part – II										
221EL1A3EA	Language-II	Professional English -III	3	1	-	3	50	50	100	3
Part – III										
224CA1A3CA	Core - V	Database Management Systems	4	-	-	3	50	50	100	4
224CT1A3CP	Core Practical - III	Java Programming	3	-	4	3	50	50	100	5
224CS1A3CA	Core -VI	Operating Systems	3	-	-	3	50	50	100	3
224CS1A3SP	SEC-I	SQL Programming	-	-	4	3	50	50	100	2
225CR1A3IB	IDC -III	Cyber law	4	-	-	3	50	50	100	4
Total			**22**	-	**08**	-	-	-	**700**	**24**

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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fourth Semester										
Part-I										
221TL1A4TA	Language-I	Tamil–IV	3	1	-	3	50	50	100	3
221TL1A4HA		Hindi-IV								
221TL1A4MA		Malayalam-IV								
221TL1A4FA		French –IV								
Part– II										
221EL1A4EA	Language-II	Professional English -IV	3	1	-	3	50	50	100	3
Part - III										
224CT1A4CA	Core - VII	Computer Networks	4	-	-	3	50	50	100	4
224CA1A4EP	Embedded Practical	Python Programming	3	-	4	3	50	50	100	5
224CS1A4CB	Core – VIII	Theory of Computation	3	-	-	3	50	50	100	3
224CS1A4SP	SEC Practical - II	Linux	-	-	4	3	50	50	100	2
222MT1A4IC	IDC - III	Operations Research	4	-	-	3	50	50	100	4
Total			**22**	**-**	**08**	**-**	**-**	**-**	**700**	**24**

16/10/23

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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fifth Semester										
Part–III										
224CS1A5CA	Core - IX	PHP and MySQL	4	-	-	3	50	50	100	4
224IT1A5CB	Core -X	Cyber Security and Ethics	4	-	-	3	50	50	100	4
224CS1A5CC	Core -XI	Software Engineering Practices	4	-	-	3	50	50	100	4
224CS1A5CP	Core Practical -V	PHP and MySQL	-	-	4	3	50	50	100	2
224CS1A5CQ	Core Practical - VI	Multimedia	-	-	4	3	50	50	100	2
224CS1A5SP	SEC Practical - III	Android Programming	-	-	4	3	50	50	100	2
224CS1A5DA	DSE	Foundations of Artificial Intelligence	4	-	-	3	50	50	100	4
224CS1A5DB		Data Mining and Data Warehousing								
224CS1A5DC		Internet of Things								
224CS1A5TA	IT	Industrial Training	-	-	-	3	50	50	100	2
Part IV										
	GE		2	-	-	-	50	-	50	2
Total			**18**	**-**	**12**	**-**	**-**	**-**	**850**	**26**

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17/04/2024

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part–III										
224CS1A6CA	Core-XII	Data Visualization	4	-	-	3	50	50	100	4
224CS1A6CP	Core Practical - VII	Data Visualization	-	-	4	3	50	50	100	2
224CS1A6SP	SEC-IV	R Programming	-	-	4	3	50	50	100	2
224CS1A6CV	Core - XIII	Project and Viva voce	-	-	8	3	50	50	100	4
224CS1A6DA	DSE	Machine Learning	4	-	-	3	50	50	100	4
224CS1A6DB		Big Data Technologies								
224CS1A6DC		Fundamentals of Cloud Computing								
224CS1A6DD	DSE	Decision Support Systems	4	-	-	3	50	50	100	4
224CS1A6DE		Augmented Reality								
224CS1A6DF		Fundamentals of Blockchain Technologies								
Part-IV										
223BC1A6AA	AECC-III	Innovation, IPR and Entrepreneurship	2	-	-	3	50	-	50	2
Total			**14**	**-**	**16**	**-**	**-**	**-**	**650**	**22**
***Grandtotal**									**4300**	**142**

*TotalCreditShould notexceed 142credits

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DISCIPLINE SPECIFIC ELECTIVE

Semester V (Elective I)

List of Elective Courses

S.No.	Course Code	NameoftheCourse
1.	224CS1A5DA	Foundations of Artificial Intelligence
2.	224CS1A5DB	Data Mining and Data Warehousing
3.	224CS1A5DC	Internet of Things

Semester VI (Elective II)

List of Elective Courses

S.No.	Course Code	Name of the Course
1.	224CS1A6DA	Machine Learning
2.	224CS1A6DB	Big Data Technologies
3.	224CS1A6DC	Fundamentals of Cloud Computing

Semester VI (Elective III)

List of Elective Courses

S.No.	Course Code	NameoftheCourse
1.	224CS1A6DD	Decision Support Systems
2.	224CS1A6DE	Augmented Reality
3.	224CS1A6DF	Fundamentals of Blockchain Technologies

GENERIC ELECTIVE COURSE (GE)

The following is the course offered under Generic Elective Course

Semester V

S.No.	Course Code	Name of the Course
1	224CS1A5GA	Social Media Engagement

EXTRA CREDIT COURSES

The following are the courses offered under self-study to earn extra credits:

Semester III

S.No.	Course Code	Name of the Course
1	224CS1ASSA	Social Media Analytics
2	224CS1ASSB	E-Commerce

UG - REGULATION (R4)

(Students admitted in the AY 2022-23)

(OUTCOME BASED EDUCATION WITH CBCS)

1.NOMENCLATURE

1.1 Faculty: Refers to a group of programmes concerned with a major division of knowledge Eg. Faculty of Computer Science consists of disciplines like Departments of Computer Science, Information Technology, Computer Technology, Computer Applications, Data analytics, Cognitive Systems and Artificial Intelligence and Machine Learning.

1.2 Programme: Refers to the Bachelor of Science / Commerce /Arts stream that a student has chosen for study.

1.3 Batch: Refers to the starting and completion year of a programme of study. Eg. Batch of 2022–25 refers to students belonging to a 3 year Degree programme admitted in 2022 and completing in 2025.

1.4 Course: Refers to component of a programme. A course may be designed to involve lectures / tutorials / laboratory work / seminar / project work/ practical training / report writing / Viva- voce, etc., or a combination of these, to meet effectively the teaching learning needs.

a) **Core Course:**A course, which should compulsorily be studied by a candidate as a core requirement

b) **Inter Disciplinary Course (IDC):** A course chosen generally from a related discipline/subject with an intention to seek exposure in the discipline relating to the core domain of the student

c) **Discipline Specific Elective (DSE) Course**: Elective courses offered under main discipline/ subject of study.

d) **Skill Enhancement Courses (SEC):** Value-based and/or skill-based courses which are aimed at providing hands-on-training, competencies, skills, etc.

e) **Ability Enhancement Compulsory Courses (AECC):** Mandatory courses that lead to Knowledge enhancement. Environmental Science, Human Rights and Women's Rights, Basic Tamil/Advanced Tamil, Innovation and IPR/Innovation, IPR and Entrepreneurship.

f) **Ability Enhancement Elective Course (AEEC)/Generic Elective (GE)** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is Generic Elective.

1.5 Project Work:

Course involving application of knowledge in problem solving / analyzing /exploring a real life situation / difficult problem. The Project work will be given in lieu of a Core paper.

Internship/Industrial Training

Students must undertake industrial / institutional training for a minimum of 15 days during the IV semester summer vacation. The students will submit the report for evaluation during V semester.

1.6 Extra Credits:

Extra credits shall be awarded for achievements in identified Curricular/co-curricular activities executed outside the regular class hours. Extra credits are not mandatory for completing the programme.

2. STRUCTURE OF PROGRAMME

2.1 PART- I: LANGUAGE- I

Tamil or any one of the languages namely Malayalam, Hindi and French will be offered under Part – I in the first four semesters.

2.2 PART- II: LANGUAGE- II

English will be offered during the first four semesters.

2.3 PART- III:

- Core Course
- Inter Departmental Course (IDC)
- Discipline Specific Elective (DSE)
- Skill Enhancement Course (SEC)
- Industrial Training (IT)

2.4 PART- IV:

2.4.1 Ability Enhancement Compulsory Course (AECC):

The Ability Enhancement Compulsory Courses such as i)Environmental Studies, ii) Human Rights and Womens' Rights, iii) Innovation and IPR/ Innovation, IPR and Entrepreneurship are offered during I,II and VI Semester.

Basic Tamil

a) Those who have not studied Tamil up to XII Std and taken a non-Tamil language under Part-I shall take one Basic Tamil course in the second semester.

(OR)

Advanced Tamil

b) Those who have studied Tamil up to XII Std and taken a non-Tamil language under Part-I shall take one Advanced Tamil course in the second semester.

Note: Students who come under the above a+b categories are exempted from Human Rights and Women's Rights in second semester.

Ability Enhancement Elective Course (AEEC)/Generic Elective (GE) An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is Generic Elective offered in V semester. (Theory/Practical/Non-Lab Practical)

2.5 PART- V: EXTENSION ACTIVITIES

The following extracurricular activities like NSS/YRC/NCC/RRC/Yoga/Sports/Clubs are offered under extension activities during semester I & II. Students will be evaluated based on their active participation in any one of the above activities. 75% Attendance is compulsory for extension activity.

3. CREDIT ALLOTTMENT

The following is the credit allotment:

- Lecture Hours (Theory) : 1 credit per lecture hour per week
- Laboratory Hours : 1 credit for 2 Practical hours per week
- Project Work : 1 credit for 2 hours of project work per week

4. DURATION OF THE PROGRAMME

The B.A. /B.Com./B. Sc. Programme must be completed within 3 years (6 semesters) and a maximum of 6 years (12 semesters) from the date of acceptance to the programme. If not, the candidate must enroll in the course determined to be an equivalent by BoS in the most recent curriculum recommended for the Programme.

5.REQUIREMENTS FOR COMPLETION OF A SEMESTER

Every student shall ordinarily be allowed to keep terms for the given semester in a program of his/ her enrolment, only if he/ she fulfills at least seventy five percent (75%) of the attendance taken as an average of the total number of lectures, practicals, tutorials, etc. wherein short and/or long excursions/field visits/study tours organized by the college and supervised by the faculty as envisaged in the syllabus

shall be credited to his/her attendance. Every student shall have a minimum of 75% as an overall attendance.

6. EXAMINATIONS

The end semester examinations shall normally be conducted after completing 90 working days for each semester. The maximum marks for each theory and practical course shall be 100 with the following breakup:

a) Mark distribution for Theory Courses

Continuous Internal Assessment (CIA) : 50 Marks

End Semester Exams (ESE) : 50 Marks

Total :100 Marks

i) Distribution of Internal Marks

S.No.	Particulars	Distribution of Marks
1	CIA I (2.5 Units) (On completion of 45th working day)	15
2	Model (All 5 Units) (On completion of 85th working day)	15
3	Assignment	05
4	Attendance	05
5	Library Usage	05
6	Skill Enhancement *	05
	Total	**50**

Assignment Rubric
(Maximum -20 marks converted to 5 marks)

Criteria	4 marks	3 Marks	2 Marks	1 MArk
Language	Excellent spelling and Grammar	Good spelling and Grammar	Reasonable spelling and Grammar	Bad spelling and Grammar
Style	Outstanding style beyond usual college level	Attains College level style	Approaches College level style	Elementary form with little or no variety in

				sentence structure
Referencing	Good use of wide range of reference sources	Moderate use of suitable reference materials	Shows signs of plagiarism & using sources without referencing	No reference material used
Development	Main points well developed with high quality and quantity support	Main points developed with quality and quantity supporting details	Main points are present with limited details and development	Main points lack detailed development
Critical thinking/Problem solving	Advanced attempt to interpret the process, content/ analyse and solve the problem	Proficient attempt to interpret the process, content/ analyse and solve the problem	Adequate attempt to interpret the process, content/ analyse and solve the problem	Limited attempt to interpret the process, content/ analyse and solve the problem

Breakup for Attendance Marks:

S.No	Attendance Range	Marks Awarded
1	95% and Above	5
2	90% - 94%	4
3	85% - 89%	3
4	80% - 84%	2
5	75% - 79%	1

Note:

Special Cases such as NCC, NSS, Sports, Advanced Learner Course, Summer Fellowship and Medical Conditions etc. the attendance exemption may be given by principal and Mark may be awarded.

Break up for Library Marks:

S.No	Attendance Range	Marks Awarded
1	10h and above	5
2	9h- less than 10h	4
3	8h - less than 9h	3
4	7h - less than 8h	2
5	6h - less than 7h	1

Note:
In exception, the utilization of e-resources of library will be considered.

***Components for "Skill Enhancement" may include the following:**

Class Participation, Case Studies Presentation, Field Study, Field Survey, Group Discussion, Term Paper, Presentation of Papers in Conferences, Industry Visit, Book Review, Journal Review, e-content Creation, Model Preparation & Seminar.

Components for Skill Enhancement

Any one of the following should be selected by the course coordinator

S.No.	Skill Enhancement	Description
1	Class Participation	• Engagement in class • Listening Skills • Behaviour
2	Case Study Presentation/ Term Paper	• Identification of the problem • Case Analysis • Effective Solution using creativity/imagination
3	Field Study	• Selection of Topic • Demonstration of Topic • Analysis & Conclusion
4	Field Survey	• Chosen Problem • Design and quality of survey • Analysis of survey
5	Group Discussion	• Communication skills • Subject knowledge • Attitude and way of presentation • Confidence • Listening Skill
6	Presentation of Papers in Conferences	• Sponsored • International/National • Presentation • Report Submission

7	Industry Visit	• Chosen Domain • Quality of the work • Analysis of the Report • Presentation
8	Book Review	• Content • Interpretation and Inferences of the text • Supporting Details • Presentation
9	Journal Review	• Analytical Thinking • Interpretation and Inferences • Exploring the perception if chosen genre • Presentation
10	e-content Creation	• Logo/ Tagline • Purpose • Content (Writing, designing and posting in Social Media) • Presentation
11	Model Preparation	• Theme/ Topic • Depth of background Knowledge • Creativity • Presentation
12	Seminar	• Knowledge and Content • Organization • Understanding • Presentation

ii) Distribution of External Marks

Total	**:**	**50**
Written Exam	**:**	**50**

Marks Distribution for Practical course

Total	**:**	**100**
Internal	**:**	**50**
External	**:**	**50**

i) Distribution of Internals Marks

S.No.	Particulars	Distribution of Marks
1	Experiments/Exercises	15
2	Test 1	15
3	Test 2	15
4	Observation Notebook	05
	Total	**50**

ii) Distribution of Externals Marks

S.No.	Particulars	External Marks
1	Materials and methods/ Procedures/Aim	10
2	Experiment/ Performance/ Observations/ Algorithm	10
3	Results/ Calculations/ Spotters/ Output	10
4	Inference/Discussion/ Presentation	10
5	Record	6
6	Viva- voce	4
	Total	**50**

A) Mark Distribution for Project/Internship/Industrial Training

Total : 100
Internal : 50
External : 50

i) Distribution of Internal Marks

S.No.	Particulars	Internal Marks
1	Review I	20
2	Review II	20
3	Attendance	10
	Total	**50**

ii) Distribution of External Marks

S.No	Particulars	External Marks
1	Project Work/Internship/ Industrial training presentation	40
2	Viva -voce	10
	Total	**50**

Evaluation of project Work/Internship/ Industrial training shall be done jointly by Internal and External Examiners

7. Credit Transfer

a. Upon successful completion of 1 NPTEL Course (4 Credit Course) recommended by the department, during Semester I to IV, a student shall be eligible to get exemption of one **4 credit course** during the V or VI semester. The proposed NPTEL course should cover content/syllabus of exempted core paper in V or VI semester.

S. No.	Course Code	Course Name	Proposed NPTEL Course	Credit
1			Option – 1 Paper title	4
			Option – 2 Paper title	
			Option – 3 Paper title	

b. Upon successful completion of **2 NPTEL Courses** (2 Credit each) recommended by the department, during Semester I to IV, a student shall be eligible to get exemption of **one 4 credit course** during the V or VI semester. Out of 2 NPTEL proposed courses, **atleast 1 course** should cover content/syllabus of exempted core paper in V or VI semester.

Mandatory

The exempted core paper in the V or VI semester should be submitted by the students for approval before the end of 4th semester.

Credit transfer will be decided by equivalence committee

S. No.	Course Code	Course Name	Proposed NPTEL Course	Credit
1			Option – 1 Paper title	2
			Option – 2 Paper title	
			Option – 3 Paper title	
2			Option – 1 Paper title	2
			Option – 2 Paper title	
			Option – 3 Paper title	

NPTEL Courses to be carried out during semester I – IV.

S.No.	Student Name	Class	Proposed NPTEL Course		Proposed Course for Exemption
			Course I	Option 1- Paper Title Option 2- Paper Title Option 3- Paper Title	Any one Core Paper in V or VI Semester
			Course II	Option 1- Paper Title Option 2- Paper Title Option 3- Paper Title	

Upon Successful outcome of Design Thinking / Copy right/Product/ Patent by the end of the V Semester, student shall be eligible to get exemption in AECC: Innovation, IPR & Entrepreneurship / Innovation & IPR offered during VI Semester.

9. Internship/Industrial Training

Students must undertake industrial / institutional training for a minimum of 15 days during the IV semester summer vacation. The students shall submit the report for evaluation during V semester.

10. Extra Credits: 10

Earning extra credit is not essential for programme completion. Student is entitled to earn extra credit for achievement in Co-Curricular/ Extracurricular activities carried out other than the regular class hours.

A student is permitted to earn a maximum of Ten extra Credits during the programme period. A maximum of 1 credit under each category is permissible.

Category	Credit
Proficiency in foreign language	1
Proficiency in Hindi	1
Self study Course	1
Typewriting/Short hand	1
CA/ICSI/CMA (Foundations)	1
CA/ICSI/CMA (Inter)	1
Sports and Games	1
Publications / Conference Presentations (Oral/Poster)/Awards	1
Lab on Project	1
Innovation / Incubation / Patent / Sponsored Projects / Consultancy/	1
Representation in State / National level celebrations	1
Awards/ Recognitions / fellowships	1

Credit shall be awarded for achievements of the student during the period of study only.

GUIDELINES

Proficiency in foreign language

A pass in any foreign language in the examination conducted by an authorized agency.

Proficiency in Hindi

A pass in the Hindi examination conducted by Dakshin Bharat Hindi Prachar Sabha.

Examination passed during the programme period only will be considered for extra credit.

Self study Course

A pass in the self study courses offered by the department.

The candidate should register the self study course offered by the department only in the III semester.

Typewriting/Short hand

A Pass in short hand /typewriting examination conducted by Tamil Nadu Department of Technical Education (TNDTE) and the credit will be awarded.

CA/ICSI/CMA(Foundations)

Qualifying foundation in CA/ICSI/CMA / etc.

Sports and Games

The Student can earn extra credit based on their Achievement in sports in University/ State / National/ International.

Publications / Conference Presentations (Oral/Poster)

Research Publications in Journals

Oral/Poster presentation in Conference

Lab on Project (LoP)

To promote the undergraduate research among all the students, the LoP is introduced beyond their regular class hours. LoP is introduced as group project consisting of not more than five members. It consist of four stages namely Literature collection, Identification of Research area, Execution of research and Reporting / Publication of research reports/ product developments. These four stages spread over from III to V semester.

(Evaluation will be done internally)

Innovation / Incubation / Patent / Sponsored Projects / Consultancy

Development of model/ Products /Prototype /Process/App/Registration of Patents/ Copyrights/Trademarks/Sponsored Projects /Consultancy

Representation in State/ National level celebrations

State / National level celebrations such as Independence day, Republic day Parade, National Integration camp etc.

Awards/ Recognitions/fellowships

Regional/ State / National level awards/ Recognitions/Fellowships

100 % CIA Courses :

- **AECC**
- **AEEC**

S.No	Type of Course
1	Environmental Studies (AECC)
2	Human Rights and Women's Rights, Basic Tamil /Advanced Tamil (AECC)
3	Innovation &IPR/ Innovation, IPR and Entrepreneurship(AECC)
4	Generic Elective (AEEC)

Modalities for Implementing Internal Assessment Marks:

- Student pertaining to 2022 Batch (2022-25) UG programme for the above mentioned courses shall secure a minimum of 40% out of the maximum marks in the continuous internal assessment (CIA) i.e., 20 marks out of 50 marks.
- Students who have not acquired the minimum marks shall be allowed to reappear to improve their marks in the exam components only within the time duration of the programme, in the forthcoming semesters.

Distribution of Internal Marks for AECC & AEEC (Theory)

S.No.	Particulars	Distribution of Marks
1	CIA I (2.5 Units) (On completion of 45th working day)	15
2	Model (All 5 Units) (On completion of 85th working day)	15
3	Assignment	05
4	Attendance	05
5	Library Usage	05
6	Skill Enhancement *	05
	Total	**50**

Distribution of Internal Marks for Generic Elective (AEEC) (Practical)

S.No.	Particulars	Distribution of Marks
1	CIA -I (1-5 Exercise)	5
2	CIA-II (6-10 Exercise)	5
3	Class Participation	10
4	Practical Record	10
5	Test-III & Viva –Voce(10+10)	20
	Total	**50**

Question paper pattern AECC & AEEC

Test	MARKS	DESCRIPTION	TOTAL	Remarks
CIA Test I **1 Hour** **First 2.5 Units**	50 x 1 = 50 Marks	MCQ	50 Marks	Marks secured will be Converted to 15 marks
CIA test II/ Model test **1 Hour** **All five Units**	50 x 1 = 50 Marks	MCQ	50 Marks	Marks secured will be Converted to 15 marks

Question paper pattern		Total Marks - 50	
Basic Tamil		**Advanced Tamil**	
Section -A		**Section -A**	
Choose the correct answer	**10**x2=20	**Choose the correct answer**	**10**x1=10
Section -B		**Section -B**	
True or false	10x2=20	**Fill in the blanks**	10x2=20
Section -C		**Section -C**	
Answer in one page	1x10=10	**Write an essay in two pages**	2x10=20

Question paper pattern for all other courses falling under Part I to Part III

CIA Test : [1 ½ Hours-2.5 Units] - 25 Marks

SECTION	MARKS	DESCRIPTION	TOTAL	Remarks
Section – A	8 x 0.5 = 04 Mark	MCQ	25 Marks	Marks secured will be converted to 15 marks
Section - B	3 x 3 = 09 Mark	Answer ALL Questions Either or Type ALL Questions Carry Equal Marks		
Section - C	2 x 6 = 12 Mark			

Model Test: [3 Hours-5 Units] - 50 Marks

SECTION	MARKS	DESCRIPTION	TOTAL	Remarks
Section – A	5 x 1 = 05 Marks	MCQ	50 Marks	Marks secured will be converted to 15 marks
Section - B	5 x 3 = 15 Marks	Answer ALL Questions (Either or Type Questions) Each Questions Carry Equal Marks		
Section - C	5 x 6 = 30 Marks			

End Semester Examination: [3 Hours-5 Units] - 50 Marks

SECTION	MARKS	DESCRIPTION	TOTAL
Section – A	5 x 1 = 05 Marks	MCQ	50 Marks
Section - B	5 x 3 = 15 Marks	Answer ALL Questions (Either or Type Questions) Each Questions Carry Equal Marks	
Section - C	5 x 6 = 30 Marks		

Course Code	Course Name	Category	L	T	P	Credit
221TL1A1TA	TAMIL- I:IKKALA ILAKKIYAM	LANGUAGE- I	4	1	-	03

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடுநாகரீகம்,பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள்(Life Skills)- மாணவர்களின் செயலாக்கத்திறனை ஊக்குவித்தல்	K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K4
CO3	பாடஇணைச்செயல்பாடுகள் (Co-curricular activities)	K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு(Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A1TA	TAMIL- I:IKKALA ILAKKIYAM	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I **மறுமலர்ச்சிக் கவிதைகள்** 13 h

1. இலக்கிய வரலாறு -மறுமலர்ச்சிக் கவிஞர்களின் தமிழ்ப்பணிகள்
2. பாரததேசம் - பாரதியார்
3. படி - பாரதிதாசன்
4. தமிழரின் பெருமை - நாமக்கல்கவிஞர்
5. தமிழ்க் கொலை புரியாதீர் - புலவர் குழந்தை
6. திரைத்தமிழ்

அ) 'விஞ்ஞானத்த வளர்க்கப் போறண்டி'எனத்தொடங்கும் பாடல் - உடுமலை நாராயண கவி

ஆ) 'சும்மா கிடந்த நிலத்தை' எனத்தொடங்கும் பாடல் - பட்டுக்கோட்டை கல்யாண சுந்தரனார்

இ) 'சமரசம் உலாவும் இடமே' எனத்தொடங்கும் பாடல்- மருதகாசி

ஈ) 'உன்னை அறிந்தால்' எனத்தொடங்கும் பாடல் - கண்ணதாசன்

Unit II **புதுக்கவிதைகள்** 13 h

1. இலக்கிய வரலாறு - புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்
2. கடமையைச் செய் - மீரா
3. மலையாளக் காற்று - சிற்பி
4. ஒப்பிலாத சமுதாயம் - அப்துல் ரகுமான்
5. கன்னிமாடம் - மு.மேத்தா
6. கரிக்கிறது தாய்ப்பால் - ஆரூர் தமிழ்நாடன்
7. ஐந்தாம் வகுப்பு 'அ' பிரிவு - நா. முத்துக்குமார்
8. ஹைகூ கவிதைகள் - 10 கவிதைகள்

Unit III **பெண்ணியம்** 09 h

1. தொலைந்து போனேன் - தாமரை

2. நீரில் அலையும் முகம் - அ. வெண்ணிலா

3. தற்காத்தல் - பொன்மணி வைரமுத்து

4. ஏனிந்த வித்தியாசங்கள் ?- மல்லிகா

5. புதையுண்ட வாழ்க்கை - சுகந்தி சுப்ரமணியன்

Unit IV சிறுகதைகள் 15 h

1.இலக்கிய வரலாறு -சிறுகதையின் தோற்றமும் வளர்ச்சியும்

2. கனகாம்பரம் - கு.ப.ராஜகோபாலன்

3. ஆற்றங்கரைப் பிள்ளையார் - புதுமைப்பித்தன்

4. பொம்மை - ஜெயகாந்தன்

5. காய்ச்சமரம் - கி. ராஜநாராயணன்

6. காட்டில் ஒருமான் - அம்பை

7.வேட்கை - சூர்யகாந்தன்

Unit V பயிற்சிப் பகுதி 10 h

அ. இலக்கணம்

1.வல்லின ஒற்று மிகும், மிகா இடங்கள் - ஒற்றுப்பிழை நீக்கி எழுதுதல்

2.ர,ற - ல,ழ,ள - ண,ந,னவேறுபாடு - ஒலிப்பு நெறி,சொற்பொருள் வேறுபாடு அறிதல்)

ஆ. படைப்பாக்கம்

1. கவிதை- எழுதுதல் (15 வரிகள் முதல் 30 வரிகள் வரை)

2.சிறுகதை - எழுதுதல் (குறைந்தது 3 பக்கங்கள்)

Text Book

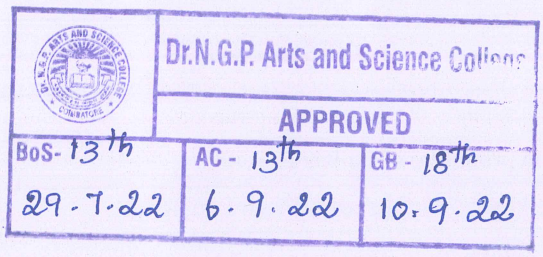
1 தமிழ் மொழிப்பாடம் - 2022-2023,தொகுப்பு: தமிழ்த்துறை, டாக்டர்என்.ஜி.பி. கலை அறிவியல் கல்லூரி,கோயம்புத்தூர் – 641048,வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ்,சென்னை – 600 098.

References

1 பேராசிரியர் புலவர் சோம. இளவரசு,எட்டாம் பதிப்பு -2014,தமிழ் இலக்கிய வரலாறு – மணிவாசகர் பதிப்பகம்,சென்னை – 600 108.

2 பேராசிரியர் முனைவர் பாக்கியமேரி,முதற் பதிப்பு- 2013,இலக்கணம் - இலக்கிய வரலாறு - மொழித்திறன்- பூவேந்தன் பதிப்பகம்,சென்னை-600 004.

3 இணையதள முகவரி: https://www.tamilvu.org



Course Code	Course Name	Category	L	T	P	Credit
221TL1A1HA	HINDI- I: MODERN LITERATURE	LANGUAGE-I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature
- The techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Apply the knowledge writing critical views on fiction	K3
CO4	Build creative ability	K3
CO5	Expose the power of creative reading	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A1HA	HINDI- I: MODERN LITERATURE	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I 13 h

गद्य - नूतनगद्यसंग्रह(जयप्रकाश)पाठ 1- रजयिापाठ 2- मक्रीलपाठ 3- बहतापानीनर्मिला पाठ 4- राष्ट्रपतिामहात्मागाँधी

Unit II 13 h

कहानीकुंज- डॉवी.पी. 'अमतिाभ'(पाठ 1-4)

Unit III 12 h

व्याकरण : शब्दवचिार (संज्ञा, सर्वनाम,वशिषण)

Unit IV 12 h

अनुच्छेद लेखन

Unit V 10 h

अनुवाद अभ्यास-III (केवल अंग्रेजी से हनि्दी में) (पाठ 1 to 10)

Text Books

1. प्रकाशक: सुमत्रिप्रकाशन 204 लीलाअपार्ट्मेंट्स, 15 हेस्टग्सिरोड'अशोकनगरइलाहाबाद-211001
2. प्रकाशक: गोवन्दिप्रकाशनसदरबाजार, मथुराउत्तरप्रदेश-281001
3. पुस्तक: व्याकरण प्रदपि – रामदेवप्रकाशक: हनि्दी भवन 36 टेगोर नगर इलाहाबाद-211024
4. पुस्तक: व्याकरण प्रदपि – रामदेवप्रकाशक: हनि्दी भवन 36 इलाहाबाद-211024
5. प्रकाशक: दक्षणि भारत प्रचार सभा चेनैई -17

APPROVED
BoS- 13th 29.7.22 | AC- 13th 6.9.22 | GB- 18th 10.9.22

Course Code	Course Name	Category	L	T	P	Credit
221TL1A1MA	MALAYALAM- I: MODERN LITERATURE	LANGUAGE-I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories.	K1
CO2	Understand the principles of translation work.	K2
CO3	Apply the knowledge writing critical views on fiction.	K3
CO4	Build creative ability.	K3
CO5	Expose the power of creative reading	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

✓	Skill Development	✓	Entrepreneurial Development
	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A1MA	MALAYALAM- I: MODERN LITERATURE	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I **Novel** 14 h

PathummayudeAdu

Unit II **Novel** 10 h

PathummayudeAdu

Unit III **Short Story** 14 h

Nalinakanthi

Unit IV **Short Story** 10 h

Nalinakanthi

Unit V **Practical Application** 12 h

Expansion of ideas, General Essay and Translation

Text Books

1 Vaikkam Muhammed Basheer, "PathummayudeAdu" (NOVEL), DC Books & Kottayam

2 T.Padmanabhan, "Nalinakanthi" (Short Story), DC Books & Kottayam.

References

1 MalayalaNovel Sahithyam.

2 MalayalaCherukathaInnale Innu.

Dr.N.G.P. Arts and Science College
APPROVED

BoS- 13th	AC - 13th	GB - 18th
29.7.22	6.9.22	10.9.22

Course Code	Course Name	Category	L	T	P	Credit
221TL1A1FA	FRENCH- I: GRAMMAR, TRANSLATION AND CIVILIZATION	LANGUAGE - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the Competence in General Communication Skills – Oral + Written – Comprehension & Expression
- the Culture, life style and the civilization aspects of the French people as well as of France
- the students to acquire Competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	Apply the adjectives and the classroom environment in France	K2
CO3	Evaluate the Plural, Articles and the Hobbies	K3
CO4	Measure the Cultural Activity in France	K3
CO5	Select the sentiments, life style of the French people and the usage of the conditional tense	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A1FA	FRENCH- I: GRAMMAR, TRANSLATION AND CIVILIZATION	SEMESTER I

Total Credits: 3
Total Instruction Hours: 60 h

Syllabus

Unit I Salut I Page 10 — 12 h

Objectifs de Communication	Tâche	Activités deréception et de production orale
• Saluer • Enter en contact • avecquelqu'un. • Se presenter. • S'excuser	Encours de cuisine, premiers contacts avec les members d'un groupe	• Comprendre des personnes qui se saluent. • Ēchanger pour entrer en contact, se présenter, saluer, s'excuser. • Communiquer avec *tu* ou *vous*. • Comprendre les consignes de classe • Ēpeler son nom et son prénom. Computer jusqu'à 10.

Unit II Enchanté I Page 20 — 12 h

Objectifs de Communication	Tâche	Activités deréception et de production orale
• Demander de se presenter. • Présenter quelqu'un.	Dans la classe de français, se presenter et remplir une fiche pour le professeur.	• Comprendre les informations essentielles dans un échange en milieu professionnel. • Ēchanger pour se presenter et présenter quelqu'un.

Unit III J'adoreI Page 30 — 12 h

Objectifs de Communication	Tâche	Activités deréception et de production orale
• Exprimerses gouts.	Dans un café, participer à une soirée de rencontres rapides et remplir de taches d'appréciation.	• Dans une soirée de recontresrapid comprendre des personnes qui échangent sur elles et sur leurs goût • Comprendre une personne qui parler des goûts de quelqu'un d'autre.

Unit IV J'adoreI Page 30 14 h

Objectifs de Communication	Tâche	Activités deréception et de production orale
• Présenterquelqu'un	Dans un café, participer à une soirée de rencontres rapides et remplir de taches d'appréciation	• Exprimersesgoûts. • Comprendre une demande laissée sur un répondeur téléphonique. • Parler de ses projets de week-end.
Autoévaluation du module I Page 40 – Préparation au DELF A1 page 42		
Demander à quelqu'un de faire quelque chose. Demander poliment. Parlerd'actions passes. Tuveuxbien?	Organiser un programme d'activités pour accueillirunepersonneimportante.	Comprendreunepersonne demande un service à quelqu'un. Demander à quelqu'un de faire quelque chose. Imaginer et raconter au passé à partir de situations dessinées.

Unit V Practical Application 10 h

Make in Own Sentences

Text Book

1 RegineMerieux, Yves Loiseau, "LATITUDES - 1" (Page No: 9-55)(Methode de Français), Goyal Publisher &DistributorsPvt.Ltd., 86 UB JawaharNagar (Kamala Nagar),Delhi-7 Les Editions Dider, Paris,2008- Imprime en Roumanie par Canale en Janvier 2012.

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Course Code	Course Name	Category	L	T	P	Credit
221EL1A1EA	PROFESSIONAL ENGLISH- I	LANGUAGE- II	4	-	1	3

PREAMBLE

This course has been designed for students to learn and understand

- the effect of dialogue, the brilliance of imagery and the magnificence ofvaried genres
- any spontaneous spoken discourse and respond to them with proper sentence structure
- the transactional concept of English language

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Identify the various aspects in poetry	K2
CO2	Infer linguistic and non-linguistic features of the context for understanding and interpreting	K3
CO3	Construct sentences and convey messages effectively in real life situations	K3
CO4	Apply different reading strategies with varying speed	K3
CO5	Prepare modules with their own ideas and present them coherently in a grammatically correct form	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221EL1A1EA	PROFESSIONAL ENGLISH- I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Genre Studies 10 h

Nissim Ezekiel: The Worm- Author's Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques– Annotations

NiyiOsundare: Our Earth Will Not Die- Author's Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques– Annotations

A. G. Gardiner: On Superstitions- Author's biography- Narrative structure- Exploration of the text- passage analysis- insight of ideas- cohesion and context- style- language techniques- Annotations

Nancy Bella: Clever Thief- Author's Biography- Plot Summary- Detailed summary and Analysis- Themes- Important Quotations-Characters- Description - analysis- Terms- Symbols- Critical analysis

H. G. Wells: The Truth about Pyecraft- Author's Biography-narrative structure- passage analysis- insight of ideas- cohesion and context- style- language techniques

Unit II Listening Skills 12 h

Listening vs. hearing- Types of listening, Tips to enhance Listening Skills, Non-verbal and Verbal signs of active listening - Comprehensive Listening - Listening to pre-recorded audios on speeches, interviews and conversations - Listening Activities- Listening and responding to complaints (formal situation), Listening to problems and offering solutions (informal)

Unit III Speaking Skills 14 h

Formal occasions- Introducing oneself, Introducing others, Enquiries and Seeking permission, Making short presentations - Informal occasions- Requests, Offering help, Congratulating, Farewell party, graduation speech -Giving instructions to do a task and to use a device, Giving and asking directions

Unit IV Reading Skills 10 h

Study Skills: Skimming and Scanning- Reading different kinds of texts- Types of reading-Developing a good reading speed, reading aloud, Referencing skill - Word Power (Denotation and Connotation) - Reading comprehension, Data interpretation –Charts, Graphs, Advertisements

Unit V Writing Skills 12 h

Sentence patterns, Note- making and note taking-Strategies - Paragraph writing: Structure and Principles - Academic Writing - Formal and Informal Letters, Report, Book /Movie Review

Text Books

1 Gardiner, A. G. 1926. Alpha of the Plough: Second series, J.M. Dent & Sons Ltd., London, United Kingdom. pg.no-151-156. (Unit I)

2 Ezekiel, Nissim. "The Worm," Crazy Romantic Love, www. mianmawaisarain.live/2020/05/poem-worm-nissim-ezekiel.html. Accessed 3 Aug. 2022. (Unit I)

3 <http://livros01.livrosgratis.com.br/ln000835.pdf />(Unit I)

4 Mithra,S.M. 1919. Hindu Tales from the Sanskrit, Macmillan & Co Ltd., London, United Kingdom. pg.no-127-142. (Unit I)

5 Nation, I. S. P and Jonathan Newton. 2009. Teaching ESL/EFLListening and Speaking. Routledge, New York, United States. (Unit II)

6 Prabha, Dr. R. Vithya & S. Nithya Devi. 2019. Sparkle. (1st Edn.) McGraw - Hill Education, Chennai, India. (Unit III– V)

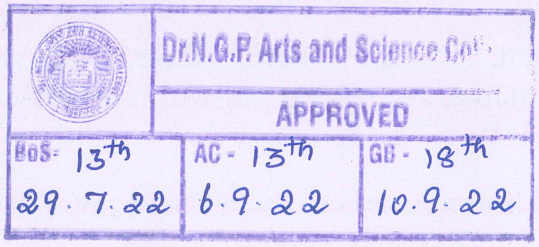
References

1. Our Earth Will Not Die By NiyiOsundare." Studocu.Com, studocu.com/in/document/bangalore-university/bachelor-of-computer-applications/1586771577-our-earth-will-not-die/27675462. Accessed 3 Aug. 2022.

2. OnSuperstitions."THEHISTORIAN,thehistorian1947.wordpress.com/2019/03/08/on-superstitions-by-a-g-gardiner. Accessed 3 Aug. 2022.

3. Swales, John M. & Feak, Christine B. 2012. Academic Writing for Graduate Students: Essential Tasks and Skills, University of Michigan Press, Michigan.

4. Rudzka, Brygida -Ostyn, 2003. Word Power: Phrasal Verbs and Compounds: A Cognitive Approach, Mouton de Gruyter, New York, United States.



Course Code	Course Name	Category	L	T	P	Credit
224AI1A1CA	PROBLEM SOLVING AND PROGRAMMING IN C	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamental aspects of programming and problem solving
- The C language fundamentals
- The representation and working of arrays, pointers, functions and files

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Illustrate the basic principles of programming and problem solving	K2
CO2	Understand the fundamentals of C Language	K2
CO3	Implement decision making using branching and looping.	K3
CO4	Develop programs using arrays and functions	K3
CO5	Execute programs using pointers, structures and files	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓		✓	✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓		✓	✓
CO4	✓		✓	✓	✓
CO5	✓		✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224AI1A1CA	PROBLEM SOLVING AND PROGRAMMING IN C	SEMESTER I

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Programming and Problem Solving 12 h

Introduction: Types of Programming Languages – High level Languages – Assembly Languages – Machine Level Languages – System Software – Operating Systems – Compiler – Linker and Interpreter. Problem Solving Strategies: Steps involved in problem solving - Algorithms - Flow Charts - Symbols used in Flow Charts - Pseudo Codes – Structured Programming - Sequence – Selection – Repetition – Modular Programming.

Unit II C Language Fundamentals 12 h

Language Fundamentals: Introduction to C - Basic Structure of C Program – Constants – Variables – Data Types - Operators – Expressions – Evaluation of Expressions - Operator Precedence and Associativity - Managing the Input and Output – Formatted I/O – Unformatted I/O – Storage classes- Simple programs for logic building.

Unit III Decision Making and Arrays 12 h

Branching: Simple if Statement – if-else statement – elseif Ladder – Switch statement – goto, break and continue statements. Looping: while loop – do-while loop -for loop- nested for loop – Pre-processor Directives: Macro substitution – File inclusion – Compiler control directives. Arrays: Introduction – Types of arrays – Declaration and Initialization of Arrays – Dynamic Arrays.

Unit IV Strings, Functions and Pointers 12 h

Strings: Declaring and Initializing the string variables – String handling functions. Functions – Need for functions – Elements of functions – Category of functions – Passing arrays to functions - Recursion. Pointers: Understanding Pointers – Declaration and Initialization of pointer variables – Accessing variables through pointers – Pointers and arrays.

Unit V Structures and Files 12 h

Structures: Defining a structure – Declaring structure variables – Accessing structure member – Array of structures - Structure within structures -Unions. Files: Defining and opening a File – Closing a file – I/O Operations on files - Dynamic memory allocation - Command Line Arguments.

Text Books

1 Ashok N. Kamthane, 2009, "Programming and Data Structures", 1st Edition, Pearson Education

2 Byron Gottfried, 2018, "Schaum's Outline of Programming with C", 4th Edition, McGraw Hill Education.

References

1 E.Balagurusamy, 2017, "Programming in ANSI C", 7th Edition, TMH

2 H. Schildt, 2000, "C: The Complete Reference", 4th Edition, TMH.

3 ReemaThareja , 2015, "Programming in C", 2nd Edition, Oxford University Press

4 Anita Goel, Ajay Mittal, 2016,"Computer Fundamentals and Programming in C", 1st Edition, Pearson.

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224CS1A1CP	CORE PRACTICAL: C PROGRAMMING	SEMESTER I

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Develop a Program to solve simple computational problems using arithmetic expressions.
2	Develop a program to compute the roots of a quadratic equation by accepting the coefficients. Print the appropriate messages
3	Implement using Looping to check whether the given number is prime and display appropriate messages
4	Write functions to implement string operations such as compare, concatenate, string length.
5	Implement Recursive functions for Binary to Decimal Conversion.
6	Develop a program to sort the given set of numbers
7	Compute the average of n numbers using arrays
8	Implement structure to read, write and compute average marks and display the number of students score above and below average marks in a class of N students.
9	Compute the following operations Using Pointers: i. Addition of two matrices ii. Multiplication of two matrices
10	Compute the command line operations and display it
11	Using File Operations display the contents of a file.
12	Develop a program to copy the contents of one file to another

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29.7.22	6.9.22	10.9.22

Note: Any 10 Experiments are Mandatory

Course Code	Course Name	Category	L	T	P	Credit
224IT1A1CA	DIGITAL COMPUTER FUNDAMENTALS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of number system and circuits
- The principles of logic gates and memory
- The design and architecture of microprocessors and microcontrollers

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the types of number systems, Boolean Algebra	K2
CO2	Understand and analyze Logic gates	K2
CO3	Illustrate the concepts of combinational circuits	K3
CO4	Understand the different types of sequential logic and memory organization	K2
CO5	Understand the architecture of microprocessors and microcontrollers	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓	✓	
CO2	✓	✓			✓
CO3		✓	✓	✓	✓
CO4	✓	✓	✓	✓	
CO5	✓		✓	✓	

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224IT1A1CA	DIGITAL COMPUTER FUNDAMENTALS	SEMESTER I

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Binary Systems and Boolean Algebra 10 h

Binary Numbers- Number base conversions- Octal and Hexadecimal conversions- Complements- Binary codes - Decimal codes.

Basic Definitions-Boolean functions- Canonical standard forms: Minterms and Maxterms - Sum of Minterms-Product of Maxterms-conversion between canonical forms.

Unit II Logic Gates and Boolean functions 8 h

Digital Logic Gates: AND, OR, Inverter, Buffer, NAND, NOT, Exclusive-OR, Exclusive-NOR.

The Map method-Two and three-variable Maps-Four variable Map - Five and Six-Variable Maps- Product of Sum simplification - Don't care conditions.

Unit III Combinational Logic 10 h

Adders: Half-Adder, Full-Adder. Subtractors Half-Subtractor, Full-Subtractor. Multilevel NAND Circuits: Universal Gate. Multilevel NOR Circuits: Universal Gate. Binary Parallel Adder- Decimal Adder - BCD Adder. Decoders: Demultiplexers-Encoders - Multiplexer.

Unit IV Sequential Logic & Memory Unit 10 h

Introduction- Flip-flops-Clocked RS Flip-flop - D Flip-flop - JK Flip-flop - Design of Counters- Registers -Ripple Counters.

The Memory Unit - Random Access Memories: Integrated-circuit Memory- Magnetic-core Memory.

Unit V Introduction to Microprocessors and Microcontrollers 10 h

Introduction – Microprocessor- Microcomputer- Architecture of Microprocessors- History- Evolution- Microprocessor Applications- Evolution of Microcontrollers- Application of Microcontrollers. Architecture of 8085 Microprocessor- Pin diagram of 8085 Microprocessor.

Text Books

1 M.Morris Mano, 2019, "Digital Logic and Computer Design", Pearson India Education.

2 Soumitra Kumar Mandal, 2018, "Microprocessors and Microcontrollers – Architecture, Programming and Interfacing using 8085, 8086, 8051", 15th Edition, Tata Mc Graw Hill Education.

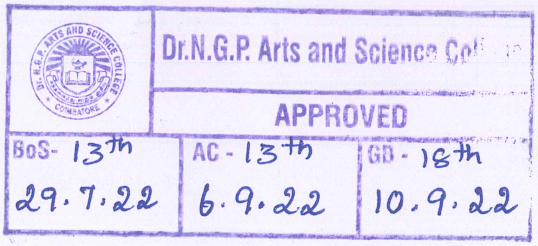
References

1 S. Salivahanan and S Arivazhagan, 2018, "Digital Circuits and Design", 5th Edition, Oxford University Press, Noida

2 Thomas Floyd L., 2015, "Digital Fundamentals", 11th Edition, Pearson Publication Ltd, New Delhi

3 M Morris Mano, 2016, " Digital Logic and Computer Design", 5th edition, Pearson

4 Aditya P Mathur, 2016, "Introduction to Microprocessor", 3rd Edition, McGrawHill Education.



Course Code	Course Name	Category	L	T	P	Credit
222MT1A1IC	NUMERICAL METHODS AND STATISTICS	IDC	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the method of solving linear system of equations
- the relation between two attributes and measure their efficiency
- the method of checking the validity of parameters through test statistic

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	recognize the direct and indirect methods for solving algebraic equations	K1
CO2	discuss the method of solving differential and integral problems	K2
CO3	Define the parameters of central tendencies and dispersion.	K1
CO4	demonstrate the applications of correlation and regression	K2
CO5	Analyze the validity of the values of parameters through hypothesis testing.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓		✓		
CO2	✓		✓	✓	
CO3		✓	✓	✓	
CO4			✓	✓	✓
CO5	✓	✓	✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

222MT1A1IC	NUMERICAL METHODS AND STATISTICS	SEMESTER I

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Solution of Algebraic, Transcendental and Linear systems of Equations 13 h

Introduction - Newton-Raphson method-Direct methods -Matrix inversion method - Gaussian elimination method - Gauss Jordan method - Iterative methods - Gauss Seidel Method - Gauss Jacobi method

Unit II Interpolation, Numerical Differentiation and Integration 12 h

Introduction - Finite differences - Newton's formulae for interpolation – Interpolation with unevenly spaced points: Lagrange's interpolation formula- Numerical differentiation - maximum and minimum values of a tabulated Function - Numerical integration - Trapezoidal rule - Simpson's 1/3 Rule - Simpson's 3/8 Rule.

Unit III Classification, Measures of Central tendency and Dispersion 13 h

Frequency distribution - Characteristics of a good measure of central tendency - Mean - Arithmetic Mean - pooled mean - Geometric Mean - Harmonic Mean - Median - Mode.

Measures of Dispersion - purposes - properties -Range - Inter quartile range –Mean deviation - Variance - Standard Deviation - coefficient of variation.

Unit IV Correlation and Regression 11 h

Scatter diagram-Least square method of fitting a regression line - properties - regression line of X on Y-Correlation methods - determination of correlation by graphical method-Correlation Coefficient-Correlation in grouped bivariate data - relationship between correlation coefficients and regression coefficient-Rank correlation.

Unit V Test of Significance and Chi-square Test 11 h

Test of hypothesis for population variance -two types of error-level of significance - critical region - one and two tailed test - size and power of a test -randomized test - non randomized test - degrees of freedom - student's t- test - test of equality of two population means - paired t- test. Chi-square Test: test of hypothesis for population variance - test of goodness of fit - test in one way classification - Contingency table - Test of independence of factors - Yate's correction.

Note: 20% Theory and 80% Problem

Text Books

1 Sastry, S.S ,(2012) Introductory methods of Numerical Analysis. New Delhi: Prentice-Hall of India. (Unit I to II)

2 Agarwal B. L , (2013) Basic Statistics ,New age International (P) Limited publishers, New Delhi.(Unit III to V)

References

1 Gupta. C.B. and Vijay Gupta, 2007,"Introduction to Statistical Methods", S.Chand & Co,New Delhi

2 Sanchetti. D.C. Kappor, V.K. 2010. Statistic, S.Chand & Co , New Delhi

3 Venkataraman,M.K. 2004,"Numerical Methods in Science and Engineering", 4th Edition,NPC.

4 Veerarajan.T, Ramachandran.T, 2004. "Theory and Problems in Numerical Methods With Programs in C and C++",10th Edition, Tata Mc- Graw Hill Publishing Company Limited, New Delhi .

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Course Code	Course Name	Category	L	T	P	Credit
223MB1A1AA	ENVIRONMENTAL STUDIES	AECC	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- Multi disciplinary aspects of Environmental studies
- Importance to conserve the Biodiversity
- Causes of Pollution and its control

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the importance of natural resources in order to conserve for the future.	K2
CO2	Infer on Natural resources and its conservation	K2
CO3	Apply the knowledge on Biodiversity and its conservation	K3
CO4	Relate effects, causes and control of air, water, soil and noise pollution etc.,	K2
CO5	Build awareness about sustainable development and Environmental protection	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	
CO2				✓	
CO3				✓	
CO4				✓	
CO5				✓	

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

223MB1A1AA	ENVIRONMENTAL STUDIES	SEMESTER I

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Environmental studies & Ecosystems 5 h

Introduction to Environmental studies& Ecosystems: Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere. Scope and importance; Concept of sustainability and sustainable development. Ecosystem- Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession.

Unit II Natural Resources: Renewable and Non-renewable Resources 5 h

Natural Resources: Renewable and Non-renewable Resources: Land Resources and land use change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and overexploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs.

Unit III Biodiversity and Conservation 5 h

Biodiversity and Conservation: Levels of biological diversity: genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hot spots. India as a mega-biodiversity nation; Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit IV Environmental Pollution, Environmental Policies & Practices 5 h

Environmental Pollution, Environmental Policies & Practices: Environmental pollution: types, causes, effects and controls; Air, water, soil, chemical and noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measures of urban and industrial waste. Pollution case studies. Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. Environment Laws: Environment Protection Act; Prevention & Control of Pollution Act – Air & Water. Wildlife Protection Act; Forest Conservation Act;

Unit V Human Communities and the Environment& Field Work 4 h

Human Communities and the Environment & Field Work: Human population and growth: Impacts on environment, human health and welfares. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness. Visit to an area to document environmental assets; river/forest/flora/fauna, etc. Population explosion – Family Welfare Programmes. Role of Information Technology in Environment and human health. Role of the Colleges, Teachers and Students in village adoption towards clean, green and make in villages in various aspects.

Text Books

1 Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.

2 Gadgil, M., & Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press.

References

1 Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge

2 Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press

3 Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006

4 Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.

5 McCully, P.1996. Rivers no more: the environmental effects of dams (pp. 29-64). Zed Books

6 McNeil, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century

7 Odum, E.P., Odum, h.T. & Andrews, J.1971. Fundamentals of Ecology. Philadelphia: Saunders.

29/7/22

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Course Code	Course Name	Category	L	T	P	Credit
221TL1A2TA	TAMIL - II: ARA ILAKKIYAM	LANGUAGE-I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடுநாகரீகம்,பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள் (Life Skills) - மாணவர்களின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2
CO3	பாடஇணைச்செயல்பாடுகள் (Co-curricular activities)	K2
CO4	சூழலியல் ஆக்கம் (Ecology)	K3
CO5	மொழி அறிவு (Tamil knowledge)	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A2TA	TAMIL - II: ARA ILAKKIYAM	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I அற இலக்கியம் 13 h

1. இலக்கிய வரலாறு- பதினென்கீழ்க்கணக்குநூல்கள்

2.திருக்குறள்

அ. அறன்வலியுறுத்தல்- அ. எண் 04

ஆ. நட்பாராய்தல் - அ. எண் 80

இ. நாடு- அ. எண் 74

ஈ. குறிப்பறிதல்- அ. எண் 110

Unit II அற இலக்கியம் 13 h

1. நாலடியார் - அறிவுடைமை

2. மூதுரை - ஔவையார் - 10 பாடல்கள்-6,7,9,10,14,16,17,23,26,30

3. இனியவைநாற்பது- பூதஞ்சேந்தனார் - முதல் 10 பாடல்கள்

Unit III அறநெறிக் கட்டுரைகள் 09 h

1. இலக்கியவரலாறு - தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்

2. கலைகள்-உ.வே.சா

3. சங்க நெறிகள்- வ.சுப.மாணிக்கம்

Unit IV அறநெறிக் கட்டுரைகள் 15 h

1. வீர வணக்கம் - க.கைலாசபதி

2. தமிழர் பண்பாடு - டாக்டர் சோ.நா.கந்தசாமி

3. இணையத் தமிழ் வளர்ச்சி - முனைவர் ப.அர.நக்கீரன்

Unit V பயிற்சிப் பகுதி 10 h

1.இலக்கணம்-வழு, வழுவமைதி,வழாநிலை

2.அலுவலகம் சார்ந்த கடிதம் -விண்ணப்பங்கள், வேண்டுகோள்,முறையீடு

3.படைப்பாக்கம்-பொதுத்தலைப்பில் கட்டுரைகள் எழுதுதல்

Text Book

1. தமிழ் மொழிப்பாடம்-2022-2023,தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி,கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ்,சென்னை. (Unit I to V)

References

1. பேராசிரியர் புலவர் சோம. இளவரசு,எட்டாம் பதிப்பு-2014,தமிழ் இலக்கிய வரலாறு- மணிவாசகர் பதிப்பகம்,சென்னை.
2. பேராசிரியர் முனைவர் பாக்கியமேரி,முதற் பதிப்பு- 2013,இலக்கணம்- இலக்கிய வரலாறு- மொழித்திறன்- பூவேந்தன் பதிப்பகம்,சென்னை. .
3. தமிழ் இணையக் கல்விக்கழகம் - TAMIL VIRTUAL ACADEMY
   வலைதள முகவரி : https://www.tamilvu.org

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Course Code	Course Name	Category	L	T	P	Credit
221TL1A2HA	HINDI- II: MODERN LITERATURE	LANGUAGE- I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature
- the techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Apply the knowledge writing critical views on fiction	K3
CO4	Build creative ability	K3
CO5	Expose the power of creative reading	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A2HA	HINDI- II: MODERN LITERATURE	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I 13 h

आधुनिकपद्य – शबरी(श्रीनरेशमेहता)

Unit II 13 h

उपन्यास: सेवासदन-प्रेमचन्द

Unit III 12 h

कहानी-किरीट- डा उषा पाठक / डा अचला पाण्डेय

पाठ 1.कफ़न, 3. चीफ़ की दावत

Unit IV 12 h

पत्र लेखन: (औपचारिक या अनौपचारिक)

Unit V 10 h

अनुवाद अभ्यास-III (केवल हिन्दी से अंग्रेजी में) (पाठ 1 to 10)

Text Books

1. प्रकाशक: लोकभारती प्रकाशन पहली मंजिल, दरबारी बिल्डिंग,महात्मा गाँधी मार्ग, इलाहाबाद. (Unit I)
2. प्रकाशक: सुमित्र प्रकाशन 204 लीला अपार्ट्मेंट्स, 15 हेस्टिंग्स रोड'अशोक नगर इलाहाबाद. (Unit II)
3. प्रकाशक: राधाकृष्ण प्रकाशन दिल्ली. (Unit III)
4. पुस्तक: व्याकरण प्रदिप – रामदेवप्रकाशक: हिन्दी भवन 36 इलाहाबाद. (Unit IV)
5. प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई. (Unit V)

Course Code	Course Name	Category	L	T	P	Credit
221TL1A2MA	MALAYALAM- II: MODERN LITERATURE	LANGUAGE-I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Apply the knowledge writing critical views on fiction	K3
CO4	Build creative ability	K3
CO5	Expose the power of creative reading	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

COURSE FOCUS ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A2MA	MALAYALAM- II: MODERN LITERATURE	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I **Novel** 12 h

Enmakaje: Chapter1- Chapter5

Unit II **Novel** 10 h

Enmakaje: Chapter 6- Chapter 10

Unit III **Novel** 12 h

Enmakaje: Chapter 11- Chapter 15

Unit IV **Autobiography** 14 h

Neermathalam PoothaKalam : Chapter 1- Chapter 10

Unit V **Autobiography** 12 h

Neermathalam PoothaKalam: Chapter 11- Chapter 20

Text Books

1. Ambika SuthanMangad, Enmakaje (Novel), DC Books Kottayam, Kerala, India. (Unit I to III)
2. Madhavikkutty, NeermathalamPoothaKalam (Autobiography), DC Books Kottayam, Kerala, India. (Unit IV & V)

References

1. Malayala Novel Sahithyam, DC Books Kottayam, Kerala, India.
2. Malayala Sahithya Charithram, National Books Kottayam, Kerala, India.

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Course Code	Course Name	Category	L	T	P	Credit
221TL1A2FA	FRENCH - II: GRAMMAR, TRANSLATION AND CIVILIZATION	LANGUAGE- I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the Competence in General Communication Skills – Oral + Written- Comprehension & Expression
- the Culture, life style and the civilization aspects of the French people as well as of France
- the Competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	Apply the adjectives and the classroom environment in France	K2
CO3	Evaluate the Plural, Articles and the Hobbies	K3
CO4	Measure the Cultural Activity in France	K3
CO5	Select the sentiments, life style of the French people and the usage of the conditional tense	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A2FA	FRENCH- II: GRAMMAR, TRANSLATION AND CIVILIZATION	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I

12 h

Proposer, accepter, refuserune invitation. Indiquer la date.	Organiser une soirée au cinéma avec des amis, par téléphone et par courriel.	Comprendreunemessage d'invitationsurunréponde urtéléphonique. Inviter quelqu'un accepter ourefuserl'invitation.

Unit II

12 h

Prendreet fixer un rendez-vous. Demander etindiquerl'heure.	Organiser une soirée au cinéma avec des amis, par téléphone et par courriel.	Comprendre des personnes qui fixentunrendez-vous par téléphonique. Prendreun rendez-vous par telephone

Unit III

12 h

Exprimer son point de vue positif et négatif. S'informersur le prix. S'informersur la quantitité. Exprimer la quantitité.	En groupes, choisir un cadeau pour un ami.	Exprimer son point de vuesur des idées de cadeau. Faire des achatsdans un magasin

Unit IV 14 h

Demander et indiquer une direction. Localiser (près de, en face de ….). Exprimerl'obligationl' Interdit. Conseiller.	Suivre un itinéraire à l'aided'indications par telephone et d'un plan. Par courrierélectronique, donner des informations et des conseils à un ami qui veut voyager.	Comprendre des indications de direction. Comprendre des indications de lieu. Comprendre une chanson. Comprendre de courts messages qui experiment l'obligation ou l'interdiction. Donner des conseils à des personnes dans des situations données.

Unit V 10 h

Make in Own Sentences

Text Book

1 Regine Merieux, Yves Loiseau, "LATITUDES - 1" (Page No: 56-101) (Methode de Français), Goyal Publisher & Distributors Pvt.Ltd., 86 UB Jawahar Nagar (Kamala Nagar), New Delhi-7 Les Editions Dider, Paris, 2008- Imprime en Roumanie par Canale en Janvier 2012. (Unit I to IV)

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Course Code	Course Name	Category	L	T	P	Credit
221EL1A2EA	PROFESSIONAL ENGLISH - II	LANGUAGE- II	4	-	1	3

PREAMBLE

This course has been designed for students to learn and understand

- the language for specific purposes through various literary manuscripts
- the process of communicative competences in academics through authentic contexts
- the different formats of business correspondence with lucidity and accuracy via various media

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn to appreciate the works of eminent writers from various genres	K1
CO2	Construct and comprehend complex situational talks	K3
CO3	Identify formal and informal communicative context to speak fluently	K3
CO4	Infer the denotative and connotative meanings while reading specialized texts	K2
CO5	Develop the skill of writing through descriptions, narrations and essays	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221EL1A2EA	PROFESSIONAL ENGLISH - II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Genre Studies 12 h

John Keats: La Belle Dame Sans Merci - Author's Note - title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques- Annotations

A. G. Gardiner: On Keyhole Morals- Author's Note- Title indications- Outline - Passage Analysis - context of the Prose - Narrative techniques- Style

Charles Lamb: A Dissertation upon Roast Pig- Author's Note - title indications- outline- paraphrasing the Essay- context of Essay- form- devices- Narrative techniques

John Galsworthy: The Silver Box - Author's Note- Plot Summary- Critical Analysis- Themes- Characters- Description - analysis- Terms- Symbols

Unit II Listening Skills 10 h

Listening to Talks/Lectures by Specialists on selected subject specific topics- Listening to Public Announcements- Listening to Instructions & Directions- Listening to Speeches- Listening to process/event descriptions to identify cause & effects

Unit III Speaking Skills 14 h

Small Talk- Mini Presentations and Making Recommendations- Group Discussions, Debates, and Expressing opinions through Role play– Picture Description- Giving Instruction to Use a Product- Presenting a Product- Summarizing a Lecture- Narrating Personal Experiences/ Events- Interviewing a Celebrity- Scientific Lectures- Educational Videos- Debates- Different Viewpoints on an Issue

Unit IV Reading Skills 12 h

Reading Biographies, Newspaper Reports, Technical Blogs- Reading Advertisements- Gadget Reviews - Newspaper Articles- Journal Reports- Reading Editorials & Blogs- Case Studies- Excerpts from Literary Texts.

Unit V Writing Skills 12 h

Inferring & Interpreting- Predicting Reorganizing Material- Summary Writing Based on the Reading Passages- Writing – Emails & Essay Writing (Descriptive or narrative)- Grammar - Tenses- Question Types: Wh/ Yes or No/ and Tags.

Text Books

1. <https://www.poetryfoundation.org/poems/44475/la-belle-dame-sans-merci-a-ballad/> (Unit I)
2. <https://sittingbee.com/on-keyhole-morals-a-g-gardiner/> (Unit I)
3. <https://www.gradesaver.com/charles-lamb-essays/study-guide/summary- a-dissertation-upon-roast-pig/> (Unit I)
4. <https://public-library.uk/ebooks/41/61.pdf- The Silver Box- John Galsworthy/> (Unit I)
5. Hart, Steve, Aravind R. Nair, Veena Bhambhani. 2016. Embark: English for Undergraduates. Cambridge University Press, New Delhi, India. (Unit II)
6. Lakshminarayanan. 2012. A Course Book On Technical English. Scitech Publications Pvt. Ltd, New Delhi, India. (Unit III)
7. Raman, Meenakshi & Sangeeta Sharma. 2016. Technical Communication-Principles And Practice, Oxford University Press, New Delhi, India. (Unit IV)
8. Viswamohan, Aysha. 2017. English For Technical Communication (With CD), McGraw Hill (India) Private Limited, New Delhi, India. (Unit V)

References

1. Bajwa and Kaushik. 2010. Springboard to Success- Workbook for Developing English and Employability Skills. Orient Black Swan, Chennai, India.
2. Chellammal, V. 2003. Learning to Communicate. Allied Publishing House, New Delhi, India.
3. Krishnaswamy. N, Lalitha Krishnaswamy & B.S. Valke. 2015. Eco English, Learning English through Environment Issues. An Integrated, Interactive Anthology. Bloomsbury Publications, New Delhi, India.
4. Syamala. V. 2002. Effective English Communication for You. Emerald Publishers, Chennai, Tamil Nadu, India.

Course Code	Course Name	Category	L	T	P	Credit
224CA1A2CA	DATA STRUCTURES	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Fundamental concept of data structure with effective utilization of space and time
- Linear and nonlinear data structures
- Different Searching, Sorting and Hashing techniques

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of data structures and algorithmic complexity	K2
CO2	Demonstrate the operations of Stack and Queue and their applications	K2
CO3	Implement operations on linked list and its variants	K3
CO4	Apply non linear data structures such as trees and graphs in problem solving	K3
CO5	Analyze the various sorting, searching algorithms and hashing techniques	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓		✓		
CO2		✓	✓	✓	✓
CO3	✓		✓	✓	
CO4		✓	✓	✓	
CO5		✓	✓		

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CA1A2CA	DATA STRUCTURES	SEMESTER II

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Data Structures and Arrays 10 h

Introduction: Basic Terminology -Classification of Data Structures -Operations on Data Structures-Abstract Data Type-Algorithms-Time and Space Complexity -Big O Notation-Omega Notation (Ω) -Theta Notation (Φ). Arrays: Declaration of Arrays-Accessing the elements of an array-Storing values in Arrays-Operations on Arrays. Applications of Arrays: Sparse Matrices

Unit II Stacks and Queues 12 h

Stacks: Array Representation of Stacks- Operations on a Stack-Linked Representation of Stacks. Applications of Stacks: Evaluation of Arithmetic Expressions –Recursion. Queues: Array Representation of Queues - Operations on Queues -Linked Representation of Queues - Circular Queues. Applications of Queues: JOB Scheduling

Unit III Linked Lists 12 h

Singly Linked Lists: Inserting a node in a Linked List- Deleting a node from a Linked List. Circular Linked Lists: Inserting a node in a Circular Linked List - Deleting a node from a Circular Linked List. Doubly Linked Lists: Inserting a node in a Doubly Linked List - Deleting a node from a Doubly Linked List. Applications of Linked Lists: Polynomial Addition

Unit IV Trees and Graphs 14 h

Trees: Binary Trees – Representation of Binary Trees -Creating a Binary Tree - Traversing a Binary Tree- Binary Search Trees and its Operations - Threaded Binary Trees. Applications of Trees: Expression Trees. Graphs: Graph Terminology - Representation of Graphs - Graph Traversal Algorithms.Applications of Graphs: Shortest Path Algorithm: Dijkstra's Algorithm. Minimum Spanning Trees : Prim's Algorithm

Unit V Searching , Sorting and Hashing 12 h

Searching: Linear search –Binary Search. Sorting: Bubble Sort - Insertion Sort - Selection Sort – Quick Sort-Merge Sort -Heap Sort. Hashing and Collision: Hash Tables - Hash Functions - Collision. Applications of Hashing: Keyword Table in a Compiler.

Text Books

1 Reema Thareja, 2018, "Data Structures using C", Second Edition, Oxford University Press.

2 G A V Pai, 2017, "Data Structures and Algorithms: Concepts - Techniques and Applications",McGraw Hill Education.

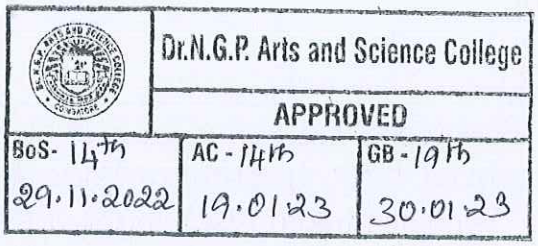
References

1 Mark Allen Weiss, 2014, "Data Structures and Algorithm Analysis in C++", Third Edition , Pearson education.

2 YashavantKanetker, 2003, "Data Structure Through C++ Paperback" ,4th Edition, BPB Publications.

3 Lipchitz (Schaum's Outline Series), 2010,"Data Structures with C", McGraw Hill Education.

4 https://www.tutorialspoint.com/data_structures_algorithms/index.htm



Course Code	Course Name	Category	L	T	P	Credit
224CS1A2CA	OBJECT ORIENTED PROGRAMMING WITH C++	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The object orientedprogramming principles.
- The structure and features of C++.
- The design and implementation of OOPs concepts using C++.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Describe the concepts of object oriented programming and basic constructs of C++ programming	K1
CO2	Design simple applications using classes and objects	K2
CO3	Illustrate the concept of Inheritance and apply pointers and strings	K3
CO4	Apply polymorphism and exception handling in program design	K3
CO5	Implement programs using File Management and STL	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1		✓		✓	✓
CO2	✓		✓		
CO3	✓	✓	✓		
CO4	✓		✓	✓	
CO5	✓	✓	✓	✓	

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A2CA	OBJECT ORIENTED PROGRAMMING WITH C++	SEMESTER II

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Object Oriented Programming 8 h

Introduction - Programming Paradigms - Key concepts of Object-Oriented Programming – Applications of Object-Oriented Programming - Variable, Value and Constant - Components of a C++ Program - Data Types - Expressions - Type Conversion - Order of Evaluation - Formatting Data: Manipulators in Input/Output- Branching and Looping.

Unit II Classes and Arrays 10 h

User-Defined Types: Classes-Class Definition-Member function- Access Modifiers-Inline function- Constructors and Destructors- Instance Members: Instance Data Members-Instance Member Functions -Static Members - Arrays: One-Dimensional Arrays - Multidimensional Arrays. Case Study: Wave Array

Unit III Pointers, Strings and Inheritance 10 h

References - Pointers - Pointer Types and Pointer variables - Constant Modifiers – Pointer to Pointer- Arrays and Pointers - Strings: C ++ String Class -C++ String Library – Inheritance: Private, Public and Protected Inheritance - Association - Dependency

Unit IV Polymorphism and Exception Handling 10 h

Polymorphism- Binding- Abstract Class : Pure Virtual Functions - Multiple Inheritance - Overloading Principles - Overloading as Member- Nonmember: Friend function-Exception Handling : Approach- Exceptions in Classes - Standard Exception Classes – Templates: Function Template - Class Template.

Unit V File Handling and Standard Template Library 10 h

Input and Output stream – Stream Classes - Console Streams - Console Objects - Stream State - File Streams - File I/O - Opening Modes - Sequential Vs Random Access - String Streams - Formatting Data: Direct use of Flags, Fields and Variables - Predefined Manipulators-Standard Template Library: Iterators, Sequence Containers, Container Adapters.

Text Books

1 Ashok Kamthane, 2017, "Object-Oriented Programming with ANSI and Turbo C++ 3rd Edition", Pearson (Unit 1.1 to 1.3).

2 Behrouz A. Forouzan, Richard F. Gilberg, 2020, "C++ Programming: An Object-Oriented Approach", McGraw-Hill Education (Unit I to V).

References

1 Bjarne Stroustrup, 2022, "C++ Programming Language, Fourth Edition" Pearson.

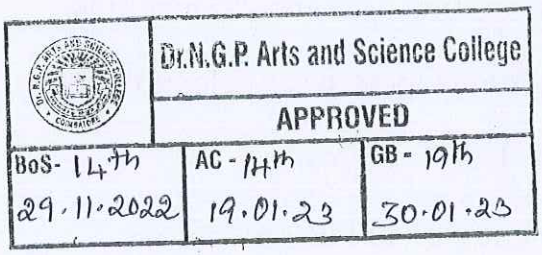
2 E Balagurusamy, 2020, "Object-Oriented Programming with C++, 8th Edition", McGraw Hill Education

3 M. Ashwin, V. Sreeprada, M. Santhosh, 2022, "A Hand Book on C++ Programming", Notion Press

4 YashavantKanetkar, 2020, "Let Us C++", BPB Publications.

5 https://www.codecademy.com/

6 https://www.simplilearn.com/



224CS1A2CP	CORE PRACTICAL: DATA STRUCTURES AND C++	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Implementation of Conditional Statements and Loops
2	Implementation of Stack using array.
3	C++ Program to use constructors, destructors and inline member functions to read an integer number and find the sum of all the digits until it reduces to a single digit.
4	Implementation of linked list using arrays.
5	C++ Program to create class, which consists of Employee details like E_Number, E_Name, Department, Basic Salary and Grade. Write a member function to get and display them. Derive a class Pay from the above class and write a member function to calculate DA, HRA and PF depending on the grade using Inheritance.
6	Implementation of Search Algorithms.
7	Demonstrate Operator Overloading using Strings.
8	Perform Tree Traversals.
9	Implementation of File Operations.
10	Implementation of graphs.
11	C++ program to throw exception when entered marks are less than 0 or greater than 100.
12	Implementation of Sorting algorithms.

Note: Any 10 experiments are mandatory.

Course Code	Course Name	Category	L	T	P	Credit
222MT1A2IC	DISCRETE MATHEMATICS	IDC	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the logical operators and applications
- the concept of relation and functions.
- the application of graph theory, trees and automata.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the concept of set theory	K1
CO2	Interpret the various optimization problems in term of relations and functions	K3
CO3	Identify applications of logical operators	K2
CO4	Determine the concept of graph theory and trees	K2
CO5	Apply the concept Finite state automation in defining the grammars.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓				
CO2		✓			
CO3	✓		✓		
CO4		✓			
CO5	✓		✓		

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

222MT1A2IC	DISCRETE MATHEMATICS	SEMESTER II

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Set Theory 10 h

Introduction - set and its elements - set description - types - Venn-Euler Diagrams - set operations and laws of set theory - fundamental products - index and indexed sets - partitions of sets - minsets - countable and uncountable sets - Algebra of sets and duality - computer representation - the inclusion and exclusion principle- Fuzzy sets

Unit II Relations and Functions 12 h

Relations: Introduction - cartesian product of sets - binary relations – set operations on relations - types– partial order relations – equivalence relation and classes- Functions: Introduction - types – invertible functions - composition of functions.

Unit III Mathematical Logic 10 h

Introduction - propositional calculus – basic logical operations - statements generated by a set - conditional statements -converse, inverse and contrapositive statements - biconditional - tautologies - contradiction - contingency - argument - methods of proof - equivalence and implication - predicate calculus-quantifiers

Unit IV Graph Theory and Trees 14 h

Introduction - paths, cycles and connectivity - subgraphs - types - isomorphic and homeomorphic graphs - representation of graphs in computer memory- Eulerian and Hamiltonian graphs-cartesian product- shortest path.

Trees: Introduction - binary trees - complete binary tree - tree of an Algebraic expression - traversing binary trees.

Unit V Language , Grammar and Automata 14 h

Introduction - language: the set theory of strings - languages – regular expressions and regular languages – Grammar – finite state machine – finite state automata.

Note: Distribution of marks 80% Problem and 20% Theory.

Text Books

1 Sharma J.K., 2022 "Discrete Mathematics", 4th Edition, Trinity Press, New Delhi.

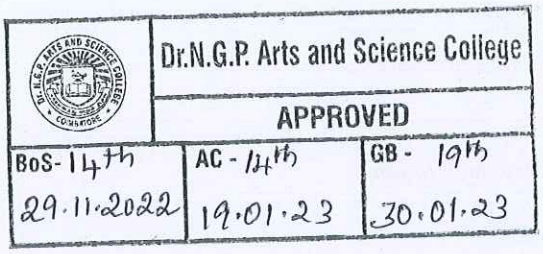
References

1 Tremblay J.P. and Manohar R, 1997,"Discrete Mathematics Structures with Applications to Computer Science", 2nd Edition, McGraw Hill International, New York.

2 Venkataraman M.K. Sridharan N. and Chandarasekaran N, 2000, "Discrete Mathematics", The National Publishing Company, Chennai.

3 Kolman B,Busby R.C. and Ross S.C,2006,"Discrete Mathematical Structures", 5th Edition., Prentice hall of India Pvt. Ltd., New Delhi.

4 Kenneth H Rosen, 1999, "Discrete Mathematics and its Applications",4th Edition, McGraw-Hill, New Delhi.



221TL1A2AA	PART-IV : BASIC TAMIL	SEMESTER II

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

இளங்கலை 2022 – 23ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(10 மற்றும் 12 – ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு)

(பருவத் தேர்வு இல்லை)

Syllabus

Unit I **தமிழ் மொழியின் அடிப்படைக் கூறுகள்** 05 h

எழுத்துகள் அறிமுகம்

1. உயிர் எழுத்துக்கள் - குறில் , நெடில் எழுத்துகள்
2. மெய் எழுத்துக்கள் - வல்லினம், மெல்லினம், இடையினம்
3. உயிர்மெய் எழுத்துக்கள்
4. பயிற்சி

Unit II **சொற்களின் அறிமுகம்** 05 h

1.பெயர்ச்சொல்

2.வினைச்சொல் – விளக்கம் (எ.கா.)

3.பயிற்சி

Unit III **குறிப்பு எழுதுதல்** 05 h

1. பெயர், முகவரி, பாடப்பிரிவு , கல்லூரியின் முகவரி
2. தமிழ் மாதங்கள்(12), வாரநாட்கள்(7)
3. எண்கள் (ஒன்று முதல் பத்து வரை), வடிவங்கள், வண்ணங்கள்

Unit IV **குறிப்பு எழுதுதல்** 05 h

1. ஊர்வன, பறப்பன, விலங்குகள்
2. மனிதர்களின் உறவுப்பெயர்கள்
3. ஊர்களின் பெயர்கள் (எண்ணிக்கை 10)

Unit V பயிற்சிப் பகுதி 04 h

பயிற்சிப் பகுதி (உரையாடும் இடங்கள்)

வகுப்பறை, பேருந்து நிலையம், சந்தை – பேசுதல், எழுதுதல்.

Notes:

அக மதிப்பீட்டுத் தேர்வு - வினாத்தாள் அமைப்பு முறை **மொத்த மதிப்பெண்கள் - 50**

பகுதி – அ

சரியான விடையைத் தேர்வு செய்தல் 10x2=20

பகுதி – ஆ

சரியா? தவறா? 10x2=20

பகுதி – இ

ஒரு பக்க அளவில் விடையளிக்க 1x10=10

குறிப்பு:

- அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ –க்கான வினாக்கள் இது அல்லது அது என்ற அடிப்படையில் அமைதல் வேண்டும்

Text Book

1 அடிப்படைத் தமிழ் - 2022-2023, தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, கோயம்புத்தூர் – 641048, வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை. (Unit I to IV)

References

1 ஒன்றாம் வகுப்பு பாடநூல் - தமிழ்நாடு அரசு பாடநூல் கழகம், சென்னை.

2 தமிழ் இணையக் கல்விக்கழகம் - TAMIL VIRTUAL ACADEMY
வலைதள முகவரி : https://www.tamilvu.org.

Dr.N.G.P. Arts and Science College		
APPROVED		
BoS- 14th 29.11.2022	AC - 14th 19.01.23	GB - 19th 30.01.23

221TL1A2AB	PART - IV : ADVANCED TAMIL	SEMESTER II

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2022– 2023 ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(10 மற்றும் 12 – ஆம் வகுப்புகளில் தமிழ் மொழிப்பாடம் பயின்றவர்களுக்கு உரியது)

(பருவத் தேர்வு இல்லை)

Syllabus

Unit I கவிதைகள் 06 h

1தமிழ்நாடு - பாரதியார்

2.மனதில் உறுதி வேண்டும் - பாரதியார்

3. இன்பத்தமிழ் - பாரதிதாசன்

4.வேலைகளல்ல வேள்விகள் - தாராபாரதி

5.தமிழா! நீ பேசுவது தமிழா! - காசியானந்தன்

6. நட்புக் காலம் (10 கவிதைகள்) - அறிவுமதி கவிதைகள்

Unit II கட்டுரை 05 h

கட்டுரைத் தொகுப்பு - நல்வாழ்வு - டாக்டர் மு.வரதராசன்

1. நம்பிக்கை
2. புலனடக்கம்
3. பண்பாடு

Unit III இலக்கணம் 04 h

1.வல்லினம் மிகும் மற்றும் மிகா இடங்கள்

2. ர,ற,ல,ழ,ள,ந,ண,ன – வேறுபாடு அறிதல்

Unit IV கடிதங்கள் 05 h

1. பாராட்டுக் கடிதம்
2. நன்றிக் கடிதம்
3. அழைப்புக் கடிதம்
4. அலுவலக விண்ணப்பங்கள்

Unit V பயிற்சிப் பகுதி 04 h

படைப்பாக்கப் பகுதி

பொதுத் தலைப்புகளில் கவிதை, கட்டுரை எழுதச் செய்தல்

Notes

அக மதிப்பீட்டுத் தேர்வு - வினாத்தாள் அமைப்பு முறை **மொத்த மதிப்பெண்கள் - 50**

பகுதி – அ

சரியான விடையைத் தேர்வு செய்தல் 10x1=10

பகுதி – ஆ

கோடிட்ட இடங்களை நிரப்புக. 10x2=20

பகுதி – இ

இரண்டு பக்க அளவில் விடையளிக்க 2x10=20

குறிப்பு:

- அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ –க்கான வினாக்கள் இது அல்லது அது என்ற அடிப்படையில் அமைதல் வேண்டும்

Text Book

1 சிறப்புத் தமிழ் - 2022-2023, தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை. (Unit- I to IV)

References

1 பேராசிரியர் புலவர் சோம. இளவரசு, எட்டாம் பதிப்பு. 2014. தமிழ் இலக்கிய வரலாறு – மணிவாசகர் பதிப்பகம், சென்னை.

2 டாக்டர் மு.வரதராசன். 2010. நல்வாழ்வு, பாரி நிலையம், சென்னை.

3 பேராசிரியர் முனைவர் பாக்கியமேரி, முதற் பதிப்பு. 2013. இலக்கணம் - இலக்கிய வரலாறு - மொழித்திறன் - பூவேந்தன் பதிப்பகம், சென்

4 தமிழ் இணையக் கல்விக்கழகம் - TAMIL VIRTUAL ACADEMY
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Course Code	Course Name	Category	L	T	P	Credit
225CR1A2AA	HUMAN RIGHTS AND WOMEN'S RIGHTS	AECC	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- Concepts of Human Rights
- human Right Violations and Redressal Mechanism
- rights to Women and Child

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the Basic concepts of Human Rights	K1
CO2	Describing Fundamental Rights	K2
CO3	Impart knowledge on Human Right Violations and Redressal Mechanism.	K4
CO4	Extend a comprehensive knowledge on Rights to Women and Child	K3
CO5	Analyze the knowledge on Civil and Political Rights of Women	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1				✓	✓
CO2				✓	✓
CO3				✓	✓
CO4				✓	✓
CO5				✓	✓

COURSE FOCUSES ON:

	Skill Development		Entrepreneurial Development
	Employability		Innovations
	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

225CR1A2AA	HUMAN RIGHTS AND WOMEN'S RIGHTS	SEMESTER II

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Human Rights 04 h

Meaning - Definition - Nature - Content - Legitimacy of Human Rights - Origin and Development of Human Rights - Theories – Principles of Magna Carta – Modern Movements of Human Rights – The Future of Human Rights.

Unit II Human Rights in India 05 h

The Constitution of India – Fundamental Rights – Right to Life and Liberty – Directive Principles of State Policy – Fundamental Duties – Individual and Group Rights – Other facets of Human Rights – Measures for Protection of Human Rights in India.

Unit III Human Right Violations and Redressal Mechanism 05 h

Human Rights – Infringement of Human Right by State Machinery and by Individual – Remedies for State action and inaction – Constitutional Remedies – Public Interest Litigation (PIL) - Protection of Human Rights Act, 1993 – National Human Rights Commission – State Human Rights Commissions – Constitution of Human Right Courts.

Unit IV Rights to Women and Child 05 h

Matrimonial protection - Protection against dowry-Protection to pregnancy-Sexual offences - Law relating to work Place - Directive principles of Constitution (Article 39 a, d, e & Article 42, 43 & 46) - Trafficking of women - Constitutional Rights – Personal Laws - Protection of children against Sexual Offences Act 2012 (POCSO).

Unit V Civil and Political Rights of Women 05 h

Right of Inheritance - Right to live with decency and dignity - The Married women's Property Act 1874 - Women's right to property - Women Reservation Bill - National Commission for Women - Political participation - Pre independent political participation of women - Participation of Women in post independent period.

Text Books

1. Lalit Parmar, 1998, "Human Rights", Anmol Publications Pvt. Limited, New Delhi.
2. Krishna Pal Malik, 2009, "Women & Law", Allahabad Law University, New Delhi.

References

1. Mandagadde Rama Jois, 2015, "Human Rights", Bharatiya Values, Bharatiya Vidya Bhavan Publications, Mumbai.
2. Paras Diwan and Piyush Diwan, 1994, "Women and Legal Protection", South Asia Books, Andhra Pradesh.
3. Venkataramand Sandhiya. N, 2001, "Research in Value Education", APH Publishing Corporation, New Delhi.
4. Anand A S, 2008, "Justice for Women: Concerns and Expressions", Universal Law Publishing Co., New Delhi.

BoS Chairman/HoD
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29.11.2022	19.01.23	30.01.23

Academic Council
Dr.V. Rajendran
CHAIRMAN
Dr.N.G.P. Arts and Science College

Course Code	Course Name	Category	L	T	P	Credit
221TL1A3TA	TAMIL - III	LANGUAGE - I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடுநாகரீகம், பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள் (Life Skills) - மாணவர்களின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2
CO3	பாடஇணைச்செயல்பாடுகள் (Co-curricular activities)	K2
CO4	சூழலியல் ஆக்கம் (Ecology)	K3
CO5	மொழி அறிவு(Tamil knowledge)	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓		
CO2				✓	
CO3		✓			
CO4	✓		✓		
CO5	✓			✓	

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A3TA	TAMIL - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **காப்பியங்கள்** 10 h

1. சிலப்பதிகாரம் – வழக்குரை காதை

2. மணிமேகலை – ஆதிரை பிச்சையிட்ட காதை

Unit II **காப்பியங்கள்** 10 h

1. கம்பராமாயணம் - கும்பகர்ணன் வதைப்படலம்: பா. எண் : 60 முதல் – 100 வரை

2. பெரிய புராணம் - அதிபத்த நாயனார் புராணம்

Unit III **சிற்றிலக்கியங்கள்** 10 h

1.திருக்குற்றாலக்குறவஞ்சி - வசந்தவல்லி பந்தாடிய சிறப்பு (6: 4 கண்ணிகள்)

2.கலிங்கத்துப்பரணி- களம் பாடியது: போர்க்களக் காட்சி- பா.எண்: 472 முதல்- 502 வரை

Unit IV **இலக்கிய வரலாறு** 10 h

1.காப்பியங்களின் தோற்றமும் வளர்ச்சியும்

2.சிற்றிலக்கியங்களின் தோற்றமும் வளர்ச்சியும்

3.நாடகத்தின் தோற்றமும் வளர்ச்சியும்

Unit V **இலக்கணம் & பயிற்சிப் பகுதி** 08 h

அ. இலக்கணம்

1.'பா' வகைகள் : வெண்பா, ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பா - பொது இலக்கணம் மட்டும்.

2. அணி: உவமையணி, உருவக அணி, இல்பொருள் உவமையணி விளக்கம், உதாரணம்.

ஆ. பயிற்சிப் பகுதி

1. வாசகர் கடிதம் : நாளிதழ்,வானொலி,செய்தி ஊடகங்களுக்கு

விமர்சனம் எழுதுதல்

2.திரைக்கதை : மத்திய மற்றும் மாநில அரசு விருது பெற்ற தமிழ்த் திரைப்படங்கள் மட்டும்

Text Book

1 தமிழ் மொழிப்பாடம் - 2022-2023, தொகுப்பு: தமிழ்த்துறை, டாக்டர் என். ஜி. பி. கலை அறிவியல் கல்லூரி, கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை. (Unit I to V)

References

1 பேராசிரியர் புலவர் சோம. இளவரசு, எட்டாம் பதிப்பு - 2014, தமிழ் இலக்கிய வரலாறு- மணிவாசகர் பதிப்பகம், சென்னை.

2 பேராசிரியர் முனைவர் பாக்கியமேரி, முதற் பதிப்பு- 2013, இலக்கணம் - இலக்கிய வரலாறு - மொழித்திறன் - பூவேந்தன் பதிப்பகம், சென்னை. .

3 தமிழ் இணையக் கல்விக்கழகம் - TAMIL VIRTUAL ACADEMY. வலைதள முகவரி: https://www.tamilvu.org

Course Code	Course Name	Category	L	T	P	Credit
221TL1A3HA	HINDI - III	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature
- the techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	K3
CO5	Apply the power of creative reading	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓			✓	✓
CO2		✓			✓
CO3	✓		✓	✓	
CO4					✓
CO5	✓	✓	✓		✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A3HA	HINDI – III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

पद्य – काव्य पराशर (भोलानाथ)

(प्राचीन- कबीर, तुलसी, सुर, मीरा, आधुनिक- मैथिलीशरण गुप्त, अरूण कमल)

Unit II 10 h

हिन्दी साहित्य का इतिहास: (साधारण ज्ञान)

Unit III 10 h

अलंकार:अनुप्रास,यमक, श्लेष, वक्रोक्ति, उपमा,रूपक

Unit IV 10 h

संवाद लेखन

Unit V 08 h

अनुवाद अभ्यास-III (केवल हिन्दी से अंग्रेजी में)

(पाठ 10 to 20)

Text Books

1. प्रकाशक: जवाहर पुस्तकालय सदर बाजार, मथुरा उत्तर प्रदेश-281001 (Unit I)
2. आचार्य रामचन्द्र शुक्ल लोकभारती प्रकाशन इलाहाबाद. (Unit II)
3. प्रकाशक: विनोद पुस्तक मंदिर आगरा-282002 (Unit III)
4. पुस्तक: व्याकरण प्रदिप - रामदेव प्रकाशक: हिन्दी भवन 36 इलाहाबाद-211024 (Unit IV)
5. प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17 (Unit V)

Course Code	Course Name	Category	L	T	P	Credit
221TL1A3MA	MALAYALAM - III	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	K3
CO5	Apply the power of creative reading	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓			✓	
CO2	✓				✓
CO3		✓	✓		
CO4	✓			✓	✓
CO5	✓	✓	✓		✓

COURSE FOCUS ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A3MA	MALAYALAM - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **Poetry** 10 h

Kumaranasan

Unit II **Poetry** 10 h

Kumaranasan

Unit III **Poetry** 10 h

Kumaranasan

Unit IV **Poetry** 10 h

Vayalar Ramavarma

Unit V **Poetry** 08 h

Vayalar Ramavarma

Text Books

1 Kumaranasan. 1998. Chinthavishtayaya Sitha. DC Books Kottayam, Kerala, India. (Unit I to III)

2 Ayisha (Poem), National Book Stall Kottayam, Kerala, India. (Unit IV & V)

Reference

1 Dr.M.Leelavathy. Kavitha Sahithya Charithram. Sahithya Academy Thrissur, Kerala, India.

Course Code	Course Name	Category	L	T	P	Credit
221TL1A3FA	FRENCH - III	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the Competence in General Communication Skills – Oral + Written- Comprehension & Expression
- the Culture, life style and the civilization aspects of the French people as well as of France
- the students to acquire Competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	Apply the adjectives and the classroom environment in France	K2
CO3	Select the Plural, Articles and the Hobbies	K2
CO4	Measure the Cultural Activity in France	K3
CO5	Evaluate the sentiments, life style of the French people and the usage of the conditional tense	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓				✓
CO2	✓	✓			
CO3			✓	✓	
CO4	✓	✓			✓
CO5	✓		✓	✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A3FA	FRENCH - III	SEMESTER III

Total Credits: 3
Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

° Décrireun lieu. ° Situer	A partird'unerecherche de documents, composer une presentation touristique pour un magazine ou un site internet.	Comprehendre la description d'un lieu. Décrireunevilleouunerégionq u'onaime. Interrogersur la situation of d'un lieu. Comprendre des indications sur la fréquenced'actions.	Comprendreune presentation de catalogue touristique. Comprendre des pictogrammes. Comprendre la description d'un lieu et d'une situation precise dans un message électronique.

Unit II 10 h

Se situerdans le temps.	A partird'unerecherc he de documents, composer une presentation touristique pour un magazine ou un site internet.	Comprehendre la description d'un lieu. Décrireunevilleouunerégio nqu'onaime. Interrogersur la situation of d'un lieu. Comprendre des indications sur la fréquenced'actions.	Comprendreune presentation de catalogue touristique. Comprendre des pictogrammes. Comprendre la description d'un lieu et d'une situation precise dans un message électronique.

Unit III 10 h

Raconter. ° Décrire les étapesd'une action.	Raconterune scene insolite à l'oreal et à l'écrit.	Comprehendre le récit d ún voyage. Raconterses actions quotidiennes.	Ecrire une biographie a partir d'eléments écrits.

Unit IV 10 h

Exprimer l'intensité et la quantité. ° Interroger.	Raconterune scene insoliteà l'oreal et à l'écrit.	Comprehendre le récit d ún voyage. Raconterses actions quotidiennes.	Ecrire une biographie a partir d'eléments écrits.

Unit V 08 h

Make in Own Sentences based on the above Lessons

Text Book

1 LATITUDES 1 (Méthode de français) Pages from 102-127, Author : Regine Mérieux, Yves Loiseau (Unit I to IV)

Course Code	Course Name	Category	L	T	P	Credit
221EL1A3EA	PROFESSIONAL ENGLISH - III	LANGUAGE- II	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the basics of English grammar and specific usage
- the importance of the vocabulary and use in different contexts
- the necessity of communication and composition writing skills

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Infer the specific usage of while-listening process	K2
CO2	Organize the various abilities and sub-skills involved in reading	K3
CO3	Utilize the importance of speaking skills and developing it through various practices	K3
CO4	Assume the sentence construction and paragraph development	K4
CO5	Acquire all-round mature outlook to function effectively in different context	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1			✓		✓
CO2	✓	✓		✓	
CO3	✓		✓		✓
CO4	✓		✓		
CO5		✓		✓	

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221EL1A3EA	PROFESSIONAL ENGLISH - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Listening and Reading 09 h

Listening in casual conversation, Small group and Conference setting - Listening for Factual Information, Detail and Situation - Developing Listening skills- Why do we avoid Listening- Poor Listening - Disadvantages - Poor listening vs Effective Listening - Basics of Reading- efficient and inefficient readers- Advantages – Benefits and Effective reading and comprehension skills- Need for Developing Efficient Reading skills- Four Basic steps of Effective Reading - Stumbling blocks in becoming an effective Reader- Improving Vocabulary power- Strategies for Comprehending and Retaining content- Effective Note Taking while Reading

Unit II Speaking 11 h

Purpose of General Conversations- Advantages, features of a good conversation- Tips for improving conversation- public speaking- importance of public speaking- Benefits, Tips, Overcoming fear of public speaking- Preparatory steps - Structuring the contents- Audience Awareness- Mode of Delivery

Unit III Writing Skills 10 h

CV and Job Applications- How to make your letter stand out?- Employers expectation - Organize the material – Useful suggestions- Cover Letter- Content to be included – Tone of the letter - Report Writing- importance – features- Types – main parts – Feasibility report– Accident report- Scientific report- Memos – Introduction – Structure- Proposal Writing- Key factors- Types- Contents- Format- Evaluation

Unit IV Effective Skills in Language 10 h

Using Word's Effectively- Mastering Spelling Techniques- Structuring Phrases and Clauses- Writing Effective Sentences– Building Effective paragraphs- Revising, Editing and Proof reading

Unit V Soft Skills 08 h

Introduction- What are soft skills?- Importance of soft skills- Attributes- Social soft skills- Thinking- Negotiating- Exhibiting- Identifying- Improving- Will formal training enhance your soft skills? - Soft Skills training -Train Yourself- Practicing soft skills- Measuring attitude – Self-Discovery: Importance of knowing yourself- Process - SWOT analysis – Benefits – Usage – SWOT Analysis grid

Text Books

1. Camp and Satterwhite. 1998. College English and Communication. 7th Edition Glencoe Mchrawttill Publishers, New York, Unites States of America. (Unit I, II, III)
2. Kumar, Sanjay and Lata Pushp. 2018. Language and Communication Skills for Engineers. First Edition, Oxford University Press, India. (Unit I, II, III)
3. Mohan, Krishna and Banerji, Meera. 2009. Developing Communication skills. 2nd Edition, Macmillcan, India. (Unit I, II, III, IV)
4. Alex. Soft Skills. 2009. S. Chand Publishing, New Delhi, India. (Unit V)

References

1. Ghosh, B.N. Editor. 2017. Managing Soft Skills for Personality Development. McGraw- Hill Education, Chennai, India.
2. Miles Craven. 2008. Cambridge English Skills Real Listening and Speaking. First Edition, Cambridge University Press, United Kingdom.
3. Mishra, Gauri and Ranjana Kaul.2016. Language Through Literature. Primus Books, India.
4. Pillai G, Radhakrishna. 2000. English for Success. Emerald Publishers, Chennai, India.

Course Code	Course Name	Category	L	T	P	Credit
224CA1A3CA	DATABASE MANAGEMENT SYSTEMS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The functional components of the DBMS and the normalization forms in building an effective database tables
- Queries using Relational Algebra, Relational Calculus and SQL
- The Development of application programs using PL/SQL

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of database concepts, design, modeling and normalization	K1
CO2	Obtain knowledge on database environment	K2
CO3	Know the DML commands	K2
CO4	Learn the concepts of PL/SQL	K3
CO5	Analyze the various composite data types	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓		✓
CO2	✓			✓	✓
CO3	✓				✓
CO4	✓		✓	✓	✓
CO5			✓	✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CA1A3CA	DATABASE MANAGEMENT SYSTEMS	**SEMESTER** III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Database Concepts and Normalization 10 h

Database Concepts: A Relational approach: Database – Relationships – DBMS –Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams – De normalization –Another Example of Normalization.

Unit II Structured Query Language 8 h

Oracle9i: An introduction – SQL* plus Environment - Structured Query Language (SQL). Oracle Tables (DDL): Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

Unit III Working with Tables 10 h

Data Management and Retrieval: DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – Retrieving Data from Table – Arithmetic Operations – Restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions – Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations.

Unit IV Fundamentals of PL/SQL 10 h

PL/SQL: History – Fundamentals – Block Structure – Comments – Data Types –Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Exceptions – Types of Exceptions.

Unit V PL/SQL Composite Data Types and Named Blocks 10 h

PL/SQL Composite Data Types: PL/SQL Records – PL/SQL Tables – PL/SQL Varrays. Named Blocks: Procedures – Functions – Packages –Triggers.

Text Books

1 Nilesh Shah, 2016, "Database Systems Using ORACLE", 2nd Edition. PHI.

References

1 Arun Majumdar & Pritimoy Bhattacharya, 2007, "Database Management Systems", TMH.

2 Kevin Loney, George Koch, and the Experts at TUSC,2002, "Oracle 9i: The Complete Reference", TMH, Copy Right .

Course Code	Course Name	Category	L	T	P	Credit
224CT1A3CP	JAVA PROGRAMMING	CORE	3	-	4	5

PREAMBLE

This course has been designed for students to learn and understand

- The object-oriented paradigm in the Java programming language.
- The multithreading, exception handling concepts.
- The swing programming and database concepts.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of Java Programming.	K2
CO2	Observe the basics and different types of Inheritance	K2
CO3	Acquire the knowledge in Packages, Exceptions concepts and String handling.	K3
CO4	Demonstrate Multithreading and Collections concepts.	K3
CO5	Apply Swing and JDBC concepts to create Java Applications.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓			✓	✓
CO2	✓			✓	✓
CO3	✓		✓	✓	✓
CO4	✓	✓	✓	✓	✓
CO5	✓	✓	✓	✓	✓

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CT1A3CP	JAVA PROGRAMMING	**SEMESTER III**

Total Credits: 5

Total Instruction Hours: 36 L + 48 P h

Syllabus

Unit I Class and Methods 7 L h

Object Oriented Programming - Data types, Variable, Arrays, and Constants - Operators - Control statements. Class, Members, and Methods - Class instantiation - Access modifiers - Method overloading - Constructors - Static members and methods.

1. Program to understand class, methods and objects.
2. Program to implement method overloading.
3. Program to distinguish the different types of constructors.
4. Program to demonstrate static members and methods

Unit II Inheritance 7 L h

Inheritance: Basics - Types - Super keyword - Method overriding - Abstract class - Final methods and classes – Interfaces

5. Program to illustrate different types of inheritance.
6. Program to implement method overriding.
7. Program to demonstrate abstract class.
8. Program to defend multiple inheritance using interface.

Unit III Packages, Exceptions, and Strings 7 L h

Java built-in packages - User defined packages - Exception handling fundamentals - Built-in exceptions - User-defined exceptions - String handling using String, StringBuffer, and StringBuilder classes

9. Program to create user-defined package.
10. Program to implement exception handling.
11. Program to apply string handling functions.

Unit IV Multithreading and Collections 7 L h

Multithreading: Thread Life Cycle - Thread Creation - Thread Priorities. Collections overview - Collection Interfaces and Classes: Stack, Queue, ArrayList, LinkedList.

12. Program to demonstrate multithreading.

13. Programs to implement ArrayList.

14. Programs to implement (i) Stack (ii) Queue.

Unit V Swing and JDBC 8 L h

MVC architecture - Basics of Swing - Difference between AWT and Swing - Swing packages - A simple swing application - Event handling - Accessing databases with Java DataBase Connectivity (JDBC).

15. Develop a Swing application to manipulate student database records.

16. Implementation of Online auction system (DBT star scheme)

17. Implementation of Search Engine (DBT star scheme)

Text Books

1 Herbett Schildt, 2015, "Java: The Complete Reference", Ninth Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.

2 Paul Deitel and Harvey Deitel, 2015, "Java How to Program", Tenth Edition Deitel & Associates, Inc Publications.

References

1 E.Balaguruswamy, 2010, "Programming with Java A Primer", Second Edition, Tata McGraw Hill Publications.

2 Schildt, 2010, "The Complete Reference Java", Eighth Edition, Tata McGraw Hill Publications.

3 C. Xavier, 2010, "Programming with JAVA 2", SciTech Publication, Chennai.

4 Instructional Software Research and Development (ISRD) Group, 2007, "Introduction to Object Oriented Programming through Java", Tata McGraw-Hill Publishing Company Limited, New Delhi.

Course Code	Course Name	Category	L	T	P	Credit
224CS1A3CA	OPERATING SYSTEMS	CORE	3	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The operations performed by OS as a resource manager.
- The various logical aspects of scheduling various processes.
- The mechanisms in memory and storage management.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the role of operating system with its function and services.	K2
CO2	Compute the waiting time and turnaround time using different process scheduling algorithms.	K3
CO3	Illustrate the methods for handling and preventing deadlocks.	K3
CO4	Apply the various mechanisms involved in memory management in contemporary OS.	K3
CO5	Allocate and deallocate memory space in secondary storages using scheduling methods.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓	✓	
CO2		✓			✓
CO3			✓		✓
CO4	✓	✓		✓	
CO5	✓		✓	✓	✓

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A3CA	OPERATING SYSTEMS	**SEMESTER III**

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Introduction to Operating Systems 6 h

Computer System Organization - Computer System Architecture - Operating System Structure - Distributed Systems - Open Source Operating Systems – Operating System Generation.

Unit II Process Scheduling 8 h

Process Concepts - Operations on Processes. Basic Concepts - Scheduling Criteria - Scheduling Algorithms: First-Come First-Served Scheduling - Shortest-Job-First Scheduling - Priority Scheduling - Round-Robin Scheduling - Multilevel Queue Scheduling. Synchronization: Background - The Critical - Section Problem - Semaphores.

Unit III Deadlocks 8 h

Deadlocks: Deadlock Characterization - Methods for Handling Deadlock - Deadlock Prevention - Deadlock Avoidance: Safe State - Resource-Allocation Graph Algorithm - Banker's Algorithm - Deadlock Detection - Recovery from Deadlock.

Unit IV Memory Management 8 h

Memory Management: Swapping - Contiguous Memory Allocation - Paging – Structure of Page Table - Segmentation. Virtual Memory: Demand Paging - Page Replacement: Basic Page Replacement - FIFO Page Replacement - Optimal Page Replacement - LRU Page Replacement.

Unit V Storage Management 6 h

Secondary-Storage Structure : Disk Structure - Disk Scheduling: FCFS Scheduling - SSTF Scheduling SCAN Scheduling-C-SCAN Scheduling-LOOK Scheduling-Selection of a Disk Scheduling Algorithm - RAID structure.

Case Studies: Linux System, Mobile Operating System.

Text Books

1 Silberschatz , Galvin , Gagne, 2018, "Operating System Concepts", 9th Edition, Wiley.

References

1 Andrew S. Tanenbaum, 2018,"Modern Operating Systems 4e", Pearson Education India.

2 Mukesh Singhal, Niranjan G. Shivaratri, 2019, "Advanced Concepts in Operaring System", 10th edition, McgrawHill.

3 William Stallings, 2017, "Operating Systems: Internals and Design Principles", 9th Edition, Pearson Education.

4 Herbert Bos, S.Tanenbaum, 2020,"Modern Operating System", 6th Edition Pearson education.

224CS1A3SP	SQL PROGRAMMING	**SEMESTER III**

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Create a table to store students bio data and insert at least 5 rows.
2	Data Retrieval using Select -where, Relational and Arithmetic operator.
3	Demonstrate the use of order by, distinct, between-in, dual and like operator.
4	Create a table and perform set operations.
5	Create a table and perform aggregate functions.
6	Create a table for student details and perform the following queries. a. Display the table information b. Add new column in the existing table c. Modify the datatype of the existing column d. Rename, Truncate and drop the table
7	Create a table for employee database and demonstrate the use of primary and foreign keys.
8	Create a table for payroll information and perform the following constraints. a. Default b. Null c. Check
9	Demonstrate the use of following functions, Date function, Numeric function, character function and conversion functions.
10	Programs development using creation of procedures, passing parameters IN and OUT of procedures.
11	Make use of COMMIT, ROLLBACK and SAVEPOINT.
12	Prepare an Electricity bill using JDBC.

Note: Any 10 Experiments mandatory

Course Code	Course Name	Category	L	T	P	Credit
225CR1A3IB	CYBER LAW	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Cyber Crimes and its impacts
- The regulation of digital environment
- The legal challenges of the information society and the different forms of cyber-crimes.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Propose a solution to the issues related to privacy issues raised by use of computer technology	K2
CO2	Identify the need for regulation of information technology in India	K2
CO3	Apply the provisions of Information Technology Act	K3
CO4	Analyze the laws related to defamation through information technology	K3
CO5	Evaluate different human rights instruments.	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓	✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓		✓	✓
CO4	✓		✓	✓	
CO5	✓	✓	✓	✓	✓

COURSE FOCUSES ON::

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

225CR1A3IB	CYBER LAW	**SEMESTER III**

Total Credits: 4

Total Instruction Hours: 4 h

Syllabus

Unit I Cyber Crimes 10 h

Meaning - Nature - Kinds of Cyber Crimes: Computer misuse, Identity theft, Grooming and Harassment, Hacking, Viruses, criminal damage and Mail bombing, Denial of service attack, Obscenity, Child abuse, Stalking, Morphing, Web Jacking, Phishing, Cyber terrorism, Bandwidth theft, Cyber Warfare, Convention on cyber crime.

Case Study:Cyber Crimes

Unit II Privacy in Cyberspace 10 h

Digitization, Personal data and data industry - Data Protection Principles - Conditions for processing of personal data - CCTV, RFID Tracking, Data Retention and Identity - Cookies Regulation - Interception and Monitoring by Government.

Unit III Defamation 10 h

Tort of Defamation, Digital defamation – Publication and Republication, Liability of Intermediary, Digital defamation and User Generated Content (UGC) - Social Sites. Casestudy: Digital defamation.

Unit IV Human Rights and Information Technology 10 h

Civil Liberties – Free speech and Art.19(1)(a) of the Constitution – Privacy and Art.21 of the Constitution – Data Collection and Storage, Freedom of Speech and Social Responsibility, Censorship – Indecency – Pornography – Determination of Standards for Provisions of IPC and Information Technology Act, 2000.

Case study: Freedom of Speech and Social Responsibility.

Unit V Penalties and Offences 8 h

Penalties and Offences under IT Act, 2000 - Penalty for Misrepresentation, Publishing False Digital Signature Certificate - Offences - Types - Tampering with Computer Source Documents - Hacking with computer system.

Note: Case study (Examined Internal only).

Text Books

1 Harish Chander, 2012, "Cyber laws and IT protection", PHI Learning Pvt. Ltd.

Ramappa. T, 2003, "Legal Issues in Electronic Commerce", Latest Edition, Macmillan India Ltd, New Delhi.

References

1 Joga Rao, S.V,2008,"Law of Cyber Crimes and Information Technology Law", 2nd Volume, Wadhwa & Co, Nagpur

2 Vakul Sharma, 2002, "Hand book of Cyber Laws", Macmillan India Ltd., New Delhi.

3 Mittal. D.P, 2000, "Law of Information Technology (Cyber Law) with Information Technology (Certifying Authorities) Rules", Taxmann Publications Pvt. Ltd.

4 Institute of Company Secretaries of India, "Information technology and Systems audit", Latest Edition.

224CS1ASSA	**SELF STUDY:** SOCIAL MEDIA ANALYTICS	**SEMESTER III**

Total Credit: 1

Syllabus

Unit I Social Media Analytics: An Overview

Core Characteristics of Social Media, Types of Social Media, Social media landscape, Need for Social Media Analytics (SMA), SMA in small & large organizations. Purpose of Social Media Analytics, Social Media vs. Traditional Business Analytics, Seven Layers of Social Media Analytics, Types of Social Media Analytics, Social Media Analytics Cycle, Challenges to Social Media Analytics, Social Media Analytics Tools.

Unit II Social Network Structure, Measures & Visualization]

Basics of Social Network Structure - Nodes, Edges & Tie Describing the Networks Measures - Degree Distribution, Density, Connectivity, Centralization, Tie Strength & Trust Network Visualization - Graph Layout, Visualizing Network features, Scale Issues. Social Media Network Analytics - Common Network Terms, Common Social Media Network Types, Types of Networks, Common Network Terminologies, Network Analytics Tools

Unit III Social Media Text, Action & Hyperlink Analytics

Social Media Text Analytics - Types of Social Media Text, Purpose of Text Analytics, Steps in Text Analytics, Social Media Text 8 Analysis Tools Social Media Action Analytics - What Is Actions Analytics? Common Social Media Actions, Actions Analytics Tools Social Media Hyperlink Analytics - Types of Hyperlinks, Types of Hyperlink Analytics, Hyperlink Analytics Tools

Unit IV Social Media Location & Search Engine Analytics)

Location Analytics - Sources of Location Data, Categories of Location Analytics, Location Analytics and Privacy Concerns, Location Analytics Tools Search Engine Analytics - Types of Search Engines, Search Engine Analytics, Search Engine Analytics Tools

Unit V Social Media Analytics Applications and Privacy

Social media in public sector - Analyzing public sector social media, analyzing individual users, case study. Business use of Social Media - Measuring success, Interaction and monitoring, case study. Privacy - Privacy policies, data ownership and maintaining privacy online.

Text Books

1 Seven Layers of Social Media Analytics_ Mining Business Insights from Social Media Text, Actions, Networks, Hyperlinks, Apps, Search Engine, and Location Data, Gohar F. Khan,(ISBN-10: 1507823207)

References

1 Analyzing the Social Web 1st Edition by Jennifer Golbeck

2 Mining the Social Web_ Analyzing Data from Facebook, Twitter, LinkedIn, and Other Social Media Sites, Matthew A Russell, O'Reilly

Charu Aggarwal (ed.), Social Network Data Analytics, Springer, 2011

224CS1ASSB	**SELF STUDY:** E-COMMERECE	**SEMESTER III**

Total Credit: 1

Syllabus

Unit I E – Commerce: Meaning, definition, features

Functions of E-Commerce, Scope, Benefits and limitations of E-Commerce – The Internet and India – E-commerce opportunities and challenges for Industries.

Unit II Business Models for E-commerce]

The Birth of Portals – E-Business Models – Business-to Consumer (B2C) – Business-to-Business (B2B) – Consumer-to Consumer (C2C) – Consumer to-Business (C2B) – Brokerage Model – Value Chain Model – Advertising Model.

Unit III E-marketing – Traditional Marketing Vs. E-Marketing

Impact of E-commerce on markets – Marketing issues in E-Marketing – Online Marketing – E-advertising – Internet Marketing Trends – E-Branding – Marketing Strategies.

Unit IV E-payment Systems

Digital payment Requirements – Digital Token-based E-payment systems – Benefits to Buyers – Benefits to Sellers – Credit card as E-payment system – Mobile payments – smart card cash payment system – Micropayment system – E- Cash.

Unit V E-Finance

Areas of Financing, E-Banking - Traditional Banking Vs. E-Banking – Operations in E-Banking – E-Trading – Stock Market trading – Importance and advantages of E-Trading.

Text Books

1 Joseph P. T., E - Commerce – An Indian Perspective", 2011, 1st Edition, Tata McGraw Hill

References

1 Janice Arnolds, E Commerce - 2014, 2nd Edition, Tata McGraw Hill.

E- Commerce - Fundamentals and Applications, Wiley Publications, 2012

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Course Code	Course Name	Category	L	T	P	Credit
221TL1A4TA	TAMIL - IV	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு நாகரீகம், பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத் திறன்கள் (Life Skills)- மாணவர்களின் செயலாக்கத் திறனை ஊக்குவித்தல்	K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K4
CO3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1		✓	✓		✓
CO2	✓			✓	
CO3		✓			✓
CO4			✓		
CO5	✓			✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A4TA	TAMIL - IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **எட்டுத்தொகை** 10 h

1. நற்றிணை – குறிஞ்சித் திணை
   I.பா.எண் : 01 – கபிலர்
   II.பா.எண் : 88 – நல்லந்துவனார்
   III.பா.எண் : 102 – செம்பியனார்
2. குறுந்தொகை – முல்லைத்திணை
   I.பா.எண் : 65 – கோவூர்கிழார்
   II. பா.எண் : 167 – கூடலூர்கிழார்
   மருதத்திணை
   I.பா.எண் : 08 – ஆலங்குடி வங்கனார்
   II.பா.எண் : 61 – தும்பிசேர்கீரனார்
   III.பா.எண் :196 – மிளைக் கந்தன்
   நெய்தல் திணை
   I.பா.எண் : 57 – சிறைக்குடி ஆந்தையார்

Unit II **எட்டுத்தொகை** 08 h

1. கலித்தொகை – பாலைக்கலி
   I.பா.எண் : 09 – பெருங்கடுங்கோ
2. அகநானூறு – மருதத்திணை
   I.பா.எண் : 86 – நல்லாவூர்கிழார்
3. புறநானூறு - I.பா.எண் : 188 – பாண்டியன் அறிவுடை நம்பி
   II.பா.எண் : 192 – கணியன் பூங்குன்றனார்
   III.பா.எண் : 279 – ஒக்கூர் மாசாத்தியார்
   IV.பா.எண் : 312 – பொன்முடியார்

Unit III **பத்துப்பாட்டு** 10 h

1. பட்டினப் பாலை – கடியலூர் உருத்திரங் கண்ணனார் -1முதல் 218 வரிகள் வரை மட்டும்.

Unit IV **இலக்கிய வரலாறு** 10 h

1. எட்டுத் தொகை நூல்கள்
2. பத்துப்பாட்டு நூல்கள்

Unit V **இலக்கணம் மற்றும் திறனாய்வுப் பகுதி** 10 h

I.இலக்கணம்
   1. அகத்திணை – அன்பின் ஐந்திணை - விளக்கம்
   2. புறத்திணை – 12 திணைகள் - விளக்கம்

II.பயிற்சிப் பகுதி

சங்கப் பாடல்கள் குறித்து திறனாய்வு செய்தல்

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது

Text Book

செய்யுள் திரட்டு - மொழிப் பாடம் - 2022- 23

1 தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, வெளியீடு : நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 600 098. (Unit I- V)

References

1 பேராசிரியர் புலவர் சோம. இளவரசு, எட்டாம் பதிப்பு -2014, தமிழ் இலக்கிய வரலாறு - மணிவாசகர் பதிப்பகம், சென்னை.

2 பேராசிரியர் முனைவர் பாக்கியமேரி, முதற் பதிப்பு- 2013, இலக்கணம் -இலக்கிய வரலாறு - மொழித்திறன் -பூவேந்தன் பதிப்பகம், சென்னை.

3 தமிழ் இணையக் கல்விக்கழகம்.<http://www.tamilvu.org/>

Course Code	Course Name	Category	L	T	P	Credit
221TL1A4HA	HINDI - IV	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature
- the techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	K3
CO5	Apply the power of creative reading	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓			✓	✓
CO2		✓			✓
CO3	✓		✓	✓	
CO4					✓
CO5	✓	✓	✓		✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A4HA	HINDI- IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

नाटक

Unit II 10 h

एकांकी

Unit III 10 h

काव्य मंजरी

Unit IV 10 h

सूचना लेखन

Unit V 08 h

अनुवाद अभ्यास- III

Text Books

1. लडाई – सर्वेश्वरदयाल सक्सेना प्रकाशक: वाणी प्रकाशन 21-A, दरियागंज नई दिल्ली-110002. (Unit I)
2. एकांकी पंचामृत – डॉ राम कुमार (भोर और तारा छोड्कर) प्रकाशक: जवाहर पुस्तकालय सदर बाजार, मथुरा उत्तर प्रदेश-281001. (Unit II)
3. काव्य मंजरी- (डा मुन्ना तिवारी) मैथिलीशरण गुप्त- मनुष्यता, जयशंकर प्रसाद- बीती विभावरी जागरी सूर्यकान्त त्रिपाठी निराला- तोडती पत्थर और भिक्षुक. (Unit III)
4. सूचना लेखन पुस्तक: व्याकरण प्रदिप – रामदेव प्रकाशक: हिन्दी भवन 36 इलाहाबाद -211024. (Unit IV)
5. अनुवाद अभ्यास (केवल अंग्रेजी से हिन्दी में) (पाठ 10 to 20) प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17 (पाठ10 to 20). (Unit V)

Course Code	Course Name	Category	L	T	P	Credit
221TL1A4MA	MALAYALAM- IV	LANGUAGE - I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Expose the knowledge writing critical views on fiction	K2
CO4	Build creative ability	K3
CO5	Apply the power of creative reading	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓			✓	
CO2	✓				✓
CO3		✓	✓		
CO4	✓			✓	✓
CO5	✓	✓	✓		✓

COURSE FOCUS ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A4MA	MALAYALAM- IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **Drama** 10 h

Saketham- Sreekandan Nair

Unit II **Drama** 10 h

Saketham- Sreekandan Nair

Unit III **Drama** 10 h

Saketham- Sreekandan Nair

Unit IV **Screen Play** 10 h

Perumthachan- Vasudevan Nair

Unit V **Screen Play** 08 h

Perumthachan- Vasudevan Nair

Text Books

1 Nair, Sreekandan C.N. 2023. Saketham, Drama. DC Books Kottayam, Kerala, India. (Unit I to III)

2 Nair, Vasudevan M.T. 1994. Perumthachan- Screenplay. DC Books Kottayam, Kerala, India. (Unit IV & V)

Reference

1 Sankarapillai. 2005. Malayala Nataka Sahithya Charithram, Kerala Sahithya Akademi Publishers, Kerala, India.

Course Code	Course Name	Category	L	T	P	Credit
221TL1A4FA	FRENCH - IV	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the Competence in General Communication Skills – Oral + Written- Comprehension & Expression
- the Culture, life style and the civilization aspects of the French people as well as of France
- the students to acquire Competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	Apply the adjectives and the classroom environment in France	K2
CO3	Select the Plural, Articles and the Hobbies	K2
CO4	Measure the Cultural Activity in France	K3
CO5	Evaluate the sentiments, life style of the French people and the usage of the conditional tense	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓				✓
CO2	✓	✓			
CO3			✓	✓	
CO4	✓	✓			✓
CO5	✓		✓	✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221TL1A4FA	FRENCH - IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

°Décrirequelqu'un. ° Comparer	En milieu professional, recruiter quelquún et justifier sonchoix.	S'exprimersur les styles de vêtemantReconnaitre des personnes à partit de descriptions.	Comprendre la description de personnesdans un extrait de roman.

Unit II 10 h

ExprimerPaccord ou le désaccord. ° Se situerdans le temps.	En milieu professional, recruiter quelquún et justifier sonchoix.	Décrire des personnes. Comprendre des personnes qui experiment leur accord ouleurdésaccord.	Comprendre des différences de points de vueexprimétesdans de message électronique. Raconter unsourvenir.

Unit III 10 h

° Parler de Pavenir.	Discuter de l'organisation d'un voyage de groupepuisprépar erune fiche projet et la templit.	Comprendreune chanson. Echangersursesprojets de vacancy	Comprendre le message d'une carte d'anniversaire

Unit IV 10 h

° Exprimer des souhaits. ° Décrirequelqu'u n	Discuter de l'organisation d'un voyage de groupepuisprépar erune fiche projet et la templit.	Discuter du programme de la soire à venir. Addresser des souhaits à quelqu'un.	Comprendre le message d'une carte d'anniversaire

Unit V 08 h

Make in Own Sentences based on the above Lessons

Text Book

1 LATITUDES 1 (Méthode de français) Pages from 128-151, Author : Regine Mérieux, Yves Loiseau (Unit I to IV)

Course Code	Course Name	Category	L	T	P	Credit
221EL1A4EA	PROFESSIONAL ENGLISH - IV	LANGUAGE- II	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the skill-based learning for better communication
- the prevalent issues logically and present coherently
- the ideas accurately and clearly

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Develop the ability to appreciate ideas and think critically	K1
CO2	Integrate academic success into practical life skills	K2
CO3	Express challenges of a competitive environment and select the profession that best suits them	K2
CO4	Discuss with confidence in conversations, to initiate, sustain and close a conversation	K3
CO5	Identify a sense of social commitment	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓		✓
CO2	✓	✓		✓	
CO3			✓	✓	✓
CO4		✓			✓
CO5	✓		✓	✓	

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

221EL1A4EA	PROFESSIONAL ENGLISH - IV	**SEMESTER IV**

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Career 08 h

Leadership- Everyday leadership- Everyday leaders motivation- Qualities of a good leader- Professionalism- Creativity- Practical Application- Ways to become more creative- Six Thinking hats techniques

Unit II Art of Promoting 11 h

Selling your skills- Neuromarketing as a tool for influencing leaders- Using neuromarketing and psychology to get ahead- Recruiters and Clients decision making skills- Three steps to use neuromarketing for a successful life- Attention- storytelling- Perception and reputation- Recognize opportunities and openings before the competition- observation– Matching yourself with your leaders

Unit III Facing Challenges 10 h

Introduction-Panicky people- Negative people- Positive people- Facing challenges and taking initiatives – Importance of youth to face challenges and take initiative Benefits of Facing challenges- Facing challenges in life

Unit IV Effective Decision Making 10 h

Decision Making Process- Methods of Decision Making- Steps in DM- Theoretical Approaches to individual Decision Making- Optimizing Decision Theory- The Subjective Expected Utility Model- Steps to Effective Decision- Making- Effective Decision Making in Terms- Methods for team decision making- Confusion and decision making- Decision making styles

Unit V Practising Corporate Social Responsibility (CSR) 09 h

Corporate Social Responsibility (CSR)- definitions- Goal- Areas- Need- Benefits - Argument in favour/against of CSR- Factors that promote CSR – Limitations for implementing- India and Corporate Social Responsibility- Activities carried out by Companies in India- List of projects for funding under CSR- Implementation of CSR commitments

Text Books

1 Sharma, Prashant. 2022. Soft Skills. BPB Publications, 3rd Edition, New Delhi, India. (Unit I & II)

2 Alex. 2013. Managerial Skills. S. Chand Publishing, New Delhi, India. (Unit III to V)

3 Alex. 2009. Soft Skills. S. Chand Publishing, New Delhi, India. (Unit II)

4 E H McGrath S J. 2011. Basic Managerial Skills for All, 9th Edition, New Delhi, India. (Unit III)

References

1 Adair J. 1986. Effective Team Building: How to make a winning team. Pan Books, London, United Kingdom.

2 Dhanavel S P. 2010. English and Soft Skills, Orient Blackswan, Hyderabad, India.

3 Singh S R. 2011. Soft Skills. APh Publishing Corporation, New Delhi, India.

4 Lakshminarayanan K R, Murugavel T. 2015. Managing Soft Skills. Scitch Publications, Chennai, India.

Course Code	Course Name	Category	L	T	P	Credit
224CT1A4CA	COMPUTER NETWORKS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic networking concepts, reference models
- Acquire knowledge on various layers and their functionalities
- The networking protocolsused in the layers

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Describethe working of OSI and TCP/IPReference Model and the services offered by physical layer.	K2
CO2	Interpret the design Issues of Data Link Layer and the protocols used in data link layer	K2
CO3	Illustrate the Routing Algorithms in network layer and perspective of it over the internet	K2
CO4	Identify the services provided by transport layer to upper layers and differentiate TCP and UDP Protocols	K2
CO5	Explain the different protocols used at application Layer and functions of application layer.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓		✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓		✓
CO4	✓	✓	✓		✓
CO5	✓	✓	✓	✓	✓

COURSE FOCUSES ON

✓	Skill Development	☐	Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CT1A4CA	COMPUTER NETWORKS	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 10 h

Introduction - Uses of Computer Networks- Types of Computer Networks: Broadband Access Networks-Mobile and Wireless Access Networks-Content Provider Networks- Transit Networks- Enterprise Networks. Network Technology-Examples of Networks-Network Protocols.

Reference Model: The OSI Reference Model- TCP/IP Reference Model.

Physical Layer: Guided Transmission Media- Wireless Transmission- Digital Transmission-Using the Spectrum for Transmission-Radio Transmission-Microwave Transmission

Unit II Data Link Layer 10 h

Data Link Layer Design Issues: Services provided to the Network Layer-Framing-Error Control-Flow Control- Error Detection and Correction.

Elementary Data Link Protocols: Basic Transmission and Receipt - Simplex Link-Layer Protocols-Improving Efficiency.

Data Link Protocols in Practice: The Medium Access Control Sublayer: Multiple Access Protocols-Ethernet - Wireless LANs- Bluetooth -Data Link Layer Switching: Repeaters, Hubs, Bridges, Switches, Routers, and Gateways.

Unit III Network Layer 10 h

Network Topologies - Network Layer Design Issues - Routing Algorithms: Shortest Path Algorithm - Distance Vector Routing.

Quality of Service and Application: Packet Scheduling- Integrated Services-Differentiated Services. Software-Defined Networking: The SDN Control Plane-The SDN Data Plane.

The Network Layer in the Internet: The IP Version 4 Protocol- IP Addresses- IP Version 6- Internet Control Protocols.

Unit IV Transport Layer 10 h

The Transport Service: Services provided to the upper layers –Transport Service Primitives - Berkeley Sockets -Elements of Transport Protocols-Congestion Control.

The Internet Transport Protocols: UDP – Remote Procedure Call- Real-Time Transport Protocols. TCP: TCP Service Model- TCP Protocol – TCP Segment Header - TCP Connection Establishment and Release – TCP Sliding Window - TCP Congestion Control

Unit V The Application Layer 8 h

The DNS:The DNS Lookup Process - The DNS Name Space and Hierarchy - Name Resolution-Electronic Mail:Architecture and Services –Message Formats- Message Transfer.The World Wide Web:Architectural Overview - HTTP and HTTPS - Content Delivery Networks- Peer-to-Peer Networks.

Text Books

1 Andrew S.Tanenbaum, Nick Feamster, David J.Wetherall, 2022, "Computer Networks", Sixth Edition,Pearson

References

1 William Stallings, 2018, "Data and Computer Communications", Tenth Edition, Pearson Education.

2 James F.Kurose, Keith W.Ross, 2021, "Computer Networking A Top-Down Approach", Pearson.

Course Code	Course Name	Category	L	T	P	Credit
224CA1A4EP	PYTHON PROGRAMMING	EMBEDDED PRACTICAL	3	-	4	5

PREAMBLE

This course has been designed for students to learn and understand

- The fundamentals of python.
- The function-oriented programming paradigm in python.
- The implementation of various applications using python.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Python Language.	K1
CO2	Build skills to work with functions and modules.	K2
CO3	Obtain knowledge to manipulate strings, lists, tuples, sets and dictionaries.	K2
CO4	Apply Numpy library operations on array.	K3
CO5	Apply the fundamentals of the Pandas library.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓			✓	✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓	✓
CO5	✓	✓	✓	✓	✓

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CA1A4EP	PYTHON PROGRAMMING	SEMESTER IV

Total Credits: 5

Total Instruction Hours: 36 L + 48 P h

Syllabus

Unit I Basics of Python Programming and Decision Control Statements — 7 L + 9 P h

Features of Python-Literal Constants-variables and Identifiers-Data Types-Input Operation-Comments-Indentation-Operators and Expressions-Other Data types – Type Conversion.

Decision Control Statements: Selection/Conditional Branching Statements-Basic Loop Structures/Iterative Statements-Nested Loops-The Break Statement-The Continue Statement-The pass Statement -The else statement used with Loops.

Practical

1.Python Program to Demonstarte Operators

2. Python program to Evaluate Expression

3.Python Program to illustrate decision statements

4.Python Program using Repetitive Statements

Unit II Functions and Modules — 7 L + 9 P h

Function Definition- Function Call-Variable Scope and life Time-Return Satements- More on Defining Functions-Lambda Functions-Recursive Functions-Modules-Packages in Python

Practical

5. Python Program to Illustrate User defined functions

6. Python program to Demonstrate Lamda function

7. Python Program to demonstrate Recursive

Unit III Python Strings and Data Structures — 8 L + 10 P h

Concatenating, Appending and Multiplying Strings-Formatting Operators- Bulit-in- string Methods and Functions – Slice Operation- in and not-in Operators- comparing String-Itearting String - Data Structures: Sequence- Lists- Functional Programming-Tuple-Sets-Dictionaries.

8. Python program to demonstrate String operations

9. Python Program to implement Lists

10. Python program to implement Tuples

11. Python Program to implement Sets

12. Python Program to implement Dictionaries

Unit IV NumPy Library — 7 L + 10 P h

The NumPy Library: NumPy : A Little History - The NumPy Installation - Ndarray: The Heart of the Library - Basic Operations - Indexing, Slicing and Iterating - Conditions and Boolean Arrays - Shape Manipulation - Array Manipulation - Structured Arrays - Reading and Writing Array Data on Files.

13.Python Program for Basic Operations in ND array

14. Python Program to implement Structured Array

Unit V Pandas] — 7 L + 10 P h

Pandas: The Python Data Analysis Library: Pandas Data Structures - Other Functionalities on Indexes - Operations between Data Structures - Function Application and Mapping - Sorting and Ranking - "Not a Number" Data. Pandas: Reading and Writing Data: CSV and Textual Files - Reading Data in CSV or Text Files - Reading and Writing HTML Files

15.Python Program for Sorting and Ranking

16.Python Program to read CSV files

17.Python program to read and write HTML Files

Text Books

1 Reema Thareja,2020, Python Programming using Problem Solving Approach,oxford University Press, 1st Edition. [Unit- 1,2 and 3].

2 Fabio Nelli , 2015, "Python Data Analytics" , Apress, 1st Edition. [Unit- 4 and 5].

References

1 Wes McKinney,2017,"Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly Media, Inc., 2nd Edition.

2 Dipanjan Sarkar,Raghav Bali,Tushar Sharma, 2018,"Practical Machine Learning with Python", Apress, 1st Edition

3 S.A. Kulkarni,2018,"Problem Solving and Python Programming,Yes Dee Publishing Pvt Ltd., 2nd Edition

[4] www.spoken-tutorial.org.

Course Code	Course Name	Category	L	T	P	Credit
224CS1A4CB	THEORY OF COMPUTATION	CORE	3	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The theoretical foundations of computer science from the perspective of formal languages
- Finite state machines to solve problems in computing
- The hierarchy of problems arising in the computer sciences.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Use basic concepts of formal languages of finite automata techniques	K2
CO2	Design Finite Automata's for different Regular Expressions and Languages	K3
CO3	Construct context free grammar for various languages	K3
CO4	Solve various problems of applying normal form techniques, push down automata and Turing Machines	K4
CO5	Participate in GATE, PGECET and other competitive examinations	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	M	S	S	S	S
CO3	S	M	M	S	S
CO4	S	S	M	S	M
CO5	S	M	S	M	S

S Strong **M Medium** **L Low**

COURSE FOCUSES ON:

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☑ Innovations
☑ Intellectual Property Rights	☐ Gender Sensitization
☐ Social Awareness/ Environment	☐ Constitutional Rights/ Human Values/ Ethics

224CS1A4CB	THEORY OF COMPUTATION	**SEMESTER** IV

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Mathematical Notation and Techniques 7 h

Basic Mathematical Notation and Techniques : Formal Proofs – Deductive Proof -If-Then statements – Additional Forms of Proof – Inductive Proof – Problem in Induction– Basic Definitions – Equivalence of NDFA and DFA – Equivalence of NDFAs with and without E-moves

Unit II Regular Expression and Languages 8 h

Regular Languages – Regular Expressions- Equivalence of Finite Automaton and Regular Expressions: Conversion of Finite Automata (DFA) to Regular Expressions - Conversion of Conversion of Finite Automata (DFA) to Regular Expressions to Finite Automata (DFA) - Regular Expressions – Pumping Lemma for Regular Sets – Problems based on Pumping Lemme – Closure Properties of Regular Languages – Minimization of DFA

Unit III Context Free Grammar and Languages 7 h

Types of Grammar – Context-Free Grammars and Languages : Context Free Grammar – Derivations and Languages – Ambiguity : Ambiguity in Grammars and Languages – Unambiguous Grammar – Relationship between Derivation and Derivation Trees – Normal Forms : Chomsky Normal Form – Greibach Normal Form – Problems Related to CNF and GNF .

Unit IV Pushdown Automata 7 h

Introduction : Definition of Pushdown Automata – Graphical Notation of Pushdown Automata – Moves – Instantaneous Descriptions of Pushdown Automata – Languages of Pushdown Automata – Equivalence of Pushdown Automata and CFGs – Types of Pushdown Automata :Deterministic Pushdown Automata (DPDA) – Non Deterministic Pushdown Automata (NDPDA).

Unit V Turing Machine 7 h

Introduction – Computable Languages and Functions – Techniques for Turing Machine Construction – Multi Head and Multi-Tape Turing Machines - Non Deterministic Turing Machine – The Halting Problem – Partial Solvability – Problems about Turing Machines – Chomskian Hierarchy of Languages- Recursive and Recursively Enumerable Languages – Universal Turing Machine.

Text Books

1. D.Shanthi, 2019, N.Umamaheswari, S.Jeyanthi, "Theory of Computation", Second Edition, Yes Dee Publishing Pvt. Ltd..
2. Sachin Agarwal, 2015 , "Theory of Computation" , Second Edition, Vikas Publishing

References

1. K.l.P. Mishra , 2018, "Theory of Computer Science Automata, Languages and Computation", Third Edition , Prentice Hall India Pvt. Ltd.
2. Anil Maheshwari MichielSmid , 2019 , "Introduction to Theory of Computation "
3. Dilip Kumar Sultania, 2021, "Theory of Computation", First Edition, Tech Knowledge Publications..
4. Donald Sannella , Michael Fourman, HaoranPeng , Philip Wadler, 2022 , " Introduction to Computation: Haskell, Logic and Automata", First Edition, Springer.

224CS1A4SP	LINUX	**SEMESTER** IV

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Perform Directory Operations.
2	Make a file in linux using cat command and view the created files
3	Create a file and to append data using cat command
4	Create a directory and changing the timestamp of a file or directory.
5	Create nested directories and multiple directories.
6	Perform various operations such as copying file, directory, moving a file, moving a directory and deleting directory.
7	Create user with default and customized properties
8	Create a new partitions and delete partitions
9	Create a label with swap partition and Visualize it.
10	Package management system using Redhat package manager
11	Make a script file
12	Update the partition information in the kernal

Note: Any 10 experiments are mandatory

Course Code	Course Name	Category	L	T	P	Credit
222MT1A4IC	OPERATIONS RESEARCH	IDC	4		-	4

PREAMBLE

This course has been designed for students to learn and understand

- the Mathematical formulation of LPP
- the method of finding optimized solutions for transportation and assignment problems
- the concept and applications of decision theory and networks

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	identify the feasible solution using Graphical method	K1
CO2	illustrate the optimality analysis in Transportation problem	K2
CO3	illustrate the concept behind the travelling salesman problem	K2
CO4	compare various strategies and identify appropriate one	K3
CO5	estimate the project duration for the shortest path using CPM and PERT	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓				✓
CO2			✓		✓
CO3		✓	✓	✓	
CO4		✓		✓	
CO5	✓			✓	

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

222MT1A4IC	OPERATIONS RESEARCH	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Linear Programming Problem 9 h

Definition - Basic requirements -assumptions - advantages and drawbacks - general model of LPP - application areas - formulation-examples-Graphical method- some special cases in LPP.

Unit II Transportation Problem 9 h

Formulation- solution procedure - methods for finding initial solution- test for optimality-variations -sensitivity analysis-prohibited and preferred routes - transhipment problem.

Unit III Assignment Problem 10 h

Mathematical model of assignment problem-solution methods-assignment algorithm-special variations -restrictions on assignments.

Unit IV Decision Analysis 10 h

Few management applications - ingredients of decision problem- types - Bayesian decision rule-Posterior analysis - decision tree analysis.

Unit V Project Network Analysis 10 h

Development of network analysis concept -developing the project network - critical path analysis - critical path method- programme evaluation and review technique - analysis of time cost relationship -resource allocation.

Text Books

1 Kapoor V K, 2022, "Operations Research: Quantitative Techniques for Management", Ninth Edition, Sultan Chand and Sons Educational Publishers, New Delhi

References

1 Kanti Swarup, Gupta P K and Man Mohan, 2007, "Operations Research" Fifth Edition, S. Chand & Sons Education Publications, New Delhi

2 Gupta P K, Hira D S, 2014, "Operations Research", Seventh Edition, S. Chand & Company Pvt. Ltd, New Delhi

3 Hamdy A Taha, 2014, "Operations Research: An Introduction", Nineth Edition, Pearson Education Publishers Private Limited, New Delhi

4 Gupta P K and Gupta S P, 2014, "Quantitative Techniques & Operations Research", Sultan Chand and Sons, New Delhi

16/10/23

BoS Chairman/HoD
Department of Computer Science
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Dr.N.G.P. Arts and Science Co

APPROVED

BoS - 16th	AC - 16th	GB - 21st
16/10/23	13/12/23	05/01/24

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Dr.N.G.P. Arts and Science College

Course Code	Course Name	Category	L	T	P	Credit
224CS1A5CA	PHP AND MYSQL	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic concepts of PHP
- The designing principles of a web page.
- How to access backend database using PHP.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Grasp introductory concepts on PHP.	K1
CO2	Understanding decision making and storing data.	K2
CO3	Incorporate the concepts of arrays and creation of web databases.	K3
CO4	Gain knowledge on string manipulation and functions in PHP.	K3
CO5	Incorporate connectivity with MySQL and PHP.	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	M	S	S	S	S
CO3	S	S	M	S	S
CO4	S	S	M	M	M
CO5	S	S	M	M	S

S Strong M Medium L Low

224CS1A5CA	PHP AND MYSQL	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to PHP 10 h

Embedding PHP in HTML-Adding Dynamic content- Accessing Form Variables- Understanding identifiers- Examining Variable Types- Declaring and using constants- Operators- Working out the Form- Understanding Precedence and Associativity- Variable Handling Functions.

Unit II Control Statements, Storing and Retrieving of Data 10 h

Making Decisions - Iterations- Control Structure- Declare- Storing and retrieving Data: Saving Data - Storing and Retrieving- Processing files- Opening, Writing and Closing a file- Reading from file-File functions.

Unit III Arrays& Web Databases 10 h

Array- Numerically Indexed Arrays- Arrays with Different Indices- Array Operators- Multidimensional Arrays- Sorting Arrays. Relational Database Concepts- Designing Web Database- Creating Web Database - Creating Database Tables- Understanding MySQL Identifiers-Choosing column Data Types.

Unit IV String Manipulation and Functions 10 h

Formatting Strings- Joining and Splitting- Comparing- Matching and Replacing-Reusing code-Using require() and include()-Functions- Defining own functions- Basic Function Structure- Parameters-Passing by Reference-Passing by Value-Recursive function.

Unit V Working and Accessing MySQL using PHP 8 h

Introduction- Inserting Data into the Database- Retrieving Data- Updating, Altering and Deleting Records- Dropping Tables and Database. Web database Architecture-Querying a Database from the web-Putting new Information in the Database-Database Interfaces.

Text Books

1 Luke Welling, Laura Thomson, 2017, " PHP and MySQL Web Development", 5th Edition, Pearson Education.

References

1 Larry Ullman, 2015, "PHP and MySQL for Dynamic Web Sites", Fourth Edition, Peachpit Press.

2 Robin Nixon, 2018, "Learning PHP, MySQL & JavaScript 5e: With jQuery, CSS & HTML5", 5th Edition, O'Reilly.

3 Larry Ullman, 2016,"PHP for the Web: Visual QuickStart Guide", 5th Edition, Peachpit Press.

4 Mike McGrath, 2018, "PHP & MySQL in easy steps: Covers MySQL 8.0", 2nd Edition, In Easy Steps Limited.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A5CB	CYBER SECURITY AND ETHICS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The objective of this course is to focus on the models, tools, and techniques for enforcement of security.
- Develop an understanding of security policies as well as protocols to implement such policies
- Will gain familiarity with computer network, defenses against them.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the foundations of Cyber security and threat landscape	K3
CO2	To equip students with the technical knowledge and skills needed to protect and defend against cyber threats and Mobile threats.	K3
CO3	To expose students to governance, regulatory, legal, economic, environmental, social and ethical contexts of cyber security	K4
CO4	To systematically educate the necessity to understand the impact of cyber crimes and threats with solutions in a global and societal context..	K4
CO5	To select suitable ethical principles and commit to professional responsibilities and human values and contribute value and wealth for the benefit of the society	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓		✓	✓
CO2			✓		✓
CO3	✓	✓		✓	
CO4		✓	✓		
CO5	✓		✓		✓

	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

224IT1A5CB	CYBER SECURITY AND ETHICS	SEMESTER V

Total Credits: 4
Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Cyber Security 12 h

Cyber Security and Cybercrime Definition and Origins of Cybercrime of the World - Cybercrime and Information Security- Classifications of Cybercrime with Cyber Security, Cybercrime and the Indian IT Act,2000. Global Perspective on Cybercrimes. Cyber Offences & Cybercrime: Cyber Offences - Introduction to Cybercrime- Cyber Security Strategic Attacks.

Unit II Computer Crime and Security 12 h

Computer Crime hacking and Security-Computer as Commodities- Theft of Intellectual Property. Identity Theft and Identity Fraud: Typologies of Internet Theft/ Fraud-Prevalence and Victimology- Physical Methods of Identity Theft- Virtual or Internet Facilitated Methods- Crimes Facilitated by Identity Theft/Fraud

Unit III Cyberattacks and Security Breach 12 h

Attacks that Inflict Damage- Impersonation-Data Theft-Malware-Web Service Attacks-Malvertising-Advanced Attacks- Identifying Security Breach: Identifying-Detecting Convert Breaches. Recovering from a security Breach: Reinstall Damage software-Stolen Information. Resetting your Device

Unit IV Cyberspace and Cyber Law 12 h

Aspects in Cyber Law - Security Aspects of Cyber Law- Intellectual Property Aspects in Cyber law and Evidence- Criminal Aspects in Cyber Law-Global Trends in Cyber Law. Legal framework for Electronic Data Interchange Law. Cybercrime and Cyber Security: Cyberspace-Cyber law - Cyber Security Policy. Case Study : Cyber Security Threats in Payment Gateway

Unit V Overview of Ethics 12 h

Ethics : Human values and Professional Ethics- Ethics in the Business World- Corporate Social Responsibility- Fostering Corporate Social Responsibility and Good Business Ethics-Improving Business Ethics- Ethical Considerations in Decision Making- Ethics in Information Technology. Professional Codes of Ethics- Professional Organizations-Certifications and Licensing- Encouraging Ethical Use of IT Resources among Users.

Text Books

1. Nilakshi Jain , Ramesh Menon, "Cyber Security and Cyber Laws" , Publications : Wiley India Pvt. Ltd., First Edition 2021
2. Marjie T.Britz ,"Computer Forensics and Cyber Crime" , Second Edition ,2022 Pearson
3. Joseph Steinberg, "Cybersecurity for Dummies",Edition 2020 – Wiley Publication.

References

1. George Reynolds , "Ethics in Information Technology", Cengage Learning Publication, 6th Edition, 2019
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. 2010
3. https://www.ugc.gov.in/pdfnews/5457035_Cyber-Security-Final.pdf
4. Cyber Ethics 4.0, Christoph Stuckelberger, Pavan Duggal, by Globethic

Course Code	Course Name	Category	L	T	P	Credit
224CS1A5CC	SOFTWARE ENGINEERING PRACTICES	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic concepts of software engineering
- Acquire knowledge on software development process
- The basics of testing

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand basic software engineering	K2
CO2	Understanding software engineering models	K3
CO3	Analysis of software requirements	K1
CO4	Identify appropriate design	K2
CO5	Identify various testing strategies	K1

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	M	S	S	S	S
CO3	S	S	M	S	S
CO4	S	S	M	M	M
CO5	S	S	M	M	S

S Strong M Medium L Low

224CS1A5CC	SOFTWARE ENGINEERING PRACTICES	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I INTRODUCTION TO SOFTWARE ENGINEERING 09 h

Nature of Software: Defining Software-Software Application Domains-Legacy Software-The changing nature of Software: Web Apps-Mobile Applications-Cloud Computing-Product Line Software-Software Process: Process Framework-Umbrella Activities-Process Adaptation- Software Engineering Practice: Essence of practice- General Principles-Software Development Myths - Generic Process Model - Defining a Framework Activity-Process Patterns.

Unit II SOFTWARE PROCESS MODELS 09 h

Perspective model-Waterfall Model-Incremental Process model: The increment model-The RAD model-Evolutionary process model: Prototyping-The Spiral model- The concurrent development model.

An agile view of Process: Agility- Agile Process-Agile Process Models: Extreme Programming-Adaptive Software Development-Scrum-Agile modeling-Agile Unified Process.

Unit III UNDERSTANDING REQUIREMENTS 10 h

Requirements Engineering-Establishing the groundwork- Eliciting the requirements-Developing Use Cases-Building the analysis model-Negotiating Requirements-Requirement Monitoring-Validating Requirements-Avoiding common mistakes

Unit IV DESIGN CONCEPTS 10h

Design Concepts: Abstraction-Architecture-Patterns-Modularity-Information Hiding-Functional Independence-Refinement-Aspects-Refactoring-Object Oriented Design Concepts-Design Classes-Design Model-Architectural Design Elements - Interface Design elements.

Unit V SOFTWARE TESTING 10h

A strategic Approach of Software Testing – Strategic Issues- Unit Testing- Integration testing- Validation testing- Validation-Test Criteria-Alpha and Beta testing -SystemTesting-Recovery Testing-Security Testing-Stress testing- Performance Testing- Deployment testing-The art of debugging- An overview of Software Testing tools-The debugging Process - Debugging Strategies.

Text Books

1 Roger S. Pressman. Bruce R. Maxim, "Software Engineering A Practitioner's Approach", McGraw Hill Education, 9th Edition 2021.

References

1 Hitesh Mohapatra, Amiya Kumar Rath, "Fundamentals of Software Engineering", BPB Publications, 2020.

2 Ian Sommerville, "Software Engineering", Pearson Education, 10th Edition, 2017
https://katalon.com/resources-center/blog/automation-testing-tools

224CS1A5CP	PHP AND MYSQL	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Illustrate the concept of operators and variables
2	Create a simple registration form by adding the basic controls.
3	Implement the concept of decision making and looping statements
4	Program to illustrate opening, writing and closing a file
5	Program to append the contents of the created file
6	Perform sorting of array elements in ascending order
7	Illustrate the concept of merging two arrays into a new array
8	Create a customer table and insert five records in the table
9	Implement various string functions in MySQL.
10	Create a program to implement the concept of user defined functions
11	Query to update, alter and delete records stored in the customer table
12	Program to retrieve data from the My SQL database

Note: Any 10 experiments are mandatory.

224CS1A5CQ	MULTIMEDIA	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Implement Image extraction and Merging of images using magic wand and filter tool
2	Create a bouquet using Lunacy
3	Animate Plane Flying in the Clouds with 3D drawing using Blender
4	Bouncing a ball using Synfig studio
5	Create Plastic Surgery for images eyes, nose and mouth using Canva
6	Create See-through text and water reflection images using Gimp
7	Create a Web Page using Graphic design tool
8	Convert Black and White Photo to Color Photo and remove red eyes using lasso selection , eye dropper and magic wand
9	Create a brochure design for a jewelry shop using Canva
10	Create front page of a web site using Photoshop slice pages
11	Design Advertisements, banners and packages using Lunacy
12	Create a poster for an inter department competitions using text, filters and layer masks
13	Create a matte painting using Krita
14	Design a menu card for a restaurant using pen and layer masks
15	Create a 2D animation story and add sound to it using Synfig studio.

Note: Any 10 experiments are mandatory

224CS1A5SP	ANDROID PROGRAMMING	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Develop an application that uses GUI Components, Fonts and Colours
2	[Develop an application that uses Layout Managers and event Listeners.
3	Write an application that draws basic graphical primitives on the screen.
4	Develop an application that makes use of databases.
5	Develop an application that makes use of Notification Manager.
6	Implement an application that uses multithreading.
7	Develop a native application that uses GPS location information.
8	Implement an application that writes data to the SD card.
9	Implement an application that creates an alert upon receiving a message.
10	Write a mobile application that makes use of RSS feed.
11	Develop a mobile application to send an email.
12	Develop a Mobile application for simple needs (Mini Project)

Note: Any 10 experiments are mandatory

Course Code	Course Name	Category	L	T	P	Credit
224CS1A5DA	FOUNDATIONS OF ARTIFICIAL INTELLIGENCE	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamental concepts of Artificial Intelligence and its application
- The basic search strategies and knowledge representation used in AI
- The fundamental concepts of learning and various applications of AI

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Artificial Intelligence	K2
CO2	Understand and apply the various searching techniques involved in problem solving	K3
CO3	Apply the various knowledge representation techniques and logical representation of problem	K3
CO4	Review the Reasoning using different Models.	K3
CO5	Examine the various learning techniques for making decision	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	M	S	S	S	M
CO3	S	S	M	S	S
CO4	S	S	M	M	M
CO5	S	S	M	M	S

S Strong **M** Medium **L** Low

224CS1A5DA	FOUNDATIONS OF ARTIFICIAL INTELLIGENCE	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to AI 9 h

Foundations of Artificial Intelligence- The History of Artificial Intelligence –The State of the Art – Risks and Benefits of AI.

Intelligent Agents: Agents and Environments – The Structure of Agents.

Unit II Problem-solving 10 h

Solving Problems by Searching: Problem Solving Agents – Example Problems –Search Algorithms – Uniform Search Strategies – Heuristic Search Strategies - Heuristic Functions.

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems – Constraint Propagation: Inference in CSPs – Backtracking Search for CSPs – Local Search for CSPs – The Structure of Problems.

Unit III Knowledge Representation and Planning 10 h

Knowledge Representation: Ontological Engineering – Categories and Obje4cts – Events – Mental Object and Model Logic – Reasoning Systems for Categories – Reasoning with Default Information.

Automated Planning: Definition of Classical Planning – Algorithms for Classical Planning – Heuristic for Planning – Hierarchical Planning – Planning and Acting in Nondeterministic Domains – Time, Schedules and Resources – Analysis of Planning Approaches.

Unit IV Knowledge and Reasoning 10 h

Quantifying Uncertainty: Acting under Uncertainty – Basic Probability Notation – Inference using Full Joint Distributions – Independence – Baye's Rule and its use – Naïve Bayes Models – The Wumpus World Revisited.

Probabilistic Reasoning: Representation Knowledge in an Uncertain Domain – The Semantics of Bayesian Networks – Exact Inference in Bayesian Networks – Approximate Inference for Bayesian Networks – Casual Networks.

Unit V Decision Making 9 h

Making Simple Decisions: Combining Beliefs and Desires under Uncertainty – The Basis of Utility Theory – Utility Functions – Multiattribute Utility Functions – Decision Networks – The Value of Information – Unknown Preferences.

Making Complex Decisions: Sequential Decision Problems – Algorithms for MDPs – Bandit Problems – Partially Observable MDPs – Algorithm for solving POMDPs

Text Books

1 Stuart Russel and Peter Norvig,(2022), "Artificial Intelligence – A Modern Approach",(4th Edition), Pearson

References

1 K.R. Chowdhary, 2020, "Fundamentals of Artificial Intelligence", First Edition, Springer

2 David L. Poole, Alan K. Mackworth, 2017, "Artificial Intelligence Foundations of Computational Agents", Second Edition, Cambridge University Press

3 Wolfgang Ertel, 2017, "Introduction to Artificial Intelligence", Second Edition, Springer

4 Nicolas Sabouret, 2020," Understanding Artificial Intelligence", First Edition, CRC Press

Course Code	Course Name	Category	L	T	P	Credit
224CS1A5DB	DATA MINING AND DATA WAREHOUSING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of Data Ware housing and Data Mining Concepts
- The methodologies used for analysis of data
- The various approaches with other techniques in data mining and data warehousing

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of Data Mining, Data Warehouse and Data Marts	K2
CO2	Assess raw input data and apply data pre-processing techniques, generalization techniques and data characterization techniques to provide suitable input for a range of data mining algorithms	K3
CO3	Identify Associations in large databases using different Techniques	K3
CO4	Differentiate various classification and clustering techniques	K4
CO5	Develop further interest in research and design of new Data Mining techniques	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	M	S	S	S
CO3	S	S	M	S	S
CO4	S	S	M	M	M
CO5	S	M	M	M	M

S Strong **M** Medium **L** Low

224CS1A5DB	DATA MINING AND DATA WAREHOUSING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Data Mining 9 h

Data Mining –Technologies - Major Issues in Data Mining - Data Preprocessing - Data Cleaning – Data Integration-Data Reduction -Data Transformation and Data Decentralization

Unit II Association Rule Mining and Classification 9 h

Mining Frequent Patterns, Associations and Correlations–Frequent Item set Mining Methods – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation– Support Vector Machines

Unit III Clustering and Applications and Trends in Data Mining 10 h

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods – Kmeans – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model - Based Clustering Methods–Clustering High Dimensional Data-Constraint –Based Cluster Analysis–Outlier Analysis

Unit IV Data Warehousing 10 h

Data warehousing Components –Building a Data warehouse – Mapping the Data Warehouse to a Multiprocessor Architecture–Data Extraction, Cleanup and Transformation Tools

Unit V Business Analysis 10 h

Reporting and Query tools and Applications – Tool Categories – The Need for Applications–Cognos Impromptu–Online Analytical Processing(OLAP)–Need Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multi relational OLAP–Categories of Tools–OLAP Tools and the Internet

Text Books

1. Jiawei Han and Micheline Kamber, 2019, “Data Mining Concepts and Techniques”, Second Edition, Elsevier. (Unit I to III)
2. Alex Berson and Stephen J.Smith, 2007, “Data Warehousing, Data Mining & OLAP”, Tenth Reprint, Tata McGraw Hill Edition. (Unit IV and V).

References

1. K.P.Soman, Shyam Diwakarand V.Ajay, 2006, "Insight into Data mining Theory and Practice”,Easter Economy Edition, Prentice Hall of India
2. PangNingTan, Michael Steinbach and VipinKumar, 2007, “Introduction to Data Mining”, First Edition, Pearson Education
3. HerbertJones, 2017, "Data Mining:The Data Mining Guide for Beginners, Including Applications for Business, Data Mining Techniques, Concepts and More", Bravex Publications
4. Alex Berson, 2017, "Data Warehousing, Data Mining & OLAP", McGraw Hill Education

Course Code	Course Name	Category	L	T	P	Credit
224CS1A5DC	INTERNET OF THINGS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- IoT concepts, IoT technologies, Creative thinking techniques, Co-creation techniques.
- The possibilities offered by the different IoT technologies
- Innovative applications of combinations of various technologies in real-life Scenarios

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	To know about Internet of Things	K2
CO2	To learn about Domain Specific IoTs	K2
CO3	To understand IoT Platforms Design Methodology.	K3
CO4	To learn about IoT Physical Server and IoT Cloud Storage Models	K3
CO5	To learn about case study for IoT design.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	S	S	S	S	S
CO3	S	M	S	M	S
CO4	M	M	M	S	M
CO5	M	S	S	M	M

S Strong M Medium L Low

224CS1A5DC	INTERNET OF THINGS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to IoT 9 h

Introduction-Physical Design of IoT-Logical Design of IoT -IoT Enabling Technologies-IoT Levels and Deployment Templates.

Unit II Domain Specific IoTs and M2M 9 h

Domain Specific IoTs: Introduction-Home Automation-Cities-Environment - Energy-Retail-Logistics-Agriculture-Industry-Health and Lifestyle.

IoT and M2M: Introduction-M2M-Difference between IoT and M2M-SDN and NFV for IoT.

Unit III IoT System Management and IoT Platforms Design Methodology 10 h

IoT System Management: Need for IoT System Management-SNMP-Network Operator Requirements-NETCONF-YANG-IOT System Management with NETCOF-YANG-NETOPEER.

IoT Platforms Design Methodology: Introduction-IoT Design Methodology.

Unit IV IoT Physical Servers & Cloud Storage Models 10 h

IoT Physical Servers and Cloud Offerings: Introduction to Cloud Storage Models and Communication APIs-WAMP-Autobahn for IoT - Xively Cloud for IoT-Python Web Application Framework-Django-Designing RESTful Web API - Amazon Web Services for IoT.

Unit V Data Analytics for IoT & Case Studies Illustrating IoT Design 10 h

Data Analytics for IoT: Introduction-Apache Hadoop -Using Hadoop Map Reduce for Batch Data Analysis Apache Oozie-Apache Spark-Apache Strom-Using Apache Storm for Real-Time Data Analysis.

Case Studies: Introduction-Home Automation-Cities-Environment-Agriculture-Productivity Applications.

Text Books

1 ArshdeepBahga, Vijay Madisetti, 2015, “Internet of Things-A Hands-on Approach”, University Press.

References

1 DimitriosSerpanos, Marilyn Wolf, 2018 "Internet-of-Things (IoT)SystemsArchitectures, Algorithms, Methodologies", Springer International Publishing.

2 SudipMisra, Anandarup Mukherjee, Arijit Roy, 2021, "Introduction to IoT", Cambridge University Press.

3 Rahul Dubey, 2019, " An Introduction to Internet of Things: Connecting Devices, Edge Gateway, and Cloud with Applications",Kindle Edition, Cengage Learning India Pvt. Ltd.

4 Samuel Greengard, 2015, "The Internet of Things", MIT Press Knowledge Essential Series.

Course Code	Course Name	Category	L	T	P	Credit
224CS1A5GA	SOCIAL MEDIA ENGAGEMENT	GE	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- Basics of Communication and social media.
- The features offered by various social media management tools.
- Different social media platforms.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics of communication.	K2
CO2	Identify various forms of communication.	K3
CO3	Identify the features of social media.	K3
CO4	List the benefits of social media.	K4
CO5	Utilize social media management tools to manage social media platforms.	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	M	S	S	S	M
CO3	S	S	S	M	S
CO4	M	S	S	M	M
CO5	S	S	S	S	S

S Strong M Medium L Low

224CS1A5GA	GE: SOCIAL MEDIA ENGAGEMENT	SEMESTER V

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Social Media 4 h

The Power of Social Media - Being Social on Social Media - Online and Offline Benefits - understand Today's Social Networks

Unit II The Role of Social Media and Content Marketing 5 h

Social Sharing - Authority Building - Broadcast Teaching - Influencer Marketing - Dark Social Media - Paid Social Media

Unit III Format Types 5 h

Graphic Requirements - Photos in Posts - Social Network Icon Rules - Video Requirements - Link Requirements

Unit IV Images & Videos for Social Media 5 h

Image Criteria - Social Media Imagery Best Practices - Recommended Tools - Creation of Video in Social Media - Publishing and Broadcasting Social Video - Live Video Tactics - Recorded Video Tactics - Short vs. Long Videos - Video Best Practices

Unit V Leverage Chatbots and Automation 5 h

Definition - Creation of Chatbot - Leverage Paid Social Media - Google Ads - Social Media Ads - The Power of Search and Remarketing - Other Platforms - Wrapping Up

Text Books

1 Ultimate Guide to Social Media Marketing, Eric Butow, Mike Allton, Jenn Herman, Stephanie Liu, 2018, Amanda Robinson.

References

1 Tracy L. Tuten , 2016, " Social Media Marketing", SAGE Publications Ltd..

2 Avery Swartz , 2016, "See You on the Internet: Building Your Small Business with Digital Marketing", Friesens..

3 Jason , 2019, " Social Media Marketing Workbook: How to Use Social Media for Business" , Kindle Edition..

4 Barry Connelly , 2019, "Digital Trust: Social Media Strategies to Increase Trust and Engage Customers" , Digital Trust..

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Course Code	Course Name	Category	L	T	P	Credit
224CS1A6CA	CORE XII: DATA VISUALIZATION	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- fundamental concepts of Visualization Techniques
- visualization Tools and Dashboards
- Real Time applications of Visualization

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental concepts in visualization	K2
CO2	Understand the data and its multiple sources	K2
CO3	Gain knowledge on sorting and grouping	K3
CO4	Make use of data and create dashboards	K3
CO5	Create charts and plots	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1		✓	✓	✓	
CO2	✓	✓	✓		✓
CO3	✓	✓	✓	✓	
CO4	✓	✓	✓		✓
CO5	✓	✓	✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A6CA	CORE XII: DATA VISUALIZATION	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introducing Visualization **10 h**

Data visualization: Need for data visualization- Communicating data-Process steps-Model of Communication- Types of Communication Problems- Principles of Communicating Data-Introduction to Tableau: Using Tableau- Tableau Products-Connecting to Data.

Unit II Working with Single and Multiple Data Sources **09 h**

Tableau: File Types - Workbook - Data Source File - Bookmark - Desktop Architecture - Data Layer - Data Connectors - Live Connection - Tableau Working Environment - Connect to a File - Connect to a Server - Metadata - Grid - Joins - Custom SQL - Data Blending - Data Extracts.

Unit III Sorting and Grouping Data **09 h**

Filtering - Sorting - Discrete and continuous data - Groups - Creating a group-Editing existing group - Creating Hierarchies - Sets - Difference between Set and Group - Measure Names - Measure Values - Table Calculations.

Unit IV Customizing Data and Dashboards **10 h**

Number Functions: Ceiling, Floor, Max, Abs - String Functions: Concatenation, Left, Find, Contains, Len - Logical Functions - Date Functions - Aggregate Functions - Table Calculation Functions - Dashboards: Types, Building, Exploring.

Unit V Measures of Central Tendency and Charts **10 h**

Measures of Central Tendency: Mean, Median, Mode- Dispersion: Range, Quartile, Variance, Standard Deviation - Charts: Box Plot, Pie Chart, TreeMaps, Heat Map, Line Graph, Stacked Bar Chart, Gantt Chart, Scatter Plot, Histogram.

Text Books

1 Ben Jones,2014, "Communication Data with Tableau", First Edition, O'Reilly Media.

2 Seema Acharya, Subhashini Chellappan, 2019, "Pro Tableau A Step-by-Step Guide", Kindle Edition, Apress.

References

1 Joshua N. Milligan, 2015, "Learning Tableau Paperback", Kindle Edition, Ingram Short title.

2 Steve Wexler, Jeffrey Shaffer , Andy Cotgreave, 2017."The Big Book of Dashboards: Visualizing Your Data Using Real-World Business Scenarios", 1st Edition ,Wiley.

3 Nathan Yau,2011," Visualize This: The following data guide to design, Visualization and Statistics", First Edition Wiley.

224CS1A6CP	CORE PRACTICAL VII: DATA VISUALIZATION	SEMESTER VI

Total Credits: 2
Total Hours: 48 h

S.No	Contents
1	Apply filters and sort data to focus on specific segments.
2	Perform various kinds of join operations.
3	Create basic visualizations like bar charts, line charts, and pie charts.
4	Construct an Excel file and create a bar chart showing the same hierarchy as a tree map, coloring it to emphasize similar results.
5	Make a visualization using the grouping function (subgroup under Branch).
6	Make a visualization for the product analysis identifying the highest profits among the products.
7	Make a visualization showing the most calls at the specific time block for call center data.
8	Make a dashboard that helps online sellers to keep track of key metrics for optimizing their online store.
9	Make a visualization of employee data that enables to identify the best employee of the month.
10	Read the data set and execute the following i. Perform Ceiling, Floor, Max and Min operations ii. Create a Scatter Plot iii. Create a Box Plot
11	Perform the following using a dataset i. Gantt Chart ii. Heat Map
12	Visualize Histogram for employee database.

224CS1A6SP	SEC IV: R PROGRAMMING	SEMESTER VI

Total Credits: 2
Total Hours: 48 h

S.No	Contents
1	Script to demonstrate usage of Data types, Variables and Operators.
2	Programs using control structures.
3	Demonstrate loop constructs.
4	Script to demonstrate functions.
5	Program to perform string manipulation functions.
6	Perform various kinds of Join Operations.
7	Apply sorting operations.
8	Demonstrate vectors, lists and arrays.
9	Program to import an Excel file into R.
10	Program to extract columns from a data frame.
11	Create different types of charts.
12	Program to read a CSV file and analyze the data in the file.

Course Code	Course Name	Category	L	T	P	Credit
224CS1A6DA	DSE: MACHINE LEARNING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- fundamental concepts in Machine Learning
- supervised and Unsupervised Learning
- basics of Neural Networks

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental concepts in Machine Learning	K2
CO2	Obtain knowledge on model selection and evaluation	K2
CO3	Examine classification and regression techniques	K2
CO4	Explore unsupervised learning	K3
CO5	Interpret different Neural Network techniques	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓	✓	✓
CO2	✓		✓		✓
CO3	✓	✓	✓	✓	
CO4	✓	✓	✓		✓
CO5	✓	✓	✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A6DA	DSE: MACHINE LEARNING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Machine Learning **09 h**

Introduction to Machine Learning - Supervised learning - Unsupervised learning - Reinforcement learning - Comparison- Applications - Machine Learning Activities - Types of Data - Exploring Structure of Data - Data Quality and Remediation - Data Pre-Processing.

Unit II Modeling and Evaluation **10 h**

Selecting Model - Predictive, Descriptive Models - Training a Model - Holdout method - k-fold Cross-validation method - Bootstrap Sampling - Model Representation and interpretability - Underfitting - Overfitting - Bias - Variance - Evaluating and improving performance of a model.

Unit III Supervised Learning **10 h**

Classification: Learning Steps - Classification Algorithms - k-Nearest Neighbour (kNN) - Decision tree - Regression: Simple linear regression -Regression Analysis: Assumptions, Problems - Improving Accuracy of the Linear Regression Model.

Unit IV Unsupervised Learning **10 h**

Unsupervised Vs Supervised Learning - Application of Unsupervised Learning - Clustering - Clustering techniques: Partitioning methods, K-Means, Hierarchical clustering, DBSCAN - Association Rule Learning - Finding Patterns using Association Rule - Apriori algorithm.

Unit V Neural Network **09 h**

Biological Neuron - Artificial Neuron - Types of Activation Functions - Implementations of Artificial Neural Network (ANN) - Architectures of Neural Network - Learning Process in ANN - Backpropagation.

Text Books

1 Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, 2019 "Machine Learning", Pearson Education

References

1 Ethem Alpaydm, 2015, "Introduction to Machine Learning", PHI Learning Pvt. Ltd., Third Edition.

2 Tom M. Mitchell, 2013, "Machine Learning", Tata McGraw-Hill, New Delhi

3 Ian Witten, 2016, Data mining: Practical Machine Learning Tools and Techniques, Fourth edition, Morgan Kaufmann Publishers.

Course Code	Course Name	Category	L	T	P	Credit
224CS1A6DB	DSE: BIG DATA TECHNOLOGIES	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- fundamental concepts of Big Data
- features of the Hadoop Frameworks and its Applications
- processing environments Hive, Pig, Spark and Kafka

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand big data concepts and characteristics	K2
CO2	Interpret Hadoop Framework and Map reduce	K2
CO3	Develop programs using Hive Scripts	K3
CO4	Design applications using Pig Scripts	K4
CO5	Design applications using Spark and Kafka	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓	✓	
CO2	✓	✓	✓		✓
CO3	✓	✓	✓	✓	
CO4	✓	✓	✓		✓
CO5	✓	✓	✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A6DB	DSE: BIG DATA TECHNOLOGIES	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Big Data **09 h**

Classification of digital data – Characteristics of data –Evolution- Challenges – Five Vs-Business Intelligence vs Big Data - Warehouse environment-Hadoop environment- Classification of analytics -Data science – Terminologies in big data environments - Big data applications.

Unit II Hadoop **10 h**

Hadoop Eco system - Hadoop core components - Hadoop distributions- Hadoop Distributed File System (HDFS) - Commands - Processing data with Hadoop - NameNode - Secondary NameNode and DataNode - Introduction to MapReduce Programming - Mapper - Reducer- Combiner - Partitioner - Searching- Sorting – Compression.

Unit III Hive **10 h**

Introduction- Architecture - Data types - File format– Hive Query Language (HQL) – Data definition – Data manipulation – Database - Tables– Partition – Bucketing - Queries - Views - Indexes – Join –Aggregations – User defined functions.

Unit IV Pig **09 h**

Pig Features - Data Model - Pig Latin – Data Types – Interactive mode – Batch mode – Local and MapReduce mode - Relational operators - User Defined Functions – Parameter substitution - Embedding Pig latin in Python

Unit V Spark and Kafka **10 h**

Hadoop and Spark - Spark programming languages - Spark Architecture – Spark Libraries: Spark SQL - Streaming - Machine learning - GraphX - Spark with Python - Working with Kafka: Kafka Architecture - Need of Apache Kafka - Use cases - Components of Kafka.

Text Books

1 Seema Acharya and Subhashini Chellappan, (2015),"Big Data and Analytics" , (1st Edn.), Wiley India.

2 Sourabh Mukherjee, Amit Kumar Das, Sayan Goswami, 2019 "Big Data Simplified, First Edition, Pearson.

References

1 C. Han Hu, Yonggang Wen, Tat-Seng, Chua, Xuelong Li, (2014), "Toward Scalable Systems for Big Data Analytics: A Technology Tutorial", IEEE.

2 Thomas Erl, Wajid Khattak, and Dr. Paul Buhler, (2016), "Big Data Fundamentals: Concepts, Drivers & Techniques", Prentice Hall.

Course Code	Course Name	Category	L	T	P	Credit
224CS1A6DC	DSE: FUNDAMENTALS OF CLOUD COMPUTING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- concepts and technologies in Cloud Computing
- cloud services
- cloud computing applications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of Cloud Computing	K2
CO2	Gain Knowledge on Cloud Services	K2
CO3	Examine Cloud Technologies	K3
CO4	Acquire knowledge on Cloud Storage providers	K2
CO5	Explore various Cloud Applications	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓		✓	✓
CO2	✓	✓	✓		✓
CO3	✓		✓	✓	
CO4	✓	✓	✓		✓
CO5	✓	✓	✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A6DC	DSE: FUNDAMENTALS OF CLOUD COMPUTING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Cloud Computing **10 h**

Introduction - Cloud Components - Infrastructure - Services - Applications - Intranets and the cloud - Cloud Benefits - Limitations - Security Concerns.

Unit II Cloud Architecture **10 h**

Cloud Computing Reference model - Types of cloud - Economics of cloud -Cloud Services: Cloud Service Providers - Cloud computing services - Operational benefits - Economical Benefits - Datacenter Operations.

Unit III Cloud Technology **09 h**

Hardware and Infrastructure: Clients - Security - Network - Public Internet - Site-to-Site - VPN - Cloud Providers - Consumers - Redundancy - Services - Accessing the Cloud: Platforms - Web Applications - Web APIs - Web browsers.

Unit IV Cloud Storage **10 h**

Security - Reliability - Advantages - Cautions - Outrages - Theft - Storage Providers - Cloud Standards: Application - Client - Infrastructure - Service - Software as a Service: Driving Forces - Company offerings - Industries - Software plus Services: Mobile device integration - Storage models.

Unit V Cloud Applications **09 h**

Google Payment - Google Gears - Microsoft live Services - SQL Services - .NET Services - Application Management - Virtualization: Server Solutions -VMware - VMware Infrastructure - Thin Clients: Sun, Dell - Cloud Services for Individuals.

Text Books

1 Anthony T Velte, 2019, "Cloud Computing: A Practical Approach", Mc Graw Hill Education, Inc.

References

1 Arshdeep Bahga,2013, "Cloud Computing: A Hands -on Approach paperback- Import.

2 Kumar Saurabh, "Cloud Computing – insights into New-Era Infrastructure", Wiley India,2011.

3 Ronald L. Krutz, Russell Dean Vines, "Cloud Security – A comprehensive Guide to Secure Cloud Computing", Wiley – India, 2010

Course Code	Course Name	Category	L	T	P	Credit
224CS1A6DD	DSE: DECISION SUPPORT SYSTEMS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- fundamentals of Decision Support Systems (DSS)
- types and architecture of DSS
- implementation of Group DSS

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the role of DSS in enhancing decision-making process	K2
CO2	Classify the DSS	K2
CO3	Analyze the architecture and software tools	K3
CO4	Identify the DSS models	K4
CO5	Discover the role of Group DSS	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓	✓	✓	
CO2	✓	✓	✓		✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓		✓
CO5	✓	✓	✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A6DD	DSE: DECISION SUPPORT SYSTEMS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Decision Support Systems **09 h**

Human decision-making process - Definition - Decision process - Decision Types - Decision making in business - Impacts - Kepner-Tregoe Decision making method. Systems Information Quality and Models: Information system - Data flow diagrams - DSS as Information Systems - Information and Quality - Models.

Unit II Type of Decision Support Systems **10 h**

DSS hierarchy - Categories - Matching DSS to the Decision type and Decision makers psychological type -Individual and Group DSS - Benefits to user Community - Usage Modes.

Unit III DSS Architecture and Software Tools **09 h**

Major options - Central corporate system - Client/Server computing - Shared data - Stand-Alone System - DSS Software Categories - Standard Packages - DSS Programming Languages and User interfaces.

Unit IV Building and Implementing Decision Support Systems **11 h**

Development process - Project participants - Implementation stage - System conversion - Overcoming resistance to change - Implementation and Ethical Issues. Models in Decision Support Systems: Types of models.

Unit V Group Decision Support Systems **09 h**

Need for Group DSS - Group Vs Individual activities - Media richness and Task types – Types of groups – Groupware – Groupware products - Constructing a data warehouse system - Stages of Project - The Planning and Architecture Stage - Data Warehouse Design Approaches.

Text Books

1 Efrem G. Mallach (2010), "Decision Support and Data Warehouse Systems", Tata Mcgraw Hill Publishers.

References

1 Marakas, G M, 2009, "Decision Support Systems in the 21st Century", (2nd Edn), PHI Learning.

2 Taylor, J, 2011, Decision Management systems : A Practical Guide to Using Business Rules and Predictive Analytics", IBM Press

3 Efraim Turban, Ramesh Sharda, Dursun Delen, 2014, "Decision Support and Business Intelligence Systems, Pearson Education

Course Code	Course Name	Category	L	T	P	Credit
224CS1A6DE	DSE: AUGMENTED REALITY	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- fundamentals of Virtual Reality
- computer Vision and Image Recognition
- user Interaction and Experience Design in AR

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	State the concept of Virtual Reality	K1
CO2	Interpret computer vision techniques used for tracking	K3
CO3	Understand working principles of 3D reconstruction and sensor data fusion.	K2
CO4	Understand the design and development of Augmented Reality	K2
CO5	Discover real-world applications of Augmented Reality	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓		✓	✓
CO2		✓	✓	✓	
CO3	✓		✓	✓	✓
CO4		✓	✓		
CO5	✓		✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A6DE	DSE: AUGMENTED REALITY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Virtual Reality **10 h**

Modern VR Experiences - Overview of VR systems: Hardware – Software- Human Physiology and Perceptions- The Geometry of Virtual Worlds: Geometric Models - Changing Position and Orientation – Axis Angle Representations of Rotation - Light and Optics: Basic Behavior of Light - Lenses - The Human Eye - Cameras.

Unit II Augmented Reality **10 h**

Introduction- Applications of AR - Calibration: Camera Calibration – Intrinsic and Extrinsic Parameters - Setup for AR - Techniques – Tools – Registration - Pose Estimation - Tracking: Pose Tracking – Classifications of Tracking – Stationary Tracking Systems -Mobile Sensor based Tracking – Optical and Hybrid Tracking – Marker Based Tracking.

Unit III Computer Vision for AR **09 h**

Image processing - Computer Vision - Object Detection - Spatial Mapping - 3D outdoor Tracking. 3D Graphics in AR: Basics of 3D Computer Graphics - 3D Rendering - 3D Modeling Software - Graphic Libraries - OpenCV and OpenGL to create AR.

Unit IV Designing and Developing AR Systems **10 h**

Design principles for AR: Interaction for AR – Software Architecture and Design Patterns for AR - AR Interfaces - Developing AR Systems: Non programming Frameworks - Programming Frameworks – Commercial Frameworks - Platforms and Toolkits for development – Developing Web based AR – AR Markup Languages.

Unit V Mobile AR **09 h**

Types of Mobile Apps - AR Browsers for Smartphones – Point of Interests in Mobile AR – AR Applications for Android - Developing Mobile AR Applications: Developing and Creating an AR application using sensor data - AR Application Development using different Platforms - Developing AR applications for Smartphones.

Text Books

1 Steven M. LaValle, 2019, " VIRTUAL REALITY ", Cambridge University Press - Reprint.

1 Shetty, G Chetankumar, 2020, "Augmented Reality - Theory, Design and Development. Published by McGraw Hill; First edition, McGraw Hill Education (India).

References

1 Schmalstieg, D., & Hollerer, T. ,2016, Augmented Reality: Principles and Practice. Addison-Wesley Professional.

2 Gerard Jounghyun Kim, 2005 , "Designing Virtual Systems: The Structured Approach".

3 Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, 2005, "3D User Interfaces, Theory and Practice", Addison Wesley, USA.

Course Code	Course Name	Category	L	T	P	Credit
224CS1A6DF	DSE: FUNDAMENTALS OF BLOCKCHAIN TECHNOLOGIES	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- fundamentals of blockchain technology and its components
- different Blockchain subjects, platforms and their unique features
- to develop and deploy smart contracts

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of blockchain	K1
CO2	Gain knowledge of decentralized systems and hash functions.	K2
CO3	Learn about consensus algorithms in decentralized systems	K3
CO4	Examine Ethereum and Bitcoin	K3
CO5	Build Smart contracts	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	✓	✓			✓
CO2	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓
CO4	✓	✓	✓		✓
CO5	✓	✓	✓	✓	✓

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

224CS1A6DF	DSE: FUNDAMENTALS OF BLOCKCHAIN TECHNOLOGIES	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Basics of Blockchain **09 h**

Concept - History - Definition - Fundamentals - Characteristics - Consensus in Trust-Building - Categories: Public, Private and Hybrid - Distributed Ledger Technologies - Decentralized Applications and Databases - Architecture - Transactions - Chaining Blocks - Value Proposition.

Unit II Decentralized System and Hash Functions **10 h**

Distributed Decentralized databases - Decentralized Enterprise - Decentralization – Disintermediation - Decentralized Enterprise Regulation - Hashing - Message Authentication Code - Secure Hash Algorithm (SHA-1) - Distributed Hash Tables - Hashing and Data Structures - Hashing in Blockchain Mining.

Unit III Consensus and Cryptography **09 h**

Consensus approach - Algorithm - Byzantine agreement methods - Cryptography: primitives - Symmetric and Asymmetric cryptography.

Unit IV Components **10 h**

Ethereum: Ethereum Virtual machine - Working - Clients - Key-pairs - Addresses - Wallets - Transactions - Bitcoin: Working - Merkle Trees - Block Structure - Address - Transactions - Network - Wallets - Payments.

Unit V Smart Contract **10 h**

Absolute and immutable - Contractual confidentiality - Law implementation and settlement - Characteristics - Internet of Things - Utilities - Proof of origin - Supply chain management - Case Study.

Text Books

1 Kumar Saurabh, Ashutosh Saxena, 2020, Blockchain Technology Concepts and Applications, WILEY publications.

References

1 Debajani Mohanty,2022, Blockchain from concept to Execution, BPB Publications, Second Edition.

2 https://www.dappuniversity.com

Course Code	Course Name	Category	L	T	P	Credit
223BC1A6AA	INNOVATION, IPR AND ENTREPRENEURSHIP	AECC-III	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- the role of Entrepreneurship in Economic Development and basics of Intellectual Property Rights, Copy Right Laws, Trade Marks and Patents
- ethical and professional aspects related to intellectual property law context
- Intellectual Property(IP) as an career option

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of innovation, IPR, entrepreneurship and its role in economic development	K2
CO2	Know the value, purpose and process of Patent	K2
CO3	Understand the basics of trademarks and industrial designs	K2
CO4	Acquire knowledge about copyright and copyright law	K2
CO5	Identify Geographical Indications	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1			✓		✓
CO2		✓			✓
CO3	✓			✓	✓
CO4	✓		✓		✓
CO5	✓	✓		✓	✓

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

223BC1A6AA	AECC III: INNOVATION, IPR AND ENTREPRENEURSHIP	SEMESTER VI

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Innovation and Entrepreneurship 05 h

Meaning of Creativity, Invention and innovation - Types of Innovation - Introduction and the need for Intellectual Property Right (IPR) - Kinds of IPR – National and International IPR Policy. Entrepreneurs-Concept, characteristics, Functions, need and types, Entrepreneurial decision process. Role of Entrepreneurship in Economic Development.

Case Study: Jayabharati Viswanath: A case of Ladel to Leather.

Unit II Patents 05 h

Introduction and origin of Patent System in India- Conceptual Principles of Patent Law in India - Process for obtaining patent - Rights granted to a Patentee -Validity of patent- Infringement of Patent.

Case Study: Apple Inc. v. Samsung Electronics Co. Ltd. (2020)

Unit III Trademarks 05 h

Origin of Trade Marks System - Types - Functions - Distinctiveness and Trademarks - Meaning of Good Trademark - Rights granted by Registration of Trademarks - Infringement of trademark.

Case Study: Merck v. Mylan Pharmaceuticals (2016)

Unit IV Copyright 05 h

Introduction and Evolution of Copyright - Objectives and fundamentals of Copyright Law - Requirements for Copyrights - Works protectable under Copyrights - Authorship and Ownership - Rights of Authors and Copyright owners - Infringement of Copyright.

Case Study: J.K. Rowling and Warner Bros. v. Steve Vander Ark (2007)

Unit V Geographical Indications 04 h

Introduction and Concept of Geographical Indications - History - Administrative Mechanism - Benefits of Geographical Indications - Infringement of registered Geographical Indication. Case Study: Darjeeling Tea v. Tea Board of India (2012)

Note: Case studies related to the above topics to be discussed (Examined internal only)

Text Books

1. Nithyananda, K V. 2019, "Intellectual Property Rights" Protection and Management. Cengage Learning India Private Limited, New Delhi, India.
2. Dr.S.S.Khanka, 2020,"Entrepreneurial Development", S Chand and Company Limited, New Delhi, India.

References

1. Ahuja, V K. 2017, "Law relating to Intellectual Property Rights", 3rd Edition, Lexis Nexis, Gurgaon, India.
2. Neeraj, P., & Khusdeep, D. 2014, "Intellectual Property Rights",1st Edition, PHI learning Private Limited, New Delhi,India.
3. http://www.bdu.ac.in/cells/ipr/docs/ipr-eng-ebook.pdf.
4. https://knowledgentia.com/knowledgeate

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