Dr. N.G.P.ARTS AND SCIENCE COLLEGE (Autonomous)

REGULATIONS 2019-20 for Under Graduate Programme

(Outcome Based Education model with Choice Based Credit System)

BACHELOR OF COMPUTER APPLICATIONS

(For the students admitted during the academic year 2020-21 and onwards)

Programme: BCA

Eligibility

A candidate who has passed in Higher Secondary Examination with any Academic stream or Vocational stream as one of the subject under Higher Secondary Board of Examination, Tamil Nadu as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent here to by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **Bachelor of Computer Applications Degree Examination** of this College after a programme study of three academic years.

Programme Educational Objectives

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

1. To provide students with a strong foundation in the mathematical, logical skills and Programming ability to solve and analyze computing problems to prepare them for graduate studies, consultancy and higher learning.
2. To inculcate in students professional and ethical attitude, effective communication skill, teamwork, and an ability to relate computer applications to global perspective issues and social context.
3. To excel with problem solving and programming skills in various IT Fields.
4. Students will demonstrate their ability to adapt to a rapidly changing environment by having learned and applied new skills and new technologies.
5. To train future industry professionals
6. To continue a lifelong professional development in computing that contributes in self and societal growth.

PROGRAMME OUTCOMES:

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

PO Number	PO Statement
PO1	Understand the concepts of key areas in Computer Applications.
PO2	Develop student's profession and ethical attitudes, effective communication, team work and logical proficiency.
PO3	Apply knowledge of mathematical, algorithmic and computing skills.
PO4	Make use of modern tools and techniques to develop software
PO5	Develop practical skills to fulfill the needs of industry and society.

Guidelines for Programmes offering Part I& Part II for Two Semesters:

Part	Subjects	No.of Papers	Credit	Semester No.
I	Tamil / Hindi / French/Malayalam	2	2 x 3 = 6	I & II
II	English	2	2 x 3 = 6	I & II
III	Core (Credits 2,3,4)	18-20	70	I to VI
	Inter Departmental Course (IDC)		16	I to IV
	Discipline Specific Elective (DSE)	3	3 x 4 =12	V & VI
	Skill Enhancement Course(SEC)	4	4 x 3=12	III & IV
	Generic Elective(GE)	2	2 x 2=4	III & IV
	Lab on Project (LoP)	1	1	III to V
IV	Environmental Studies(AECC)	1	2	I
	Value Education (VE) (Human Rights, Womens' Rights) (AECC)	2	4	II and III
	General Awareness(On-Line Exam) (AECC)	1	2	IV
	RM (AECC)	1	2	V
	Innovation, IPR, Entrepreneurship (AECC)	1	2	VI
V	Extension Activity NSS / Sports / Department Activity	-	1	I to VI
TOTAL CREDITS			**140**	

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CURRICULUM

BCA PROGRAMME

Course Code	Course Category	Course Name	L	T	P	Exam (hours)	Max Marks			Credits
							CIA	ESE	Total	
First Semester										
Part – I										
191TL1A1TA	Language - I	Tamil-I	4	1	-	3	25	75	100	3
201TL1A1HA		Hindi-I								
201TL1A1MA		Malayalam-I								
201TL1A1FA		French – I								
Part – II										
191EL1A1EA	Language -II	English – I	4	-	1	3	25	75	100	3
Part – III										
204CT1A1CA	Core - I	Problem Solving using C Programming	4	1	-	3	25	75	100	4
202MT1A1IG	IDC - I	Numerical Methods and Statistics	4	1	-	3	25	75	100	4
194CA1A1CP	Core Practical –I	C Programming	-	-	4	3	40	60	100	2
204CA1A1CQ	Core Practical -II	Web Development	-	-	4	3	40	60	100	2
Part - IV										
193MB1A1AA	AECC - I	Environmental Studies	2	-	-	3	-	50	50	2
Total			**18**	**3**	**9**				**650**	**20**

14/5/2020

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

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

Dr.NGPASC
COIMBATORE | INDIA

BCA(Students admitted during the AY 2020-21)

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Second Semester										
Part - I										
191TL1A2TA	Language - I	Tamil-II	4	1	-	3	25	75	100	3
201TL1A2HA		Hindi-II								
201TL1A2MA		Malayalam-II								
201TL1A2FA		French – II								
Part – II										
201EL1A2EA	Language - II	English – II	4	-	1	3	25	75	100	3
Part – III										
194CA1A2CA	Core - II	Data Structures	4	1	-	3	25	75	100	4
192MT1A2IG	IDC - II	Discrete Mathematical Structures	4	1	-	3	25	75	100	4
194CA1A2CP	Core Practical – III	Data Structures	-	-	4	3	40	60	100	2
194CA1A2CQ	Core Practical - IV	Multimedia Technologies	-	-	4	3	40	60	100	2
Part - IV										
196BM1A2AA	AECC-II	Human Rights	2	-	-	3	-	50	50	2
		Total	18	3	9	-	-	-	650	20

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Third Semester										
194IT1A3CA	Core - III	Java Programming	4	1	-	3	25	75	100	4
194CA1A3CA	Core - IV	Relational Database Management System	4	-	-	3	25	75	100	4
192MT1A3IG	IDC - III	Computer Based Optimization Techniques	4	1	-	3	25	75	100	4
194CA1A3CP	Core Practical-V	Java & RDBMS	-	-	4	3	40	60	100	2
194CA1A3SA	SEC-I	Data Analytics	4	-	-	3	25	75	100	4
194CA1A3SP	SEC Practical I	Data Analytics	-	-	4	3	40	60	100	2
	GE - I		2	-	-	-	-	50	50	2
	LoP	Lab on Project	-	-	-	-	-	-	-	-
Part - IV										
191TL1A3AA	AECC - III	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A3AB		Advanced Tamil								
195CR1A3AA		Women's Rights								
		Total	**20**	**2**	**8**				**700**	**24**

EXTRA CREDIT COURSES

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

S. No.	Course Code	Course Name
1	194CA1ASSA	Program logic and Computer Fundamentals
2	194CA1ASSB	System Analysis and Design

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fourth Semester										
194CA1A4CA	Core - V	Digital logic and Design	4	1	-	3	25	75	100	4
194CA1A4CB	Core - VI	Software Engineering	4	1	-	3	25	75	100	4
195PA1A4IB	IDC - IV	Business Accounting	4	-	-	3	25	75	100	4
194CA1A4CP	Core Practical - VI	Practical-Software Engineering	-	-	4	3	40	60	100	2
194CS1A4SA	SEC - II	Python Programming	4	-	-	3	25	75	100	4
194CA1A4SP	SEC-Practical II	Python Programming	-	-	4	3	40	60	100	2
	GE - II		2	-	-	-	-	50	50	2
	LoP									
Part - IV										
191TL1A4AA	AECC - IV	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A4AB		Advanced Tamil								
192PY1A4AA		General Awareness								
		Total	**20**	**2**	**8**				**700**	**24**

18/12/2021
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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fifth Semester										
Part – III										
194CT1A5CA	Core–VII	Data Communication and Networks	4	-	-	3	25	75	100	4
194CS1A5CA	Core-VIII	C# Programming	4	-	-	3	25	75	100	4
194IT1A5CB	Core-IX	Cyber Crime and Digital Forensic	4	-	-	3	25	75	100	4
194CA1A5CA	Core–X	Operating System	4	-	-	3	25	75	100	4
194CA1A5CP	Core Practical-VII	C# Programming	-	-	4	3	40	60	100	2
194CA1A5CQ	Core Practical –VIII	Network and Operating System	-		4	3	40	60	100	2
194CA1A5DA	DSE–I	Internet of Things	4	-	-	3	25	75	100	4
194CA1A5DB		Adhoc and Sensor Networks								
194CA1A5DC		Semantic Web								
194CA1A5TA	IT	Industrial Training	**Grade A to C**							
194CA1A5LA	LoP	Lab on Project	-	-	-	-	50	-	50	1
Part – IV										
192MT1A5AA	AECC - V	Research Methodology	2	-	-	3	-	50	50	2
		Total	**22**	**-**	**8**	**-**	**-**	**-**	**800**	**27**

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part – III										
194CA1A6CA	Core–XI	Web Applications using PHP	4	-	-	3	25	75	100	4
194CA1A6CB	Core–XII	Data Mining and Warehousing	4	-	-	3	25	75	100	4
194CA1A6CP	Core Practical–IX	Web Applications using PHP	-	-	4	3	40	60	100	2
194CA1A6CV	Core-XIII Project	Project Work	-		8	3	40	60	100	4
194CA1A6DA	DSE–II	Cloud Computing	4	-	-	3	25	75	100	4
194CA1A6DB		Digital Marketing								
194CA1A6DC		Object Oriented Analysis and Design								
194CA1A6DD	DSE–III	Mobile Computing	4	-	-	3	25	75	100	4
194CA1A6DE		Artificial Intelligence and Expert Systems								
194CA1A6DF		Computer Graphics								
Part - IV										
193BC1A6AA	AECC-VI	Innovation, IPR and Entrepreneurship	2	-	-	3	-	50	50	2
Part - V										
194CA1A6XA		Extension Activity	-	-		-	50	-	50	1
Total			**18**	**-**	**12**	-	-	-	**700**	**25**
Grand Total									**4200**	**140**

DISCIPLINE SPECIFIC ELECTIVE

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

Semester V (Elective I)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194CA1A5DA	Internet of Things
2.	194CA1A5DB	Ad-hoc and Sensor Networks
3.	194CA1A5DC	Semantic Web

Semester VI (Elective II)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194CA1A6DA	Cloud Computing
2.	194CA1A6DB	Digital Marketing
3.	194CA1A6DC	Object Oriented Analysis and Design

Semester VI (Elective III)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194CA1A6DD	Mobile Computing
2.	194CA1A6DE	Artificial Intelligence and Expert Systems
3.	194CA1A6DF	Computer Graphics

GENERIC ELECTIVE COURSES (GE)

The following are the courses offered under Generic Elective Course

Semester III (GE-I)

S. No.	Course Code	Course Name
1	194CA1A3GA	Fundamentals of Cloud Computing

Semester IV (GE-II)

S. No.	Course Code	Course Name
1	194CA1A4GA	Security in Computing

EXTRA CREDIT COURSES

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

S. No.	Course Code	Course Name
1	194CA1ASSA	Program logic and Computer Fundamentals
2	194CA1ASSB	System Analysis and Design

CERTIFICATE PROGRAMMES

The following are the programme offered to earn extra credits:

S. No.	Programme Code and Name	Course Code	Course Name
1	4CA5C Certificate Course in Data analysis	204CA5B1CP	Data analysis using R

MOOC (NPTEL/SWAYAM/ SPOKEN TUTORIAL)

The following are the online courses offered:

Please refer the following link to select the courses

- www.swayam.org
- www.nptel.ac.in
- www.spoken-tutorial.org

REGULATION 2019-20

Effective from the academic year 2019-20 and applicable to the students admitted to the Degree of Bachelor of Science / Commerce/Arts.

1. NOMENCLATURE

1.1 Faculty: Refers to a group of programmes concerned with a major division of knowledge are. Eg. Faculty of Computer Science consists of disciplines like Departments of Computer Science, Information Technology, Computer Technology and Computer Applications.

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 2015–2018 refers to students belonging to a 3 year Degree programme admitted in 2015 and completing in 2018.

1.4 Course Refers to a component (a paper) 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 and learning needs and the credits may be assigned suitably.

a) Core Courses

   A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

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: DSE courses are the courses offered by the respective disciplinary/ interdisciplinary programme.

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

e) Ability Enhancement Courses (AEC): AECC courses are the courses based upon the content that leads to Knowledge enhancement. These

are mandatory for all disciplines. Environmental Science, Human Rights, Women's Rights, General Awareness, IPR and Innovation, Entrepreneurship Development and Research Methodology.

All these courses should be taught according to Outcome based Education.

1.5 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.

1.6 Project work

It is considered as a special 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.

Extra credits

Extra credits will be awarded to a student for achievements in co-curricular activities carried out outside the regular class hours. The guidelines for the award of extra credits are given in section- these credits are not mandatory for completing the programme.

Advanced Learner Course (ALC):

ALC is doing work of a higher standard than usual for students at that stage in their education. Research work carried out in University/ Research Institutions/ Industries of repute in India or abroad for a period of 15 to 30 days will be considered as Advanced Learners Course.

2. STRUCTURE OF PROGRAMME

2.1 PART – I: LANGUAGE

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

2.2 PART – II : ENGLISH

English will be offered during the first two / four semester.

2.3 PART – III :

- Core course
- Inter Departmental Course (IDC)
- Discipline Specific Elective (DSE)
- Skill Enhancement Course (SEC)
- Generic Elective (GE)
- Lab on Project (LoP)
- Industrial Training (IT)

2.4 PART IV

2.4.1 Ability Enhancement Compulsory Course

The ability enhancement courses such as i)Environmental Studies, ii) Human Rights, iii) Womens' Rights, iv) General Awareness, v) Research Methodology, vi) Intellectual Property Rights(IPR), Innovation and Entrepreneurship or IPR and Innovation from I to VI Semester.

a) Those who have not studied Tamil up to XII Std and taken a non-Tamil language under Part-I shall take Tamil comprising of two courses.

(OR)

b) Those who have studied Tamil up to XII std and taken a non-Tamil language under Part-I shall take Advanced Tamil comprising of two courses in the third and fourth semesters.

(OR)

c) Students who come under the above a+b categories are exempted from Women's Rights and General awareness during III and IV semester respectively.

2.5 PART V: EXTENSION ACTIVITIES

The following co-curricular and extracurricular activities are offered under institutional / department Association/ club/ extension programmes for the students under extension activities from I to IV semester.

a) Institutional

- National Service Scheme (NSS)
  Participation in any one of the camps organized by NSS unit.
- Friends of Police(FoP)
  Active participation in traffic regulation and other extension activities
- Sports
  Active participation in any one of the sports activities
- Youth Red Cross (YRC)
  Active participation in YRC programmes

b) Department Association

Membership and active participation in the department association activities.

c) Clubs

Membership and active participation in any one club activities.

1. CREDIT ALLOTTMENT

The following is the credit allotment:

- Lecture Hours (Theory) : Max.1 credit per lecture hour per week,
  1 credit per tutorial 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

2. DURATION OF THE PROGRAMME

A student is normally expected to complete the B.Sc. /B.com. /BA Programme in 6 semesters. However, in any case not more than 7 consecutive semesters. Failing which the concern BoS will identify suitable / equivalent course.

3. REQUIREMENTS FOR COMPLETION OF A SEMESTER

Candidate shall be permitted to appear for the End Semester examinations for any semester (practical/theory) if

i) He/she secures not less than 75% of attendance in the number of working days during the semester.
ii) He/she earns a progress certificate from the Head of the institution, of having satisfactorily completed the course of study prescribed in the scheme of examinations for that semester as required by these regulations, and
iii) His/her conduct / character is satisfactory.

- Provided that it shall be open to the Academic council, or any authority delegated with such powers by the Academic council, to grant exemption to a candidate who has failed to earn 75% of the attendance prescribed, for valid reasons, subject to usual conditions. (Refer the Ordinance No.1 of 1990 of the Bharathiar University)
- A candidate who earned 75% of attendance and more in the current semester are eligible to write the examination in current semester subjects.
- A candidate who has secured less than 65% but 55% and above attendance in any semester has to compensate the shortage in attendance in the subsequent semester besides earning the required percentage of attendance in that semester and appear for both semester papers together at the end of the later semester.
- A candidate who has secured less than 55% of attendance in any semester shall not be permitted to appear for the regular examinations and to continue the study in the subsequent semester. He/she has to rejoin the semester in which the attendance is less than 55%.
- A candidate who has secured less than 65% of attendance in the final semester has to compensate his/her attendance shortage in a manner as decided by the concerned Head of the department after rejoining the same course.

4. 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 (including the project work and Viva-Voce examination in the final Semester) shall be 100 with the following breakup.

(i) Theory Courses

Continuous Internal Assessment (CIA) : 25 Marks

End Semester Exams (ESE) : 75 Marks

(ii) For Practical/ Courses

Continuous Internal Assessment (CIA) : 40 Marks

End Semester Exams (ESE) : 60 Marks

a. The following are the distribution of marks for the Continuous Internal Assessment in Practical, Project / Industrial Training Courses.

Continuous Internal Assessment for Practical Courses:

S.No	For - UG practical courses	Distribution of Marks					
1	Minimum 10 experiments to be conducted/practical paper/semester	20	15	10	8	5	4
2	Tests : Two tests out of which one shall be during the mid semester and the other to be conducted as model test at the end of the semester.)	16	10	10	8	6	6
3	Observation Note Book	4	5	5	4	4	-
	TOTAL MARKS	40	30	25	20	15	10

Project viva-voce / Industrial Training

The following are the distribution of marks for the continuous Internal assessment in UG Project/Industrial Training courses.

S.no	For - UG Project courses//Industrial Training	Distribution of Marks	
1	Review-I	5	10
2	Review-II	5	10
3	Review-III	5	10
4	Document, Preparation and Implementation	10	10
	TOTAL MARKS	25	40

b. Following are the distribution of marks for the External Examination in UG Project /Industrial Training courses

S.no	For - UG Project //Industrial Training courses	Distribution of Marks	
1	Record Work and Presentation	35	40
2	Viva-Voce	15	20
	TOTAL MARKS	50	60

Part – IV

The courses offered under Part – IV shall have only End Semester Examinations (ESE) for a maximum of 50 Marks. However, Students who select "Tamil" under Part IV, will be assessed only by Continuous Internal Assessment (CIA). The marks shall be furnished to the COE by the concerned Course teacher through the Head of the Department.

6.1CONTINUOUS ASSESSMENT EXAMS

6.1 Theory courses

a) Continuous Internal Assessment test (CIA)

There will be a Minimum of two Continuous Assessment Exams, for each Theory course. The first and Second Assessment Exams will be conducted for a Maximum of 50 Marks and 75 marks respectively. The total marks secured in the Two Assessment Exams will be converted to 15 Marks.

b) Utilization of Library

Marks will be awarded to the student based on the hours spent in the library after the working hours and submission of report by the student.

Hours spent in Library	Marks	Type of Document submitted
2	1	Report/ Assignment/ Class presentation
4	2	
6	3	
8	4	
10	5	
12	6	

- During the Library hour, the student must spend time in reading the articles, books, journals of their subject of interest
- Each student should borrow minimum three books during the semester
- Student is expected to submit one Report / Assignment / Class Presentation per Course.

c) Class Participation

Active participation in classroom discussion by the student will be evaluated based on Integration of knowledge, Interaction and Participation and demonstration of knowledge.

d) Papers / Reports/ Assignments/ Class Presentation

The student will be evaluated based on his ability to do analysis of application of theory to real world problems or creative extension of class room learning and his/her ability to communicate the given topic effectively and clearly.

Continuous Assessment OBE Rubrics Score Sheet

Degree: _____ Branch: _____ Semester: _____

Course Code: _____ Course: _____

Max. Marks: Internal:_____ External: _____ Total: _____

S.No.	REG. NO	THEORY / PRACTICAL & LIBRARY CLASS PARTICIPATION (15) (Compulsory)				RUBRICS ASSESSMENT (SELECT ANY ONE)									Total Marks out of : 30	Total Marks out of : 16 / 10 / 08 / 04
						PAPERS / REPORTS (15)			ASSIGNMENTS (15)			CLASS PRESENTATION (15)				
		Library	Integration of Knowledge	Interaction & Participation	Demonstration of Knowledge	Organization & Knowledge	Format & Spelling	Reference / Experiments	Demonstration of Knowledge	Format & Spelling	Reference	Content & Coherence	Creativity and Speaking Skills	Duration of Presentation		
		6	3	3	3	5	5	5	5	5	5	5	5	5		
1																

The following are the distribution of marks for the continuous internal assessment in UG practical courses

S.No	For - UG Practical Courses	Distribution of Marks					
1	Minimum 10 experiments to be conducted/practical paper/semester	20	15	10	8	5	4
2	Tests : Two tests out of which one shall be during the mid semester and the other to be conducted as model test at the end of the semester.)	16	10	10	8	6	6
3	Observation Note Book	4	5	5	4	4	-
	TOTAL MARKS	40	30	25	20	15	10

7. FOR PROGRAMME COMPLETION

Programme Completion (for students admitted in the A.Y.2019-20 and Onwards)

Student has to complete the following:

i) Part I, II,III,IV,V as mentioned in the scheme
ii) Industrial/ Institutional training

Students must undertake industrial / institutional training for a minimum of 15 days and not exceeding 30 days during the IV semester summer vacation. The students will submit the report for evaluation during V semester.

Based on the performance Grade will be awarded as follows:

Marks Scored	Grade to be awarded
75 and above	A
60-74	B
40-59	C
< 40	Re-Appearance

iii) Skill Enhancement Training

Student must undergo Skill Enhancement training on Communication skills (I and II Semester) and Quantitative aptitude (III and IV Semester) respectively each for 40 h.

8. EXTRA CREDITS

- Earning extra credit is mandatory. However, it is not essential for programme completion
- Extra Credits will be awarded to a student for achievement in co-curricular/ extracurricular activities carried other than the regular class-hours.
- The detailed guidelines for the award of extra credits are as follows:
- A student is permitted to earn a maximum of five extra Credits during the programme duration of UG from I to V Semester.
- Candidate can claim a maximum of 1 credit under each category listed.

The following are the guidelines for the award of Extra credits:

8.1 Proficiency in foreign language

Qualification	Credit
A pass in any foreign language in the examination conducted by an authorized agency	1

8.2 Proficiency in Hindi

Qualification	Credit
A pass in the Hindi examination conducted by Dakshin Bharat Hindi Prachar Sabha	1

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

8.3 Self-study Course

Qualification	Credit
A pass in the self-study courses offered by the department	1

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

8.4 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.

Qualification	Credit
A pass in the type writing / short hand examination offered by TNDTE	1

8.5 Diploma / Certificate

Courses offered by any recognized University / NCVRT

Qualification	Credit
A pass in any Certificate course/ Diploma / PG Diploma	1

8.6 CA/ICSI/CMA

Qualification	Credit
Qualifying foundation / Inter level / Final in CA/ICSI/CMA / etc.,	1

8.7 Sports and Games

The Student can earn extra credit based on their Achievement in sports as given below:

Qualification	Credits
Achievement in University/ State / National/ International	1

8.8 Online Courses

Pass in any one of the online courses

Qualification	Credit
SWAYAM/NPTEL/Spoken Tutorial etc.,	1

8.9 Publications / Conference Presentations (Oral/Poster)/Awards

Qualification	Credit
Research Publications in Journals/ oral/poster presentation in Conference	1

8.10 Innovation / Incubation / Patent / Sponsored Projects / Consultancy

Qualification	Credit
Development of model/ Products /Prototype /Process/App/Registration of Patents/ Copyrights/Trademarks/Sponsored Projects /Consultancy	1

8.11 Representation

Qualification	Credit
State / National level celebrations such as Independence day, Republic day Parade, National Integration camp etc.,	1

Course Code	Course Name	Category	L	T	P	Credit
191TL1A1TA	தமிழ்த் தாள் - I	மொழி- I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு , 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) – மாணவனின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1,K2,K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2,K4
CO3	பாட இணைச் செயல்பாடுகள் (Co-curricular activities)	K2,K3,K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5, K6

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

191TL1A1TA	தமிழ்த்தாள் - I	SEMESTER I

Total Credits: 03

Total Instruction Hours: 60 h

Syllabus

Unit I மறுமலர்ச்சிக் கவிதைகள் 12 h

1. உயிர் பெற்ற தமிழர் பாட்டு - பாரதியார்
2. படி - பாரதிதாசன்
3. போராடப் புறப்பட்டோம் - தமிழ் ஒளி
4. தமிழ்க் கொலை புரியாதீர் - புலவர் குழந்தை
5. திரைத்தமிழ்

அ) சும்மா கிடந்த நிலத்தை எனத்தொடங்கும் பாடல் -

_ பட்டுக்கோட்டை கல்யாண சுந்தரனார்

ஆ) சமரசம் உலாவும் இடமும் எனத்தொடங்கும் பாடல் - மருதகாசி

இ) உன்னை அறிந்தால் எனத்தொடங்கும் பாடல் - கண்ணதாசன்

Unit II புதுக்கவிதைகள் 12 h

1. கடமையைச் செய் - மீரா
2. அம்மாவின் பொய்கள் - ஞானக்கூத்தன்
3. செருப்புடன் ஒரு பேட்டி - மு.மேத்தா
4. ஒரு சிங்கவால் குரங்கின் மரணம் - சிற்பி
5. கடல்கோள் 2004 - முத்தமிழ் விரும்பி
6. கரிக்கிறது தாய்ப்பால் - ஆரூர் தமிழ்நாடன்
7. பள்ளி - நா. முத்துக்குமார்
8. ஹைகூ கவிதைகள் - 15 கவிதைகள்

Unit III பெண்ணியம் 08 h

1. ஒரு கதவும் கொஞ்சம் கள்ளிப்பாலும் - தாமரை
2. நீரில் அலையும் முகம் - அ. வெண்ணிலா
3. தொட்டிச் செடி - இளம்பிறை
4. ஏனிந்த வித்தியாசங்கள் - மல்லிகா

Unit IV சிறுகதைகள் 15 h

1. வேப்பமரம் - ந. பிச்சமூர்த்தி
2. அகல்யை - புதுமைப்பித்தன்
3. ஒருபிடி சோறு - ஜெயகாந்தன்
4. காய்ச்சமரம் - கி. ராஜநாராயணன்
5. நிராசை - பாமா
6. எருமை சீமாட்டி - பெருமாள் முருகன்
7. குதிரை மசால் தாத்தா - சு. வேணுகோபால்

Unit V இலக்கியவரலாறு, இலக்கணம் மற்றும் பயிற்சிப் பகுதி 13 h

அ. இலக்கிய வரலாறு

1. மறுமலர்ச்சிக் கவிஞர்களின் தமிழ்ப்பணிகள்
2. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்
3. சிறுகதையின் தோற்றமும் வளர்ச்சியும்

ஆ. இலக்கணம்

1. வல்லினம் மிகும், மிகா இடங்கள் (ஒற்றுப்பிழை நீக்கி எழுதுதல்)
2. ர,ற ,ல, ழ, ள ,ண, ந,ன, வேறுபாடு (ஒலிப்பு நெறி, சொற்பொருள் வேறுபாடு அறிதல்)

இ. படைப்பாக்கப் பயிற்சி

1. கவிதை, சிறுகதை எழுதுதல்

Text Books

1 செய்யுள் மற்றும் உரைநடைத் திரட்டு . 2019. தொகுப்பு : தமிழ்த் துறை , டாக்டர் என். ஜி.பி. கலை மற்றும் அறிவியல் கல்லூரி. நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட். சென்னை.

References

1 பேராசிரியர் முனைவர் பாக்கியமேரி. இலக்கணம் இலக்கிய வரலாறு மொழித்திறன். முதல் பதிப்பு 2013 . பூவேந்தன் பதிப்பகம். சென்னை

2 தமிழண்ணல் . புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு . பதினாறாம் பதிப்பு 2000 மீனாட்சி புத்தக நிலையம். மதுரை.

3 பேராசிரியர் புலவர் இளவரசு ,சோம. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு. எட்டாம் பதிப்பு ஜூலை 2012.மணிவாசகர் பதிப்பகம்.சென்னை

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

Course Code	Course Name	Category	L	T	P	Credit
201TL1A1HA	HINDI-I	Language 1	4	1	-	03

PREAMBLE

This course has been designed for students to learn and understand

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

  communicate Hindi

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	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

201TL1A1HA	HINDI-I	SEMESTER I

Total Credits: 03

Total Instruction Hours: 60 h

Syllabus

Unit I गद्य – नूतन गद्य संग्रह (जय प्रकाश) 12 h

पाठ 1- रजिया

पाठ 2- मक्रील

पाठ 3- बहता पानी निर्मला

पाठ 4- राष्ट्रपिता महात्मा गाँधी

Unit II कहानी कुंज- डॉ वी.पी. 'अमिताभ' 12 h

कहानी कुंज- डॉ वी.पी. 'अमिताभ' (पाठ 1-4)

Unit III व्याकरण 12 h

शब्द विचार (संज्ञा, सर्वनाम, कारक, विशेषण)

Unit IV अनुच्छेद लेखन 12 h

अनुच्छेद लेखन

Unit V अनुवाद 12 h

अभ्यास-III (केवल अंग्रेजी से हिन्दी में)

Text Books

1. प्रकाशक: सुमित्र प्रकाशन 204 लीला अपार्ट्मेंट्स, 15 हेस्टिंग्स रोड' अशोक नगर इलाहाबाद-211001 (Unit - I)
2. प्रकाशक: गोविन्द प्रकाशन सदर बाजार, मथुरा उत्तर प्रदेश – 281001 (Unit-II)
3. पुस्तक: व्याकरण प्रदिप – रामदेव प्रकाशक: हिन्दी भवन 36 टेगोर नगर इलाहाबाद – 211024 (Unit-III)
4. पुस्तक: व्याकरण प्रदिप – रामदेव प्रकाशक: हिन्दी भवन 36 इलाहाबाद-211024 (Unit-IV)
5. (पाठ 1 to 10) प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17 (Unit – V)

Course Code	Course Name	Category	L	T	P	Credit
201TL1A1MA	MALAYALAM	Language - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- develop the writing ability and develop reading skill.
- various concepts and techniques for criticizing literature, to learn 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	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

201TL1A1MA	MALAYALAM - I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Novel 12 h

1. Alahayude penmakkal

Unit II Novel 12 h

1. Alahayude penmakkal

Unit III Short Story 14 h

2. Nalinakanthi

Unit IV Short Story 10 h

2. Nalinakanthi

Unit V 12 h

Composition & Translation

Text Books

1 Alahayude penmakkal (NOVEL) By Sara Joseph Published by Current books Thrissur.

2 Nalinakanthi (Short story) By T.Padmanabhan Published by DC.Books Kottayam

3 Expansion of ideas,General Essay And Translation.

References

1 Malayala Novel Sahithyam

2 Malayala cherukatha Innale Innu.

Course Code	Course Name	Category	L	T	P	Credit
201TL1A1FA	FRENCH- I	Language - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- 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.
- 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	learn the adjectives and the classroom environment in France.	K2
CO3	Learn the Plural, Articles and the Hobbies.	K3
CO4	learn the Cultural Activity in France.	K3
CO5	learn 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	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

201TL1A1FA	FRENCH- I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Salut I Page 10 12 h

Objectifs de Communication	Tâche	Activités de réception et de production orale
• Saluer • Enter en contact • avec quelqu'un. • Se presenter. • S'excuser	En cours 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 de réception 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'adore I Page 30 12 h

Objectifs de Communication	Tâche	Activités de réception et de production orale
• Exprimer ses gouts.	Dans un café, participer à une soirée de rencontres	• Dans une soirée de recontres rapid comprendre des personnes qui échangent sur elles et sur leurs goût • Comprendre une personne

	rapides et remplir de taches d'appréciation.	qui parler des goûts de quelqu'un d'autre.

Unit IV J'adore I Page 30 14 h

Objectifs de Communication	Tâche	Activités de réception et de production orale
• Présenter quelqu'un	Dans un café, participer à une soirée de rencontres rapides et remplir de taches d'appréciation	• Exprimer ses goûts. • 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		

Unit V Tu veux bien? Page 46 10 h

Objectifs de Communication	Tâche	Activités de réception et de production orale
• Demander à quelqu'un de faire quelque chose. • Demander poliment. • Parler d'actions passes.	Organiser un programme d'activités pour accueillir une personne importante.	• Comprendre une personne demande un service à quelqu'un. • Demander à quelqu'un de faire quelque chose. • Imaginer et raconter au passé à partir de situations dessinées.

Text Books

1 Regine Merieux, Yves Loiseau, LATITUDES 1(Methode de Français), Goyal Publisher & Distributors Pvt.Ltd., 86 UB Jawahar Nagar (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
191EL1A1EA	ENGLISH - I	Language - II	4	0	1	3

PREAMBLE

This course has been designed for students to learn and understand

- To experience the effect of dialogue, the brilliance of imagery and the magnificence of varied genre
- To strengthen the student's English vocabulary and understanding of English sentence structure
- To communicate effectively and acquire knowledge on 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	Extend interest in and appreciation of the works of eminent writers from various literatures	K2
CO2	Interpret the genres in literature through the master works of great visionaries	K3
CO3	Perceive the language gaps through a clear model of the grammatical structure	K5
CO4	Analyze the concepts of texts in the course of different lessons which are realistic and discursive in nature	K4
CO5	Value the integral concepts of English grammar necessarily required in their linguistic competence	K5

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

191EL1A1EA	ENGLISH - I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Genre Studies - I 10 h

The Road Not Taken – Robert Frost
All the World's a Stage – William Shakespeare
Whitewashing the Fence – Mark Twain
The Face of Judas Iscariot - Bonnie Chamberlain
Soul Gone Home – Langston Hughes

Unit II Genre Studies - II 11 h

Ode on a Grecian Urn – John Keats
Mending Wall – Robert Frost
My Early Days – Dr. A.P.J. Abdul Kalam
Nightfall – Isaac Asimov
A Kind of Justice – Margret Atwood

Unit III Grammar - I 14 h

Parts of Speech
Articles and Prepositions
Subject Verb Agreement
Degrees of Comparison
Sequence of Tenses

Unit IV Genre Studies - III 11 h

On his Blindness - John Milton
Small - Scale Reflections on a Great House – A.K. Ramanujan
On Prayer – Khalil Gibran
The Garden Party – Katherine Mansfield
The Tell - Tale Heart – Edgar Allen Poe

Unit V Grammar - II 14 h

If Conditionals

Modal Auxiliary Verbs

Question Types/Tags

Voice

Direct and Indirect Speech

Text Books

1 Prabha, Vithya. R and S. Nithya Devi. 2019. Sparkle: English Textbook for First Year. McGraw Hill Education, Chennai.

2 Wren and Martin. 2006. High School English Grammar and Composition. S. Chand Publishing, New Delhi.

References

1 Bajwa and Kaushik. 2010. Springboard to Success- Workbook for Developing English and Employability Skills. Orient Black Swan, Chennai

2 Syamala. V. 2002. Effective English Communication for You. Emerald Publishers, Chennai.

3 Krishnaswamy. N, Lalitha Krishnaswamy & B.S. Valke. 2015. Eco English, Learning English through Environment Issues. An Integrated, Interactive Anthology. Bloomsbury Publications, New Delhi.

4 Krishnaswamy. N. 2000. Modern English: A Book of Grammar, Usage And Composition. Macmillan, New Delhi.

Course Code	Course Name	Category	L	T	P	Credit
204CT1A1CA	PROBLEM SOLVING USING C PROGRAMMING	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The program development techniques.
- The basic syntax of decision making and branching statements, arrays, strings, structures, union , pointers and functions.
- The concepts of file management.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the problem solving techniques and C programming basics	K1
CO2	Remember the concepts of c fundamentals , types of operator and Input /Output functions	K1,K2
CO3	Understand the principles of decision making statement, array and strings	K1,K2,K3
CO4	Apply the knowledge of functions and pointers	K3
CO5	Expose the concept of structure, union and file management	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204CT1A1CA	PROBLEM SOLVING USING C PROGRAMMING	SEMESTER I

Total Credits: 4
Total Instruction Hours: 60 h

Syllabus

Unit I Program Development Style and Basic of C 10 h

Programming Development Methodologies – Programming Style – Stepwise Refinement and Modularity – Problem Solving Techniques – Algorithm – Flowchart – Pseudocode – Sequence and Selection – Iteration and Recursion – Recursion Versus Iteration – Overview of Compilers and Interpreters – Structure of a C program – Programming Rules – Executing the Program.

Unit II C Declaration 12 h

Introduction – C Character Set – Tokens – Keywords and Identifiers – Constants – Variables – DataTypes – Declaring Variables – Declaration of Storage Class – Defining Symbolic constant. Operator and Expressions: Arithmetic operators - Relational Operators - Logical Operators – Assignment Operators – Increment and Decrement Operators - Conditional Operators – Bitwise Operators - Special Operators – Precedence of Arithmetic Operators – Type conversion in Expressions. Managing Input and Output Operations: Reading a Character – Writing a Character – Formatted Input and Output.

Unit III Decision Making Statements ,Arrays and Strings 12 h

Decision Making and Branching: Introduction – Simple if statement –if..else statement - Nesting of if..else statements – Else if Ladder – Switch statement - goto statement. Decision Making and Looping: while statement – do statement – for statement – jumps in loops. Arrays: One Dimensional Arrays – Two Dimensional Arrays. Character arrays and strings: Declaring and Initializing String Variables – Reading Strings from Terminal – Writing Strings to Screen – String-handling Functions.

Unit IV Functions, Pointers 14 h

User-defined Functions: Needs for User-defined Functions – Elements of User-Defined Functions – Definition of Functions – Return Values and their Types – Function Calls – Function Declaration – Category of Functions. Pointers: Understanding Pointers – Accessing the Address of a Variable – Initialization of Pointer Variables – Accessing a Variable through its Pointer.

Unit V Structures, Unions and File Management 12 h

Structures and Unions: Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Unions – Bit Fields. File Management: Defining and Opening a File – Closing a File – Input/Output Operation on Files.

Text Books

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

2 Balagurusamy.E, 2017, "Programming in ANSI C", Seventh Edition, Tata McGraw Hall, New Delhi

References

1 ISRD Group, 2008, “Programming and Problem Solving Using C”,Tata McGraw Hill.

2 Hanly J R & Koffman E.B, 2009, “Problem Solving and Programme design in C”, Pearson Education

3 Reema Thareja , 2015, "Programming in C", Second Edition, OXFORD University Press.

4 https://www.pdfdrive.com/c-for-dummies-2nd-edition-shranisi-e17843209.html

Course Code	Course Name	Category	L	T	P	Credit
202MT1A1IG	NUMERICAL METHODS AND STATISTICS	IDC	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- simultaneous Linear Algebraic Equations
- Measures of central tendency and dispersion
- the concept of Significance and Chi-Square Test

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	explain Linear Algebraic Equations	K1
CO2	discuss the concept of numerical Differentiation and Numerical Integration	K2
CO3	use measures of central tendency and Variation for Statistical Analysis	K3
CO4	demonstrate the relation between the variables using Correlation and Regression Analysis	K3
CO5	analyze the concept of Test of Significance	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

202MT1A1IG	NUMERICAL METHODS AND STATISTICS	SEMESTER I

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Simultaneous Linear Algebraic Equations 10 h

Introduction – Gauss Elimination Method – Gauss Jordan Method – Iterative Methods - Jacobi Method of Iteration – Gauss Seidel Iteration Method

Unit II Numerical Differentiation and Integration 12 h

Numerical Differentiation - Derivatives using Newton's forward difference formula - Derivatives using Newton's Backward difference formula - Numerical Integration Trapezoidal Rule - Simpson's 1/3 rd rule - Simpson's 3/8 th rule

Unit III Measures of Central Tendency and Dispersion 12 h

Function of an Average – Characteristics of Typical Average - Limitations - Properties - Mean - Calculation of Mean - Merits of Mean - Demerits of Mean - Median – Calculation of Median - Merits of Median - Demerits of Median - Mode - Calculation of Mode - Merits of Mode - Demerits of Mode - Range - Quartile Deviation – Standard Deviation

Unit IV Correlation and Regression 12 h

Types of Correlation – Scatter diagram Method - Coefficient of Correlation - Karl Pearson's Coefficient of Correlation - Merits and Demerits of Correlation – Rank Correlation - Regression - Uses - Difference between Correlation and Regression - Method of Studying Regression – Regression Equations - Regression equation of Y on X - Regression equation of X on Y

Unit V Test of Significance and Chi-Square Test 14 h

Testing of Hypothesis - Standard Error - Test of Significance for Attributes - Test for Proportion of Success - Test for Difference in Proportions - Test of Significance for Large Samples - Standard error of mean - Testing the difference between means of Two Samples - Test of Significance for Small Samples - Students' t Distribution - Chi Square Test - Characteristics of Chi Square Test - Degree of Freedom - Chi Square Test of goodness of fit - Chi Square as a test of independence

Note: Theory 20% and Problem 80%

Text Books

1 Kandasamy, P. Thilagavathy, K. and Gunavathi K., 1997, 'Numerical Methods', 1st Editiion, S. Chand and Company Ltd, New Delhi.

2 Pillai R.S.N, and Bagavathi, 2002, 'Statistical Methods', 14th Edition, S. Chand and Company Ltd, New Delhi

References

1 Gupta S.P, Gupta M.P, 2002, 'Business Statistics', 17th Edition, Sultan Chand and Sons, New Delhi

2 Beri.,G.C, 2010, 'Business Statistics', 3rd Edition, McGraw Hill Education Pvt. Ltd, 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 Ltd, New Delhi

194CA1A1CP	CORE PRACTICAL: C PROGRAMMING	SEMESTER I

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Operators
2	I/O Statements
3	Conditional Statements
4	Looping Statements
5	String Handling Functions
6	Arrays
7	Functions
8	Structure
9	Union
10	Pointers
11	Files
12	Command Line Arguments

Note: Out of 12- 10 Mandatory

204CA1A1CQ	CORE PRACTICAL: WEB DEVELOPMENT	SEMESTER I

Total Credits: 2
Total Instructions Hours: 48h

S.No	Contents
1	Static HTML Web Page using formatted text, table, list and image
2	Static HTML Web Page using frame, forms with Hyper Text and Hyper Image.
3	Style sheet using CSS.
4	Static DHTML Web Site with DTD.
5	Dynamic Web Page using XML
6	XML document to store information about the student
7	CSS style sheet and use it to display the document
8	XSLT style sheet for the document and display it
9	Adding and editing a gallery in Word Press.
10	Add a single video to a Word Press page.
11	Dynamic Web Page to print Fibonacci series using VBScript.
12	Dynamic Web Page to generate student grade sheet using VBScript.

Note: Out of 12- 10 Mandatory

Course Code	Course Name	Category	L	T	P	Credit
193MB1A1AA	VALUE EDUCATION- 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	inculcate the knowledge on structure, function and energy flow in the Eco system.	K3
CO3	impart knowledge on Biodiversity and its conservation.	K3
CO4	create awareness on effects, causes and control of air, water, soil and noise pollution etc.	K2,K3
CO5	build awareness about sustainable development and Environmental protection	K2,K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

193MB1A1AA	VALUE EDUCATION- ENVIRONMENTAL STUDIES	SEMESTER I

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Environmental studies& Ecosystems 4 h

Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere. Scope and importance; Concept of sustainability and sustainable development. What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

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

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). Heating of earth and circulation of air; air mass formation and precipitation. Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit III Biodiversity and Conservation 5 h

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. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit IV Environmental Pollution, Environmental Policies & Practices 5 h

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; Air (Prevention & Control of Pollution) Act; Water (Prevention and

control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International agreements; Montreal and Kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC). Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context.

Unit V Human Communities and the Environment& Field Work 5 h

Human population and growth: Impacts on environment, human health and welfares.Carbon foot-print. Resettlement and rehabilitation of project affected persons; case studies. Disaster management: floods, earthquakes, cyclones and landslides. Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi). Visit to an area to document environmental assets; river/forest/flora/fauna, etc. Visit to a local polluted site – Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds and basic principles of identification. Study of simple ecosystems-pond, river, Delhi Ridge, etc.

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.
3. Gleeson,B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J. Gary K. Meffe, and Carl Ronald carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7. McCully, P.1996. Rivers no more: the environmental effects of dams(pp. 2964). Zed Books.
8. McNeil, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, h.T. & Andrews, J.1971. Fundamentals of Ecology. Philadelphia: Saunders.

References

1 Pepper, I.L., Gerba, C.P. &Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.

2 Rao, M.N. &Datta, A.K. 1987. Waste Water Treatement. Oxford and IBH Publishing Co. Pvt. Ltd.

3 Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.

4 Rosencranz, A., Divan, S., & Noble, M.L. 2001. Environmental law and policy in India. Tripathi 1992.

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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Second Semester										
Part-I										
191TL1A2TA	Language - I	Tamil-II	4	1	-	3	25	75	100	3
201TL1A2HA		Hindi-II								
201TL1A2MA		Malayalam-II								
201TL1A2FA		French – II								
Part-II										
201EL1A2EA	Language-II	English – II	4	-	1	3	25	75	100	3
Part-III										
194CA1A2CA	Core - II	Data Structures	4	1	-	3	25	75	100	4
192MT1A2IG	IDC - II	Discrete Mathematical Structures	4	1	-	3	25	75	100	4
194CA1A2CP	Core Practical –III	Practical -Data Structures	-	-	4	3	40	60	100	2
194CA1A2CQ	Core Practical -IV	Practical - Multimedia Technologies	-	-	4	3	40	60	100	2
Part - IV										
196BM1A2AA	AECC-II	Human Rights	2	-	-	3	-	50	50	2
		Total	**18**	**3**	**9**	**-**	**-**	**-**	**650**	**20**

30/11/2020

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

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

Course Code	Course Name	Category	L	T	P	Credit
191TL1A2TA	பகுதி-1: தமிழ் - தாள்- II	மொழி	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப் பாடங்களின் வாயிலாகத் தமிழரின் பண்பாடு, 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	வாழ்க்கைத்திறன்கள் (Life Skills) – மாணவனின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1,K2,K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2,K4
CO3	பாட இணைச் செயல்பாடுகள் (Co-curricular activities)	K2,K3,K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

191TL1A2TA	பகுதி-1: தமிழ் - தாள்- II	SEMESTER II

Total Credits: 3
Total Instruction Hours: 60 h

Syllabus

Unit I **அற இலக்கியம்** 12 h

1. திருக்குறள்

அ.அறன் வலியுறுத்தல் (அ. எண்: 04)

ஆ.நட்பாராய்தல் (அ. எண்: 80)

இ.சான்றாண்மை (அ. எண்: 99)

ஈ.குறிப்பறிதல் (அ. எண்: 110)

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

Unit II **அற இலக்கியம்** 10 h

1. நாலடியார் - அறிவுடைமை

2.பழமொழி நானூறு - வீட்டு நெறி

3. கார்நாற்பது - தோழி பருவங்காட்டி தலைமகளை வற்புறுத்திய பாடல்கள் (1முதல் – 18பாடல்கள்)

Unit III **உரைநடை** 10 h

1. பெற்றோர்ப் பேணல் - திரு.வி.க.

2. உள்ளம் குளிர்ந்தது - மு.வரதராசனார்

3. சங்கநெறிகள் - வ.சுப.மாணிக்கம்

Unit IV **உரைநடை** 13 h

1.பெரியார் உணர்த்தும் சுயமரியாதையும் சமதர்மமும் - வே. ஆனைமுத்து

2. வீரவணக்கம் - கைலாசபதி

3.மொழியும்நிலமும் - எஸ். ராமகிருஷ்ணண்

Unit V **இலக்கிய வரலாறு, இலக்கணம் மற்றும் பயிற்சிப் பகுதி** 15 h

அ.இலக்கிய வரலாறு

1. பதினெண் கீழ்க்கணக்கு நூல்கள்

2. தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்

ஆ. இலக்கணம்

1. வழு, வழுவமைதி, வழாநிலை

இ. பயிற்சிப் பகுதி

1. நூல் மதிப்பீடு மற்றும் திரைக்கதை திறனாய்வு

2. தன்விவரக் குறிப்பு எழுதுதல்

Note : பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது

Text Books

1 தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி (தன்னாட்சி) செய்யுள் மற்றும் உரைநடைத் திரட்டு. (முதல்பதிப்பு.) சென்னை: நியூ செஞ்சுரி புக்ஹவுஸ் (பி) லிட்.

References

1 பேராசிரியர் புலவர் இளவரசு, சோம. (ஜூலை2012). தமிழ் இலக்கிய வரலாறு. (எட்டாம் பதிப்பு) சென்னை: மணிவாசகர் பதிப்பகம்.

2 பேராசிரியர் முனைவர் பாக்கியமேரி (2013). இலக்கணம் இலக்கிய வரலாறு மொழித்திறன். (முதல் பதிப்பு) சென்னை பூவேந்தன் பதிப்பகம்.

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

Course Code	Course Name	Category	L	T	P	Credit
201TL1A2HA	HINDI -II	LANGUAGE	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn 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	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

201TL1A2HA	HINDI -II	SEMESTER II

Total Credits: 03

Total Instruction Hours: 60 h

Syllabus

Unit I 12 h

आधुनिक पद्य – शबरी (श्री नरेश मेहता

प्रकाशक: लोकभारती प्रकाशन

पहली मंजिल, दरबारी बिल्डिंग,

महात्मा गाँधी मार्ग, इलाहाबाद-211001

Unit II 12 h

उपन्यास: सेवासदन-प्रेमचन्द

प्रकाशक: सुमित्र प्रकाशन

204 लीला अपार्ट्मेंट्स, 15 हेस्टिंग्स रोड'

अशोक नगर इलाहाबाद-211001

Unit III 12 h

कहानी-किरीट- डा उषा पाठक / डा अचला पाण्डेय

पाठ 1. उसने कहा था

पाठ 2. कफ़न,

पाठ 3. चीफ़ की दावत

प्रकाशक: राधाकृष्ण प्रकाशन दिल्ली

Unit IV 12 h

पत्र लेखन: (औपचारिक या अनौपचारिक)

पुस्तक: व्याकरण प्रदिप – रामदेव

प्रकाशक: हिन्दी भवन 36 इलाहाबाद-211024

Unit V 12 h

अनुवाद अभ्यास-III (केवल हिन्दी से अंग्रेजी में)

(पाठ 1 to 10)

प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

Course Code	Course Name	Category	L	T	P	Credit
201TL1A2MA	MALAYALAM - II	LANGUAGE	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn 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	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

201TL1A2MA	MALAYALAM -II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I 12 h

Travelogue

Unit II Novel 12 h

Travelogue

Unit III 14 h

Travelogue

Unit IV 10 h

Autobiography

Unit V 12 h

Autobiography

Text Books

1. Dubai Puzha (Travelogue) By K.Krishna Das, Published by Green books Thrissur.
2. Vazhithirivukal (Autobiography) By Dr.APJ Abdul Kalam Published by DC.Books Kottayam

.

Course Code	Course Name	Category	L	T	P	Credit
201TL1A2FA	FRENCH -II	LANGUAGE	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression.
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France.
- To help 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	To learn the adjectives and the classroom environment in France.	K2
CO3	Learn the Plural, Articles and the Hobbies.	K3
CO4	To learn the Cultural Activity in France.	K3
CO5	To learn 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	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

201TL1A2FA	FRENCH -II	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'invitationsurunrépondeurt éléphonique. • 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 vuepositifetnégatif. • 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 12 h

• Demander etindiquerune direction. • Localiser (près de, en face de ….).	Suivre un itinéraire à l'aided'indications par telephone et d'un plan.	• Comprendre des indications de direction. • Comprendre des indications de lieu.

Unit V 12 h

• Exprimerl'obligationl'interdit. • Conseiller.	Par courrierélectronique, donner des informations et des conseils à un ami qui veut voyager.	• Comprendreune chanson. • Comprendre de courts messages qui experiment l'obligationoul'interdiction • Donner des conseils à des personnesdans des situations données.

Text Book

1	LATITUDES 1 (Méthode de français) Pages from 56 to 101, Author : RÉGINE MÉRIEUX Publisher : GOYAL Publishers & Distributors Pvt

Course Code	Course Name	Category	L	T	P	Credit
201EL1A2EA	ENGLISH - II	LANGUAGE	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 of varied genres
- The vocabulary and to frame 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	Interpret skills in communication and to shape their attitude	K2
CO2	Develop oral and written language skills in a business context	K3
CO3	Analyze to gain key strategies and expressions for communicating with professionals	K3
CO4	Inspect the knowledge to the corporate needs	K4
CO5	Formulate Inter and Intrapersonal skills	K5

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

201EL1A2EA	ENGLISH - II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Technical English 12 h

Communication: Process- Methods- Channels- Barriers of Communications

Phonetics: Basics of phonetics - Consonants and Vowel sounds

Reading Skills: Skimming and Scanning- Reading Different Kinds of Texts- Types- Developing a Good Reading Speed

Writing Skills: Note- Making and note taking, Paragraph Writing: Structure and principles

Unit II Business English 12 h

Structure and Planning of Letters: Elements of Structure- Forms of Layout- Style- Writing Business Letters

Quotation, Order and Tender: Inviting - Sending Quotation letter - Placing Orders- Inviting Tenders

E-mail Correspondence: Structure- Procedure- Style- Guidelines- Jargon and Acronyms- Security Precaution

Seminar and Meetings: Introduction- Organizing a Seminar- Sample Brochure- Conducting and Participating in a Meeting

Unit III Professional English 12 h

Report Writing: Importance- Process- Types- Structure

Memo: Importance- Structure

Notice, Agenda and Minutes: Meeting- Notice- Agenda- Minutes: Preparation- Structure- Delivery

Brochures: Purpose- Audience- Qualities

Unit IV Employment Communication 12 h

Resume Writing : Elements of Resume - difference between CV and Resume - Writing Job Application

Art of Conversation: Small Talk- Body Language- Principles of Good Conversation

Interview: Organizational role- Goals- Types- Interview Process

Group Discussion: Importance- Features- Strategies- Barriers

Unit V Soft Skills 12 h

Self - Discovery and Goal Setting: Self - Discovery - Goals and Types- Benefits, Areas and Clarity of Goal Setting

Positive Thinking (PT) and Attitude: Benefits of PT and Attitude- Develop Positive Attitude and Thinking- Drive out Negative Thinking and Attitude

Etiquettes and Manners: Home, Table and Business, Time Management

Text Books

1 Prabha, Dr. R. Vithya & S. Nithya Devi. 2019. Sparkle. (1st Edn.) McGraw - Hill Education. Chennai. [Unit I - V]

References

1 Ghosh, B.N. Editor. 2017. Managing Soft Skills for Personality Development. McGraw - Hill Education, Chennai.

2 Adams, Katherine L. and Gloria I. Galanes. 2018. Communicating in Groups- Applications and Skills. McGraw - Hill Education, Chennai.

3 Koneru, Aruna. 2017. Professional Communication. McGraw - Hill Education, Chennai.

4 Koneru, Aruna. 2011. English Language Skills. McGraw - Hill Education, Chennai.

Course Code	Course Name	Category	L	T	P	Credit
194CA1A2CA	DATA STRUCTURES	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- basic data structure algorithms
- the fundamental of linked list, Searching and Sorting methods
- the traversal of trees and graph

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental concepts of data structures	K1
CO2	Develop algorithm for linked list methods	K1,K2
CO3	Understand searching and sorting techniques	K1,K2,K3
CO4	Demonstrate the concepts of Binary, Binary Search and AVL trees	K3
CO5	Build algorithms for graph and its Application	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A2CA	DATA STRUCTURES	SEMESTER II

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction : Algorithm, Array, Stack and Queue 10 h

Introduction : History of Algorithm - Definition, Structure and properties of algorithm - Development of an algorithm - Data Structures and Algorithm - Data Structure Definition and Classification - Efficiency of Algorithm

Array : Introduction - Representation of Array -Array Operations

Stack : Stack operation - Evaluation of Expression: Infix to Postfix - Queue: Operation on Queue - Circular Queue

Unit II Linked List 12 h

Linked List: Singly Linked List- Circular Linked List - Doubly Linked List - Linked Stack and Queue: Implementation of Linked Representation- Operations on Linked Stack and Linked Queue - Polynomial Addition- Sparse Matrices

Unit III Searching and Sorting 12 h

Searching : Introduction - Linear Search - Binary Search

Sorting : Introduction - Bubble Sort - Insertion Sort- Merge Sort- Quick Sort - Heap Sort

Hashing : Introduction - Hash Table Structure - Hash Functions – Linear Open Addressing- Chaining-Directories

Unit IV Trees 12 h

Tree: Introduction - Definition and Basic Terminologies - Representation of Trees- Binary Tree – Representation of Binary Tree- Binary Tree Traversals- Threaded Binary Tree

Binary Search Tree: Definition and Operations- AVL Tree Definition and Operations

Unit V Graph 14 h

Graph: Introduction- Definition and Basic Terminologies- Representation of Graphs- Graph Traversals - Applications : Minimum Cost Spanning Tree - Shortest Path

Text Books

1 Vijayalakshmi Pai, G A, 2008, "Data Structures and Algorithms", First Edition, Delhi: Tata McGraw Hall

References

1 Ellis Horowitz, Sartaj Shani, 2010, "Data and File Structures", Second Edition, Galgotia Publication

2 Horowitz, Shani, Anderson - Freed, 2008, "Fundamentals of Data Structures in C", Second Edition, Hyderabad: Universities Press

3 Malik, D S., 2003, "Data Structures using C++", First Edition, Cengage Learning

4 Varsha H. Patil, 2012, "Data Structures using C++", First Edition, Oxford Higher Education

Course Code	Course Name	Category	L	T	P	Credit
192MT1A2IG	DISCRETE MATHEMATICAL STRUCTURES	IDC	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- set theory and assist in planning and operations.
- basic benefit of having a concept of function is that it allows us to use the same function more than once in an expression with different parameter.
- Graph theory and Algebraic structures to apply in various field

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	Understanding and apply Mathematical Logics	K3
CO3	Know the difference between Relation and Function	K2
CO4	Know the concept of Algebraic Structures and Graph Theory	K2
CO5	Learn Language and Finite State Machine	K1

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A2IG	DISCRETE MATHEMATICAL STRUCTURES	SEMESTER II

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Set Theory 12 h

Introduction - Set and its elements - Set Description - Types of Sets - Venn-Euler Diagrams - Set Operations and Laws of Set Theory - Fundamental Products - Partitions of sets - Minsets - Algebra of sets and Duality - The Inclusion and Exclusion Principle.

Unit II Mathematical Logic 12 h

Introduction - Propositional Calculus – Basic Logical Operations - Statements Generated by a Set - Conditional Statements -Converse, Inverse and Contrapositive Statements - Biconditional statements - Tautologies - Contradiction - Contingency.

Unit III Relations and Functions 12 h

Relations : Introduction - Cartesian Product of Sets - Binary Relations – Set Operation on Relations - Types of Relations – Partial Order Relation – Equivalence Relation

Functions : Introduction - Definition and Notation of a function - Types of Functions – Invertible Functions.

Unit IV Algebraic Structures and Graph Theory 12 h

Algebraic Structures : Introduction - Mathematical Operations - Binary Operations - Groups - Modulo.

Graph Theory : Introduction - Basic Terminology - Path, Cycles and Connectivity - Subgraphs - Types of Graphs - Isomorphic Graphs - Homeomorphic Graphs - Representation of Graphs in Computer Memory-Eulerian and Hamiltonian graphs

Unit V Language , Grammar and Automata 12 h

Introduction - The Set Theory of Strings - Languages – Regular Expressions and Regular Languages – Grammar – Finite State Machine – Finite State Automata.

Note: 20% Theory and 80% Problem

Text Books

1 Sharma, J.K., 2014, "Discrete Mathematics", 2nd Edition, Macmillan India, Delhi

References

1 Tremblay, J.P. and Manohar, R. "Discrete Mathematics Structures with Applications to computer science", 2nd Edition, Mc Graw Hill International, New York

2 Venkataraman M.K., Sridharan N., and Chandarasekaran N., "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 Professional, China

194CA1A2CP	CORE PRACTICAL: DATA STRCUTURES	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Linear Search
2	Binary Search
3	Insertion sort
4	Selection sort
5	Quick sort
6	Stack using array
7	Queue using array
8	Inserting a Node in Singly Linked List
9	Deleting a Node in Singly Linked List
10	Tree Traversal
11	Depth First Search
12	Breadth First Search

Note: Minimum 10 programs compulsory

194CA1A2CQ	CORE PRACTICAL: MULTIMEDIA TECHNOLOGIES	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Create a company logo with selection tool and crop tool using Photoshop
2	Apply wrap text around image using Photoshop
3	Apply blend two images using Photoshop
4	Animate Plane flying in the Clouds using Photoshop
5	Create Plastic Surgery for Nose using Photoshop
6	Create Web Page using Photoshop
7	Convert Black and White to Color Photo using Photoshop
8	Animation (tweened, motion) Using Flash
9	Adding Action scripts Using Flash
10	Create a product advertisement using Flash

Note: Minimum 8 Programs Compulsory

Course Code	Course Name	Category	L	T	P	Credit
196BM1A2AA	HUMAN RIGHTS	AECC	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- To study how human values and personality traits help to develop the characteristics of each individual
- Understanding the moral values towards the enrichment of the society
- Identify the impact of ethics and values on the global development of the current scenario

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 human values, personality traits and character formation.	K2
CO2	Acquire the knowledge through value education towards national and global development.	K1
CO3	Introduce the basic concepts of conflict, emotions and adolescent emotions.	K1
CO4	Illustrate the techniques in therapeutic measures like yoga and meditation.	K2
CO5	Learn the concepts of human rights, rights for women and children and domestic violence.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

196BM1A2AA	HUMAN RIGHTS	SEMESTER II

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Human Values 05 h

Concept of Human Values - Value Education Towards Personal Development - Aim of education and value education - Evolution of value oriented education - Concept of Human values - Types of values - Components of value education - Personal Development: Self analysis and introspection - Sensitization towards gender equality - Physically challenged - Intellectually challenged - Respect to age - Experience - Maturity - Family members - Neighbours - Co-workers - Character Formation towards Positive Personality: Truthfulness - Constructivity - Sacrifice - Sincerity - Self Control - Altruism - Tolerance - Scientific Vision.

Unit II Value Education and Social Values 05 h

Value Education Towards National and Global Development National and International Values: Constitutional or national values - Democracy - Socialism - Secularism - Equality - Justice - Liberty - Freedom and fraternity -Social Values - Pity and probity - Self control - Universal brotherhood - Professional Values - Knowledge thirst - Sincerity in profession - Regularity - Punctuality and faith - Religious Values - Tolerance - Wisdom - Character - Aesthetic values - Love and appreciation of literature and fine arts and respect for the same - National Integration and international understanding.

Unit III Global Development on Ethics and Values 04 h

Impact of Global Development on Ethics and Values: Conflict of cross-cultural influences - Mass media - Cross-border education - Materialistic values - Professional challenges and compromise - Modern Challenges of Adolescent Emotions and behave or Sex and spirituality: Comparison and competition - Positive and negative thoughts - Adolescent Emotions - Arrogance - Anger - Sexual instability - Selfishness - defiance.

Unit IV Yoga and Meditation 05 h

Therapeutic Measures: Control of the mind through - Simplified physical exercise - Meditation – Objectives - Types - Effect on body - Mind - Soul - Yoga – Objectives - Types - Asanas - Activities: Moralisation of Desires -Neutralisation of Anger - Eradication of Worries - Benefits of Blessings.

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Unit V Human Rights and Rights of Women and Children 05 h

Human Rights - Concept of Human Rights – Indian and International Perspectives - Evolution of Human Rights - Definitions under Indian and International documents - Broad classification of Human Rights and Relevant Constitutional Provisions - Right to Life - Liberty and Dignity - Right to Equality - Right against Exploitation - Cultural and Educational Rights - Economic Rights - Political Rights - Social Rights - Human Rights of Women and Children - Social Practice and Constitutional Safeguards - Female Foeticide and Infanticide - Physical assault and harassment - Domestic violence - Conditions of Working Women - Institutions for Implementation - Human Rights Commission - Judiciary - Violations and Redressel Violation by State - Violation by Individuals - Nuclear Weapons and Terrorism Safeguards.

References

1 Brain Trust Aliyar, 2008, Value Education for health, happiness and harmony. Vethathiri publications, Erode

2 Grose. D. N, 2005, A text book of Value Education. Dominant Publishers and Distributors, New Delhi.

3 Yogesh Kumar Singh & Ruchika Nath, 2005, Value Education, P. H Publishing Corporation, New Delhi.

4 Venkataram & Sandhiya. N, 2001, Research in Value Education, APH Publishing Corporation, New Delhi.

5 Seetharam. R. (Ed), 1998, Becoming a better Teacher Madras Academic Staff College.

6 Brain Trust Aliyar, 2004, Value Education for Health, Happiness and Harmony. Vethathiri publications, Erode.

7 Swami Vivekananda, 2008, Personality Development. Advaita Ashrama, Kolkata.

8 Dey A. K, 2002, Environmental Chemistry. New Delhi – Vile Dasaus Ltd.

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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Third Semester										
194IT1A3CA	Core - III	Java Programming	4	1	-	3	25	75	100	4
194CA1A3CA	Core - IV	Relational Database Management System	4	-	-	3	25	75	100	4
192MT1A3IG	IDC - III	Computer Based Optimization Techniques	4	1	-	3	25	75	100	4
194CA1A3CP	Core Practical-V	Java & RDBMS	-	-	4	3	40	60	100	2
194CA1A3SA	SEC-I	Data Analytics	4	-	-	3	25	75	100	4
194CA1A3SP	SEC Practical I	Data Analytics	-	-	4	3	40	60	100	2
	GE - I		2	-	-	-	-	50	50	2
	LoP	Lab on Project	-	-	-	-	-	-	-	-
Part - IV										
191TL1A3AA	AECC - III	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A3AB		Advanced Tamil								
195CR1A3AA		Women's Rights								
		Total	**20**	**2**	**8**				**700**	**24**

EXTRA CREDIT COURSES

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

S. No.	Course Code	Course Name
1	194CA1ASSA	Program logic and Computer Fundamentals
2	194CA1ASSB	System Analysis and Design

Course Code	Course Name	Category	L	T	P	Credit
194IT1A3CA	JAVA PROGRAMMING	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The object-oriented paradigm in the Java programming language
- Event -driven programming methods
- The special and unique features of java programming.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Define the basic fundamentals of Java Programming.	K1
CO2	Learn about Object-oriented programming concepts.	K2
CO3	Apply the knowledge in java packages, Threads and Strings.	K3
CO4	Demonstrate the concept of JDBC and RMI.	K3
CO5	Building programs to develop rich internet applications using JavaFX	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A3CA	JAVA PROGRAMMING	SEMESTER III

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Object Oriented Concepts 12 h

Introduction to Object-Oriented Programming – The Java language – Variable Declarations and Arrays – Operators in Java. Control Statements: Introduction – Selection Constructs – Iteration Constructs – Jump Constructs. Introduction to Classes: Instance variables – Class variables – Instance Methods – Constructors – Class Methods – Declaring Objects – Singleton pattern.

Unit II Classes and Methods 12 h

Classes and Methods :Method Overloading – Constructor Overloading – This Reference – Using Objects in Method – Recursion – Access Modifiers – Inner Classes – Command Line Arguments. Inheritance: Basics of Inheritance – Super Class Variable and Subclass Object – The super reference – Constructor Chaining – Method Overriding – The final Keyword. The abstract Classes and Methods – Defining Interface – Implementing Interfaces – Extending Interface – Interface Reference – JNI.

Unit III Exception Handling, Multithreading, Packages and Strings 12 h

Exception Handling: Types of Exceptions-Uncaught Exceptions – Handling Exceptions – User Defined. Multithreaded Programming: Concept of Threads – Thread Creation – Thread's Life Cycle – Thread Scheduling. Packages – An Introduction – The package Declaration – The import Statement – Illustration Package – The Java Language Packages. Handling Strings: Creating Strings – Operations on Strings – Character Extractor Methods – String Comparison Methods.

Unit IV I/O Operations, JDBC and RMI 12 h

Input and Output Operations – Hierarchy of classes in java.io Package – File class – Input Stream and Output Stream-Random Access File Class. JDBC: Architecture-JDBC-ODBC-Types of Drivers- components-Interfaces and classes-Steps for querying the database with JDBC-Creating ODBC Data Source-Querying and Updating Database tables. RMI: How RMI Works-RMI Process- Implementing RMI Services-Executing RMI Client and Server.

Unit V JavaFx 12 h

JavaFX: Introduction –History - Environment - Architecture – Application - Shapes – Text – Effects – Transformation- Animations – Colors – Images – User Interface [illegible]ols – Charts – CSS – Layout Panes - Media with JavaFx – Event handling with

Text Books

1. Instructional Software Research and Development (ISRD) Group,2007, "Introduction to Object Oriented Programming through Java", Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Kishori Sharan,2015,"Learn JavaFx – Builiding User Experiences and Interfaces with Java 8", Apress

References

1. E.Balaguruswamy, 2010, "Programming with Java A Primer", Tata McGraw Hill Publications, Second Edition
2. Schildt, 2010, "The Complete Reference Java", Tata McGraw Hill Publications, Eighth Edition.
3. C. Xavier, 2010, "Programming with JAVA 2", SciTech Publication, and Chennai
4. Paul deitel and Harvey Deitel, 2015, "Java How to Program", 10/e , Deitel & Associates, Inc Publications,10th Edition.

Course Code	Course Name	Category	L	T	P	Credit
194CA1A3CA	RELATIONAL DATABASE MANAGEMENT SYSTEM	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, database design and data 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	S	M	S	M	M
CO2	S	M	S	M	M
CO3	S	M	S	M	S
CO4	S	M	M	M	M
CO5	S	M	S	S	S

S Strong M Medium L Low

194CA1A3CA	RELATIONAL DATABASE MANAGEMENT SYSTEM	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 Oracle9i 8 h

Oracle9i: Oracle9i an introduction – 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 Data Management and Retrieval 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 10 h

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

Text Books

1 Nilesh Shah, 2011, "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
192MT1A3IG	COMPUTER BASED OPTIMIZATION TECHNIQUES	IDC	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- method of solving Linear Programming Problem and assist in planning and operations
- most basic benefit of having a concept of optimization function is that it allows us to use the same function more than once in an expression with different parameter
- concept of project scheduling in Network field

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	explain optimum solution of linear programming problem.	K1
CO2	apply the concept of transportation models in transport goods from one origin to various destination	K3
CO3	solve the concept of Assignment Models in various Job allocation in various field	K2
CO4	analyze the concept of Game Theory and Queueing Theory	K2
CO5	demonstrate the Network diagrams in project scheduling	K1

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A3IG	COMPUTER BASED OPTIMIZATION TECHNIQUES	SEMESTER III

Total Credits: 4
Total Instruction Hours: 60 h

Syllabus

Unit I Linear Programming Problem 12 h

Origin and Development of Operations Research – Nature and Feature of Operations Research – Modelling in Operations Research – Classification of Models – General Solution Methods for Operations Research – Methodology of Operations Research - Applications of Operations Research – Limitation of Operations Research – Scope of Linear Programming - Linear Programming Problem - Mathematical Formulation of Linear Programming Problem – Graphical Method of Linear Programming Problem - Simplex Method of Linear Programming Problem – Computational Procedure for Simplex Method

Unit II Transportation and Assignment Model 12 h

General Transportation Problem – Transportation Table – Loops in Transportation Tables - Solution of a Transportation Problem - Minimizing and Maximizing Problems - Balanced and Unbalanced Problems- Initial Basic Feasible Solution by North West Corner Rule- Least Cost Method - Vogel's Approximation Methods – Test for Optimality - MODI Method – Non Degeneracy in Transportation Problem

Assignment Problem – Mathematical Formulation of the Problem - Minimizing and Maximizing Problem - Balanced and Unbalanced Assignment Problem - Hungarian Algorithm - Travelling Salesman Problem

Unit III Game Theory and Replacement Problem 12 h

Two person Zero Sum Games – Some Basic Terms - Maximin and Minimax Principle – Rule for Determining a Saddle Point – Games without Saddle Points - Mixed Strategies – Graphical Solution of mx2 and 2xn Games - Dominance Property

Replacement Model – Replacement of Equipment – Replacement Policy when value of Money does not change with time – Replacement Policy when value of Money changes with time – Replacement of Equipment that Fails Suddenly - Individual Replacement – Group Replacement

Unit IV Queueing Theory 12 h

Queueing System – Elements of a Queueing System – Input Process – Queue Discipline – Service Mechanism – Capacity of the System - Operating Characteristics of Queueing System – Probability Distributions in Queueing Systems – Classification of Queueing Models - Transient and Steady States – Poisson Queueing Systems – (M/M/1) : (∞/FIFO) Model – Relations between average queue length and average waiting time

Unit V CPM and PERT 12 h

Network and Basic Components – Activity – Event – Logical Sequencing – Rules of Network Construction – Critical Path Analysis – Forward Pass Calculations – Backward Pass Calculations – Types of Floats – Probability considerations in PERT – Probability of Meeting the Schedule Time – Distinction between PERT and CPM

Note: Theory 20% and Problem 80%

Text Books

1 Kantiswarup, Gupta, P. K, and Man Mohan, 2003 , 'Operations Research', 5th Edition, S. Chand & Sons Education Publications, New Delhi.

References

1 P.K. Gupta, D.S. Hira, 2015, 'Problems in Operations Research', 2nd Edition, S. Chand & Sons, New Delhi.

2 Rajagopal K, 2012, 'Operations Research' ,1st Edition, PHI Learning Pvt. Ltd,New Delhi.

3 Hamdy A, Taha, 2014, ' Operations Research: An Introduction', 9th Edition, Pearson Education Publishers Pvt Ltd, New Delhi.

4 Frederick S. Hillier, Gerald J. Lieberman, Bodhibrata Nag and PreetamBasu, 2012, ' Introduction to Operations Research', 9th Edition, Tata McGraw Hill Education Pvt Ltd, New Delhi.

194CA1A3CP	CORE PRACTICAL: JAVA & RDBMS	SEMESTER III

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Programs
1	Polymorphism
2	Inheritance and Interface
3	Exception
4	Threads
5	RMI
6	JavaFx Components
7	DDL
8	DML
9	Trigger
10	Cursor
11	Procedure
12	JDBC

Note: Out of 12-10 Mandatory

Course Code	Course Name	Category	L	T	P	Credit
194CA1A3SA	DATA ANALYTICS	SEC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concept of Big Data Analytics.
- Hadoop, Hive, Pig and NoSQL.
- MongoDB, Cassandra and machine learning.

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 big data analytics.	K2
CO2	Understand knowledge of Hadoop, HDFS, NoSQL	K3
CO3	Apply the knowledge of MongoDB and MapReduce Query Language.	K3
CO4	Build programs using Cassandra, Pig and HIVE	K4
CO5	Apply the concept Database Connectivity	K5

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A3SA	DATA ANALYTICS	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Big Data 10 h

Introduction to Big Data: Definition of Big Data -Types-Characteristics – Evolution of Big Data - Challenges with Big Data - 3Vs of Big Data - Business Intelligence vs. Big Data - Data warehouse and Hadoop environment.Big Data Analytics: Classification of analytics -Terminologies in Big Data.

Unit II Nosql And Hadoop Architecture 8 h

NoSQL: What is NoSQL -Types of Databases – Advantages - SQL vs. NoSQL vs NewSQL. Introduction to Hadoop: Features – Advantages - Overview of Hadoop Eco systems - Hadoop distributions - Hadoop vs SQL – RDBMS vs. Hadoop - Hadoop Components – Architecture – HDFS

Unit III Map Reduce And Mongo Db 10 h

Map Reduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting - Compression. Mongo DB: Introduction – Features - Data types - Mongo DB Query language - CRUD operations – Arrays - Functions: Count – Sort – Limit – Skip – Aggregate - Map Reduce.

Unit IV Cassandra And Hadoop Eco System 10 h

Cassandra: Introduction – Features - Data types – CQLSH - Key spaces - CRUD operations –Alter commands - Import and Export - Querying System tables. Hadoop Eco systems: Hive – Architecture - data type - File format – HQL – SerDe - User defined functions. Pig: Features – Anatomy - Pig on Hadoop - Pig Latin overview - Data types - Running pig - Execution modes of Pig - HDFS commands.

Unit V Machine Learning 10 h

Introduction to Jasper Reports- Connecting to MongoDB. NoSQL Database- Connecting to Cassandra NoSQL Database. Machine Learning- Introduction – Supervised learning - Unsupervised Learning – Collaborative filtering -Big data Analytics using R.

Text Books

1 Seema Acharya and Subhashini Chellappan,2015,"Big Data and Analytics", First edition,Wiley India Pvt Ltd.

2 Hadley Wickham, Garett Groledund,2017, "R for Data Science: Import, Tidy, Transform, Visualize, and Model Data", First Edition, Shroff/ O' Reilly,

References

1 Chris Eaton, Dirk deroos et al. , 2012, "Understanding Big data", McGraw Hill.

2 Vignesh Prajapati, 2013, "Big Data Analytics with R and Haoop", Packet Publishing

3 Tom White, 2011, "Hadoop: The Definitive Guide", O'Reilly Publications

4 Kyle Banker,2012, "Mongo DB in Action", Manning Publications Company.

194CA1A3SP	SEC PRACTICAL: DATA ANALYTICS	SEMESTER III

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Programs
1	Data types in R
2	Bulit-in Functions in R
3	Manipulation of vector in R
4	Operations on data frame in R
5	Basic Commands in MongoDB
6	Database and operations in MongoDB
7	Data models in Cassandra
8	File system for performing data analytics using Cassandra
9	Table operations in Cassandra
10	Cassandra Query Language
11	Decision tree classification techniques
12	Visualize data using plotting techniques

Note: Out of 12 – 10 Mandatory

194CA1A3GA	GENERIC ELECTIVE 1 : FUNDAMENTALS OF CLOUD COMPUTING	SEMESTER III

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Understanding Cloud Computing 4 h

Introduction to Cloud Computing – History of Cloud Computing –How Cloud Computing Works – Companies in the Cloud Today – Why Cloud Computing Matters

Unit II Pros and Cons of Cloud Computing 5 h

Advantages of Cloud Computing – Disadvantages of Cloud Computing –Who benefits from Cloud Computing. Web-Based Application – Pros and Cons of Cloud Service Development

Unit III Developing Cloud Services 5 h

Types of Cloud Service Development: Software as a Service – Platform as a Service – Web Services – On-Demand Computing

Discovering Cloud Services Development Services and Tools: Amazon Ec2 – Google App Engine – IBM Clouds

Unit IV Cloud Computing for Everyone 5 h

Cloud computing for the family: Collaborating on Schedules-Collaborating on House Hold Budgets. Cloud computing for the community: Collaborating on Group Projects and Events. Cloud Computing for the corporation: Managing Projects-Collaborating on Expense Reports-Collaborating on Budgets

Unit V Other ways to collaborate online 5 h

Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Evaluating Instant Messaging Services – Evaluating Web Conference Tools

Text Books

1 Michael Miller,2008, Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online, Que Publishing

References

1 Kumar Saurabh, 2011, Cloud Computing – Insights into New Era Infrastructure, Wiley Indian Edition

2 Kaittwang Geoffrey C.Fox and Jack J Dongrra, 2012, Distributed and Cloud Computing, Elsevier

3 Raj Kumar Buyya, Christian Vecchiola and S.Tanurai Selvi, 2013, Mastering Cloud Computing

194CA1ASSA	SELF STUDY: PROGRAM LOGIC AND COMPUTER FUNDAMENTALS	SEMESTER III

Total Credits: 1

Syllabus

Unit I Introduction to Computer

Introduction to Computer – Computer System Hardware – Computer Memory.

Unit II Input and Output Devices

Input and Output Devices – Interaction of user and computer.

Unit III Programming Fundamentals and Internet

Computer Programming fundamentals – Internet and Internet services.

Unit IV Information Systems

Information Systems – Multimedia.

Unit V Ms Office

Ms-Word 2007 - Ms-Excel 2007 – Ms –Powerpoint 2007.

Text Books

1 Anita Goel, 2010,Computer Architecture, Pearson Publications, 1st Edition.

References

1 V. Rajaraman, 2014, "Fundamental of Computers", Prentice- Hall India Ltd., New Delhi.

2 Sinha P.K, 2007, "Computer Fundamentals", BPB Publications, New Delhi

3 Dubey, Manoj,2013, "P C Packages", Kamal Prakashan Publications, Indore.

194CA1ASSB	SELF STUDY: SYSTEM ANALYSIS AND DESIGN	SEMESTER III

Total Credits: 1

Syllabus

Unit I Information Systems Development

Introduction to Information Systems Development: System-System concept-system analysis-System component – What is system analysis and design? -Role of system analyst-Categories of information system-Types of system.

Unit II System Development Strategies and Tools

System Development Strategies: System Development life cycle-Tools for system development-Tools for determining system requirements: Basic requirements-Fact finding Techniques.

Unit III Computer aided system tool

Computer aided system tool: Role of tools in system development -Categories of automated tools - Structured analysis development strategy – Structured analysis – Data flow diagram – data dictionary.

Unit IV Analysis to Design transition

Analysis to Design transition: Objectives in designing an information system – What feature must be designed?-Design of computer output- Design of input and control

Unit V Quality Assurance and Implementation

Systems Engineering and Quality Assurance: Design objectives –Managing system implementation: Training – Conversion – post implementation review.

Text Books

1 A.Priya,2015, "System Analysis and Design", 1st Edition, Margham Publications.

References

1 Jeffrey L Whitten & Lonnie D Bentley, 2007,"Systems Analysis and Design Methods", Seventh Edition, Tata McGraw-Hill.

191TL1A3AA	பகுதி – 4 : அடிப்படைத்தமிழ்தாள் : 1(Basic Tamil)	SEMESTER III

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2019–20ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது (10 மற்றும் 12 – ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு) (பருவத் தேர்வு உண்டு)

அலகு : 1 தமிழ் மொழியின் அடிப்படைக் கூறுகள் 12 h

அ) எழுத்துகள் அறிமுகம் :

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

ஆ) சொற்களின் அறிமுகம்: பெயர்ச்சொல், வினைச்சொல் – விளக்கம் (எ.கா.)

அலகு : 2 குறிப்பு எழுதுதல் 12 h

1. பெயர், முகவரி, பாடப்பிரிவு , கல்லூரியின் முகவரி
2. தமிழ் மாதங்கள்(12), வாரநாட்கள்(7),
3. எண்கள் (ஒன்று முதல் பத்து வரை), வடிவங்கள், வண்ணங்கள்
4. ஊர்வன, பறப்பன, விலங்குகள், மனிதர்களின் உறவுப்பெயர்கள்
5. ஊர்களின்பெயர்கள் (எண்ணிக்கை 10)
6. பயிற்சிப் பகுதி (உரையாடும் இடங்கள்) : வகுப்பறை, பேருந்து நிலையம், சந்தை

வினாத்தாள் அமைப்பு முறை - மொத்த மதிப்பெண்கள் - 50

பகுதி –அ

சரியான விடையைத் தேர்வு செய்தல் 10x2=20

பகுதி –ஆ

அரைப்பக்க அளவில் விடையளிக்க 03x5=15

பகுதி-இ

இரண்டு பக்க அளவில் விடையளிக்க 01x15=15

குறிப்பு:

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

Text Books

1	அடிப்படைத் தமிழ். 2019. தொகுப்பு : தமிழ்த் துறை, டாக்டர் என். ஜி.பி. கலை மற்றும் அறிவியல் கல்லூரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட். சென்னை

References

1	ஒன்றாம் வகுப்பு பாடநூல் - தமிழ்நாடு அரசு பாடநூல் கழகம்
2	வலைதள முகவரி : http://tamilvu.org

191TL1A3AB	பகுதி – 4 : சிறப்புத் தமிழ் தாள் : 1 **(Advanced Tamil)**	**SEMESTER - III**

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2019– 2020 ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது (10 மற்றும் 12 – ஆம் வகுப்புகளில் தமிழ் மொழிப்பாடம் பயின்றவர்களுக்கு உரியது)(பருவத் தேர்வு உண்டு)

அலகு – 1 மரபுக் கவிதைகள் 05 h

அ) பாரதியார் கவிதைகள்

- தமிழ்நாடு
- மனதில் உறுதி வேண்டும்
- வருகின்ற பாரதம் (பா.எண்.5-8)

ஆ) பாரதிதாசன் கவிதைகள்

- இன்பத்தமிழ்
- நீங்களே சொல்லுங்கள்
- வாளினை எடடா!

இ) தாராபாரதி கவிதைகள்

- வேலைகளல்ல வேள்விகள்

அலகு – 2 புதுக்கவிதைகள் 05 h

- கம்பன் கவியரங்கக் கவிதை - மு.மேத்தா
- தமிழா! நீ பேசுவது தமிழா! - காசியானந்தன்
- நட்புக் காலம் (10 கவிதைகள்) - அறிவுமதி கவிதைகள்

அலகு – 3 இலக்கணம் 04 h

- வல்லினம் மிகும் மற்றும் மிகா இடங்கள்
- ர, ற,- ல, ழ, ள - ந, ண, ன - ஒலிப்பு நெறி, பொருள் வேறுபாடு அறிதல்

அலகு – 4 கடிதங்கள் எழுதுதல் 05 h

- பாராட்டுக் கடிதம்
- நன்றிக் கடிதம்
- அழைப்புக் கடிதம்
- அலுவலக விண்ணப்பங்கள்

அலகு – 5 பாடம் தழுவிய வரலாறு 05 h

- பாரதியாரின் இலக்கியப் பணி
- பாரதிதாசனின் இலக்கியப்பணி
- மரபுக்கவிதை, புதுக்கவிதை - விளக்கம்

வினாத்தாள் அமைப்பு முறை - மொத்த மதிப்பெண்கள் - 50

பகுதி –அ	
சரியான விடையைத் தேர்வு செய்தல்	10x1=10
பகுதி –ஆ	
அரைப்பக்க அளவில் விடையளிக்க	05x3=15
பகுதி-இ	
இரண்டு பக்க அளவில் விடையளிக்க	05x5=25

குறிப்பு:

- பகுதி –அ அனைத்து அலகுகளில் இருந்தும் இரண்டு வினாக்கள் அமைதல் வேண்டும்
- பகுதி ஆ மற்றும் இ –க்கான வினாக்கள் இது அல்லது அது என்ற அடிப்படையில் அந்தந்த அலகுகளில் அமைதல் வேண்டும்

Text Books

1 சிறப்புத் தமிழ் . 2019. தொகுப்பு : தமிழ்த் துறை, டாக்டர் என். ஜி.பி. கலை மற்றும் அறிவியல் கல்லூரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட். சென்னை

References

1 புலவர் சோம. இளவரசு - 2014. இலக்கிய வரலாறு, மணிவாசகர் பதிப்பகம், சென்னை – 108

2 வலைதள முகவரி : http://tamilvu.org

195CR1A3AA	WOMEN'S RIGHTS	SEMESTER III

Total Credits: 2

Total Instruction Hours: 24h

Syllabus

Unit I Rights to Infant & Child 4 h

Issues for women in India- Law relating to Female infanticide-Rights to the survival of a child-Child Labour- Child trafficking –Child Marriage- Protection of Children against Sexual Offences Act 2012 (POCSO)

Unit II Rights to women 5 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

Unit III Laws for Senior Citizen women 5 h

Constitutional Rights –Personal Laws- The Tamil Nadu Maintenance and Welfare of Parents and Senior Citizens Rules in 2009- The National Council for Older person- Government Provisions for elderly persons

Unit IV Civil and Political Rights of Women 5 h

Right of inheritance-Right to live with decency and dignity-The Married women's Property Act 1874-Personl law 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

Unit V International convention on Womens' Right 5 h

Convention on the Elimination of All Forms of Discrimination against Women(CEDAW)-United Nations population Fund(UNFPA)-Protocol to the African Charter on the rights of women in Africa-Convention on the Nationality of Married women-Convention on the political rights of women- Inter-American convention on granting of civil and political rights for women-Universal declaration of Human rights

Text Books

1 Women & Law(2009)-Krishna Pal Malik-Allahabad Law University, Delhi

References

1 Women's Human Rights in India(2019)-Christian Foster and Jaya Sagade- Routledge India

2 Justice for Women: Concerns and Expressions (2008)-Anand AS –Universal Law Publishing Co.

Course Code	Course Name	Category	L	T	P	Credit
194CA1A4CA	DIGITAL LOGIC AND DESIGN	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Digital behavior of the computer system
- Ideas behind the Logic of various core component of the computer system
- Different Computer Organization Methodologies

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Illustrate the digital representations & ArithmeticOperations	K1
CO2	Understand the functional concepts of Logic gates	K2
CO3	Analyze the concept of Boolean Algebra & itssimplifications	K2,K3
CO4	Acquire knowledge of Arithmetic and LogicCircuits	K1,K2
CO5	Understand the knowledge of various Organization in Computer System	K1,K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A4CA	DIGITAL LOGIC AND DESIGN	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Binary Systems and Binary Code 12 h

Digital Computers and Digital Systems- Binary Numbers- Number Base Conversion- Octal and Hexadecimal Numbers- 1's Complement- 2's Complement. Binary Codes: Decimal Codes -error Detection Code- Reflected Code-Alphanumeric Codes

Unit II Boolean Algebra and Logic Gates 12 h

Basic Definitions-Axiomatic Definition of Boolean Algebra- Basic Theorems and Properties of Boolean Algebra – Boolean Functions- Digital Logic Gates.

Simplification of Boolean Functions: The Map Method- Two and Three Variable Maps- Four Variable Map- Product of Sum Simplification- Don't care conditions

Unit III Combinational Logic 12 h

Combinational Logic: Introduction –Design Procedure-Half Adder- Full Adder- Half Subtractor - Full Subtractor- BCD to Excess -3 Code conversion.

Combinational Logic with MSI and LSI: Binary Parallel Adder- BCD Adder – Decoders- Combinational Logic Implementation – De multiplexer – Encoders- Multiplexer

Unit IV Sequential Logic 12 h

Introduction – Flip Flop-Basic Flip Flop Circuits- Clocked RS Flip Flop- D- Flip Flop- JK Flip Flop- Triggering of Flip flop- Master Slave Flip Flop.

Registers, Counters and The Memory Unit: Shift Registers- Serial Transfer- Bi Directional Shift register with Parallel Load –Ripple Counters- Binary Ripple Counter

Unit V Register - Transfer, Processor, and Control Logic Design 12 h

Inter-register transfer- Arithmetic Logic and Shift Micro Operations- Conditional Control Statements- Instruction Codes- Instruction Code Format.

Processor Organization – Bus organization- Arithmetic Logic Unit- Control Organization

Text Books

1 M.Morris Mano 2019, “Digital Logic and Computer Design”,Pearson India Education Services

References

1 R K Gaur, 2012, "Digital Electronics and Micro Computers",ThirdEdition,DhanpatRai Publications PvtLtd,New Delhi.

2 M Morris Mano,2016,"Computer System Architecture", PHI, New Delhi

Course Code	Course Name	Category	L	T	P	Credit
194CA1A4CB	SOFTWARE ENGINEERING	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- To provide knowledge in the development of software system of high quality
- To be able to work with software development within different industrial sectors.
- To learn about the systematic approach to the design, development, operating and maintenance of quality software products

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the systematic approach to design, development of software systems.	K1
CO2	Demonstrate the development process of a software Engineering and Requirement engineering techniques	K2
CO3	Translate Design engineering Techniques	K2
CO4	Make use of component design, user interface design and Testing techniques.	K3
CO5	Identify quality of the software management techniques and perform case study.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A4CB	SOFTWARE ENGINEERING	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction and Life cycle Models 12 h

Introduction –Evolution – types of software development projects – Changes in Software Development Practices – Computer Systems Engineering.

Software Life Cycle Models: Classical Waterfall Model – Iterative Waterfall Model – Prototyping Model – Evolutionary Model – Agile Development Models- Spiral Model.

Unit II Project Management and Software Requirement Analysis 12 h

Software Project Management: Responsibilities of a Software Project Manager – Project Planning – Metrics for Project Size Estimation – Project Estimation Techniques – COCOMO – A Heuristic Estimation Technique – Staff Level Estimation – Scheduling – Organization and Team Structures – Staffing – Risk Management – Software Configuration Management

Requirements Analysis and Specification: Requirements Gathering and Analysis – Software Requirements Specification (SRS) – Formal System Specification

Unit III Software Design 12 h

Software Design: overview of the Design process- Characteristics of a Software Design – Cohesion and Coupling – Layered Arrangement of modules – Software Design Approaches.

Function-Oriented Software Design: Overview of SA/SD Methodology – Structured Analysis – Data Flow Diagrams(DFDs) – Structured Design - Detailed Design – Design Review.

Object Modeling Using UML: Basic Concepts- advantages and Disadvantages of OOD - UML Diagrams – Use Case Model – Class Diagrams – Interaction Diagrams.

Unit IV Coding and Testing 12 h

Coding and Testing: Coding – Code Review – Software Documentation - Testing – UNIT Testing – Black-Box Testing – White-Box Testing – Debugging – Program Analysis Tools – Integration Testing – System Testing.

Unit V Software Quality and CASE Environment 12 h

Software Reliability and Quality Management: Software Reliability – Statistical Testing – Software Quality – Software Quality Management System – ISO 9000.

Computer Aided Software Engineering: CASE Environment – CASE support in Software Life Cycle – Characteristics of CASE Tools – Second Generation CASE Tool – Architecture of a CASE Environment. Software Maintenance: Characteristics of Software Maintenance – Software Reverse Engineering – Software Maintenance Process Models – Estimation of MaintenanceCost. Software Reuse: Introduction – Issues in any Reuse Program – Reuse Approach – Reuse at Organization Level.

Text Books

1 Rajib Mall, 2014,"Fundamentals of Software Engineering", Prentice Hall of India Private Limited, 4th Edition.

References

1 Roger S Pressman,2005,"Software Engineering", MC Graw-Hill, 6th Edition

2 Dorothy Graham, Erik van Veenendaul, Isabel Evans, Rex Black,2007,"Foundation of Software Testing", Len gage learning India Pvt. Ltd., Indian edition.

3 Darrel Ince,1994,"An Introduction to Software Quality Assurance its Implementation", McGraw Hill Book Company Ltd.

Course Code	Course Name	Category	L	T	P	Credit
195PA1A4IB	BUSINESS ACCOUNTING	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The rules of accounting used to enter the business transactions in a systematic manner to maintain books of accounts
- the procedures involved
- The concepts in preparation of accounts

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Know the book keeping concepts and conventions of accounting and rules of accounting and its types	K1,K2
CO2	Capture the procedures relating to pass journal entries, posting of ledger, trial balance and subsidiary books	K2,K3
CO3	Obtain knowledge to prepare final accounts of a sole trader	K2
CO4	Know the consignment accounting and the theoretical aspect of joint venture.	K3
CO5	Classify and apply appropriate methods of depreciation	K2,K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

195PA1A4IB	BUSINESS ACCOUNTING	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Fundamentals of Book Keeping 08 h

Fundamentals of Book Keeping: Definition, objectives, methods of accounting, Branches of accounting, Types of Accounts and Accounting rules – Accounting Concepts and Conventions – double entry system – advantage – difference between double entry and single entry

Unit II Accounting Books 10 h

Journal, ledger, and Trial balance, subsidiary books – purchase book, sales books, purchase returns book, sales returns book and cash book with single, double and triple column cash book

Unit III Final Accounts 10 h

Final Accounts of a sole trader - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.

Unit IV Accounting for consignments and Joint ventures 12 h

Accounting for consignments and Joint ventures: Consignment Meaning, definition, features, account sales, valuation of unsold stock, goods sent on consignment at cost price various commission to consignee (only Problem). Joint venture: Meaning, features, distinction between joint venture and partnership, joint venture and consignment.(Only Theory).

Unit V Depreciation 8 h

Depreciation - Meaning- Features- Methods- Straight Line Method– WDV Method - Annuity Method

Note: Distribution of Marks between problems and theory shall be 80% and 20%

Text Books

1. Vinayakam N., Mani P.L. and Nagarajan K.L,2019, "Principles of Accountancy", S.Chand& Company Ltd., New Delhi

2. Jain S P and Narang K L,2019, "Advanced Accountancy", Kalyani Publishers, New Delhi.

References

1. Gupta R.L., Gupta V.K. and Shukla M.C, 2006,"Financial Accounting", Sultan chand& sons, New Delhi.

2. Maheswari S.K., and Reddy T.S, 2005,"Advanced Accountancy", Vikas publishers, New Delhi

194CA1A4CP	CORE PRACTICAL: SOFTWARE ENGINEERING	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Software Requirement Specification
2	DFD model (level 0, level 1 DFD and Data dictionary) and ERD
3	Use case diagram
4	Class diagram
5	Object diagram
6	State-chart diagram
7	Activity diagram
8	Component diagram
9	Deployment diagram for the system
10	Testing using testing tools
11	Estimation of effort using FP Estimation
12	Time line chart/Gantt Chart/PERT Chart for software project

Note: Choose any one project and to do the above exercises

a. Student result management system

b. Library management system

c. Inventory control system

d. Railway reservation system

e. Hotel management system

f. E-Banking

g. Hospital management system

h. Payroll processing

i. E-Insurance renewal

Course Code	Course Name	Category	L	T	P	Credit
194CS1A4SA	PYTHON PROGRAMMING	SEC	4	0	0	4

PREAMBLE

This course has been designed for students to learn and understand

- the fundamentals of python
- a function-oriented programming paradigm through 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	Enable the students to understand the basic principles of the Python Language.	K1
CO2	Applying the design principles in the data-driven applications	K2
CO3	Enabling to design the web-based applications using Python	K2
CO4	Understanding the machine learning ability of Python based components	K3
CO5	Solving the real time problems using Python	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CS1A4SA	PYTHON PROGRAMMING	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Python 8 h

Introduction: Python overview– Comments – Python identifiers – Reserved keywords – Variables – Standard data types – Operators –Statements and Expressions . Control Statements: The for loop – While statement – if elif else statement – Input from keyboard.

Unit II Functions and Strings 10 h

Functions: Introduction – Built-in functions – Type conversion – Type coercion – Date and time – dir() function – help() function – User defined functions – Parameters & arguments – Function calls – The return statement –Python recursive function. Strings: Compound data type – len() function – String slices – String traversal – Escape characters – String formatting operator – String formatting functions .

Unit III Lists, Tuples and Dictionaries 10 h

Lists – Values and accessing elements – Traversing a list – Deleting elements from list – Built-in list operators – Built-in list methods. Tuples – Creating tuples – Accessing values in tuples – Tuple assignment –Tuples as return values – Basic tuple operations – Built-in tuple functions. Dictionaries – Creating a dictionary – Accessing, Updating, Deleting elements from dictionary – Operations in dictionary – Built-in dictionary methods.

Unit IV NumPy Library 10 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.

Unit V Pandas 10 h

Pandas: The Python Data Analysis Library: Installation- Getting Started with pandas - 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

Text Books

1 E. Balagurusamy, 2016, "Introduction to Computing and Problem Solving Using Python", McGrawHill publication. UNIT 1, 2 and 3

2 Fabio Nelli , 2015, "Python Data Analytics" , Apress, 1st Edition. UNIT 4 and 5

References

1 Wes McKinney, 2011, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Ipythony", O'Reilly.

2 Zed Shaw,2014, "Learn Python the Hard Way", Addison-Wesley, 3rd Edition

3 www.spoken-tutorial.org

194CA1A4SP	SEC PRACTICAL: PYTHON PROGRAMMING	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Operators
2	Decision making and Looping
3	Python Recursive function
4	String Functions
5	Mathematical Functions
6	List functions
7	Tuple Functions
8	Sorting and Ranking
9	Arrays
10	Data Manipulations in Series
11	Data Manipulation in Data Frames
12	Types of Charts

Note: Out of 12 - 10 mandatory

194CA1A4GA	GENERIC ELECTIVE: SECURITY IN COMPUTING	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction 5 h

Security problem in computing: What does "Secure" mean? - Attacks-The meaning of computer security – computer criminals.

Unit II Program Security 5 h

Program Security: Secure Programs – Non malicious program errors-Viruses and other malicious code.

Unit III Protection 5 h

Protection in general: Purpose of Operating systems- Protected objects and methods of protection –Memory and address protection – File protection mechanisms.

Unit IV Database and Mining Security 5 h

Database and Data Mining Security: Introduction to Databases – Security requirements – Reliability and Integrity

Unit V Cyber Security 4 h

Cyber Security in Social Networks: Introduction to Cyber Crimes & Legal Framework -Cyber Crimes against Individuals, Institution and State-Hacking-Digital Forgery- Cyber Stalking/Harassment-Cyber Pornography- Identity Theft & Fraud Cyber terrorism- Cyber Defamation

Text Books

1 Charles. P Pfleeger& Shari Lawrence Pfleeger ,2015,"Secuirty in Computing", Fourth Edition, Eastern Economy Edition

References

1 Brijendra Singh,2012 "Network Security and Management" Second Edition, Eastern Economy Edition

2 William Stallings, 2018, "Network Security Essentials", Sixth Indian Reprint, Pearson Education

3 Justice Yatindra Singh,2012," Cyber Laws", Universal Law Publishing Co, New Delhi

191TL1A4AA	பகுதி – 4 : அடிப்படைத்தமிழ் - தாள் : II (Basic Tamil)	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2019–20ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

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

(பருவத் தேர்வு உண்டு)

அலகு : 1 12 h

நீதி நூல்கள்

I.ஆத்திசூடி - "அறம் செய விரும்பு" முதல் "ஔவியம் பேசேல்"வரை -12 பாடல்கள்

II.கொன்றைவேந்தன் - "அன்னையும் பிதாவும் முன்னறி தெய்வம்" முதல்

"எண்ணும் எழுத்தும் கண் எனத் தகும்" வரை -7 பாடல்கள்

III.திருக்குறள் - 6 பாடல்கள்

1. அகர முதல 1
2. மனத்துக் கண்.....34
3. இனிய உளவாக 100
4. தீயவை தீய பயத்தலான்.....202
5. கற்க கசடற 391
6. கண்ணொடு கண்ணினை.....1100

அலகு : 2 12 h

I. எளிய நீதிக்கதைகளும் வாழ்க்கை முறைகளும்

1. நீதிகாத்த மன்னன்
2. சிங்கமும் முயலும்
3. புத்திசாலி உழவனும் போக்கிரிப் பூதமும்
4. தேனீயும் புறாவும்
5. முயல் கூறிய தீர்ப்பு

II. தமிழகப் பண்பாடுகள்

1. தமிழர் விழாக்கள் - பொங்கல், ஆடிப்பெருக்கு
2. தமிழர் கலைகள் - தெருக்கூத்து, ஓவியம், சிற்பம்
3. தமிழர் விளையாட்டுகள்- ஏறுதழுவுதல், சடுகுடு

III . பயிற்சிப் பகுதி

1. படத்திற்கு ஏற்ற சொற்களை எழுதுதல்.
2. சொற்களைத் தொடராக்குதல்.
3. பொருத்துதல்,
4. உரையாடல் பகுதி

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது

வினாத்தாள் அமைப்பு முறை - மொத்த மதிப்பெண்கள் - 100

பகுதி – அ

சரியான விடையைத் தேர்வு செய்தல் 10x2=20

பகுதி – ஆ

சரியா? தவறா? தேர்ந்தெடுத்து எழுதுக . 10x2=20

பகுதி - இ

ஒரு பக்க அளவில் விடையளிக்க 03x20=60

குறிப்பு:

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

Text Books

1 அடிப்படைத்தமிழ் - 20-21. தொகுப்பு : தமிழ்த்துறை , டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட். சென்னை-600 098

References

1 ஒன்றாம் வகுப்பு பாடநூல் - தமிழ்நாடு அரசு பாடநூல் கழகம்

2 வலைதள முகவரி : http://tamilvu.org

191TL1A4AB	பகுதி – 4 : சிறப்புத்தமிழ் - தாள் : II (Advanced Tamil)	SEMESTER - IV

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2019– 2020 ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(10 மற்றும் 12 – ஆம் வகுப்புகளில் தமிழ் மொழிப்பாடம் பயின்றவர்களுக்கு உரியது

(பருவத் தேர்வு உண்டு)

அலகு – 1 05 h

திருக்குறள்

I அறத்துப்பால்

1. இனியவை கூறல் - அதிகார எண் : 10
2. அடக்கமுடைமை - அதிகார எண் : 13

II பொருட்பால்

1. கல்வி - அதிகார எண் : 40
2. உழவு - அதிகார எண் : 104

III இன்பத்துப்பால்

1. தகையணங்குறுத்தல் - அதிகார எண் :109
2. பிரிவாற்றாமை - அதிகார எண் : 116

அலகு – 2 05 h

கட்டுரைத் தொகுப்பு

I நல்வாழ்வு - டாக்டர் மு.வரதராசன்

1. நம்பிக்கை
2. புலனடக்கம்
3. பண்பாடு

II இளைஞர்களின் ஒளிமயமான எதிர்காலத்திற்கு - கு.வெ. பாலசுப்பிரமணியம்

1. காலக்கணக்கு
2. நற்பழக்கமே செல்வம்

அலகு – 3 05 h

I காப்பியங்கள் - குறிப்பு எழுதுதல்

1. சிலப்பதிகாரம்
2. மணிமேகலை
3. கம்பராமாயணம்
4. பெரியபுராணம்

II ஊடகம் - காட்சி ஊடகங்கள்

1. தொலைக்காட்சி
2. திரைப்படம்
3. இணையம்
4. முகநூல்
5. கீச்சகம்
6. கட்செவி அஞ்சல்

அலகு – 4 05 h

இலக்கணம் - வழக்கறிதல்

1. இயல்பு வழக்கு
2. தகுதி வழக்கு

அலகு – 5 04 h

I படைப்பாற்றல் பகுதி

கவிதை,கட்டுரை எழுதச்செய்தல் - பொதுத் தலைப்பு

II பயிற்சிப் பகுதி

தமிழில் தட்டச்சு செய்தல் - யூனிகோடு எழுத்துருவில்.

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது

வினாத்தாள் அமைப்பு முறை - மொத்த மதிப்பெண்கள் - 100

பகுதி –அ

சரியான விடையைத் தேர்வு செய்தல் 10x2=20

பகுதி –ஆ

கோடிட்ட இடங்களை நிரப்புக 10x2=20

பகுதி –இ

இரண்டு பக்க அளவில் விடையளிக்க 4x15=60

குறிப்பு :

- அனைத்து அலகுகளில் இருந்தும் இரண்டு வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ –க்கான வினாக்கள் இது அல்லது அது என்ற வகையில் அந்தந்த அலகுகளிலிருந்து அமைதல் வேண்டும்.

Text Books

1 சிறப்புத்தமிழ் 20-21. தொகுப்பு : தமிழ்த் துறை , டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி) லிட். 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 வலைதள முகவரி : http://tamilvu.org

192PY1A4AA	AECC : GENERAL AWARENESS	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 24 h

S.No	Contents
1	Current Events
2	General Science
3	Geography of India
4	Tamil and Other Literature
5	Inventions and Discoveries
6	Numerical and Mental Aptitude
7	Verbal and Non Verbal Reasoning
8	Socio- Culture and Heritage of India
9	Indian Economy and Political System
10	History of India and Freedom Struggle

References

1. Majid Hussain, Arrora N D, 2019, "General Studies -TNPSC Group -I ", G.K.Publications (P) Ltd. New Delhi
2. Aggarwal R S, 2014, "Verbal and Non Verbal Reasoning" S Chand & Company, New Delhi
3. Competition Success Review, Competitive Success Publisher, New Delhi
4. Pratiyogita Darpan, Pratiyogita Darpan Publishers, Agra.

Course Code	Course Name	Category	L	T	P	Credit
194CT1A5CA	DATA COMMUNICATION AND NETWORKS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Modes of Data Transmission, Transmission Media and Network Topologies.
- OSI layers, Routing Algorithms and ISDN architecture
- Internetworking devices, Analyze the problems in inter networking, TCP and UDP

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Know about Data Communications and Transmission Methods	K1,K2
CO2	Describe modes of Data Transmission, Multiplexing Techniques and Transmission Media	K1,K2
CO3	Interpret Network Topologies, OSI layers and Routing Algorithms	K3
CO4	Understand the ISDN Architecture, Internetworking concepts and Basics of TCP/IP	K3
CO5	Apply TCP and UDP formats.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A5CA	DATA COMMUNICATION AND NETWORKS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Data Communication and Transmission Methods 10 h

Introduction to Data Communications and Networking: Data Communications – Protocols - Standards – Signal propagation – Analog and Digital Signals – Bandwidth of a Signal

Analog and Digital Transmission Methods: Analog Signal, Analog Transmission – Digital Signal, Digital Transmission – Digital Signal, Analog Transmission – Analog Signal, Digital Transmission – Baud Rate

Unit II Data Transmission Modes, Multiplexing and Transmission Media 12 h

Modes of Data Transmission and Multiplexing: Parallel and Serial Communication – Asynchronous, Synchronous and Isochronous Communication – Simplex, Half-duplex, Full-duplex Communication.

Multiplexing: Frequency Division Multiplexing – Time Division Multiplexing – Statistical Time Division Multiplexing – Wavelength Division Multiplexing.

Transmission Errors: Introduction – Error Classification - Types of Error

Error Detection: Checksum – Vertical Redundancy Check – Longitudinal Redundancy Check – Cyclic Redundancy Check.

Transmission Media: Guided Media, Unguided Media.

Unit III Network Topologies, Switching and Routing, OSI layers 10 h

Network Topologies: Mesh, Star, Tree, Ring, Bus.

Switching Techniques: Circuit Switching, Message Switching, Packet Switching.

Routing Algorithms: Routers and Routing – Factors affecting Routing Algorithms - Routing Algorithms: Distance Vector Routing - Link State Routing.

Network Protocols and OSI Model: Protocols in Computer Communications – OSI Model – OSI Layer Functions.

Unit IV ISDN, Internetworking and Basics of TCP/IP 8 h

Integrated Services Digital Network (ISDN): ISDN Architecture – ISDN interfaces.

Internetworking Concepts: Introduction – The Problems in Internetworking - Internetworking Devices - Repeaters – Bridges – Routers – Gateways.

Introduction to TCP / IP: Introduction - TCP/IP Basics – Example - Address Resolution Protocol – Reverse Address Resolution Protocol – Internet Control Message Protocol.

Unit V TCP & UDP 8 h

TCP & UDP: Features of TCP - Relationship between TCP and IP - Ports and Sockets - TCP connections - What makes TCP Reliable - TCP Packet Format.

User Datagram Protocol (UDP): UDP - UDP Packet - Difference between UDP and TCP – Domain Name System (DNS) – Electronic Mail (Email) – File Transfer Protocol (FTP).

Text Books

1 Achyut S. Godbole , 9th reprint, 2018, "Data Communications and Networks", 2nd Edition, Tata McGraw Hill Publications

References

1 Behrouz A. Forouzan, 2007, "Data Communications and Networking", 4th Edition, Tata McGraw-Hill Publication

2 Andrew S. Tanenbaum, 2003, "Computer Networks", 4th Edition, Prentice Hall of India.

Course Code	Course Name	Category	L	T	P	Credit
194CS1A5CA	C# PROGRAMMING	CORE	4	0	0	4

PREAMBLE

This course has been designed for students to learn and understand

- The objectives of the .Net Framework.
- About the programming methodologies of C#.Net
- Develop window applications, database connectivity and webapplications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the C#.Net framework	K1
CO2	Illustrate generic control structures and arrays regulatory functions	K2
CO3	Learn the additional features in C#.Net	K3
CO4	Develop the knowledge of database connectivity and build programs	K2
CO5	Expose the concepts of server side web controls	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CS1A5CA	C# PROGRAMMING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Visual C#.Net 9 h

Introduction-.Net Framework-.Net Base Classes VC#.Net Language-Development and Execution of a simple VC#.Net Program in the Command Prompt Window. Features in Visual Studio.Net: Start page-Solution Explorer Window-Class View window-Object Browser-Code Window. Data Types and Console I/O: Value types and Reference types-Boxing and Unboxing-variable declaration and Initialization-Data type conversion-Console I/O functions.

Unit II Control Statement 9 h

for each statement – Goto statement. Arrays and Methods: One-dimensional arrays-Two-dimensional arrays – Jagged array – array and Array list Classes – Methods – value Type parameters – out Type parameters – params Type parameters – method overloading. Classes and Objects- Properties, Indexers and Operator Overloading-Inheritance and Polymorphism.

Unit III Interface 10 h

Interfaces, Namespaces and Components – Delegates, Events and Attributes – Exception Handling.

Unit IV Window Applications 10 h

Classes used in windows applications - Textbox and Label controls- Button – checkbox – radio button – group box – list box – checkedlistbox – combo box – calendar control – docking – progress bar – track bar – panel – tree view – splitter – menu – dialog boxes – toolbar - status bar.

Unit V Data base and web applications 10 h

Database connectivity Database connectivity – Basic web controls: Advantages of ASP.Net-ASP.Net Object Model – server-side controls – server-side processing of Client-side events-Calendar controls-Adrotator control. Validation and list web controls.

Text Books

1 Muthu .C, 2007, “Visual C# .Net”, 1st Edition, Vijay Nicole Publication, Chennai.

References

1 Balagurusamy. E, 2010, "Programming in C# A Primer", 3rd Edition, Tata McGraw Hill. India.

2 Matt Telles, 2008, "C# Programming" - Black Book, Dreamtech Press, New Delhi.

Course Code	Course Name	Category	L	T	P	Credit
194IT1A5CB	CYBER CRIME AND DIGITAL FORENSIC	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The application of forensics and analyze computer forensic evidence.
- The essential Protocols and Knowledge about Forensic
- The importance of network forensic principles, legal considerations, digital evidence controls.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic forensics and techniques for conducting the forensic.	K1
CO2	Examine digital evidences such as the data acquisition, Threats and Applications	K1, K2
CO3	Apply forensic analysis tools to recover important evidence for identifying computer crime.	K2, K3
CO4	Learn Theft and fraud identification	K3
CO5	Acquire Knowledge on Web based criminal activity and crime investigators.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A5CB	CYBER CRIME AND DIGITAL FORENSIC	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Fundamentals of Cybercrime 8 h

Cybercrime: Introduction, Motivation and Methods: Introduction-The Scale of the Problem and Reasons for the Growth of Cyber Crime-Profiling Cyber Criminals-Challenges for Criminal Justice and Law Enforcement-The Future of Cybercrime

Unit II Computer System as Target 10 h

Unauthorized Access Offences in Cyberworld: Emerging Threats: Expected Targets and Forms- Criminal Statutes- Other Offences Associated with Hacking

Injection of Malicious Code in Application: Introduction- Types of Malicious Code-Threats Posed by Viruses, Worms, and Trojan Horses. Legislative Approaches.

Unit III Introduction and overview of Computer forensics and Cybercrime 10 h

Introduction- Cyberspace and criminal behavior-clarification of terms-traditional problems associated with computer crime-extent of the problem-the emergence of e-cash: a new problem for law enforcement-Traditional computer crimes: Traditional problem-recognizing and defining computer crime-three incidents-phreakers-hacking-computers as commodities-theft of intellectual property

Unit IV Contemporary Computer Crime & Identify Theft & Fraud 12 h

Web based criminal activity-Malware-Theft of Information, Data Manipulation and Web Encroachment-Terrorism

Typologies of Identity Theft/Fraud-Prevalence and Victimology-Physical Methods of Identity Theft- Virtual or Internet-Facilitated Methods

Computer Forensics- Traditional Problems in Computer Investigations-Disk Structure and Digital Evidence-Developing Computer Forensic Science Capabilities-Minimum Housing, Hardware, Software Requirements- A Sampling of Popular Forensic Software

Unit V Searching and Seizing Computer-Related Evidence 8 h

Traditional Problems Associated with Finding Digital Evidence-Pre-search activities-On-scene Activities-Processing of evidence and report preparation: Aspects of data analysis-Non windows Operating Systems- Smart phones and GPS forensics-A sample of Popular products

Text Books

1 Mohamed Chawki, Ashraf Darwish, Mohammad Ayoub Khan, Sapna Tyagi, 2015, "Cybercrime, Digital Forensics and Jurisdiction", Third Edition, Springer & London.

2 Marjie T.Britz, "Computer Forensics and Cyber Crime", Third Edition, Pearson, New York.

References

1 Thomas J, Holt Adam M, Bossler Kathryn C, Seigfried-Spellar, "Cybercrime and Digital Forensics: An Introduction", Kindle.

Course Code	Course Name	Category	L	T	P	Credit
194CA1A5CA	OPERATING SYSTEM	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic concepts on various components and responsibilities of Operating System
- The logic ability to solve the problem efficiently in resource management
- Different approaches of memory management

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Define operating system and its types.	K1
CO2	Understand the role of operating system as a CPU scheduler.	K2
CO3	Apply the process management through process synchronization and deadlock.	K3
CO4	Build skills to apply virtual memory and memory scheduling.	K3
CO5	Develop problem solving techniques for disk scheduling and file management.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

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

194CA1A5CA	OPEARTING SYSTEM	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 10 h

Introduction: What is an OS?-Batch-timesharing-Parallel – real time – distributed process: The Process – Process State – Process Control block-Inter Process Communication

Unit II CPU Scheduling and Algorithms 10 h

CPU Scheduling: CPU/I/O burst cycle-CPU Scheduler-Preemptive Scheduling-Scheduling Criteria-Scheduling Algorithms: First come First served-Shortest job first – Priority –Round Robin

Unit III Process Synchronization and Deadlock 10 h

Process Synchronization: Critical Section - Semaphores-Reading/Writing Problem – Dining Philosopher problem – monitor, Deadlock: Characterization –Prevention – Avoidance – Detection - Recovery

Unit IV Storage Management System and Virtual Memory 10 h

Storage Management System: Logical versus physical Address space-Swapping-Contiguous memory Allocation-Paging-Segmentation-Virtual Memory: Demand Paging-Page Replacement Strategies.

Unit V Disk Scheduling and File System 8 h

I/O Hardware -Disk Scheduling: FCFS-SSTF-SCAN-CSCAN-Look. File System: File Concept-Access Methods-Directory structures

Text Books

1 Silber schatz, peter galvin, greg gagne,2009, "Applied Operating System Concepts", 8th Edition, ,John Wiley & sons Pvt. Ltd,

References

1 Achyut S. Godbole, 1997, "Operating Systems" , 1st edition,TMH.

2 Andrew S. Tanenbaum, 2014, "Modern Operating Systems", Fourth Edition, PHI.

Course Code	Course Name	Category	L	T	P	Credit
194CA1A5DA	INTERNET OF THINGS	DSE	4	0	0	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic concepts of Internet of Things
- Recognize the factors that contributed to the emergence of IoT
- The methodologies, data analytics and physical servers of IoTs

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the basics of IoT	K1
CO2	Relate IoT with M2M	K2
CO3	Build IoT platform design methodologies	K3
CO4	Illustrate IoT Physical Servers and Cloud offerings	K2
CO5	Make use of Data Analytics of IoT	K3

MAPPING WITH PROGRAMME OUTCOMES

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

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

194CA1A5DA	INTERNET OF THINGS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 10 h

Introduction of Internet of Things (IoT): Introduction, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates. IoT Applications for Home, Industry, Agriculture, Health & Lifestyle

Unit II IoT and M2M 10 h

M2M, Differences and similarities between M2M and IoT, SDN and NFV for IoT. IoT System Management with NETCONF-YANG: NETCONF, YANG, IoT Systems Management with NETCONF-YANG

Unit III IoT Platforms Design Methodology 10 h

IoT Design Methodology. IoT Physical Devices & Endpoints: Basic building blocks of an IoT device, Rapsberry Pi, Rapsberry Pi interfaces, Other IoT devices

Unit IV IoT Physical Servers & Cloud Offerings 9 h

Cloud Storage Models & Communication APIs, Web Application Messaging Protocol (WAMP), Xively cloud for IoT,, Amazon Web Services for IoT. Studies Illustrating – Smart Lighting, Smart Parking, Weather Reporting Bot, Forest Fire Detection, IoT Printer

Unit V Tools for IoT 9 h

Introduction, chef, chef case studies, puppet- puppet case study – Multi-tier Deployment, NETCONF-YANG Case Studies. IoT Code Generator.

Text Books

1 Arshdeep Bahga & Vijay Madisetti, 2015, "Internet of Things", Universities Press (India) Private Limited.

References

1 Olivier Hersent and David Boswarthick, 2015,"The Internet of Things", John Wiley & Sons Ltd.

Course Code	Course Name	Category	L	T	P	Credit
194CA1A5DB	ADHOC AND SENSOR NETWORKS	DSE	4	0	0	4

PREAMBLE

This course has been designed for students to learn and understand

- The design issues in ad hoc and sensor networks
- Different applications of adhoc and sensor networks.
- The architecture and protocols of adhoc and sensor networks

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 adhoc network and challenges and applications.	K1
CO2	Obtain knowledge on various routing protocols	K2
CO3	Know the different applications of sensor networks.	K3
CO4	Learn the Architecture of Sensor Networks.	K2
CO5	Learn security issues and solutions in adhoc and sensor networks.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

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

194CA1A5DB	ADHOC AND SENSOR NETWORKS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Ad-Hoc Network Introduction and Routing protocols 10 h

Introduction-The Communication Puzzle, Applications of MANETs, Challenges. Routing in Ad Hoc Networks: Topology-Based Routing Protocols, Position-Based Routing

Unit II Broadcasting, Multicasting and Geocasting 10 h

Introduction-The Broadcast Storm, Broadcasting in a MANET, Flooding, Redundancy Analysis, Rebroadcasting Schemes. Multicasting: Issues in Providing Multicast in a MANET, Multicast Routing Protocols-Geocast Routing Protocols

Unit III Wireless Sensor Networks 10 h

Introduction-The Mica Mote, Sensing and Communication Range, Design Issues, Challenges, Energy Consumption. Clustering of Sensors: Regularly placed sensors, Heterogeneous WSNs, Mobile Sensors- Applications

Unit IV Data Retrieval in Sensor Networks 9 h

Introduction: Classifications of WSNs, Architecture of Sensor Networks, Network Architecture, Physical Layer. MAC Layer-Routing Layer-High-Level Application Layer Support-Adapting to the Inherent Dynamic Nature of WSNs

Unit V Security 9 h

Security in Ad Hoc Networks: Requirements , Security Solutions Constraints, Challenges Key Management- Secure Routing- Cooperation in MANETs- Wireless Sensor Networks Security- Key Distribution and Management -Intrusion Detection Systems- IDS Architecture for Ad Hoc Networks- Anomaly Detection

Text Books

1 Carlos De Morais Cordeiro, Dharma Prakash Agrawal, 2006, "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company.

References

1 C. Siva Ram Murthy, and B. S. Manoj, 2008, "Ad Hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference.

2 Holger Karl , Andreas willig , 2006, "Protocol and Architecture for Wireless Sensor Networks", John wiley publication.

3 Kazem Sohraby, Daniel Minoli, & TaiebZnati, 2007, "Wireless Sensor Networks-Technology, Protocols, and Applications", John Wiley.

Course Code	Course Name	Category	L	T	P	Credit
194CA1A5DC	SEMANTIC WEB	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of Semantic Web.
- The various semantic web services and its design.
- The implementation described in the architecture level of present web.

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 semantic web.	K2
CO2	Identify the web resources like RDF, SPARQL.	K2
CO3	Outline Web Ontology language like OWL	K2
CO4	Develop logic and make inferences using SWARL and RuleML.	K3
CO5	Apply the semantic web resources to the real-time problems.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

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

194CA1A5DC	SEMANTIC WEB	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 11 h

Semantic Web Vision: Today's Web - Today's Web to the Semantic Web- Semantic Web Technologies - A Layered Approach. A Structured Web Documents: XML - XML Language - Structuring - Namespaces - Addressing and Querying XML Documents - Processing XML Documents.

Unit II Describing Web Resources 9 h

RDF: RDF Basics - XML Based Syntax - RDF Schema - Axiomatic Semantics in RDF and RDF Schema - Direct Inference System - Querying in SPARQL.

Unit III Web Ontology Language 9 h

Introduction to OWL - OWL and RDF /RDFS - Sublanguages of OWL - Description of OWL - Layering in OWL - Examples.

Unit IV Logic and Inference 9 h

Rules: Introduction - Monotonic Rules - Examples - Family Relationships - Monotonic Rules Syntax - Monotonic Rules Semantics - Description Logic Programs (DLP) - Semantic Web Rule Language (SWARL) - Non-monotonic Rules - Examples - Rule Markup Language (RuleML).

Unit V Applications 10 h

Horizontal Information Products at Elsevier - Openacademia: Distributed Publication Management- Bibstar: Data Exchange in Peer to Peer Systems - Data Integration at Audi - Skill Finding at Swiss Life - Think tank portal at EnerSearch - e-Learning - Web services .

Text Books

1 Grigoris Antoniou, Frank Van Harmelen, 2010, "A Semantic Web Primer ",2nd Edition, Prentice Hall of India Private Limited.

References

1 Liyang Yu, 2007, “Introduction to the Semantic Web and Semantic web services”, 1st Edn., Chapman & Hall/CRC, Taylor & Francis group.

2 Johan Hjelm, 2001, “Creating the Semantic Web with RDF“, 2nd Edn.,Wiley.

194CA1A5CP	CORE PRACTICAL : C# PROGRAMMING	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Classes and objects.
2	Inheritance.
3	Exception.
4	Events.
5	Generic controls.
6	Advanced controls.
7	Host Website.
8	Validation controls.
9	Files.
10	Menu.
11	Adrotator control.
12	Database Connectivity.

Note: Out of 12 -10 Mandatory

194CA1A5CQ	CORE PRACTICAL: NETWORK AND OPERATING SYSTEM	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Cyclic Redundancy Check.
2	Distance Vector Routing
3	Link State Routing
4	UDP Protocol
5	Applications using TCP Sockets (CHAT)
6	Resolve IP Address from a given Domain Name
7	CPU Scheduling –FCFS ,SJF,RR
8	Producer Consumer Problem using Semaphore
9	Page Replacement Algorithm – FIFO & LRU
10	DISK Scheduling Algorithm- FCFS
11	Deadlock Avoidance – Bankers Algorithm
12	Deadlock Prevention

Note: Out of 12 -10 Mandatory

Course Code	Course Name	Category	L	T	P	Credit
192MT1A5AA	RESEARCH METHODOLOGY	AECC	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- The art of using different research methods and techniques
- Planning and writing of research proposals and dissertations, as well as a thesis
- The necessity for research ethics and guidelines to pursue research

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the basics of the research methods and techniques	K1
CO2	Remember the hypothesis, laws related to research problem	K1
CO3	Understand the limitations of experimentation in research	K2
CO4	Illustrate the concept of interdisciplinary and multidisciplinary research	K3
CO5	Analyze the ethics and responsibilities of research	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A5AA	RESEARCH METHODOLOGY	SEMESTER V

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introductionto Research 4 h

Research: Introduction- Basic, Applied and Evaluation research – multidisciplinary and interdisciplinary Research – value of research skills – formulating a research problem – Research in relation to Teaching and Publishing

Unit II Hypotheses, Theories and Laws 6 h

Hypotheses – Theories – Laws. Scientific statements: their justification and acceptance: verification – Falsification – Acceptance – Peer review

Unit III Experimentationand research 5 h

The roles and limitations of experimentation – Experimentation and research – conducting experiments - validity and reliability in experimentation – Design of experiments

Unit IV Scientific method and Research Design 4 h

Introduction to Scientific method – Research Design - Components - research design and proposal -checklist in the preparation of proposals

Unit V Ethics and Responsibility in Scientific Research 5 h

Ethics – guidelines for Ethical practices in research - unethics to ethics in research - responsibility of Scientists and of Science as an Institution

Text Books

1 Perter Pruzan, (2016), Research Methodology: The Aims, Practices and Ethics of Science. Springer, Switzerland

References

1 Thomas, C.G. (2015) Research Methodology and Scientific Writing. Ane Books Pvt. Ltd.: New Delhi.

2 Locharoenrat, K. (2017) Research Methodologies for Beginners.Pan Stanford Publishing: Singapore.

3 Ranjit Kumar, (2014) Research Methodology: A Step-by-Step Guide for Beginners. SAGE Publications Ltd.: Singapore.

4 Kothari, C.R. Garg, G. (2009) Research Methodology Methods and Techniques. New Age International Publishers, New Delhi..

Course Code	Course Name	Category	L	T	P	Credit
194CA1A6CA	WEB APPLICATIONS USING PHP	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts on web design and PHP Programming.
- Efficientlycreateand design the web applications.
- Server/client scriptingwithin different web applications.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Personalize the PHP work space, define strings and Array	K1
CO2	Understand the functions and data reading operation in web page applications	K2
CO3	Apply the data base concepts to read and write from database.	K3
CO4	Build skills to using cookies, execute FTP and e-mail transactions and publish an applications on the Web using Angular JS	K3
CO5	Develop, analyze and solve common web application tasks by writing PHP programs.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A6CA	WEB APPLICATIONS USING PHP	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Essential PHP and Strings and Arrays 9 h

Creating Your Development Environment – PHP Page – Mixing HTML and PHP - Working with Variables – Storing Data in Variables.

Strings and Arrays: The String Functions - Converting to and from Strings – Formatting Text Strings – Building & Modifying Arrays – Deleting Array Elements – Handling Arrays with Loops – The PHP Array Functions – Converting Between Strings and Arrays Using Implode and Explode - Extracting Data from Arrays – Sorting Arrays.

Unit II Creating Functions and Reading Data in Web Pages 10 h

Creating Functions in PHP – Passing Data & Arrays to Functions – Passing by Reference – Using Default Arguments – Passing Variable Numbers of Arguments - Returning Data From Functions – Returning arrays – Returning List – Returning References.

Reading Data in Web Pages: Web Pages to Communicate with PHP – Handling Text Fields – Handling Text Areas – Handling Checkboxes – Handling Radio Buttons – Handling List Boxes – Handling Password Controls – Handling Hidden Controls – Handling Image Maps – Handling File Uploads – Handling Buttons.

Unit III PHP Browser-Handling Power and Working with a Databases 10 h

Handling Form Data with Custom Arrays – Performing Data Validation – Checking if the User Entered Required Data – Requiring Numbers – Requiring Text – Persisting User Data – Client-Slide Data Validation.

Working with a Databases : Creating a MySQL Database – Creating a Table – Putting Data into the New Database – Accessing the Database in PHP – Updating Databases – Inserting New Data items into a Database – Deleting Records – Creating New Tables – Creating a New Database – Sorting Your Data.

Unit IV Sessions, Cookies, Email and Drawing Images on the Server 10 h

Setting a Cookie – Reading a Cookies – Setting Cookies Expiration – Deleting Cookies – Sending E-mail – Sending Advanced E-mail – Adding attachments to E-mail –Storing Data in Sessions – Writing a Hit Counter Using Sessions.

Drawing Images on the Server: Creating an Image – Displaying Images in HTML Pages – Drawing Lines – Setting Line Thickness – Drawing Rectangles – Drawing Ellipses – Drawing Arcs. Case study

Unit V Angular JS 9 h

Basics of Angular JS : Why We Need Frameworks - What Is a Framework? - Downloading and Installing AngularJS - First AngularJS Application

Introduction to MVC: Design Patterns- MVC the AngularJS Way - Directives: The Basics of Directives- Using Directives - Built-in Directives - Working with Forms: HTML Forms – Angular JS Animation.

Text Books

1 Steven Holzner, 2018, "PHP: The Complete Reference", McGraw-Hill. (UNIT I- IV)

2 Andrew Grant, 2014"Beginning AngularJS", Apress. (UNIT V)

References

1 Steve Suehring, 2009, "PHP6 MySQL", Tim Converse, Joyce Park, Willy.

2 Vikramvaswani, 2004, "The Complete Reference of MySQL", Tata MC-Graw Hill Publications.

3 Adam Freeman, 2014,"Pro AngularJS", Apress.

4 www.w3schools.com

Course Code	Course Name	Category	L	T	P	Credit
194CA1A6CB	DATA MINING AND WAREHOUSING	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basic concepts, tasks, methods, and techniques in data mining
- Techniques in data mining and knowledge discovery
- The data mining process and issues, learnvarious techniques for data mining, and apply the techniques insolving data mining problems using data mining tools and systems

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals ideas ofData Mining.	K1
CO2	Classify the Techniques in Data Mining.	K2
CO3	Understand the classification.	K2
CO4	Construct the clustering algorithms.	K3
CO5	Build Association rules in algorithms.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A6CB	DATA MINING AND WAREHOUSING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Data Warehousing and Business Analysis 10 h

Data warehousing Components –Building a Data warehouse –Data Warehouse Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata – reporting – Query tools and Applications – Online Analytical Processing (OLAP) – OLAP and Multidimensional Data Analysis.

Unit II Basic Data Mining Tasks 10 h

Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Metrics -Data Mining Techniques – A Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

Unit III Classification 10 h

Introduction – Statistical Based Algorithms – Distance Based Algorithms – Decision Tree – Based Algorithms – Neural Network Based Algorithms.

Clustering : Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms - Partitional Algorithms

Unit IV Association Rules 9 h

Introduction - Large Item sets – Basic Algorithms – Parallel & Distributed Algorithms - Incremental Rules - Advanced Association Rules Techniques- Measuring Quality Rules.

Unit V Web Mining 9 h

Web Content Mining – Web Structure Mining –Web Usage Mining-Spatial Mining: Spatial data – Spatial Rules- Spatial Classification Algorithms – Multimedia Data mining - Data mining Applications.

Text Books

1. Jiawei Han, MichelineKamber and Jian Pei, 2011, "Data Mining Concepts and Techniques", Elsevier, Third Edition.
2. Margaret H.Dunhabam, 2009, "Data Mining Introductory and Advanced Topics, Pearson Education.

References

1. Prabhu C.S.R, 2011, "Data Warehousing Concepts, Techniques, Products and Applications", PHI Learning Private Limited,Third Edition.
2. Soman, K. P, DiwakarShyam and Ajay ,2009,"Insight Into Data Mining: Theory And Practice", PHI.
3. Amitesh Sinha, 2001, "Data Warehousing", Thomson Asia Pvt Ltd.
4. www.tutorialspoint.com

194CA1A6CP	CORE PRACTICAL : WEB APPLICATIONS USING PHP	SEMESTER VI

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Strings
2	Arrays
3	Functions
4	Generic controls
5	Advanced Controls
6	Client-Slide Data Validation
7	Accessing the Database
8	Sessions and Cookies
9	E-mail functions
10	Drawing Shapes
11	Angular JS with controls
12	Angular JS Directives

Note: Out of 12 – 10 Mandatory

194CA1A6CV	PROJECT WORK	SEMESTER VI

Total Credits: 4

Total Instructional Hours 96 h

GUIDELINES:

1. A Guide has been allotted to each student by the department. Student can select any topic in discussion with the supervisor. Students should maintain a work diarywere in weekly work carried out has to be written. Guide should review the workevery week and put his/her signature. The work diary along with project reportshould be submitted at the time of viva voce.

2. CA Marks Distribution: A minimum of three reviews have to be done, one at the time finalizing the project title, second at framing questionnaire/identifying the primary data and the third review at the time of commencement of report writing. They should be asked to present the work doneto the respective guide in the three reviews. The guide will give the marks for CIA asper the norms stated below:

First Review	10 Marks
Second Review	10 Marks
Third Review	10 Marks
Document, Preparation and Implementation	10 Marks
Total	**40 Marks**

3. End Semester Examination:The evaluation for the end semester examination should be as per the norms Given Below:

Record work and Presentation	40 Marks
Viva-Voce	20 Marks
Total	**60 Marks**

Note: (End Semester Examination marks jointly given by the external and internal examiner).

Course Code	Course Name	Category	L	T	P	Credit
194CA1A6DA	CLOUD COMPUTING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Various Cloud models andits architecture.
- The critique the Cloud Enabling Technologies.
- How to use Web-based Applications to collaborate on cloud.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand Fundamental Concepts and Models of Cloud.	K1
CO2	Outline the Cloud Enabling Technology.	K2
CO3	Illustrate the Cloud Computing Architectures.	K2
CO4	Learn Advanced Cloud Computing Architecture	K2
CO5	Identify the Applications of Cloud Computing.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A6DA	CLOUD COMPUTING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Understanding Cloud Computing 10 h

Introduction : Definitions – Business Drivers – Technology Innovations – Basic Concepts and Terminology: Cloud – IT Resource – On-Premise –Cloud Consumers and Cloud Providers – Scaling –Cloud Service – Cloud Service Consumer– Goals and Benefits –Risk and Challenges.
Fundamentals concepts and Models
Roles and Boundaries – Cloud Characteristics – Cloud Delivery Models: Infrastructure-as-a-Service - Platform-as-a-Service – Software-as-a-Service - Cloud Deployment Models: Public Clouds – Community Clouds – Private Clouds – Hybrid Clouds – Other Cloud Deployment Models.

Unit II Cloud Enabling Technology 10 h

Broadband Networks and Internet Architecture: Internet Service Provider – Connectionless Packet Switching – Router Based Interconnectivity – Data Center Technology - Virtualization Technology – Web Technology – Multitenant Technology – Service Technology.

Unit III Cloud Computing Architecture 10 h

Fundamental Cloud Architecture : Workload Distribution Architecture – Resource Pooling Architecture – Dynamic Scalability Architecture – Elastic Resource Capacity Architecture – Service Load Balancing Architecture – Cloud Bursting Architecture – Elastic Disk Provisioning Architecture – Redundant Storage Architecture – Case Study Examples.

Unit IV Advanced Cloud Architecture 9 h

Load Balanced Virtual Server Instances Architecture – Zero Downtime Architecture – Dynamic Failure Detection and Recovery Architecture – Fundamental Cloud Security: Cloud Security Threats.

Unit V Cloud Platforms in Industry & Cloud Applications 9 h

Cloud Platforms in Industry: Amazon Web Services –Google AppEngine – Cloud Applications: Scientific Applications – Healthcare: ECG Analysis in Cloud – Biology: Protein Structure Prediction – Business & Consumer Applications: CRM &ERP , Social Networking.

Text Books

1. Thomas Erl, Zaigham Mahmood and Ricardo Puttini, 2019, "Cloud Computing Concepts, Technology & Architecture", Pearson India Education Services Pvt. Ltd, Twelfth Impression. (Unit I –IV)

2. Rajkumar Buyya, Christian Vecchiola and S.ThamaraiSelvi, 2018, "Mastering Cloud Computing", McGraw Hill Education(India) Pvt. Ltd, Thirteenth reprint. (Unit V)

References

1. Kumar Saurabh, 2011, "Cloud Computing – Insights into New Era Infrastructure", Wiley Indian Edition.

2. Kaittwang Geoffrey C.Fox and Jack J Dongrra, 2012, "Distributed and Cloud Computing", Elsevier.

3. Michael Miller,2008, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing.

4. www.w3schools.com

Course Code	Course Name	Category	L	T	P	Credit
194CA1A6DB	DIGITAL MARKETING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The key concepts in digital marketing
- The scope of digital marketing and how it integrates with overall business and marketing strategy
- The digital technology in achieving marketing objectives

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the basic concepts of digital marketing	K1
CO2	Understand the techniques used in digital marketing	K2
CO3	Compare the different types of marketing	K2
CO4	Apply the marketing strategies in social media	K3
CO5	Analyze the marketing strategies	K2

MAPPING WITH PROGRAMME OUTCOMES

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

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

194CA1A6DB	DIGITAL MARKETING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction and SEO 9 h

An introduction to Digital Marketing, Search Engine Optimization – Search Engine Result Pages, Search Behavior, The Process – Goals, On-Page Optimization, Off-Page Optimization, Analyze, Exercises

Unit II Pay Per Click and Digital Display Ads 10 h

PPC Definition, Process – Goals, Setup, Manage and Analyze, Digital Display Advertising Definition, Process – Define, Format, Configure and Analyze, Display Advertising – Industry Overview

Unit III Email Marketing and Mobile Marketing 11 h

Email Marketing - Definition, Process – Data, Design, Delivery and Discovery, Mobile Marketing – Definition, Process – Opportunity – Mobile Industry Opportunities and Challenges, Optimize – Mobile Optimized websites, App Development, Advertise – Proximity Marketing, SMS Marketing, Analyze – Mobile Analytics.

Unit IV Social Media Marketing 9 h

Definition, Process – Goals, Channels - Facebook, LinkedIn, Twitter, Google+, YouTube, Blogs, Pinterest, Instagram, Implement - Listening, Publishing, Events, Groups, Jobs and Advertising , Analyze – Facebook Insights, LinkedIn Analytics, Twitter Analytics, Google+ Insights, YouTube Analytics, Social Media KPIs, Exercises

Unit V Strategy and Planning 9 h

Digital Marketing Plan: Structure - Situation Analysis, Audience – Information Gathering, Google Tools, Building Customer Profile, Activities – Objectives, Tools, Action plan, Budget, Analysis

Text Books

1 Dodson Ian, 2017, "The Art of Digital Marketing", New Delhi: Wiley India

References

1 Gupta Seema, 2018, "Digital Marketing, Chenna", Mc Graw Hill Education.

2 Bhatia Singh Puneet, 2017, "Fundamentals of Digital Marketing", Noida: Pearson India Education Services.

3 Philip Kotler, 2017, Marketing 4.0: Moving from Traditional to Digital, New Delhi:Wiley, 1st Edition.

4 www.edureka.com

Course Code	Course Name	Category	L	T	P	Credit
194CA1A6DC	OBJECT ORIENTED ANALYSIS AND DESIGN	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The importance and basic concepts of object-oriented modeling
- Object-oriented technologies and software modeling as applied to a software development process.
- Benefits of using graphical modeling language(UML)

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts and principles of object oriented programming	K1
CO2	Learn about System Development Methodologies	K2
CO3	Build UML Notation and Modelling Diagrams	K3
CO4	Demonstarte Object Oriented Design Process	K2
CO5	Apply Testing Strategies	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A6DC	OBJECT ORIENTED ANALYSIS AND DESIGN	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Object Oriented System Development 9 h

Introduction- Object Oriented Systems Development Methodology- Why an Object Orientation – Overview of the unified approach.

Object Basics: Introduction – Objects- Classes – Attributes – Object Behavior and Methods – Encapsulation and Information Hiding – Class Hierarchy – Object Relationships and Associations – Polymorphism – Aggregations and Object Containment- Case study

Unit II Object Oriented System Development Life cycle 10 h

Object Oriented System Development: Object Oriented Analysis – Object Oriented Design – Prototyping.

Methodologies: The Booch Methodology: The Macro Development – The Micro Development Process. The Jacobson et al Methodologies - Unified approach: Analysis – Design – Modeling based on unified modelling language – The Layered approach to software Development

Unit III Unified Modeling Language 10 h

Introduction – Static and Dynamic Models – UML Diagrams – UML Class Diagram: Class Notation – Object Diagram – Class Interface Notation- Binary Association Notation- Association Role – Qualifier- Multiplicity -OR Association-Association Class - N-Ary Association – Aggregation and composition-Generalization – Use Case Diagram – UML Dynamic Modeling: UML Interaction Diagrams – UML State chart diagram– UML Activity diagram

Unit IV Object Oriented Design Process , Axioms and Classes 9 h

Introduction - Object Oriented Design Process -Object Oriented Design axioms- Design patterns - Designing

Classes: Class visibility: Designing well defined public, private and protected protocols - Refining attributes-Designing Methods and Protocols- Access layer: Introduction -Data Base management Systems -Object Relational Systems: The practical world

Unit V Quality Assurance Testing 10 h

Introduction -Quality assurance tests- Testing Strategies- Test Cases-Test Plan-Case study Usability testing: Guidelines for developing Usability Testing. User Satisfaction Testing: Guidelines for developing a User Satisfaction Testing-Test Template-Case study

Text Books

1. Ali Brahmi, 2013, "Object Oriented System Development", Tata McGraw-Hill International Edition.

References

1. Grady Booch, 2003, "Object Oriented Analysis and Design with Applications", Pearson Education
2. Gandharba Swain, 2010, "Object-Oriented Analysis and Design through Unified Modeling Language", Laxmi Publications
3. Martina Seidl, Marion Scholz, 2015,Christian Huemer, GertiKappel, "UML @ Classroom: An Introduction to Object Oriented Modeling", Springer
4. www.tutorialspoint.com

Course Code	Course Name	Category	L	T	P	Credit
194CA1A6DD	MOBILE COMPUTING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Concepts on Mobile Computing.
- Mobile technologies and how these technologies are utilized and integrated to meet specific business needs.
- Current technologies and architectures that provides the network and communications infrastructure for mobile-enabled enterprise computer systems.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the basic concepts of Mobile Computing.	K1
CO2	Understand the mobile computing architecture.	K2
CO3	Compare the different types of emerging technologies in mobile computing.	K2
CO4	Illustrate the modern network technology GPRS and its Applications.	K2
CO5	Identify CDMA, WAP and Wi-Fi applications.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A6DD	MOBILE COMPUTING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Mobile Application Services and Security 9 h

Introduction: Wireless The Beginning – Mobile Computing – Dialogue Control – Networks- Middleware and Gateways - Application and services - Developing Mobile computer Applications – Security in Mobile Computing.

Unit II Mobile Computing Architecture and Telephony 10 h

Mobile Computing Architecture: Architecture for mobile computing – Three-tier architecture: Presentation Tier, Application Tier and Data Tier- Making Existing Applications Mobile Enabled.

Mobile Computing Through Telephony: Evaluation of telephony-Mobile computing through telephone – IVR Application – Voice XML – TAPI.

Unit III Emerging Technologies 10 h

Introduction -Bluetooth – Radio Frequency Identification (RFID) – Wireless Broadband (WiMAX) – Mobile IP – Internet Protocol Version 6 (IPv6) – Java Card.

GSM: Global System for Mobile Communications – GSM Architecture–– Authentications and Security.

Unit IV SMS and GPRS 10 h

SMS: Mobile Computing over SMS, Short Message Services. GPRS – GPRS and packet data network – GPRS network architecture – GPRS network operations – Data services in GPRS – Application for GPRS- Limitations – Billing and Charging.

Unit V WAP and Wireless LAN 9 h

WAP: MMS – GPRS Applications. CDMA: CDMA vs GSM –WIRELESS LAN: Wireless LAN advantages – IEEE 802.11 standards – Architecture – Mobile ad-hoc networks and sensor networks – WiFi Vs 3G,4G,5G.

Text Books

1 Asoke K Talukder & Roopa R Yavagal, 2017, ”Mobile Computing”, TMH.

References

1 Raj Kamal, 2007, “Mobile Computing”, Oxford Higher Education, Third Edition.

2 William Stallings, 2009, "Wireless Communications & Networks", Pearson, Second Edition.

3 Kaveh Pahlavan and Prashant Krishnamurthy, 2006, “Principle of Wireless network - A Unified Approach”, Prentice Hall.

4 Jochen Schiller, 2003, “Mobile Communications”, PHI/Pearson Education, Second Edition.

Course Code	Course Name	Category	L	T	P	Credit
194CA1A6DE	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The categories of AI Techniques and Expert Systems.
- Expert system concepts and functioning of AI.
- The Problem solving, Search, Heuristic methods.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn Conceptual framework for Artificial intelligence Technique.	K1
CO2	Understand key concept of Searching process.	K2
CO3	Classify different approach for issues in knowledge representation.	K2
CO4	Make use of Predicate Logic.	K3
CO5	Build traditional information systems to be inadequate for addressing expert system.	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A6DE	ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Artificial Intelligence 9 h

AI Problems – AI techniques – Criteria for success. Problems, Problem Spaces, Search: State space search – Production Systems – Problem Characteristics – Issues in design of Search.

Unit II Heuristic Search techniques 10 h

Generate and Test – Hill Climbing – Best-First, Problem Reduction, Constraint Satisfaction, Means-end analysis.

Unit III Knowledge representation issues 10 h

Representations and mappings – Approaches to Knowledge representations – Issues in Knowledge representations – Frame Problem.

Unit IV Using Predicate Logic 10 h

Representing simple facts in logic – Representing Instance and Isa relationships – Computable functions and predicates – Resolution – Natural deduction.

Unit V Representing knowledge using rules 9 h

Procedural Vs Declarative knowledge – Logic programming – Forward Vs Backward reasoning – Matching – Control knowledge Brief explanation of Expert Systems-Definition- Characteristics-architecture- Knowledge Engineering- Expert System Life Cycle-Knowledge Acquisition Strategies- Expert System Tools.

Text Books

1 Elaine rich and Kelvin Knight, 1991, "Artificial Intelligence", Tata McGraw Hill Publication, 2nd Edition.

References

1 Stuart Russell & Peter Norvig, 2009, Artificial Intelligence a modern Approach, PHI, 2nd Edition.

2 George F Luger, 2002, Artificial Intelligence, Tata McGraw Hill Publication, 4th Edition.

3 V S Janaki Raman, K Sarukesi, P Gopalakrishnan, "Foundations of Artificial Intelligent and Expert Systems", MacMillan India limited.,

4 www.tutorialspoint.com

Course Code	Course Name	Category	L	T	P	Credit
194CA1A6DF	COMPUTER GRAPHICS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Computer graphics leading to the ability to understand contemporary terminology, progress, issues, and trends.
- Mathematical Knowledge on Graphics and Technicalbackground of 2D and 3D objects.
- Geometric transformation and computer animation.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn methods for basic building blocks ofgraphics.	K1
CO2	Understand the key concept of two dimensionalgeometric transformations.	K2
CO3	Apply the knowledge of clipping algorithm.	K3
CO4	Build the procedures for Three-dimensionalobjects.	K3
CO5	Identify various color models.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CA1A6DF	COMPUTER GRAPHICS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Graphics Output Primitives 9 h

Coordinate Reference Frames – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms – other curves.

Unit II Graphics Primitives Attributes and Geometric Transformations 10 h

Fill-Area Primitives – Polygon Fill Areas - Attributes of Graphics Primitives: Point attributes - Line Attributes – Curve attributes – Fill Area Attributes - Character Attributes. Geometric Transformations: Basic Two Dimensional Geometric Transformations – Matrix Representations and Homogeneous Coordinates – Two Dimensional Composite Transformations – Other Two Dimensional Transformations.

Unit III Two-Dimensional Viewing and Clipping 10 h

Two Dimensional Viewing: The Two Dimensional Viewing Pipeline – The Clipping Window – Normalization and Viewport transformations – Clipping Algorithms – Two Dimensional Point Clipping – Two Dimensional Line Clipping: Cohen-Sutherland line Clipping, Polygon Fill Area Clipping: Sutherland-Hodgman Polygon Clipping.

Unit IV Three Dimensional Viewing 10 h

Overview of Three Dimensional Viewing Concepts – Transformation from World to View Coordinates – Geometric Transformations Three Dimensional Space – Three Dimensional Translation – Three Dimensional Rotation – Three Dimensional Scaling –Composite Three-Dimensional Transformations.

Unit V Color Models and Color Applications 9 h

Properties of Light – Color Models – The RGB Color Model – The CMY and CMYK Color Models – The HSV Color Model – The HLS Color Model – Color Selection and Applications – Computer Animation : Raster methods for Computer Animation – Design of Animation Sequences – Traditional Animation Techniques.

Text Books

1 Donald Hearn&M. Pauline Bake, 2009, "Computer Graphics with OpenGL", PHI, Third Edition.

References

1 Willium M. Newman &Robert F. Sproull, 2007, "Principles Of Interactive Computer Graphics", TMH.

2 Krishnamoorthi N, 2003, "Introduction to Computer Graphics", TMH, Sixth Edition.

3 Plastock R & Xiang Z, Theory and problems of computer Graphics, Second Edition Schaum Series, McGraw Hill Publishers.

4 www.tutorialspoint.com

Course Code	Course Name	Category	L	T	P	Credit
193BC1A6AA	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	S	M	M	M	M
CO2	S	M	M	M	M
CO3	S	M	M	M	M
CO4	S	M	M	M	M
CO5	S	M	M	M	M

S Strong M Medium L Low

193BC1A6AA	INNOVATION, IPR AND ENTREPRENEURSHIP	SEMESTER VI

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Innovation, IPR 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 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 - Infringement of Patent.
Case Study: When Google was used for Patent Infringement.

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: Trademark mismanagement by Cadbury's.

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: Copyright Case of Napster and Grokster.

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: The story of the Tirupati Laddu.

Note: Case studies related to the above topics to be discussed (Examined internal only)

Text Book

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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