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

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu and Accredited by NAAC with 'A++' Grade (3rd Cycle-3.64 CGPA)
Dr. N.G.P. - KalapattiRoad, Coimbatore-641048, Tamil Nadu, 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 Information Technology Degree

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

Programme: B. Sc (Information Technology)

Eligibility

Candidates for admission to the first year of the Bachelor of Science (Information Technology) 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 there to 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. Demonstrating a substantial understanding of concepts in key areas of Information Technology and its applications.

2. Analysis and synthesis involved in Computer System, Information System and Computer applications.

3. To develop a software and in its design and implementation for professional competence

4. To equip and train the students to meet the requirement of the IT Industries and Public Sectors.

5. To stimulate an interest in computing as an academic discipline with a view to encouraging progression to research and higher studies.

PROGRAMME OUTCOMES

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

PO Number	PO Statement
PO1	Understand the fundamental concept of Information Technology
PO2	Gain knowledge on programming language to constructs application and packages
PO3	Improve programming knowledge to solve real-world problems using Information Technology
PO4	Develop necessary skills to design digital system
PO5	Enhance problem solving, analytical, communication, team work and potential to develop software and network management

B. Sc. INFORMATION TECHNOLOGY

(For the students admitted during the Academic Year 2022-23)

Credit Distributions

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 (4 credits)	11	11x4=44	I to VI
	Core (3 credits)	2	2x3=6	I to VI
	Core Practical (5 credits) - Embedded	2	2x5=10	III to IV
	Core Practical (2 credits)	3	3x2=6	I to VI
	Core Project (4 credits)	1	1x4=4	VI
	Inter Departmental Course (IDC)	4	4x4=16	I to IV
	Discipline Specific Elective (DSE)	3	3 x 4 =12	V & VI
	Skill Enhancement Course (SEC)	4	4x2 =8	III to VI
	Industrial Training	1	1x2=2	V
IV (8 Credits)	Environmental Studies (AECC)	1	1x2=2	I
	Basic Tamil/Advanced Tamil/Human Rights, & Women's Rights (AECC)	1	1x2=2	II
	Generic Elective (GE)	1	1x 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. INFORMATION TECHNOLOGY

Course Code	Course Category	Course Name	L	T	P	Exam (hours)	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
224IT1A1CP	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										
224IT1A1XA	Extension Activity	NSS/NCC/ YRC/RRC/ Yoga/Sports/ Clubs	-	-	-	-	50	-	50	1
Total			22	3	5	-	-	-	700	23

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Course Code	Course Category	Course Name	L	T	P	Exam (hrs)	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
224IT1A2CP	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										
224IT1A2XA	Extension Activity	NSS/NCC/ YRC/RRC/ Yoga/Sports/ Clubs	-	-	-	-	50	-	50	1
		Total	**22**	**3**	**5**	-	-	-	**700**	**23**

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Course Code	Course Category	Course Name	L	T	P	Exam (hours)	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
224CS1A3CA	Core - VI	Operating Systems	3	-	-	3	50	50	100	3
224CT1A3CP	Core Practical-III	Java Programming	3	-	4	3	50	50	100	5
224IT1A3SP	SEC PRACTICAL-I	SQL and PL/SQL	-	-	4	3	50	50	100	2
225AT1A3IA	IDC - III	Business Accounting	4	-	-	3	50	50	100	4
		Total	20	2	8	-	-	-	700	24

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Course Code	Course Category	Course Name	L	T	P	Exam (hours)	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
224IT1A4CA	Core - VIII	Software Engineering	3	-	-	3	50	50	100	3
224CA1A4EP	Embedded Practical	Python Programming	3	-	4	3	50	50	100	5
224IT1A4SP	SEC-II	PHP Programming	-	-	4	3	50	50	100	2
225CO1A4IB	IDC-IV	Human Resource Management	4	-	-	3	50	50	100	4
		Total	**20**	**2**	**8**	-	-	-	**700**	**24**

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Course Code	Course Category	Course Name	L	T	P	Exam (hours)	Max Marks			Credits
							CIA	ESE	Total	
Fifth Semester										
Part-III										
224IT1A5CA	Core-IX	Full Stack Development	4	1	-	3	50	50	100	4
224IT1A5CB	Core-X	Cyber Security and Ethics	4	1	-	3	50	50	100	4
224IT1A5CC	Core-XI	Cloud Computing	4	1	-	3	50	50	100	4
224IT1A5CP	Core Practical-V	Full Stack Development	-	-	4	3	50	50	100	2
224IT1A5SP	SEC Practical-III	Mobile Application Development	-	-	4	3	50	50	100	2
224IT1A5DA	DSE –I	Mobile Computing	4	1	-	3	50	50	100	4
224IT1A5DB		Principles of Data Mining and Data Warehousing								
224IT1A5DC		Software Quality Assurance								
224IT1A5TA	IT	Industrial Training	-	-	-	3	50	50	100	2
Part-IV										
	GE–I		2	-	-	-	50	-	50	2
		Total	**18**	**4**	**8**	**-**	**-**	**-**	**750**	**24**

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Course Code	Course Category	Course Name	L	T	P	Exam (hrs)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part-III										
224IT1A6CA	Core- XII	Internet of Things	4	-	-	3	50	50	100	4
224IT1A6CB	Core - XIII	Big Data Analytics	4	-	-	3	50	50	100	4
224IT1A6SP	SEC- IV	Data Analysis with R			4	3	50	50	100	2
224IT1A6CV	Core - XIV	Project and Viva voce	-	-	8	3	50	50	100	4
224IT1A6DA	DSE –II	Blockchain Technology and Applications	4	-	-	3	50	50	100	4
224IT1A6DB		Artificial Intelligence and Machine Learning								
224IT1A6DC		Software Project Management								
224IT1A6DD	DSE –III	Fundamentals of Augmented Reality and Virtual Reality	4	-	-	3	50	50	100	4
224IT1A6DE		Human Computer Interaction Design								
224IT1A6DF		DevOps								
Part – IV										
223BC1A6AA	AECC-III	Innovation, IPR and Entrepreneurship	2	-	-	3	50	-	50	2
		Total	18	-	12	-	-	-	650	24
		***Grand total**							**4200**	**142**

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DISCIPLINE SPECIFIC ELECTIVE

Students shall select the desired course of their choice in the listed elective course during Semesters V and VI

Semester V (Elective I)

List of Elective Courses

S.No.	Course Code	Name of the Course
1	224IT1A5DA	Mobile Computing
2	224IT1A5DB	Principles of Data Mining and Data Warehousing
3	224IT1A5DC	Software Quality Assurance

Semester VI (Elective II)

List of Elective Courses

S.No.	Course Code	Name of the Course
1	224IT1A6DA	Blockchain Technology and Applications
2	224IT1A6DB	Artificial Intelligence and Machine Learning
3	224IT1A6DC	Software Project Management

Semester VI (Elective III)

List of Elective Courses

S.No.	Course Code	Name of the Course
1	224IT1A6DD	Augmented Reality and Virtual Reality
2	224IT1A6DE	Human Computer Interaction Design
3	224IT1A6DF	DevOps

GENERIC ELECTIVE COURSES(GE)

The following are the courses offered under Generic Elective Course

Semester V(GE-I)

S.No.	Course Code	Course Name
1	224IT1A5GA	Business Information Systems

EXTRA CREDIT COURSES

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

Semester III

S.No.	Course Code	Course Name
1	224IT1ASSA	Data Science Concepts
2	224IT1ASSB	Network Protocols

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	10x2=20	**Choose the correct answer**	10x1=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 1/2 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- रजियापाठ 2- मक्रीलपाठ 3- बहतापानीनिर्मला
पाठ 4- राष्ट्रपितामहात्मागाँधी

Unit II 13 h

कहानीकुंज- डॉवी.पी. 'अमिताभ'(पाठ 1-4)

Unit III 12 h

व्याकरण : शब्दविचार (संज्ञा, सर्वनाम,विशेषण)

Unit IV 12 h

अनुच्छेद लेखन

Unit V 10 h

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

Text Books

1 प्रकाशक: सुमित्रप्रकाशन 204 लीलाअपाट्मेंट्स, 15 हेस्टिंग्सरोड'अशोकनगरइलाहाबाद-211001

2 प्रकाशक: गोविन्दप्रकाशनसदरबाजार, मथुराउत्तरप्रदेश-281001

3 पुस्तक: व्याकरण प्रदिप – रामदेवप्रकाशक: हिन्दी भवन 36 टेगोर नगर इलाहाबाद-211024

4 पुस्तक: व्याकरण प्रदिप – रामदेवप्रकाशक: हिन्दी भवन 36 इलाहाबाद-211024

5 प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

Dr.N.G.P. Arts and Scie
APPROVED

BoS- 13th	AC - 13th	GB 18th
30-7-22	6-9-22	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 30-7-22	AC - 13th 6-9-22	GB - 18th 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.

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 members – 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 Reema Thareja , 2015, "Programming in C", 2nd Edition, Oxford University Press.

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

224IT1A1CP	CORE PRACTICAL I : C PROGRAMMING	SEMESTER I

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Program to perform various Operators in C
2	Program to implement Decision making statements in C
3	Program to perform Iteration statements in C
4	Program to implement Array concept in C
5	Program to perform User-defined functions
6	Program to perform String Manipulations using Built-in functions
7	Program to demonstrate handling of preprocessor directives
8	Program to demonstrate handling of pointers
9	Program to implement User-defined data types using Union
10	Program to implement Structure concept
11	Program to implement File operations
12	Program to implement Memory Management

Note: Out of 12 programs 10 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, McGraw Hill 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)

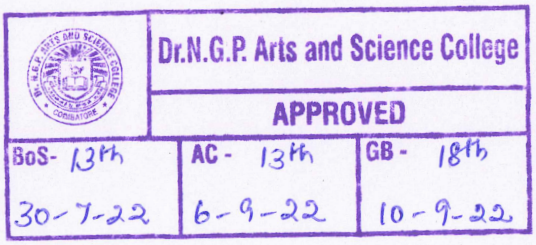
References

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 .



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.

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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 பண்பாடு நாகரீகம், பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத் திறன்களை 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	K1
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2
CO3	பாட இணைச்செயல்பாடுகள் (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 - பதினென் கீழ்க்கணக்கு நூல்கள்

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. இனியவை நாற்பது - 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 - பொதுத் தலைப்பில் 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

आधुनिक पद्य – शबरी (श्री नरेश मेहता)

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 – रामदेव प्रकाशक: 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 FOCUSES 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: Chapter 1- Chapter 5

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 Pootha Kalam : Chapter 1- Chapter 10

Unit V **Autobiography** 12 h

Neermathalam Pootha Kalam: Chapter 11- Chapter 20

Text Books

1. Ambika Suthan Mangad, Enmakaje (Novel), DC Books Kottayam, Kerala, India. (Unit I to III)
2. Madhavikkutty, Neermathalam Pootha Kalam (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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BoS- 14th	AC - 14th	GB - 19th
6-12-22	19.01.23	30.01.23

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 nonlinear 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.

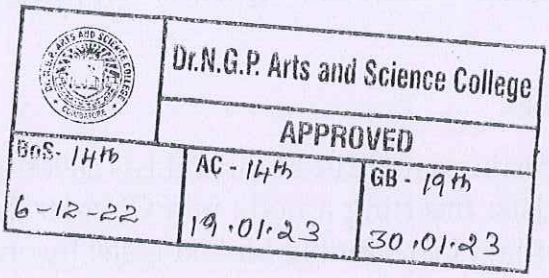
References

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

2 Yashavant Kanetker, 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 oriented programming 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 Yashavant Kanetkar, 2020, "Let Us C++", BPB Publications.

5 https://www.codecademy.com/

6 https://www.simplilearn.com/

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224IT1A2CP	CORE PRACTICAL: DATA STRUCTURES AND C++	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Program to implement the following using an array a) Stack ADT b) Queue ADT
2	Program to perform normal queue using array method in C++.
3	Program to implement list ADT to perform following operations a) Insert an element into a list b) Delete an element from list c) Search for a key element in list d) Count number of nodes in list
4	Program to demonstrate Circular queue using array.
5	Program to use functions and perform the following a) Create a doubly linked list of elements b) Delete a given element from the above doubly linked list c) Display the contents of the above list after deletion
6	Program to Use recursive functions and Tree Traversal for the following a) Preorder b) Inorder c) Postorder
7	Program to perform the following a) Create a binary search tree of characters b) Traverse the above Binary search tree recursively in Preorder, Inorder and Postorder
8	Program to perform Insertion and Deletion from an AVL-tree.
9	Program to perform the following a) Search for a key element in a list of elements using linear search b) Search for a key element in a list of sorted elements using binary search

10 Program to implement the following

a) Create a binary search tree of integers

b) Traverse the above Binary search tree non recursively in Inorder

11 Program to implement Sorting algorithms

a) Bubble sort b) Selection sort c) Quick sort d) Insertion sort

12 Program to implement all the functions of a dictionary (ADT) using hashing.

Note: Out of 12 – 10 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.

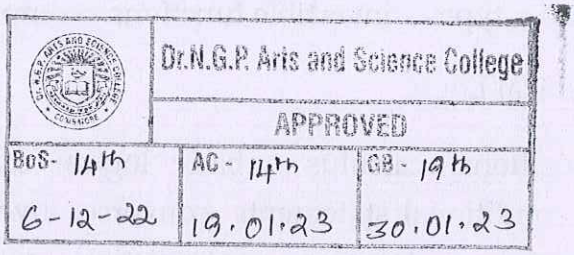
References

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 6-12-22	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. வலைதள முகவரி : https://www.tamilvu.org

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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. Venkataram and 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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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
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.

Course Code	Course Name	Category	L	T	P	Credit
224CT1A3CP	JAVA PROGRAMMING	CORE PRACTICAL	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.

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.

224IT1A3SP	SEC PRACTICAL I: SQL AND PL/SQL	**SEMESTER III**

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Program to implement DDL commands with constraints
2	Program to implement DML commands
3	Program to implement different types of function
4	Program to implement different types of operators
5	Program to implement different types of Joins
6	Program to implement Group By & having clause , Order by clause , Indexing and Views
7	Program to implement aggregate functions
8	Program to implement packages
9	Program to implement PL/SQL cursor and exceptions
10	Program to implement SQL procedures
11	Program to implement SQL Triggers
12	Program to prepare report using SQL Queries

Note: Out of 12 programs 10 mandatory

Course Code	Course Name	Category	L	T	P	Credit
225AT1A3IA	BUSINESS ACCOUNTING	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the basic accounting concepts and conventions
- the preparation of different types of Cash books
- the purpose of preparing the final accounts

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	know the basic concepts of accounting	K1
CO2	understand the Journal transaction for posting the ledger	K2
CO3	apply the knowledge of accounting process in the preparation of subsidiary books	K3
CO4	prepare the Bank Reconciliation Statement	K3
CO5	examine the Final Accounts	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

225AT1A3IA	BUSINESS ACCOUNTING	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Basic Accounting Concepts 08 h

Need for Accounting - Objectives - Branches of Accounting - Book-keeping vs Accounting - Functions and Importance of Accounting - Advantages and Limitations - Users of Accounting information - Accounting Concepts and Conventions. Accounting Standards (AS) - International Financial Reporting Standards (IFRS) - Accounting Standards in India.

Case Study on Accounting Concepts

Unit II Journal, Ledger and Trial Balance 10 h

Journal: Recording of entries in journal with narration - Ledger: Posting from journal to respective ledgers. Trial balance - Need for preparing Trial Balance - Features - Objectives of preparing Trial Balance - Limitations - Methods of preparing Trial Balance - Suspense account.

Unit III Subsidiary Books 10 h

Subsidiary Books - Types of subsidiary books - Advantages of subsidiary books - Purchases book - Purchases returns book -Sales book - Sales returns book - Bills receivable book -Bills payable book. Cash Book - Importance - Types of cash book - Single column cash book - Double column cash book - Three column cash book - Petty Cash book

Unit IV Bank Reconciliation Statement 10 h

Bank Reconciliation Statement-difference between cash book and pass book-Preparation of Bank Reconciliation Statement.

Case Study on Bank Reconciliation Statement

Unit V Final Accounts 10 h

Preparation of Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.

Case Study on Final Accounts

Note: The question paper shall cover 20% theory and 80% problem.

Case laws related to the above topics to be examined (Examined internal only)

Text Books

1 Reddy T.S. and Murthy A, 2023, "Financial Accounting", Sixth Edition, Margham Publications, Chennai.

2 Nagarajan,K.L.,Vinayaka, Nand Mani P.L. 2019. "Principles of Accountancy", Fifth Edition. Sultan Chand & Company Ltd, New Delhi

References

1 Dr. Maheswari, S.N., 2017, Financial Accounting, Fifth Edition,Vikas Publishing House, New Delhi).

2 Arulandam. M. A and Ramaan. K.S, 2019 Advanced Accountancy. Revised Edition 2016, Himalaya Publishing House, Mumbai.

3 Jain, S.P. and Narang , K.N. , 2018, Financial Accounting, Tenth Edition, Kalyani Publishers, New Delhi.

4 Gupta R.L 2019. Financial Accounting, Ninth Edition, Sultan Chand & Company Ltd., New Delhi

224IT1ASSA	SELF STUDY: DATA SCIENCE CONCEPTS	SEMESTER III

Total Credit: 1

Syllabus

Unit I Introduction

AI, Machine learning and Data Science : What is Data Science, Extracting Patterns, Building Models , Learning Algorithms , Associated Fields- Case for data science : Volume, Dimensions.

Unit II Data Science Process

Prior Knowledge: Objective, Subject area, data - Data Preparation: Data Exploration, Data Quality, Missing Values, Data types and Conversions, Transformations-, Feature Selection , Data Sampling.

Unit III Data Exploration

Objectives - Data sets : Types of data- Descriptive statistics, Univariate Exploration, Multivariate Exploration - Data Visualization : Univariate Visualization, Multivariate Visualization, Visualizing High-Dimensional Data.

Unit IV Classification

Decision Trees : How It Works, How to Implement - Rule Induction : Approaches to Developing a Rule Set, How It Works, How to Implement- K- Nearest Neighbours - How It Works, How to Implement.

Unit V Regression Models

Linear regression : How it Works, How to Implement - Check points - Logistic Regression : How it Works, How to Implement - Mining Association rules : Itemsets, Rule Generation, Apriori Algorithm

Text Books

1 Vijay Kotu, Bala deshpande, 2019, "Data Science - Concepts and Practices ", MK Publishers, Second Edition.

2 V. K. Jain , 2018, "Data Science and Analytics ", Khanna Publishing.

References

1 A. Ali, 2022, " Data Science for Beginners", Hack Book Works Pubishers.

2 Dr Gypsy Anand/ DrRupam Sharma, 2020, "Data Science Fundamentals And Practical Approaches ", BPB Publications.

3 N. Meenakshi K. E. Rajakumari S. Hariharasitaraman, 2015, "Data Science and Machine Learning", Notion Press Publishing.

4 Joel Grus, 2019, "Data Science From Scratch", Shroff/O'Reilly, Second edition.

224IT1ASSB	SELF STUDY: NETWORK PROTOCOLS	SEMESTER III

Total Credit: 1

Syllabus

Unit I Network Models

Network Models: What is a Model- why use a model?- OSI Model:OSI-Beyond the Layers, OSI/ITU-T Protocols – Introducing TCP/IP: TCP/IP and the RFCs-The Practical Side of TCP/IP-Encapsulation-Addressing-Equipment.

Unit II Ethernet and Internet Protocol

Ethernet:Structure: Preamble, Source and Destination MAC Addresses, Control Field, Data Field, Frame Check Sequence. Ethernet Operation- Physical Layer: Cabling –Encoding:10Base-T, 100Base-T, 1000Base-T-Topologies.Internet Protocol: Structure-Addressing- Operation-Security Warning.

Unit III Address Resolution Protocol

Address Resolution Protocol: Techniques- Protocol Description-StructureAddressing in the ARP Request- Addressing in the ARP Reply- Operation – Additional Operations-Security Warning-IPv6..

Unit IV Network Equipment and ICMP

Network Equipment: Tables and Hosts -Hubs or Repeaters-Switches and BridgesAccess Points-Routers- Multilayer Switches and Home Gateways- Security. Internet Control Message Protocol: Structure- Operation and Types: Echo Request and Echo Reply, Redirect (Type 5), Time to Live Exceeded(Type 11), Destination Unreachable (Type 3) -IPv6.

Unit V Subnetting and Other Masking Acrobatics

Subnetting and Other Masking Acrobatics: What is a Subnet?-Subnet PatternsSubnet IP Addressing- A shorthand Technique- Effect on Address SpaceSupernetting-Supernetted Network-Classless Inter-Domain Routing

Text Books

1 Bruce Hartpence, 2011, "Packet Guide to Core Network Protocols", First Edition, O'Reilly.

References

1 Andrew S. Tanenbaum, 2011, "COMPUTER NETWORKS", 5th edition, PHI.

2 Javvin, 2005, "Network Protocols Handbook", 2nd Edition, Javvin Technologies Inc., USA

BoS Chairman/HOD
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APPROVED

BoS - 15th	AC - 15th	GB - 20th
10/6/23	14/7/23	05/08/23

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'un	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 protocols used in the layers

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Describe the working of OSI and TCP/IP Reference 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
224IT1A4CA	SOFTWARE ENGINEERING	CORE	3	-	-	3

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	✓	✓	✓	✓	✓
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

224IT1A4CA	SOFTWARE ENGINEERING	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I INTRODUCTION TO SOFTWARE ENGINEERING 06 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.

Unit II SOFTWARE PROCESS 08 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

Unit III UNDERSTANDING REQUIREMENTS 07 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 07 h

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

Unit V SOFTWARE TESTING 08 h

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

Text Books

1 Roger S.Pressman. Bruce R.Maxim, "Software Engineering A Practitioner's Approach", McGraw Hill Education, 8th Edition 2019

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

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 Oeartors

2. Python program to Evaluate Expression

2.Python Program to illustrate decision statements

3.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

6. Python Program to Illustrate User defined functions

7. Python program to Demonstrate Lamda function

8. 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.

9. Python program to demonstrate String operations

10. Python Program to implement Lists

11. Python program to implement Tuples

12. Python Program to implement Sets

13. 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.

14.Python Program for Basic Operations in ND array

15. 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

16.Python Program for Sorting and Ranking

17.Python Program to read CSV files

18.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.

224IT1A4SP	PHP Programming	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Implement arithmetic operations that takes two numbers and an operator (+, -, *, /) as input and produce the results.
2	Generate and display the Fibonacci sequence up to a specified number of terms.
3	Implement sorting in ascending order.
4	Count number of words in a given sentence.
5	Implement a login system in PHP where users can log in with a username and password.
6	Design a scientific calculator using PHP
7	Develop a basic PHP-based quiz application that presents multiple-choice questions to users and provides instant feedback on their answers.
8	Build a simple PHP application that performs CRUD (Create, Read, Update, Delete) operations on a predefined dataset.
9	Design a webpage for Student Profile.
10	Develop a user registration form that allows users to create an account with a unique username and password and it stores the user information in a MySQL database.
11	Develop a simple product inventory management system that allows users to add, view and delete products. Store the product information, such as name, description, and quantity in MySQL database.
12	Build a system that calculate student grades and overall GPA in a MySQL database

Course Code	Course Name	Category	L	T	P	Credit
225CO1A4IB	HUMAN RESOURCE MANAGEMENT	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- realize the importance of human resource management
- explain the various methods of performance appraisal
- analyze the qualities of a leader and controlling methods

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept and importance of Human Resource Management	K2
CO2	Summarize about human resource planning	K2
CO3	Contrast the human behaviour process	K3
CO4	Assess the organizational discipline and behaviours	K4
CO5	Analyze the qualities required for a leader and directing	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

225CO1A4IB	HUMAN RESOURCE MANAGEMENT	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48h

Syllabus

Unit I Human Resource Management 8 h

Meaning – Importance – Evaluation – Objectives – Scope -Hawthorn Studies – Its implications – Organization structure.

Unit II Human resource planning 8h

Human resource planning – Job analysis – Role analysis – Selection and Recruitment – Right Sizing - Testing – Interview- SWOC analysis - Training – Promotion

Case study on Recruitment and Selection

Unit III Human Resource Development 10 h

Human Resource Development - Performance appraisal – Job evaluation and merit rating – Job satisfaction. Human behaviour process – Perception – Motivation-theories of Motivations - Personality development -Main determinants of Personality – Theories of personality

Case study on human behaviour process

Unit IV Organisational Discipline 12 h

Organisational Discipline: Meaning – Causes of Indiscipline – Acts of Indiscipline – Procedure for Disciplinary Action – Organization conflict- Conflict in organizational behaviors – Individual aspect of conflict – Management of conflict - Whistle Blowing - Grievance – Meaning – Characteristics of Grievances – Causes of Grievance – Methods of knowing Grievance – Grievance Redressal Procedure

Case study on conflict in organizational behaviour.

Unit V Direction 10 h

Direction – Supervision – Control - Leadership –Types of Leadership - Leadership theories, Theories of supervision.

Text Books

1 Prasad,L.M., 2019, Organizational behavior, 6th Edition, S. Chand Publishing, New Delhi.

2 Gupta, C.B., 2018, Human Resource Management, 19th Edition, S. Chand Publishing, New Delhi

References

1 Balaji. C.D., 2018, Human Resource Management, 1st Edition, Margham Publication, Chennai

2 Aswathappa, K., 2016, Organizational Behaviour, 12th Edition Himalaya Publishing Home Pvt Ltd., Mumbai.

3 Fred Luthans., 2015, Organizational Behaviour, 10thEdition, Tata McGraw-Hill Education, New Delhi.

4 Memoria, C.B., 2014, Personnel Management, 24th Edition, Himalay Publishing House Pvt. Ltd., Mumbai

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

Course Code	Course Name	Category	L	T	P	Credit
224IT1A5CA	FULL STACK DEVELOPMENT	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basics of Front-End Design
- Styling and validating the elements
- Back-End & Database

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Gain Knowledge in designing the webpage using HTML	K1
CO2	Demonstrate the working of CSS	K2
CO3	Understanding and applying the validation to the webpage.	K2
CO4	Explain the concept of Node.js	K2
CO5	Apply the concept of MongoDB in web development	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

224IT1A5CA	FULL STACK DEVELOPMENT	SEMESTER V

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Full Stack & Web Programming 10 h

Introduction to Full Stack Development: Full Stack - Full Stack Web Developers – Front-end Development – Back-end Technologies - Database – Popular Stacks.

HTML 5.0: HTML Tags - Structural Elements - Title and Meta Elements – Attributes - Body Elements – Difference between HTML 4.0 and HTML 5.0.

Coding standards - Block Elements -Text Elements and Character References – Audio – Video.

Unit II CSS 10 h

CSS Overview – CSS Rules- CSS Syntax and style- Class Selectors – ID Selectors – Cascading- Style attributes and container – CSS Properties: Color, Text, Font and Border.

Case study: Designing a Web Page.

Unit III Introduction to Java Script 12 h

Introduction: Buttons - Functions- Variables – Identifiers – Form element – Controls: Text. JavaScript Basics: window Object - if Statement – Strings –Loops and Additional Controls.

Unit IV Node JS 14 h

Learning Node.JS - Getting Started with Node.js - Using Events, Listeners, Timers, and Callbacks in NodeJS - Handling Data I/O in Node.js - Accessing the File System from Node.js - Implementing HTTP Services in Node.js - Implementing Socket Services in Node.js - Scaling Applications Using Multiple Processors in NodeJS.

Unit V MongoDB 14 h

Introduction - Collections – Documents – difference between SQL and NoSQL – Inserting data into Database – Filter quires and scheme validation in MongoDB Database – Indexing in collections – Aggregation and Embedded documents in MongoDB.

Text Books

1 John Dean, 2019, "Web Programming with HTML5, CSS and JavaScript", Jones & Bartlett Learning.

2 Brad Dayley Brendan Dayley, 2018, "Node.js, MongoDB and Angular Web Development", Addison –Wesley, 2nd Edition

3 Manu Sharma,2021, "MongoDB Complete Guide", BPB Publication.

References

1 Thomas A Powell, 2010, "The Complete Reference HTML & CSS ", Mc Graw Hill, Fifth Edition.

2 Eric Bush, "Full-Stack JavaScript Development" Red Sky Productions LLC

3 https://www.geeksforgeeks.org/what-is-full-stack-development/

Course Code	Course Name	Category	L	T	P	Credit
224IT1A5CB	CYBER SECURITY AND ETHICS	CORE	4	1	-	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
224IT1A5CC	CLOUD COMPUTING	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basics of cloud computing
- Cloud-based services & Technologies
- Cloud Security

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the characteristics, Services and Deployment of Cloud Computing	K1
CO2	Identify Cloud Computing Architecture and Virtualization Technology	K2
CO3	Analyze SOA, Cloud Security and Privacy	K3
CO4	Analyze the Cloud Computing Applications at various sectors	K3
CO5	Understand the Cloud Operations]	K1

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

224IT1A5CC	CLOUD COMPUTING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Cloud Computing 12 h

Cloud Computing - Historical Developments - Building Cloud Computing Environments - Computing Platforms and Technologies. Principles of Parallel and Distributed Computing: Eras of Computing – Parallel vs Distributed Computing.

Unit II Virtualization 12 h

Introduction - Characteristics of Virtualized Environment-Taxonomy of Virtualization Techniques-Virtualization and Cloud computing -Pros and Cons of Virtualization- Technology Examples- Xen: ParaVirtualization – VMware: Full Virtualization - Microsoft Hyper-V.

Unit III Cloud Computing Architecture 12 h

Introduction- Cloud Reference Model- Types of Clouds-Economics of the Cloud-Open Challenges- Cloud Interoperability and Standards- Scalability and Fault Tolerance. Cloud Platforms in Industry: Amazon Web Services- Compute Services, Storage Services, Communication Services and Additional Services. Google App Engine-Architecture and Core Concepts, Application Life-Cycle, cost model. Microsoft Azure- Azure Core Concepts, SQL Azure.

Unit IV Cloud Applications 12 h

Cloud Applications: Scientific Applications – Health care, Geoscience and Biology. Business and Consumer Applications- CRM and ERP, Social Networking, Media Applications and Multiplayer Online Gaming.

Advancement in Cloud Computing: Energy Efficiency in Clouds- Market based management of Clouds.

Unit V Cloud Operation & Challenges 12 h

Cloud Operation & Challenges: Defining Cloud Operations – Objectives – Management – benefits of Cloud Operations – Challenges related to Cloud Computing. Cloud Cube Model: Securing data – Dimensions of Cloud Cube Model- Location of data internal / external dimension

Text Books

1. Rajkumar Buyya, Christian Vecchiola and ThamaraiSelvi S, 2023, "Mastering Cloud Computing", Tata McGraw Hill Education Private Limited, New Delhi.
2. Surbhi Rastogi, 2023, "Cloud Computing Simplified", BPB Publications

References

1. Dr Kumar Saurabh, 2022, "Cloud Computing Architecting Next-Gen Transformation Paradigms",WILEY
2. Kamal Kant Hiran, Ruchi Doshi, Temitayo Fagbola, Mehul Mahrishi, 2023, " Cloud Computing", BPB Publications
3. Rishabh Sharma, 2017, "Cloud Computing - Fundamentals, Industry Approach and Trends", Durga Printographics
4. Arshdeep Bahga, Vijay Madisetti, 2014, "Cloud Computing - A Hands-on Approach", Universities Press.

224IT1A5CP	CORE PRACTICAL -V FULL STACK DEVELOPMENT	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Design a webpage for Curriculum Vitae using HTML 5.0.
2	Design a web page with multimedia tags.
3	Create a Responsive web page with HTML and CSS.
4	Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties (color, bold and size). of the font of the capital.
5	Write a JavaScript code to find the sum of N natural Numbers using user-defined function.
6	Write a Java Script code for Form Validation.
7	Perform File System operations such as creating, Reading, Writing and Deleting File using Node.js.
8	Create a simple To-do List app using node.js and MongoDB.
9	Create and store customer database using MongoDB.
10	Perform Create, Read, Update and Delete (CRUD) Operations in MongoDB Database.
11	Develop Event Management System where users can create, manage, and Response to events. Node.js can handle backend processes, MongoDB for storing event information and user data, and HTML/CSS/JavaScript for the user interface.
12	Create a dynamic blogging platform where users can create, edit, and publish blog posts. Node.js can handle the backend logic, MongoDB for storing blog data, and HTML/CSS/JavaScript for frontend design and interactivity.

224IT1A5SP	SEC III: MOBILE APPLICATION DEVELOPMENT	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48

S.No	List of Experiments
1	Create an application to design a Visiting Card. The Visiting card should have a company logo at the top right corner. The company name should be displayed in Capital letters, aligned to the centre. Information like the name of the employee, job title, phone number, address, email, fax and the website address are to be displayed. Insert a horizontal line between the job title and the phone number.
2	Develop an Android application using controls like Button, TextView, EditText for designing a calculator having basic functionality like Addition, Subtraction, Multiplication, and Division.
3	Create a SIGN Up activity with Username and Password. Validation of password should happen based on the following rules: a.Password should contain uppercase and lowercase letters. b.Password should contain letters and numbers. c.Password should contain atleast one special characters. d.Minimum length of the password is 8.
4	Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 seconds.
5	Write a program to create an activity with two buttons START and STOP. On pressing of the START button, the activity must start the counter by displaying the numbers from One and the counter must keep on counting until the STOP button is pressed. Display the counter value in a TextView control.
6	Create two files of XML and JSON type with values for City_Name, Latitude, Longitude, Temperature, and Humidity. Develop an application to create an activity with two buttons to parse the XML and JSON files which when clicked should display the data in their respective layouts side by side.
7	Develop a simple application with one Edit Text so that the user can write some text in it. Create a button called "Convert Text to Speech" that converts the user input text into voice.

8	Create an activity like a phone dialer with CALL and SAVE buttons. On pressing the CALL button, it must call the phone number and on pressing the SAVE button it must save the number to the phone contacts.
9	Develop an application to demonstrate the use of Asynchronous tasks in android. The asynchronous task should implement the functionality of a simple moving banner. On pressing the Start Task button, the banner message should scroll from right to left. On pressing the Stop Task button, the banner message should stop. Let the banner message be "Demonstration of Asynchronous Task".
10	Develop an application that makes use of the clipboard framework for copying and pasting of the text. The activity consists of two EditText controls and two Buttons to trigger the copy and paste functionality.
11	Write a program to enter Medicine Name, Date and Time of the Day as input from the user and store it in the SQLite database. Input for Time of the Day should be either Morning or Afternoon or Evening or Night. Trigger an alarm based on the Date and Time of the Day and display the Medicine Name
12	Develop a content provider application with an activity called "Meeting Schedule" which takes Date, Time and Meeting Agenda as input from the user and store this information into the SQLite database. Create another application with an activity called "Meeting Info" having Date Picker control, which on the selection of a date should display the Meeting Agenda information for that particular date, else it should display a toast message saying "No Meeting on this Date".

Course Code	Course Name	Category	L	T	P	Credit
224IT1A5DA	MOBILE COMPUTING	DSE- I	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of mobile computing
- The network protocol stack
- Ad-Hoc networks and Gain knowledge about different mobile platforms and application development

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Remember the basic concepts of mobile computing.	K1
CO2	Understanding mobile IP, and MAC Protocols	K2
CO3	Understanding the concept of Mobile ad hoc system.	K3
CO4	Wireless Sensor Networks and Operating Systems for Mobile Computing	K2
CO5	Mobile Databases and Mobile Commerce	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

224IT1A5DA	MOBILE COMPUTING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Mobile Computing and Wireless Networking 12 h

Mobile Computing - Mobile Computing vs. Wireless Networking—Mobile Computing Applications—Characteristics of Mobile Computing—Structure of Mobile Computing Application. Cellular Mobile Communication—Global System for Mobile Communication (GSM). General Packet Radio Service (GPRS)—Universal Mobile Telecommunications System (UMTS)—Software Defined Radio (SDR)—Mobile Phone and Human Body.

Unit II MAC Protocols and Mobile Internet Protocol 12 h

MAC Protocols: Properties required of MAC Protocols—MAC Protocol Issues—A taxonomy of MAC Protocols—Fixed Assignment Schemes—Random Assignment Schemes—Reservation-based schemes—The 802.11 MAC Standard—MAC Protocol for ad hoc networks—Cognitive Radio ad-hoc Networks. Mobile Internet Protocol: Mobile IP - Packet Delivery - Overview of Mobile IP -Desirable features of Mobile IP - Key Mechanism used in Mobile IP - Routing Optimization - Dynamic Host Configuration Protocol (DHCP).

Unit III Mobile Ad Hoc Networks 12 h

Basics Concepts - Characteristics of Mobile Ad hoc Networks (MANETs) - Applications of MANETs - MANET Design Issues - Routing Essentials of Traditional Routing Protocols - Routing in ANETs: Basic Concepts - Popular MANET Routing Protocols - Vehicular Ad Hoc Networks (VANETs) - MANET vs VANET - Security Issues in a MANET - Attacks on Ad Hoc Networks - Security Attack Countermeasures.

Unit IV Wireless Sensor Networks and Operating Systems for Mobile Computing 12 h

WSN vs. MANET – Applications - Architecture of the Sensor Node - Challenges in the Design of an Effective WSN - Characteristics of Sensor Networks - WSN Routing Protocols - Target Coverage - Clustered Wireless Sensor Networks. Operating Systems for Mobile Computing: Basic Concepts—Special Constraints and Requirements of Mobile O/S—A Survey of Commercial Mobile Operating Systems—A Comparative Study of Mobile OSs—Operating Systems for Sensor Networks.

Unit V Mobile Databases and Mobile Commerce 12 h

Mobile Databases: Issues in Transaction Processing - Transaction Processing Environment - Data Dissemination - Transaction Processing in Mobile Environment - Data Replication - Mobile Transaction Models - Rollback Process - Two-phase commit Protocol - Query Processing – Recovery. Mobile Commerce: Applications of M-Commerce - Business-to-Consumer (B2C) Application - Business-to-Business (B2B) Application - Structure of Mobile Commerce - Pros and Cons Of M-Commerce - Mobile Payment Systems - Security Issues.

Text Books

1 Prasant Kumar Pattnaik, Rajib Mall, 2016, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd., Second Edition.

References

1 Prashant Kumar Patra, Sanjit Kumar Dash, 2013, "Mobile Computing", Scitech Publications, Second Edition

2 Asoke K Talukder, Hansan Ahmed, Roopa R Yavagal, 2019, "Mobile Computing Technology, Applications and Service Creation", Mc Graw Hill, Second Edition.

3 Jochen Schiller, 2008, "Mobile Communications", Addison-Wesley, Second edition.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A5DB	PRINCIPLES OF DATA MINING AND DATA WAREHOUSING	DSE-I	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The principles of Data Mining and Data warehousing
- The working of various algorithms
- Data Warehousing Architecture and Analytical tools

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand Data Mining Applications and Techniques	K2
CO2	Implement Cluster and Classification Algorithms	K3
CO3	Understand Association Mining and Web Mining	K2
CO4	Illustrate Data Warehousing concepts	K2
CO5	Implement Data Warehousing concepts using Online Analytical Processing	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

224IT1A5DB]	PRINCIPLES OF DATA MINING AND DATA WAREHOUSING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Data Mining 12 h

Introduction to Data Mining - Need of Data Mining - Data Mining Applications - Data Mining Process: Problem Definition Phase - Data Understanding Phase - Data Preparation Phase - Data Mining Techniques: Predictive Modeling - Database Segmentation - Link Analysis - Deviation Detection - Data Preprocessing - Data Processing Methods: Data Cleaning - Data Integration - Data Transformation - Data Reduction.

Unit II Classification and Clustering 12 h

Introduction to Machine Learning - Types of ML Algorithms - Classification - Types of Classification: Posteriori classification - Priori classification - Working of Classification - Decision Tree Classifier - Naive Bayes Method - Introduction to Cluster Analysis - Applications and Features of Clustering - Clustering Methods: Partitioning Clustering - Hierarchical Clustering Algorithms.

Unit III Association and Web Mining 12 h

Association Rule Mining - Definition - Representation - Metrics of Association Rules: Support - Confidence - Lift - The Apriori Algorithm - Web Mining - Web Content Mining - Web Usage Mining - Web Structure Mining: Hyperlink Induced Topic Search (HITS) algorithm - Search Engines - Working with Search Engine.

Unit IV Data Warehousing 12 h

Data Warehousing – Characteristics of Data Warehouse – Need for Data Warehousing – Benefits and Future of Data Warehouse – Limitations of Data Warehouse – Applications - Advantages of Data Warehouse – Data Warehousing Tools – Data Warehouse Architecture: Construction of Data Warehouse – Data Warehouse Design Process – Three-Tier Data Warehouse Architecture – Operations of Data Warehouse – Testing the Data Warehouse.

Unit V On-Line Analytical Processing and OLTP 12 h

OLAP Introduction – Need for OLAP – OLAP Guidelines – Data Warehouse Schema: Star Schema – Snow Flake Schema – Fact Constellation – OLAP Operations – Multidimensional versus Multirelational OLAP – OLAP Tools - Data Warehouse

Recovery Models – OLAP Engine -OLTP - Need for OLTP - Difference between OLTP and OLAP.

Text Books

1 Parteek Bhatia, 2022, Data Mining and Data Warehousing: Principles and Practical Techniques, Cambridge University Press [Unit - I, II, III]

2 Dr. P. Rizwan Ahmed, 2015, "Data Warehousing and Data Mining",Margham Publications. [Unit - IV, V]

References

1 Alex Berson and Stephen J. Smith, 2007, "Data Warehousing, Data Mining and OLAP", Tata McGraw – Hill Edition, Tenth Reprint.

2 K.P. Soman, Shyam Diwakar and V. Ajay,2006, "Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.

3 G. K. Gupta, 2006, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India.

4 Pang-Ning Tan, Michael Steinbach and Vipin Kumar, 2007, "Introduction to Data Mining", Pearson Education.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A5DC	SOFTWARE QUALITY ASSURANCE	DSE-I	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic concepts of Software Quality Assurance
- SQA components
- The basic concepts of Testing & Software Quality Standards

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 Software Quality	K2
CO2	Understand the Quality Metrics	K2
CO3	Apply Software Quality Tools	K3
CO4	Implement Software Quality Assessment	K3
CO5	Identify Software Project Improvements	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

224IT1A5DC	SOFTWARE QUALITY ASSURANCE	SEMESTER V

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Software Quality and Measurement Theory 12 h

Software Quality: Quality- The role of customer- Software Quality- Total Quality Management. Measurement Theory: Measurement- Levels of measurement- Some basic measures- reliability and validity-Measurement errors.

Unit II Software Quality Metrics 12 h

Product Quality Metrics- In-process Quality Metrics-Metrics for Software Maintenance - example of Metrics Program: Motorola- Collecting Software Engineering Data.

Unit III Software Quality Tools 12 h

Ishikawa's Seven basic tools- Checklist- Pareto diagram- Histogram- Run charts- Scatter diagram- Control chart- Cause and Effect diagram- Relations Diagram- Quality planning- Cost Effectiveness.

Unit IV Software Quality Assessment 12 h

Preparation phase-Evaluation phase- Summarization phase- Audit and Assessment- Process Maturity assessment- Assessment Cycle-Project Assessment Method.

Unit V Software Project Improvement and Metrics 12 h

Process Maturity-Process Capability-Staged Vs. Continuous- Alignment Principle- Decomplexification- Process Improvement- Adoption-Compliance-Improvement Sequences-Economies-Data Quality Controls-Software Quality Engineering Modeling- Statistical Process Control.

Text Book

1 Stepen H Kan, 2016, " Metrics and Models in Software Quality Engineering", Pearson Education Ltd.

References

1 Daniel Galin, 2015,"Software Quality Assurance", Pearson Education Ltd.

2 Mordechai Ben-Menachem and Garry S. Marliss, 2016,"Software Quality", BS Publications

3 Nina S Godbole, 2012,"Software Quality Assurance", N.K. Mehra for Narosa Publishing House Pvt.Ltd.,

4 Kshirasagar Naik and Priyadarshi Tripathy, 2010, "Software Testing and Quality Assurance", A John Wiley & Sons, Inc., Publication

Course Code	Course Name	Category	L	T	P	Credit
224IT1A5GA	BUSINESS INFORMATION SYSTEMS	CORE	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- Basics of Information system and Business Information System
- Concepts of Information technology
- Real-time business information System

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the purpose, components, and issues related to common business information systems.	K1
CO2	Recall the impact of business processes and information systems on an organization.	K1
CO3	Classify various functional systems.	K2
CO4	Understand the roles and responsibilities associated with information systems management.	K1
CO5	Gain knowledge on businesses manage ethical considerations with respect to information systems.	K1

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

224IT1A5GA	BUSINESS INFORMATION SYSTEMS	**SEMESTER V**

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Information Systems and Business Information Systems 4 h

Information System - Business Information Systems -Information Systems in Society, Business and Industry- Global Challenges in Information Systems- An Introduction to Organizations

Unit II Information Technology Concepts 4 h

Hardware: Input, Processing, output and Storage Devices- Software: Systems and Applications Software - Organizing and Storing Data: Data management and Data modelling, Database Management System.

Unit III Enterprise Resource Planning and Transaction Processing System 4 h

Enterprise Resource Planning: Advantages of ERP Systems -Disadvantages of ERP Systems -ERP for Small- and Medium-Sized Enterprises (SMEs). Transaction Processing System: Traditional Transaction Processing Methods and Objectives

Unit IV Management Information System and Decision Support System 6 h

Decision Making and Problem Solving - Overview of Management Information Systems - Functional MIS - Decision Support Systems: Characteristics- Capabilities- Components - A comparison of DSS and MIS.

Case Studies : Computer Games on DSS

Unit V Executive Support System and Knowledge Management System 6 h

Capabilities of Executive Support Systems - Overview of Knowledge Management Systems -Obtaining, Storing, Sharing and Using Knowledge -Technology to Support Knowledge Management.

Case Studies : Start up based ESS AND KMS

Text Books

1 Ralph Stair, George Reynolds and Thomas Chesney,2018, Principles of Business Information Systems, Cengage Learning EMEA, 3rd Edition.

References

1 Rolf T. Wigand, Peter Mertens Freimut Bodendorf, Wolfgang Konig Arnold Picot, Matthias Schumann,2003, Introduction to Business Information Systems, Springer Science & Business Media.

2 Paul Beynon-Davies, 2020, Introduction to Business Information System, Red Globe Press, 3rd Edition.

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Course Code	Course Name	Category	L	T	P	Credit
224IT1A6CA	INTERNET OF THINGS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- design patterns of Internet of Things (IoT)
- IoT methodologies
- real-world applications of IoT

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the designs and protocols of IoT	K2
CO2	Understand the network requirements	K2
CO3	Illustrate the Design Methodologies	K3
CO4	Interpret the devices in IoT	K3
CO5	Examine Network Architecture and Design	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

224IT1A6CA	INTERNET OF THINGS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Internet of Things (IoT) 10 h

Internet of Things: Introduction, Definition, Characteristics - Physical Design: Things, Protocols - Logical Design: Functional Blocks - Communication Models - Communication APIs - Technologies: Wireless Sensor Networks - Cloud Computing - Big Data Analytics - Communication Protocols - Embedded Systems.

Unit II IoT and M2M 10 h

Levels and Deployment Templates - IoT and M2M: M2M - Difference between IoT and M2M - Software Defined Networking - Network Function Virtualization - IoT System Management: Simple Network Management Protocol - Network Operator Requirements – Network Configuration Protocol (NETCONF) – Yet Another Next Generation (YANG).

Unit III Design of IoT 8 h

Design Methodology: Purpose and Requirements Specification - Process Specification - Domain Model Specification - Information Model Specification - Service Specification - Level Specification - Functional View Specification - Operational View Specification - Device and Component Integration - Application Development - Home Automation - Case Study: IoT System for Weather Monitoring.

Unit IV Physical Device 10 h

IoT Device: Building Blocks - Linux on Raspberry Pi - Interfaces: Serial, SPI, I2C - Programming Raspberry Pi with Python: Controlling LED - Interfacing an LED and Switch - Interfacing Light Sensor - pcDuino, BeagleBone Black, Cubieboard - WAMP - Xively Cloud - Django.

Unit V Network Architecture 10 h

Drivers in Network Architecture: Scale, Security, Devices, Networks, Device Support – IoT Architectures: Physical Devices and Control Layer - Connectivity Layer - Edge Computing Layer - Upper Layers – Core Functional Stack: Things, Sensors and Actuators Layer - Communication Network Layer - Access Network Sublayer - Gateway Sublayer - Network Transport Sublayer.

Text Books

1 Arshdeep Bahga, Vijay Madisetti, 2021, "Internet of Things - A Hands-on Approach", First Edition, Universities Press.

2 David Hanes, Gonzalo Salgueiro, Patrick Grossetete, 2023, "IoT Fundamentals", First Edition, C Pearson India Education.

References

1 Mayur Ramgir, 2020, "Internet of Things", First Edition, Pearson India Education.

2 Vibha Soni, 2023, "IoT for Beginners", First Edition, BPB Publications.

3 Sudip Misra, Ananadarup Mukherjee, Arijit Roy, 2021, "Introduction to IoT", First Edition, Cambridge University Press.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A6CB	BIG DATA ANALYTICS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- fundamental concepts of Big Data Analytics
- concept of MapReduce, Pig and Hive.
- NoSQL Databases to process varieties of data.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the characteristics of Big data	K1
CO2	Demonstrate Hadoop Framework and MapReduce Model	K1
CO3	Experiment Hive and Pig	K3
CO4	Illustrate the concepts of NoSQL Using MongoDB	K3
CO5	Understand Replication and Sharding	K1

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

224IT1A6CB	BIG DATA ANALYTICS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Big Data Analytics 8 h

Classification of Digital Data - Introduction to Big Data: Characteristics – Evolution - Definition – Challenges - 3V's - Traditional Business Intelligence (BI) versus Big Data - Hadoop Environment. Big Data Analytics: Introduction – Classification – Challenges – Need – Terminologies - Top Tools for Big Data Analytics.

Unit II Hadoop and MapReduce 10 h

Hadoop: Introduction – Need - RDBMS Versus Hadoop - Distributed Computing Challenges -History – Overview - Use Case - Distributors - Hadoop Distributed File System - Processing Data - Managing Resources and Applications with Hadoop YARN- Interacting with Hadoop Ecosystem. MapReduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting - Compression.

Unit III Hive and Pig 10 h

Hive: Introduction – Architecture - Data Types - File Format - Hive Query Language. Pig: Introduction - Key Features of Pig – Anatomy - Pig on Hadoop - Use Case for Pig: ETL Processing – Overview - Data Types – Running – Execution -Relational Operators – Eval Function – Complex Data Types – User Defined Functions.

Unit IV MongoDB and Storage Engine 10 h

MongoDB: Introduction – Overview - Difference from other databases - Concept and Types of NoSQL database - Basics and Core Concepts of MongoDB. MongoDB: Database - Collections – Documents - MongoDB Shell Basic Commands. Storage Engines: Introduction – Types - Locks.

Unit V Replication and Sharding in MongoDB 10 h

Atomicity - Distributed Operations and Queries - Replication in MongoDB: Introduction – Heartbeats – Automatic Election of the new primary member - Pre-Configuration Steps – Replication on Windows Machine - MongoDB Replication using Data. Sharding: Introduction - Shared Clusters - Shared Key - Pre-Configuration Steps.

Text Books

1 Seema Acharya, Subhashini Chellappan, 2019, "Big Data and Analytics", Second Edition, Wiley.

2 Manu Sharma, 2021, "MongoDB Complete Guide", First Edition, BPB Publication.

References

1 Seema Acharya, 2018, "Data Analytics Using R", First Edition, McGraw Hill Education (India) Private Limited.

2 Vignesh Prajapati, 2013, "Big Data Analytics with R and Hadoop", Packt Publishing.

3 Tom White, 2012, "HADOOP: The definitive Guide", Third Edition, O Reilly.

224IT1A6SP	SEC PRACTICAL: DATA ANALYSIS WITH R	SEMESTER VI

Total Credits: 2
Total Hours: 48 h

S.No	List of Experiments
1	Working with objects in memory.
2	Demonstrate Data Frame.
3	Perform Matrix operations.
4	Working with various built-in Functions in R
5	Import and Export Files in R
6	Implement Statistical Methods
7	Working with Machine Learning algorithms
8	Implement Time Series Analysis
9	Demonstrate Data Mining algorithms
10	Implement Text Mining algorithms
11	Data Visualization Techniques
12	Experiment Hypothesis Testing methods

Course Code	Course Name	Category	L	T	P	Credit
224IT1A6DA	BLOCKCHAIN TECHNOLOGY AND APPLICATIONS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- essentials of Blockchain Technology and Decentralization
- technology behind the Bitcoin and Ethereum
- Blockchain Applications

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 Blockchain Technology	K1
CO2	Comprehend Decentralization and Consensus Algorithms	K2
CO3	Explore Bitcoin and its Architecture	K3
CO4	Identify Ethereum and its Applications	K3
CO5	Apply Blockchain in various domains	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

224IT1A6DA	BLOCKCHAIN TECHNOLOGY AND APPLICATIONS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Blockchain 10 h

Blockchain: Growth, Distributed Systems, History of Blockchain and Bitcoin, Architecture, Generic Elements, Benefits, Features and Limitations - Types of Blockchains.

Unit II Decentralization and Consensus Algorithms 8 h

Decentralization: Introduction, Methods, Disintermediation, Contest-Driven Decentralization - Full-Ecosystem Decentralization - Decentralization in Practice - Innovative Trends - Consensus Algorithms: Introduction, Analysis and Design, Classification, Crash Fault Tolerance and Byzantine Fault Tolerance Algorithms.

Unit III Bitcoin Architecture 10 h

Bitcoin - Cryptographic Keys - Addresses -Transactions: Lifecycle, Data Structure - Blockchain for Bitcoin - Miners: Proof-of-Work (PoW), Mining Systems, Mining Pools - Network - Wallets.

Unit IV Ethereum Architecture 10 h

Ethereum - Cryptocurrency - Keys and Addresses - Accounts - Transactions and Messages - Ethereum Virtual Machine (EVM) - Blocks and Blockchain - Nodes and Miners - Ethereum Network.

Unit V Blockchain Applications and Challenges 10 h

Use Cases - IoT Architecture - Applications: Government, Health, Media, Blockchain and AI, Emerging Trends - Challenges: Governance Challenges, Technical Challenges.

Text Books

1 Imran Bashir, 2023, "Mastering Blockchain", Fourth Edition, Packt Publishing.

2 Joseph J. Bambara, Paul R. Allen, 2018, "Blockchain-A Practical Guide to Developing Business, Law, and Technology Solutions", First Edition, McGraw Hill Education.

References

1 Tiana Laurence, 2017, "Blockchain for Dummies", Third Edition, John Wiley & Sons, Inc.

2 Gulshan Shrivastava, 2020, "Cryptocurrencies and Blockchain Technology Applications", First Edition, John Wiley & Sons Publisher.

3 Kumar Saurabh, Ashutosh Saxena, 2020, "Blockchain Technology Concepts and Applications", First Edition, Wiley India Pvt Limited.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A6DB	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- essentials of Artificial Intelligence
- problem solving methods with searching techniques
- Supervised and Unsupervised learning

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 Artificial Intelligence	K2
CO2	Classify Search Strategies	K2
CO3	Understand Machine Learning models	K2
CO4	Identify Supervised Learning Techniques	K3
CO5	Apply Unsupervised Learning 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

224IT1A6DB	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Artificial Intelligence and Problem-Solving Methods 10 h

Artificial Intelligence: Definition, History, Problems and Techniques - Problem Solving Methods - State Space Search - Production System - Problem Characteristics - Control Strategy - Issues in Search Programs - Search Strategies Problems: Tower of Hanoi, Missionaries and Cannibals.

Unit II Search Strategies and Knowledge Representation 10 h

Search Strategies: Generate-and-Test Method - Hill Climbing Method, - Best First, A* Search - Knowledge Representation: Ontologies, Objects, Events, Representations and Mappings, Approaches, Forward versus Backward Chaining, Slot and Filler Structures, Issues, Developments.

Unit III Machine Learning (ML) and Model 8 h

Machine Learning: Introduction, Human Learning, Types, ML Types, Applications, Tools, Issues - Model: Activities, Structure of Data, Data Quality, Pre-Processing.

Unit IV Supervised Learning 10 h

Classification: Introduction, Model, Learning Steps - Classification Algorithms: K-Nearest Neighbour - Decision Tree - Random Forest - Support Vector Machine - Regression Algorithms: Simple Linear Regression, Multiple Linear Regression.

Unit V Unsupervised Learning 10 h

Unsupervised vs Supervised Learning - Applications - Clustering: Machine Learning Task, Techniques, Partitioning Methods, K-Medoids, Hierarchical Clustering - Density-based Methods - Association Rule: Definition, Apriori Algorithm, Apriori Principle Rules – Semi-Supervised Learning – Reinforcement Learning – Robotics: Introduction – Application Domains.

Text Books

1 Lavika Goel, 2021, "Artificial Intelligence: Concepts and Applications", First Edition, Wiley.

2 Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, 2021, "Machine Learning", Eighth Edition, Pearson.

References

1 Stuart J. Russell and Peter Norving, 2020, "Artificial Intelligence: A Modern Approach", Third Edition, Pearson.
2 Denis Rothanman, 2020, "Artificial Intelligence by Example", Second Edition, Kindle.
3 Oliver Theobald, 2024, "Machine Learning for Absolute Beginners", Third Edition, Sanage Publishing House LLP.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A6DC	SOFTWARE PROJECT MANAGEMENT	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- project planning
- cost estimation, monitoring and control
- metrics of software quality

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand project objectives and evaluation methods	K2
CO2	Identify software development process models	K2
CO3	Apply cost estimation techniques	K3
CO4	Identify risks	K2
CO5	Understand software quality	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

224IT1A6DC	SOFTWARE PROJECT MANAGEMENT	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I **Software Project Management and Project Evaluation** 10 h

Software Project Management: Introduction – Activities – Plans – Methods - Categorizing Software Projects - Project Charter – Stakeholders – Objectives - Management Control - Project Management Life Cycle - Project Evaluation and Programme Management: Project Portfolio Management – Evaluation - Cost-benefit Evaluation Techniques - Risk Evaluation - Programme Management.

Unit II **Project Planning and Process Models** 10 h

Project Planning: Introduction - Project Selection - Project Scope – Objectives - Project Infrastructure - Project Characteristics – Products - Activities - Effort Estimation - Activity Risks - Resource Allocation - Review Plan - Execute Plan - Software Process Models: Waterfall Model - Spiral Model - Agile Methods – Scrum - Lean Software Development.

Unit III **Software Effort Estimation and Activity Planning** 10 h

Software Estimation: Introduction - Over and under Estimates - Effort Estimation Techniques - Bottom-up estimation - Top-down Approach - Parametric Model - COCOMO II - Function Points Analysis - Activity Planning: Project Schedules – Projects – Activities – Sequencing - Scheduling Activities - Network Planning Models - Time Dimension - Forward Pas - Backward Pass - Critical Path.

Unit IV **Risk Management and Resource Allocation** 10 h

Risk Management: Risk – Categories – Approaches - Identification – Assessment – Planning – Management - Evaluating Risks - Counter Measures - PERT Technique - Resource Allocation: Introduction - Nature of Resources – Requirements – Scheduling - Critical Paths - Publishing Schedule - Cost Schedule - Sequence Schedule.

Unit V **Monitoring, Control and Software Quality** 8 h

Monitoring and Control: Visualizing Progress - Earned Value Analysis - Change Control - Software Configuration Management - Software Quality: Project Planning – Importance – Definition - Quality Models - ISO 9126 - Product vs Process Metrics - Product vs Process Quality Management - Quality Management Systems - Techniques to Enhance Software Quality – Testing - Software Reliability - Quality Plans.

Text Books

1 Bob Hughes, Mike Cotterell, Rajib Mall, 2019, "Software Project Management", Sixth Edition, TMC.

References

1 Walker Royce, 2008, "Software Project Management ", First Edition, Pearson Education.

2 Subramanian Chandramouli Saikat Dutt, Pearson, 2013," Software Project Management", First Edition, Pearson Education.

3 Chandrani Singh, 2015, "Software Project Management", First Edition, Pearson Education.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A6DD	FUNDAMENTALS OF AUGMENTED REALITY AND VIRTUAL REALITY	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- applications of Augmented Reality
- interactive technique of 3D graphics and rendering
- visual perception aspects of Virtual Reality

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 Augmented Reality	K2
CO2	Apply the 3D technical concepts on Augmented Reality to enhance user engagement and interaction	K3
CO3	Infer the Design of Augmented Reality	K2
CO4	Identify the key elements of Virtual Reality	K1
CO5	Experiment with Visual Perception in Virtual 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

224IT1A6DD	FUNDAMENTALS OF AUGMENTED REALITY AND VIRTUAL REALITY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Augmented Reality 10 h

Introduction: Applications of AR - Calibration and Registration: Camera Calibration, Technique - Pose Estimation and Tracking: Classification - Pose Tracking in AR, Stationary - Mobile Sensor - Optical - Hybrid Tracking.

Unit II Computer Vision of AR 8 h

Image Processing: Computer Vision - Object Detection - Spatial Mapping - 3D Outdoor Tracking - 3D Graphics in AR: 3D Computer Graphics - 3D Rendering - 3D Software's - Graphic Libraries - OpenCV, OpenGL.

Unit III Designing AR Systems 10 h

Design Principles: AR Interaction - Design Patterns, Interfaces - Introduction to Mobile AR: Types of Mobile Apps, AR Browsers, POIs, AR Applications for Android. Developing Mobile AR Apps: Mobile Applications - Development Platforms, Smartphones - Case Study: Augmented Reality Movie Trailer Poster.

Unit IV Virtual Reality 10 h

Virtual Reality - Modern VR Experiences - Bird's-Eye View: Hardware, Software - Geometry of Virtual Worlds: Models - Changing Position, Orientation, Axis - Light and Optics: Behavior of Light, Lenses, Human Eye, Cameras.

Unit V Visual Perception 10 h

Perception of Depth: Monocular Depth Cues - Stereo Depth -Implications for VR - Perception of Motion: Detection - Implications for VR - Perception of Color, Combining Sources. Visual Rendering: Ray Tracing - Shading Models - Motion in Real Virtual World: Velocities and Accelerations - 3D World – Simulation - Case Study: Virtual 3D Insects info Book.

Text Books

1 Chetankumar G Shetty, 2020, "Augmented Reality - Theory, Design and Development", First Edition, McGraw Hill Education.

2 Steven M. LaValle, 2019, "Virtual Reality", Third Edition, Cambridge University Press.

References

1 Alan B. Craig, 2013, "Understanding Augmented Reality, Concepts and Applications", First Edition, Morgan Kaufmann Publishers.

2 Paul Mealy, 2018, "Virtual & Augmented Reality for Dummies", First Edition, Wiley India Pvt Ltd.

3 Gerard Jounghyun Kim, 2005, "Designing Virtual Systems: The Structured Approach", First Edition, Springer.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A6DE	HUMAN COMPUTER INTERACTION DESIGN	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- fundamental concepts of Human Computer Interaction (HCI)
- user interactive systems design
- strategies for effective Human Computer Interaction

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand Usability of Interactive Systems	K2
CO2	Understand the design processes	K2
CO3	Design interaction styles	K3
CO4	Analyze Human and Command Languages	K3
CO5	Experiment the Visualization	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

224IT1A6DE	HUMAN COMPUTER INTERACTION DESIGN	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Usability and Guidelines 10 h

Usability: Goals and Measures, Motivations – Universal Usability: Variation in Physical Abilities and Workplaces - Diverse Cognitive and Perceptual Abilities - Personality Difference - Cultural and International Diversity - Users with Disabilities – Guidelines and Principles.

Unit II Design Process and Evaluation 9 h

Design Process: Organizational support - Design Process - Design Frameworks - Design methods - Design tools - practices and patterns –Evaluating Interface Design: Expert Reviews and Heuristic - Usability Testing and Laboratories - Survey Instruments - Acceptance Test - Evaluation During Active Use - Controlled Psychologically Oriented Experiments.

Unit III Manipulation and Navigation 10 h

Manipulation: Direct Manipulation, Examples of Direct Manipulation Systems - 2D and 3D Interface – Teleoperation - Augmented and Virtual Reality – Fluid Navigation: Navigation by Selection - Small display - Content organization - Form Fill-in and Dialog Boxes.

Unit IV Human and Command Languages 9 h

Introduction to Human and Command Languages - Speech Recognition - Speech Production - Human Language Technology - Traditional Command Languages – Devices: Keyboards, Keypads, Pointing Devices, Displays.

Unit V Search and Visualization 10 h

Information Search - Five-stage search frameworks - Dynamic Queries - Command languages and natural language queries - multimedia document search –Data Visualization - Tasks in Data Visualization - Visualization by Data Type - Challenges – Case Study: User Interface Design for Automated Teller Machines.

Text Books

1 Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven Jacobs & Niklas Elmqvist, 2016, "Designing the User Interface: Strategies for Effective Human-Computer Interaction.", Sixth Edition, Pearson Education.

References

1 Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, 2004, "Human - Computer Interaction", Third Edition, Prentice Hall.

2 Jonathan Lazar, Jinjuan Heidi Feng, & Harry Hochheiser, 2010, "Research Methods in Human Computer Interaction", Wiley.

3 Samit Bhattacharya, 2019, "Human-Computer Interaction User-Centric Computing for Design", McGraw-Hill Education.

Course Code	Course Name	Category	L	T	P	Credit
224IT1A6DF	DEVOPS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- structure and features of DevOps
- DevOps Architecture
- real-world applications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the essentials of DevOps	K2
CO2	Understand Architecture and Operations	K2
CO3	Interpret Testing Tools	K2
CO4	Experiment the Security Challenges	K3
CO5	Identify Container Platform in DevOps	K1

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

224IT1A6DF	DEVOPS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I DevOps and Cloud as a Platform 10 h

DevOps: Introduction, Need, Perspective - DevOps and Agile - Team Structure – Coordination - Barriers - Cloud as a Platform - Introduction - Features - Consequences of Cloud Features - On-Premise Infrastructure.

Unit II Operations and Deployment Pipeline 10 h

Operations: Operations as a Service - Service Operation Functions - Continual Service Improvement - Disaster Recovery - Operations and DevOps - Deployment Pipeline: Architecture Structure - Microservice Architecture - Amazon's Rule - Microservice Adoption - Building: Introduction, Moving a System through the Deployment Pipeline - Crosscutting Aspects.

Unit III Testing, Deployment and Monitoring 8 h

Testing: Development and Pre-commit Testing - Build and Integration Testing - Performance Testing - Production - Deployment: Introduction - Strategies -Logical Consistency - Packaging - Deploying to Multiple Environments - Partial Deployment – Rollback - Tools - Monitoring: Introduction, Monitor - Monitoring Configuration - Challenges.

Unit IV Security Audits 10 h

Security Audits: Security – Threats – Resources - Roles and Activities - Identity Management - Access Control, Development - Llitie: Repeatability – Performance - Reliability - Recoverability - Interoperability- Testability - Modifiability - Business Considerations: Business Case - Measurements and Compliance - Interaction Between Dev and Ops.

Unit V Container Platform 10 h

Container Platform: Docker, Features – Architecture – Engine - Registry, Container Orchestration – Compose – Kubernetes - Installation and Key Terms - Kubernetes Cloud Solutions - Docker Swarm - OpenShift Container Platform - OpenShift as Platform as a Service - DevOps with OpenShift - Core Items, Learning Scenarios.

Text Books

1 Len Bass, Ingo Weber, Liming Zhu, 2016, "DevOps-A Software Architect's Perspective", First Edition, Pearson India Education.

2 Jose Manuel Ortega Candel, 2020, "DevOps and Containers Security", First Edition, BPB Publications.

References

1 Mitesh Soni, 2020, " Hands-on Azure DevOps ", First Edition, BPB Publications

2 Ashish Raj, 2021," Azure Devops Services", First Edition, BPB Publications

3 Joachim Rossberg, 2022, "Agile Project Management with Azure DevOps", Second Edition, APress Publications

Course Code	Course Name	Category	L	T	P	Credit
223BC1A6AA	INNOVATION, IPR AND ENTREPRENEURSHIP	AECC	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	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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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.

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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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