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 Science in Information Technology Degree

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

Programme:B.Sc. (Information Technology)

Eligibility

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

Programme Educational Objectives

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

1. Demonstrating a substantial understanding of concepts in key areas of Information Technology and its applications.
2. Analysis and synthesis involved in Computer System, Information System and Computer applications
3. To develop a software and in its design and implementation for professionalcompetence
4. To equip and train the students to meet the requirement of the IT Industries and Public Sectors.
5. To stimulate an interest in computing as an academic discipline with a view to encouraging progression to research and higher studies.

PROGRAMME OUTCOMES:

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

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

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)	4	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, Women's 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**	

CURRICULUM

B.Sc. INFORMATION TECHNOLOGY 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
202MT1A1IB	IDC - I	Discrete Mathematical Structure	4	1	-	3	25	75	100	4
194IT1A1CP	Core Practical - I	Programming in C	-	-	4	3	40	60	100	2
204IT1A1CQ	Core Practical - II	Python Programming	-	-	4	3	40	60	100	2
Part - IV										
193MB1A1AA	AECC - I	Environmental Studies	2	-	-	3	-	50	50	2
		Total	**18**	**3**	**9**	**-**	**-**	**-**	**650**	**20**

13/5/20

BoS Chairman/HoD
Department of Information Technology
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

B.Sc.(Information Technology) (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
192MT1A2IC	IDC - II	Numerical Methods and Statistics	4	1	-	3	25	75	100	4
204IT1A2CP	Core Practical - III	Data Structures using Python	-	-	4	3	40	60	100	2
194IT1A2CQ	Core Practical – IV	Open Source and Web Development	-	-	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
204IT1A3CB	Core - IV	Relational Database Management System	4	1	-	3	25	75	100	4
205AT1A3IA	IDC-III	Income Tax and E-Filing	4	-	-	3	25	75	100	4
204IT1A3CP	Core Practical - V	Java and RDBMS	-	-	4	3	40	60	100	2
194IT1A3SA	SEC - I	Internet Programming	4	-	-	3	25	75	100	4
194IT1A3SP	SEC Practical-I	Internet Programming	-	-	4	3	40	60	100	2
	GE - I		2	-	-	3	-	50	50	2
	LoP		-	-	-	-	-	-	-	-
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	194IT1ASSA	Ethical Hacking
2	194IT1ASSB	Network Protocol

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fourth Semester										
194CS1A4CA	Core-V	Agile Methodology	4	1	-	3	25	75	100	4
204IT1A4CA	Core -VI	Operating System	4	1	-	3	25	75	100	4
192PY1A4IA	IDC-IV	Digital Electronics	4	-	-	3	25	75	100	4
204IT1A4CP	Core Practical - VI	Operating System Lab	-	-	4	3	40	60	100	2
204IT1A4SA	SEC – II	Dot Net Programming	4	-	-	3	25	75	100	4
204IT1A4SP	SEC Practical-II	Dot Net	-	-	4	3	40	60	100	2
	GE - II		2	-	-	3	-	50	50	2
	LoP	Lab on Project	-	-	-	-	-	-	-	-
Part - IV										
191TL1A4AA	AECC - IV	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A4AB		Advanced Tamil								
192PY1A4AA		General Awareness								
		Total	**20**	**2**	**8**	**-**	**-**	**-**	**700**	**24**

Board Chairman/HOD
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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
204IT1A5CA	Core – VIII	PHP and MYSQL	4	-	-	3	25	75	100	4
194IT1A5CB	Core - IX	Cyber Crime and Digital Forensic	4	-	-	3	25	75	100	4
194IT1A5CC	Core - X	Artificial Intelligence and Machine Learning	4	-	-	3	25	75	100	4
204IT1A5CP	Core Practical - VII	PHP and MYSQL	-	-	4	3	40	60	100	2
194IT1A5CQ	Core Practical - VIII	Mobile Application Development	-	-	4	3	40	60	100	2
194IT1A5DA	DSE – I	5G Mobile Networks	4	-	-	3	25	75	100	4
194IT1A5DB		Next Generation Database								
194IT1A5DC		Deep Learning								
194IT1A5TA	IT	Industrial Training	**Grade A to C**							
194IT1A5LA	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										
204IT1A6CA	Core - XI	Big Data Analytics	4	-	-	3	25	75	100	4
194IT1A6CB	Core - XII	Cloud Computing	4	-	-	3	25	75	100	4
204IT1A6CP	Core Practical -IX	Data Analytics	-	-	4	3	40	60	100	2
194IT1A6CV	Core – XIII Project	Project Work	-	-	8	3	40	60	100	4
194IT1A6DA	DSE -II	Software Testing	4	-	-	3	25	75	100	4
194IT1A6DB		Augmented Reality and Virtual Reality								
194 IT1A6DC		Robotics								
194IT1A6DD	DSE -III	Routing and Switching	4	-	-	3	25	75	100	4
194IT1A6DE		Blockchain Technology								
194IT1A6DF		Data Visualization								
Part - IV										
193BC1A6AA	AECC - VI	Innovation, IPR and Entrepreneurship	2	-	-	3	-	50	50	2
Part - V										
194IT1A6XA		Extension Activity	-	-	-	-	-	-	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.	194IT1A5DA	5G Mobile Networks
2.	194IT1A5DB	Next Generation Database
3.	194IT1A5DC	Deep Learning

Semester VI (Elective II)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194IT1A6DA	Software Testing
2.	194IT1A6DB	Augmented Reality and Virtual Reality
3.	194IT1A6DC	Robotics

Semester VI (Elective III)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194IT1A6DD	Routing and Switching
2.	194IT1A6DE	Blockchain Technology
3.	194IT1A6DF	Data Visualization

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	194IT1A3GA	Internet of Things

Semester IV (GE-II)

S. No.	Course Code	Course Name
1	194IT1A4GA	Search Engine Optimization

EXTRA CREDIT COURSES

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

S. No.	Course Code	Course Name
1	194IT1ASSA	Ethical Hacking
2	194IT1ASSB	Network Protocols

CERTIFICATE PROGRAMMES

The following are the programme offered to earn extra credits:

S. No.	Programme Code and Name	Course Code	Course Name
1	4IT5AA Bio-Python	194IT5A1CP	Bio-Python
2	4IT5AB Linux Foundation	194IT5B1CP	Linux Foundation

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 and i/o operations

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

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 E. Balagurusamy, 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 ReemaThareja , 2015, "Programming in C", Second Edition, OXFORD University Press

4 https://www.pdfdrive.com/c-for-dummies-2nd-edition-shranisi-17843209.html

Course Code	Course Name	Category	L	T	P	Credit
202MT1A1IB	DISCRETE MATHEMATICAL STRUCTURE	IDC	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- set theory operation and assist in planning.
- basic concept of relation and function.
- apply the concept of graph theory and algebraic structures in various fields

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	explainthe concept of set theory	K1
CO2	apply the concept of Logical operators	K3
CO3	demonstrate the concept and know the difference between Relation and Function	K2
CO4	analyze the concept of Algebraic Structures and Graph theory	K2
CO5	expose the concept of 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

202MT1A1IB	DISCRETE MATHEMATICAL STRUCTURE	SEMESTER I

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

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

Unit IV Algebraic Structures and Graph Theory 12 h

Algebraic Structures - Mathematical Operations - Binary Operations - Groups - Modulo

Graph Theory - 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 - Set Theory of Strings - Languages – Regular Expressions and Regular Languages – Grammar – Finite State Machine – Finite State Automata

Note: Theory 20% and Problem 80%

Text Books

1 SharmaJ.K,2014,' Discrete Mathematics' , Second Edition,Macmillan India Ltd,Chennai

References

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

2 Dr Venketaramen M.K , Dr Sridharan .N , Chandarasekaran. N, 2000, 'Discrete Mathematics', second edition , The National publishing Company, Chennai

3 Dr Uma Shanker Gupta,' Discrete Mathematics Structures' , first edition , Pearson publication, Delhi

4 Dr Babu Ram,' Discrete Mathematics ', second edition , Delhi Pearson publication,Delhi

194IT1A1CP	CORE PRACTICAL: PROGRAMMING IN C	SEMESTER - I

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Program to implement operators
2	Program to implement branching Conditions
3	Program to demonstrate do and while loop
4	Program to demonstrate for loop
5	Program to sort using arrays
6	Program to implement Matrix Addition and Multiplication
7	Program to demonstrate string command with arrays
8	Program to demonstrate string commands with pointers
9	Program to implement recursive function
10	Program to use structure and array of structures
11	Program to use file manipulation commands
12	Program to use command line argument

Note: Out of 12 - 10 Mandatory

204IT1A1CQ	CORE PRACTICAL: PYTHON PROGRAMMING	SEMESTER - I

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Program to implement basics of python
2	Program to implement Operators and Expression
3	Program to implement conditional statements
4	Program to demonstrate string functions
5	Program to demonstrate mathematical functions
6	Program to implement iterators and generators
7	Program to perform Exception handling
8	Program to implement packages
9	Program to demonstrate functions and modules
10	Program to use file commands
11	Program to perform on dataset
12	Program to implement data visualization

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.

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
192MT1A2IC	IDC - II	Numerical Methods and Statistics	4	1	-	3	25	75	100	4
204IT1A2CP	Core Practical - III	Data Structures using Python	-	-	4	3	40	60	100	2
194IT1A2CQ	Core Practical – IV	Open Source and Web Development	-	-	4	3	40	60	100	2
Part - IV										
196BM1A2AA	AECC - II	Human Rights	2	-	-	3	-	50	50	2
		Total	**18**	**3**	**9**	-	-	-	**650**	**20**

BoS Chairman/H&D 26/11/20
Department of Information Technology
Dr. N. G. P. Arts and Science College
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COIMBATORE | INDIA
B.Sc.(Information Technology) (Students admitted during the AY 2020-21)

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
192MT1A2IC	NUMERICAL METHODS AND STATISTICS	IDC	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- To solve Simultaneous Linear Algebraic Equations
- To enhance student knowledge in Measures of central tendency and dispersion
- To know about Test 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	Learn about 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	Analyzing 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

192MT1A2IC	NUMERICAL METHODS AND STATISTICS	SEMESTER II

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 - The 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 SquareTest of goodness of fit - Chi Square as a test of independence

Note: 20% Theory and 80% Problem

Text Books

1 Vedamurthy V.N, IyengarN.Ch.S.N, 2015, "Numerical Methods", 1st Edition, Vikas Publishing House, Noida (Unit I to II)

2 Pillai R.S.N and Bagavathi, 2002, "Statistics" 14th Edition, S. Chand and Company Ltd, New Delhi.(Unit III to V).

References

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

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

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

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

204IT1A2CP	CORE PRACTICAL : DATA STRUCTURES USING PYTHON	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Write a program to demonstrate the application of Array.
2	Write a program to perform various string operations - representing strings using arrays.
3	Write a program to implement Stack and its operations using array.
4	Write a program to evaluate an expression by converting it from infix to postfix expression.
5	Write a program to implement Queue and its operations using array.
6	Write a program to demonstrate Singly linked, Doubly linked and Circular lists.
7	Write a program to illustrate the linked list representation of Stacks and Queues.
8	Write a program to create a Threaded tree in python.
9	Write a program to implement Depth first search in a tree.
10	Write a program to implement Breadth first search in a tree.
11	Write a program to demonstrate various Searching Techniques.
12	Write a program to implement any of Sorting Techniques.

Note: Out of 12 - 10 Mandatory

194IT1A2CQ	CORE PRACTICAL: OPEN SOURCE AND WEB DEVELOPMENT	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Creating and executing a bash program
2	Check whether the given number is prime or not.
3	Create a D-shape pattern in BASH programming.
4	Write a program to generate Fibonacci Series.
5	Write a program to prepare electric bill for domestic consumers. • For first 100 UNIT s - Rs.0.75/ UNIT • For next 100 UNIT s - Rs.1.50/UNIT • Above 200 UNIT s - Rs.3.00/UNIT Prepare the bill for the following format: Customer No, Customer Name, Pre. Reading, Cur. Reading UNITs Consumed, Charge, Signature
6	Write a program to display the result PASS or FAIL using the information given below: Student Name, Student Reg. No., Mark1, Mark2, Mark3, Mark4. The minimum pass for each subject is 50
7	Using Case Statement, write a program to check the files ending with vowels
8	Write a single program to sort the names and numbers in alphabetical, ascending and descending order
9	Write a menu driven program to print Biodata for five persons.
10	Write a program to prepare MCQ online Test.
11	Design HTML web page using standard HTML tags.
12	Program to work with various attributes of standard HTML elements.

13 Program to Display food menu using XML.

14 Program to validate username and password using Javascript

15 Program to import CSS design for a webpage.

Note: Out of 12 – 10 Mandatory

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.

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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B.Sc.(Information Technology) (Students admitted during the AY 2020-21)

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
204IT1A3CB	Core - IV	Relational Database Management System	4	1	-	3	25	75	100	4
205AT1A3IA	IDC-III	Income Tax and E-filing	4	-	-	3	25	75	100	4
204IT1A3CP	Core Practical - V	Java and RDBMS	-	-	4	3	40	60	100	2
194IT1A3SA	SEC - I	Internet Programming	4	-	-	3	25	75	100	4
194IT1A3SP	SEC Practical-I	Internet Programming	-	-	4	3	40	60	100	2
	GE - I		2	-	-	3	-	50	50	2
	LoP		-	-	-	-	-	-	-	-
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	194IT1ASSA	Ethical Hacking
2	194IT1ASSB	Network Protocol

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

- 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	S	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 ...ols – Charts – CSS – Layout Panes - Media with JavaFx – Event handling with ...x.

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", Second Edition, Tata McGraw Hill Publications.

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

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

4 Paul deitel and Harvey Deitel, 2015, "Java How to Program, 10/E", 10th Edition, Deitel& Associates, Inc Publications

Course Code	Course Name	Category	L	T	P	Credit
204IT1A3CB	RELATIONAL DATABASE MANAGEMENT SYSTEM	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The characteristics and Significant role of DBMS.
- Normalization and relational database.
- Database security mechanisms and integrity controls.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Acquire knowledge of handling database management system.	K1
CO2	Understand need for normalizing a database and Concurrency.	K2
CO3	Recognize the facts of Oracle9i with various DBMS Concepts.	K3
CO4	Fit with any DB to deal with PL/SQL to develop huge data.	K4
CO5	Illustrate the integrity controls and security mechanisms.	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204IT1A3CB	RELATIONAL DATABASE MANAGEMENT SYSTEM	SEMESTER III

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Database concepts 12 h

Introduction to databases – Conventional file processing – Purpose of database system – Characteristics of database approach – Advantages of using DBMS – Database concept and architecture – Data Abstraction – Database Models – Instances and Schema – Data Independence – Schema Architecture – Components of a DBMS – Database Languages – Database Manager – Database Administrator – Database Users.

Unit II Relational Database 12 h

Database Concepts: A Relational approach: Database – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Anomalies in a database – Functional dependencies – Database Design – Normal forms: First normal form – Second normal form–Third normal form- Boyce – Codd Normal form – Fourth Normal form –Fifth Normal form- De -normalization.

Unit III ORACLE 9i 12 h

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.

Data Management and Retrieval:Data Management and Retrieval: DML – adding, updating and deleting a record– Arithmetic Operations – restricting Data with WHERE clause – Functions and Grouping: Built-in functions – Grouping Data. Multiple Tables: Joins - Set operations.

Unit IV PL/SQL 12 h

PL/SQL: History – Fundamentals – Block Structure – Data Types –Declaration – 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, Exceptions, PL/SQL Named Blocks:PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – Exceptions – Types of Exceptions. PL/SQL Named Blocks: Procedures – Functions – Packages –Triggers.

Unit V Database Security 12 h

Database Security, Integrity Control: Security and Integrity threats – Defense mechanisms – Transaction and concurrency control mechanisms-Database recovery management.

Text Books

1 Silberschatz A., Korth H. and Sudarshan S., "Database System Concepts", Tata McGraw Hill, 2011.

2 Nilesh Shah, "Database Systems Using ORACLE", Pearson Education,2016, India

References

1 Elmasri R. and Navathe S.B., 2009, "Fundamentals of Database Systems", Pearson Education.

2 Date C. J., Kannan A., Swamynathan S., 2009, "An Introduction to Database Systems", Pearson Education.

3 Raghu Ramakrishnan and Johannes Gehrke, 2007, "Database Management System (Digitized)", Tata McGraw Hill.

4 Graeme C. Simsion, 2006, "Data Modeling Essentials", Dreamtech.

Course Code	Course Name	Category	L	T	P	Credit
205AT1A3IA	INCOME TAX AND E-FILING	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic Concepts of Income Tax
- The differences between Capital and Revenue receipts and Payments
- The concepts of E- Filing

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 structure of Indian Taxation System.	K1
CO2	Know the functions of Capitals vs Revenues	K2
CO3	Get the awareness of Residential Status of Different Person	K2
CO4	Identify the Functions and Types of E Filing.	K1
CO5	Families the Income Tax under different heads	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

205AT1A3IA	INCOME TAX AND E-FILING	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction and Basic Concepts 10 h

Meaning of tax- Structure of Indian Taxation System- Features of Income Tax in India- History of Income Tax in India- Documents containing law relating to Income Tax- Definitions- Exemptions.

Unit II Capital and Revenue 10 h

Meaning- Functions - Capital receipts vs Revenue receipts- Distinguishing Capital Expenses vs Revenue Expenses- Revenue losses vs Capital losses - Merits and Demerits.

Unit III Basics of Charge 12 h

Meaning of Residential status- Determination of Residential status of Different Person-Types of Residential Status-Resident - Ordinary Resident- Non Ordinary Resident- Non Resident.

Unit IV E-Filing 8 h

Electronic Filing System- Meaning - Definition- Functions - Types of E Filing- E file start - Eligibility for E Filing- Benefits of E Filing- Implementation and History- Reviews - The Electronic litigation roadmap - Public consultation.

Unit V E-Filing of Income Tax Returns for individuals 8 h

Basic Terminology- Types of Assesse- Income taxable under different heads – Procedures for computation of Total Income Tax and Tax liability- Deduction available from Gross Total Income- PAN card- Due date of filing of Income tax Return.

Text Books

1 Gaur, V.P. and Narang,D.B., "Income Tax law and Practice", Kalyani Publishers, Ludhiana.

References

1 Reddy. T.S. & Hari Prasad Reddy Y.S. "Income Tax Law & Practice", Margham Publications, Chennai.

2 Vinod K. Singhania and Kapil Singhania, "Direct Taxes - Law & Practice", Taxmann Publications, New Delhi.

3 Mehrotra H.C., "Income Tax Law and Practice", Sahitya Bhawan Publishers, New Delhi.

4 ICAI CA Intermediate Study Material, Taxation, ICAI, New Delhi

204IT1A3CP	CORE PRACTICAL: JAVA AND RDBMS	SEMESTER III

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Program to implement Classes and methods
2	Program to demonstrate OOP concepts
3	Program to demonstrate multithreading
4	Program to implement packages and Exception Handling
5	Program to use JDBC
6	Program to perform on RMI and JavaFX
7	Implementation of DDL commands with Constraint and DML commands.
8	Program to implement WHERE,ORDER By clause and grouping functions.
9	Implementation of joins and operators
10	Implementation of PL/SQL program with cursors and exceptions.
11	Implementation of SQL Triggers.
12	Program to create an application for student information to insert, delete, and update records in database

Note: Out of 12 - 10 Mandatory

Course Code	Course Name	Category	L	T	P	Credit
194IT1A3SA	INTERNET PROGRAMMING	SEC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Web page and identify its elements and attributes
- The web pages using XHTML and Cascading Style Sheets
- Dynamic web pages using JavaScript (Client side programming

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 Websites	K1
CO2	Demonstrate about the HTML5 working concepts	K2
CO3	Interpreting the functioning of Control structures, Functions, Cookies using Java Scripts	K3
CO4	Analyze the concept of Node JS	K3
CO5	Inspect the Angular basics and its services in web applications	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A3SA	INTERNET PROGRAMMING	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Website Basics 08 h

Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – Web Clients – Web Servers. HTML: Formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors. Style sheets, CSS formatting text using style sheets, formatting paragraphs using style sheets.

Unit II HTML5 Tables, Forms and Media 10 h

Tables, Forms: Creating user forms, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page.

Unit III Javascript Basics 10 h

JavaScript- Basics, Advantages of Java Script- Syntax- Enabling JS-Variables- Operators- Looping statements- Looping Controls-JavaScript Functions- Scripting Cookies-Dialog Box using JavaScript-Boolean Properties- JavaScript Boolean-constructor- Prototype-JavaScript String- Arrays.

Unit IV Node JS 10 h

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

Unit V Angular JS 10 h

Learning Angular-Jumping into Typescript-Getting Started with Angular – Angular Components- Expressions- Data Binding- Built-in Directives- Advanced Angular- Custom Directives -Events and Change Detection- Implementing Angular Services in Web Applications. Creating Your Own Custom Angular Services, Having Fun with Angular

Text Books

1. Julie C. Meloni, 2015, ”HTML, CSS and JavaScript All in One, Sams Teach Yourself",2nd Edition,Pearson Education
2. Brad Dayley Brendan Dayley, 2018, "Node.js, MongoDB and Angular Web Development", 2nd Edition, Addison –Wesley

References

1. Deitel and Deitel and Nieto, 2011, . “Internet and World Wide Web – How to Program”, 5th Edition, , Prentice Hall
2. FaitheWempen, 2011, “HTML5 Step by Step”, Kindle Edition, Microsoft Press

194IT1A3SP	SEC PRACTICAL : INTERNET PROGRAMMING	SEMESTER III

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Design a web page demonstrating all Style sheet types
2	Design a web page with a form that uses all types of controls
3	Design a web page with image maps
4	Design a web page embedding with multimedia features.
5	Create the following table using HTML with CSS October 2020 Bills ITEM NAME PRICE DUE DATE Phone $50 March 1st Car insurance $100 March 5th Internet $70 March 10th
6	Design a web page demonstrating different Core JavaScript references (Array, Boolean, Date, Function, Math, Number, Object, String, regExp)
7	Create a JavaScript form along with validation controls.
8	Performing File System operations such as creating, Reading, Writing, Deleting File using Node.js.
9	Create a Node.js file that writes an HTML form, with an upload field (Formidable module)
10	Program to Implement Socket Services in Node.js.
11	Creating AngularJS Application Demo Application Enter your Name: Welcome!
12	Validate the user data using AngularJS code ($dirty , $invalid , $error)

Note: Out of 12 - 10 Mandatory

194IT1A3GA	GENERIC ELECTIVE : INTERNET OF THINGS	SEMESTER III

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to IoT 4 h

Introduction: Definition and characteristics of IoT - Physical design of IoT: Things in IoT, IoT Protocols - Logical design of IOT: IOT functional blocks, IoT communication models, IoT communication APIs - IoT Enabling technologies: Wireless Sensor networks, Cloud computing, Big data Analytics, Communication networks, Embedded system – IoT Levels & deployment templates

Unit II Domain Specific IoTs 5 h

Introduction - Home Automation – Cities – Environment – Energy – Retail – Logistic – Agriculture – Industry – Health & Lifestyle.

Unit III IoT and M2M 5 h

Introduction – M2M – Difference between IoT and M2M – SDN and NFV for IoT. IoT system development with NETCONF-YANG: Need for IoT System Management, SNMP, Network operator requirement, NETCONF, YANG, IoT system management with NETCONF-YANG

Unit IV IoT Platforms Design Methodology 5 h

Introduction- IoT design methodology : Purpose and requirement specification, Process specification, Domain model specification, Information model specification, Service specification, IoT level specification, Functional view, Operational view, Device and component integration, Application development

Unit V Case Studies illustrating IoT Design 5 h

Introduction – Home Automation – Cities – Environment – Weather monitoring system – Agriculture – Productivity Applications

Text Books

1 ArshdeepBahga, Vijay Madisetti, 2014, "Internet of Things – A Hands on Approach".

References

1 David G. Hanes, Gonzalo Salgueiro, and Patrick Grossetete , 2017, “IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things”.

2 Jamil Y. Khan, Mehmet R. Yuce, 2019, "Internet of Things (IoT): Systems and Applications".

3 RajkumarBuyya, Amir VahidDastjerdi , 2016, "Internet of Things: Principles and Paradigms".

194IT1ASSA	SELF STUDY : ETHICAL HACKING	SEMESTER III

Total Credit: 1

Syllabus

Unit I Introduction to hacking, Ports and Protocols

Hacking - Introduction to hacking- types of hacking- Phases of hacking- Protocols in hacking-Virtualization. Deep Web - Introduction to Deep Web-Dark Net-TOR (The Onion Router).

Unit II Scanning, Hacking and Foot printing

Scanning - what is scanning? Basics of scanning- Techniques of Scanning. System Hacking - Process of system Hacking-Password Cracking. Foot printing - Foot printing Types.

Unit III Malwares, Viruses and Worms

Malwares – Trojans- working of Trojans. Virus - Introduction to virus- working of virus-characteristics of virus. Worms

Unit IV Social Engineering

Social Engineering - Introduction to Social Engineering- process of social engineering- Identity theft. Phishing - what is phishing - phishing process- types of phishing Attacks.

Unit V Cryptography and Steganography

Cryptography : Cryptography- Digital signature- Hash functions. Steganography - what is Steganography- Steganography Process-Terms associated with Steganography-Methods- Steganography Tools.

Text Books

1 Harsh Bothra, 2017, “Hacking: Be a Hacker with Ethics”, Kindle Edition, Khanna Publishing

References

1 Roger A Grimes, 2017, “Hacking the Hacker”, John Wiley & Sons.

2 Michael Gregg, 2017, “Certified Ethical Hacker(CEH), Second Edition, Pearson IT Certification version 9.

194IT1ASSB	SELF STUDY : NETWORK PROTOCOLS	SEMESTER III

Total Credit: 1

Syllabus

Unit I Network Models

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

Unit II Ethernet and Internet Protocol

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

Unit III Address Resolution Protocol

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

Unit IV Network Equipment and ICMP

Network Equipment: Tables and Hosts -Hubs or Repeaters-Switches and Bridges-Access Points-Routers- Multilayer Switches and Home Gateways- Security.

Internet Control Message Protocol: Structure- Operation and Types: Echo Request and Echo Reply, Redirect (Type 5), Time to Live Exceeded(Type 11), Destination Unreachable (Type 3) -IPv6

Unit V Subnetting and Other Masking Acrobatics

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

Text Books

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

References

1. Andrew S. Tanenbaum, 2011, "COMPUTER NETWORKS", 5th edition, PHI.
2. Javvin, 2005, "Network Protocols Handbook", 2nd Edition, Javvin Technologies Inc., USA

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
194CS1A4CA	AGILE METHODOLOGY	CORE	4	1	0	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamental concepts of project management.
- The theory behind Agile Methodology
- To apply Agile methodology in Project Management tasks.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Ability to understand the various Project Management tasks.	K2
CO2	Understand the basic techniques of Agile Methodology	K2
CO3	Apply Lean and Agile in Project Management Life Cycle.	K3
CO4	Learn about Agile Management	K3
CO5	Ability to apply the Agile Leadership Ethics in Project Management.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CS1A4CA	AGILE METHODOLOGY	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Project Management 12 h

Understanding Project Management Theory: The Three Faces of Traditional Project Management - Project Initiation - Project Planning - Project Execution - Project Monitoring and Controlling - Project Closing - Roles and Responsibilities - Common Project Management Challenges - Managing Project Success - A Lean History of Lean - Five Laws of Lean

Unit II Basics of Agile Methodology 12 h

Agile Comprehensive: Earned Value Management - Agile Basic Tools and Techniques - Agile Manufacturing - Agile Change Management - Agile Project Management - Agile Challenges. Applying Lean and Agile to the Project Management Life Cycle: Initiating the Project: Project Selection Using the Lean Six Sigma Model.

Unit III Agile Planning and Execution 12 h

Applying Lean and Agile to the Project Management Life Cycle: The Planning Process: WBS - The Project Plan - Models for Planning. Project Execution: Evaluation Metrics for Piloting or Testing - Schedule and Effort / Cost Variance - Resource Utilization - Change Requests to Scope of Work - Performance Monitoring-Provide Project Status.

Unit IV Agile Management 12 h

Monitoring, Controlling and Closing a Project: The Data Collection Plan - Change Management - Making Communication Easier - Specific Activities - Managing and Tracking: Decisions - Action Items - Execute and Revise Project Schedule - Manage Risk - Cause and Effect Matrix - Control Charts - Tools. Applying Lean and Agile Techniques to Project Management: Integration - Scope - Time - Cost - Quality - Human Resource - Communications - Risk

Unit V Lean and Agile Leadership Ethics 12 h

Ethics and Social Responsibility: Ethics - Values - The Lean and Agile Project Manager: Being Both a Leader and a Manager - Appreciation of a System - Knowledge of Variation - Theory of Knowledge - Understanding of Psychology -

Change Management Basics for Lean and Agile Project Managers - Change Management Basics for Lean and Agile Project Managers - Lean and Agile Project Management International.

Text Books

1 Terra Vanzant Stern, 2017, "Lean and Agile Project Management-How to Make Any Project Better, Faster, and More Cost Effective", 1st Edition, CRC Press.

References

1 Bruce Powel Douglass, 2016, "Agile Systems Engineering", Kindle Edition, Morgan Kaufmann.

2 David C.Kung, 2013, "Object-Oriented Software Engineering: An Agile Unified Methodology", 1st Edition, TMH.

3 Hazza and Dubinsky, 2009, "Agile Software Engineering, Series: Undergraduate Topics in Computer Science", Springer.

Course Code	Course Name	Category	L	T	P	Credit
204IT1A4CA	OPERATING SYSTEM	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The Structure and Open Source Operating System
- The method for handling deadlock
- The concept of memory and storage management

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	State the evolution of OS functions and process	K1
CO2	Extend the idea on Process scheduling and Synchronization	K2
CO3	Apply the concept of deadlock with Banker's Algorithm	K3
CO4	Show the knowledge on memory management	K3
CO5	Illustrate the disk scheduling algorithm	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204IT1A4CA	OPERATING SYSTEM	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Operating Systems 10 h

Introduction: What Operating Systems do - Computer System Organization - Computer System Architecture - Operating System Structure - Distributed Systems- Special Purpose Systems - Computing Environments - Open Source Operating Systems. Process: Process Concept - Process Scheduling - Operations on Processes.

Unit II Process Scheduling 12 h

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

Unit III Deadlocks 14 h

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

Unit IV Memory Management 12 h

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

Unit V Storage Management 12 h

File System: File Concepts - Access Methods. Secondary-Storage Structure : Overview - Disk Structure - Disk Scheduling: FCFS Scheduling - SSTF Scheduling SCAN Scheduling-C-SCAN Scheduling-LOOK Scheduling- Selection of a Disk Scheduling Algorithm - RAID structure. Case Studies: Linux System, Mobile Operating System

Text Books

1 Silberschatz, Galvin, Gagne, 2009, "Operating System Concepts", Eighth Edition, John Wiley & Sons Inc.

References

1 William Stallings, 2012, "Operating Systems: Internals and Design Principles", Edition, Prentice Hall publication

2 D.R.Choffnes, Harvey Deitel, Paul Deitel, 2004, "Operating Systems", Third Edition, Pearson/Prentice Hall publication

Course Code	Course Name	Category	L	T	P	Credit
202PY1A4IB	DIGITAL ELECTRONICS	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of number system and circuits
- The ideas about logic families and memory
- The design of microprocessors

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Show and enumerate about the number system.	K1
CO2	Plan and simplify the expressions of combinational Logic Circuits	K3
CO3	Infer and outline the concept of sequential circuits	K2
CO4	Spell and understand the different types of logic families and memory	K1
CO5	Tell and understand the concept of microprocessors and microcontrollers.	K1

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

202PY1A4IB	DIGITAL ELECTRONICS	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Number System 10 h

Binary Codes: Decimal – Binary – Octal – Hexadecimal – Binary addition – Multiplication – Division – Floating point representation – Complements – BCD – Excess3– Gray Code. Digital Logic: The Basic Gates – NOR – NAND – XOR Gates. Arithmetic Circuits: Half adder – Full adder – Half Subtractor – Full Subtractor

Unit II Combinational Logic Circuits 9 h

Boolean algebra – Karnaugh map (Up to 4 Variables) – Canonical form 1 – Construction and properties – Implicants – Don't care combinations – Product of Sum – Sum of Products – Simplifications

Unit III Sequential Circuits 9 h

Flip Flops – RS Flip Flops – Clocked RS Flip Flop – D Flip Flop – T Flip Flop – Master Slave JK Flip Flop. Registers: Registers – Decoders (3 to 8 line decoder) – Encoder (octal to binary encoder) – Multiplexers (4 to 1 line multiplexer) – Demultiplexers (1 to 8 line demultiplexer)

Unit IV Logic Families and Memory 10 h

Logic Families: Transistor - Transistor Logic (TTL) – Resistor Transistor Logic (RTL)– Diode Transistor Logic (DTL) Complementary Metal Oxide Semiconductor (CMOS). Memory: Memory Classification – Read/Write Memory – Read only Memory – Masked Read Only Memory - Programmable Read-Only Memory - Erasable Programmable Read-Only Memory - Electrically Erasable PROM - Flash Memory - Advantages in Memory Technology

Unit V Microprocessors 10 h

Introduction and Evolution – Microprocessor Architecture – Microprocessor Bus Organization – Functional Block Diagram of 8085 Microprocessor – Pin out Diagram of 8085 – Microprocessor Programming – Instruction set of 8085 - Microcontrollers

Text Books

1. Puri, V.K., 2017, "Digital Electronics Circuits and Systems", 1st Edition, TMH New Delhi
2. Ramesh Gaonkar, S., 2010, "Microprocessor Architeture, Programming, and Applications with the 8085", 5th Edition, New Delhi l

References

1. S.Salivahanan and S Arivazhagan, 2018, "Digital Circuits and Design", 5th Edition, Oxford University Press, Noida
2. Thomas Floyd L., 2015, "Digital Fundamentals", 11th Edition, Pearson Publication Ltd, New Delhi
3. Morris Mano M, 2012, "Digital Logic and Computer Design", 1st Edition, PHI, New Delhi
4. Carter M, 2008, "Computer Architecture", Schaum's outline series, 1st Edition, TMH ,New Delhi

204IT1A4CP	CORE PRACTICAL: OPERATING SYSTEM LAB	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Scheduling
2	Semaphores
3	Deadlock
4	IPC Using Shared memory
5	Page Replacement Algorithm
6	Disk Scheduling Algorithm
7	File Organization Techniques
8	File Allocation Strategies
9	Memory Management Techniques
10	Contiguous Memory Allocation
11	Paging Techniques
12	System Calls in UNIX

Note: Out of 12 – 10 Mandatory

Course Code	Course Name	Category	L	T	P	Credit
204IT1A4SA	DOT NET PROGRAMMING	SEC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The Framework and architecture.
- Applications using C# and Asp.Net.
- The ability to develop applications using ADO.NET.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Remember and understand the concept of Dot Net architecture	K1, K2
CO2	Apply C# programming to Create and develop a console-based applications	K3
CO3	Apply advanced C# programming to Create and design standalone applications	K3
CO4	Demonstrate web-based applications using ASP.NET.	K4
CO5	Develop applications with ADO.Net connectivity.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204IT1A4SA	DOT NET PROGRAMMING	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to .Net Framework 10 h

.Net Definition-Languages and Platforms supported- .Net Tools-.Net Framework-Features-Installing the .Net Framework SDK-Types of applications developed using .Net technologies.

Unit II C# programming 10 h

Introduction-history-Language fundamentals in C#-Overloading and Overriding-Properties-Structures-namespaces-Boxing and unboxing conversions-Enumerations- Control statements

Unit III Advanced features of C# 08 h

Interfaces-Creating and using a custom interface-Delegates and events-Arrays-Jagged arrays- Strings-Exception handling.

Unit IV ASP .Net 10 h

Features of ASP.Net -Security Controls-Form and Page based Controls-Navigation Controls-Validation Groups-Data source Controls-Web Services- history- benefits-web services stack- Building a basic web service-Creating a web page-Running web page in web server- Deploying web applications

Unit V ADO.Net 10 h

ADO.Net architecture-ADO.Net data providers-SQL server-Fundamental ADO.Net classes-The Connection Class-Testing a connection-Connection pooling- The command and Data reader Classes: Command Basics.

Text Books

1 Daminni Grover, 2011, "Dot net Technology", IK International Publishing House Pvt Ltd.

References

1 Greg Buczek, 2001, ASP.NET Developer's Guide, Tata McGraw Hill Edition.

2 E. Balagurusamy, 2010, Programming in C# - A Primer, Third Edition, TATA McGraw Hill Education India Private Limited

3 Stephen C. Perry, AtulKahate, Stephen Walther, Joseph Mayo, 2009, "Essentials of .Net and Related Technologies with a focus on C#, XML, ASP.NET, and ADO.NET", Pearsons Education custom Publishing.

204IT1A4SP	SEC PRACTICAL: DOT NET	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Conditional and Control Statements in C# programming.
2	Windows form controls in C#
3	Validating data in C#
4	Events & Delegates in C#
5	Custom dialog box
6	Web controls in ASP.Net
7	Calendar control in ASP.Net
8	Server controls in ASP.Net
9	Website using the concept of master pages in ASP.Net
10	Database programs with ADO.NET
11	Grid view control with ADO.NET
12	Online Shopping portal with ASP.NET and ADO.NET

Note: Out of 12 – 10 Mandatory

194IT1A4GA	GENERIC ELECTIVE: SEARCH ENGINE OPTIMIZATION	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to SEO 5 h

What Is SEO? - Benefits and Challenges in SEO. Black-Hat SEO vs. White-Hat SEO - On-Page and Off-Page SEO. Search Engines: Evolution of Search Engines -Search Engine Processes and Components – How Search Engines Work- Web Directories.

Unit II Ranking in SEO and Introducing the Google Tools Suite 4 h

On-Page SEO - On-Site SEO - Off-Page SEO. Introducing the Google Tools Suite: Google My Business-Google AdWords Keyword Planner-Google Trends-Page Speed Insight -Google Analytics-Google Search Console.

Unit III Obstacles in SEO and Sitemaps 5 h

Black-Hat SEO-Irrelevant Content-Targeting the Wrong Audience-Ignoring UX for Your Website-Slow Page Load Time-Using Flash on Your Site-JavaScript Accessibility Issues-AMP. Types of Sitemap-Creating a Sitemap-Popular Sitemap Generators.

Unit IV Keyword Research, Strategy and Link Building 5 h

Types of Keywords-Sources of Keywords-Boosting Your On-Page SEO Using Keywords and Long-Tail Terms. Link Building: Important Factors for Link Building-Link-Building Resources and Utilities-Link-Building Tools.

Unit V Content Considerations, SEO Hub and Social Media Marketing 5 h

Content Consideration Factors and Subsequent Implementation- Tools Used for Content Consideration and Curation- Content Building and Optimization- Site Audits. Implementing SMM- Popular Social Media Networks: Facebook, Twitter, Google+.

Text Books

1 AravindShenoy and AnirudhPrabhu, 2016,"Introducing SEO Your quick-start guide to effective SEO practices", 1st Edition,Apress.

References

1 Ryan, D., 2014, "Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation", Kogan Page Limited. (2014).

2 Pulizzi,J., 2015, "The Beginner's Guide to Digital Marketing" Digital Marketer., McGraw Hill Education.

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
204IT1A5CA	PHP AND MYSQL	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of web applications using PHP
- The databases in MySQL
- The idea about String and Array concepts

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 PHP programming.	K1
CO2	Build knowledge about the string, array and functions	K2
CO3	Apply the web programming knowledge	K3
CO4	Examine the application related to browser	K3
CO5	Synthesize to work with MYSQL and NOSQL	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204IT1A5CA	PHP AND MYSQL	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I **Introduction to** PHP 10 h

Essential PHP: Enter PHP - Creating your development environment- creating and running first PHP-mixing HTML and PHP - printing some text - adding comments to PHP code - working with variables - creating variable variables - creating constants - internal data types – Operators

Unit II Strings, Array and Function 10 h

Strings and Array: The string functions, converting to and from strings - formatting text strings - building yourself some arrays - modifying the data in arrays - deleting array elements Creating Functions - Creating function in PHP, Passing functions some data - introducing variable scope in PHP - Accessing global data, working with static variables - PHP conditional functions - PHP variable functions - nesting functions - creating include files - returning errors from functions.

Unit III Handling Webpages 08 h

Reading Data in Web Pages - Setting up web pages to communicate with PHP-handling text fields- handling text areas - handling check boxes - handling radio buttons - handling list boxes -handling password controls - handling hidden controls - handling image maps - handling file uploads - handling buttons.

Unit IV PHP Browser and File handling 10 h

PHP Browser : Handling Power – using PHP server variable, using HTTP Headers-getting browser type, redirecting browsers with HTTP headers- Dumpling a form's data all once- Handling form data with custom array- performing data validation-checking the user entered data, requiring numbers- requiring text- persisting user data- File handling

Unit V Working with databases 10 h

Working with databases: What is database, creating a MySql databases-NOSQL : Creating Records - Accessing Data - Updating and Deleting Data- Comparing NOSQL Products.

Text Books

1. Steven Holzner, 2008, “Complete Reference PHP”, Tata Mc Graw Hill, (UNIT I,II,III,IV).
2. Shashank Tiwari, 2011, “Professional NOSQL”, John Wiley & Sons Publications (UNIT V)

References

1. Steve Suehring, Tim Converse, Joyce Park, 2009, “PHP6 MySQL”, (Bible).
2. Vikram Vaswani, 2004, “The Complete Reference of MySql”, Tata McGraw Hill Publications.
3. Luke Welling ,2016, "PHP and MySQL Web Development", Addison-Wesley
4. Mike McGrath, 2018, "PHP & MySQL in easy steps", In Easy Steps Limited

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
194IT1A5CC	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamental concepts of Artificial intelligence
- The Problem solving methods with searching techniques
- The concept of Supervised, Unsupervised and Reinforcement Learning

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the history of artificial intelligence and its foundation	K1
CO2	Apply problem solving methods with searching techniques	K3
CO3	Understand the fundamental concepts of machine learning	K1,K2
CO4	Demonstrate on supervised learning with various techniques	K4
CO5	Learn the concepts of clustering and reinforcement learning	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A5CC	ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Artificial Intelligence 08 h

Introduction – Definition – History of Artificial Intelligence – Characteristics of Intelligent Agents – How Agents should Act - Structure of Intelligent Agents

Unit II Problem Solving Methods 10 h

Problem Solving Methods – Search Strategies – Breadth first search - Uniform cost search - Depth first Search - Depth limited Search - Iterative deepening Search - Bidirectional Search - Constraint Satisfaction Problems

Unit III Fundamental of Machine Learning 10 h

History and Evolution - Different forms - Statistics - Data mining - Data Analytics - Data Science - Machine Learning Categories - Supervised Learning - Unsupervised Learning - Reinforcement Learning

Unit IV Supervised Learning 10 h

Supervised Learning - Regression - Polynomial Regression - Multivariate Regression - Supervised Learning - Classification - Logistic Regression - Evaluating a classification model performance - Decision Tree - Support Vector Machine - k Nearest Neighbour(kNN)

Unit V Unsupervised Learning, Reinforcement Learning 10 h

Unsupervised Learning: Clustering - K- means - Finding value of k - Hierarchical clustering - Principal component Analysis - Reinforcement Learning

Text Books

1. S. Russell and P. Norvig, 2009, "Artificial Intelligence: A Modern Approach", Prentice Hall, Third Edition

2. Manohar Swamynathan, 2017, "Mastering Machine Learning with Python in Six steps", Apress media.

References

1. Bishop, C., 2006,"Pattern Recognition and Machine Learning", Springer-Verlag, Berlin.

2. Ethem Alpaydin, 2014, "Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series), Third Edition, MIT Press.

204IT1A5CP	CORE PRACTICAL: PHP AND MYSQL	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	HTML formatted Email in PHP.
2	Types of Sorting in PHP.
3	String Manipulation in PHP.
4	Color code with name.
5	Calculator functions.
6	Upload a file.
7	Login authentication.
8	Application with DML Queries.
9	Communication between webpage and web server.
10	Online Job portal.
11	Smart city information system.
12	Student result portal.

Note: Out of 12 – 10 Mandatory

194IT1A5CQ	CORE PRACTICAL: MOBILE APPLICATION DEVELOPMENT	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Login Page Creation
2	Menu Creation
3	Font and Colors
4	GUI components
5	Layout Managers and Event listeners.
6	GPS location
7	Alert messages
8	Alarm clock
9	Graphical primitives
10	Navigation pages
11	Street vendor App
12	Super market App

Note: Out of 12 – 10 Mandatory

Course Code	Course Name	Category	L	T	P	Credit
194IT1A5DA	5G MOBILE NETWORKS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the basics of 5G and Beyond Wireless communication
- the key technologies and enablers of 5G and beyond communication systems
- device communication and LTE wave communication

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Distinguish and understand the major cellular communication standards (1G/2G/3G/4G/5G systems) and wireless communications networks.	K1
CO2	Understand the 5G functional and physical architecture and its requirements	K2
CO3	Describe the requirements and fundamental techniques for 5G Communication.	K3
CO4	Implementation options for 5G & Compare and explain various radio access technologies for 5G networks	K3
CO5	Apply of Machine Learning in 5G Wireless Communications.	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A5DA	5G MOBILE NETWORKS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Mobile Wireless Technology Generations 10 h

5G – From History to the Present and Future-WISDOM - Global Information Multimedia Communication Village- Requirements of 5G- Standardization of WISDOM. SMNAT as Enabler of Device-to-Device Communication : 5G Communication Landscape - Cellular Device-to-Device Communication-D2D Using Physical Layer Network Coding-Network Architecture and the Processes-Implementation of SMNAT for In-Band–D2Dand Interoperability with WISDOM

Unit II Dynamic Spectrum Management And Mm-Waves 10 h

Command and Control Method-Spectrum Sharing-Spectrum Trading-Cognitive Radio. Cyber Security and Threats : Major Challenges Surrounding Future Cyber Security-BEYOND 2020 : Future Mobile Technologies-High Altitude Stratospheric Platform Station Systems-CONASENSE.

Unit III Drivers For 5G 10 h

Introduction : Pillars of 5G -Evolution of Existing RATs:The 5G Internet: Introduction - Internet of Things and Context-Awareness -Internet of Things-Context-Awareness-Networking Reconfiguration and Virtualization Support - Mobility-Quality of Service Control- Emerging Approach for Resource Over-Provisioning.

Unit IV 5G Small Cells For 5G Mobile Networks 10 h

Introduction: What are Small Cells?-Capacity Limits and Achievable Gains with Densification. Cooperation for Next Generation Wireless Networks: Cooperative Diversity and Relaying Strategies- -PHY Layer Impact on MAC Protocol Analysis.

Unit V The Wireless Spectrum Crunch: White Spaces For 5G 08 h

Introduction: TV White Space Technology - White Space Spectrum Opportunities and Challenges. Towards a Unified 5G Broadcast-Broadband Architecture: The Spectrum Dimension -SON Evolution for 5G Mobile Networks- SON in UMTS and LTE The Need for SON in 5G- Evolution towards Small-Cell Dominant HetNets-Green Flexible RF for 5G : Radio System Design.

Text Books

1. Ramjee Prasad, 2016, "5G: 2020 and Beyond", Rivers Publications
2. Jonathan Rodriguez, 2015, "Fundamentals of 5G Mobile Networks", John Wiley & Sons.

References

1. AsifOseiran, Jose F.Monserrat and Patrick Marsch, 2016, "5G Mobile and Wireless Communications Technology", Cambridge University Press.
2. R. Vannithamby and S. Talwar, 2017, "Towards 5G: Applications, Requirements and Candidate Technologies", John Willey & Sons, West Sussex.
3. Martin Sauter "From GSM From GSM to LTE–Advanced Pro and 5G: An Introduction to Mobile Networks and Mobile Broadband", Wiley-Blackwell.
4. AfifOsseiran, Jose.F.Monserrat, Patrick Marsch, "Fundamentals of 5G Mobile Networks" , Cambridge University Press.

Course Code	Course Name	Category	L	T	P	Credit
194IT1A5DB	NEXT GENERATION DATABASE	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamental elements of relational database management systems
- Concepts of Graph Databases, Column Databases
- The New Generation databases – MongoDB.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand basic concepts and terminology related to DBMS and Database revolution Design.	K1
CO2	Learn Sharding and NoSQL	K1,K2
CO3	Understand Graph Databases, Column Databases	K2,K3
CO4	Acquire Knowledge on Distributed database Pattern	K3
CO5	Learn Data models and storage	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A5DB	NEXT GENERATION DATABASE	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Three Database Revolutions 8 h

Early Database Systems - The First Database Revolution - The Second Database Revolution - The Third Database Revolution. Google, Big Data, and Hadoop : The Big Data Revolution - Google: Pioneer of Big Data - Hadoop: Open-Source Google Stack

Unit II Sharding, Amazon, and the Birth of NoSQL 10 h

Scaling Web 2.0 - Amazon's Dynamo. Document Databases: XML and XML Databases - JSON Document Databases.

Unit III Graph Databases, Column Databases 10 h

Data Warehousing Schemas - The Columnar Alternative - Sybase IQ, C-Store, and Vertica - Column Database Architectures.

Unit IV Distributed Database Patterns 12 h

Distributed Relational Databases - Nonrelational Distributed Databases - MongoDB Sharding and Replication – Hbase – Cassandra. Consistency Models: Types of Consistency - Consistency in MongoDB - HBase Consistency - Cassandra Consistency.

Unit V Data Models and Storage 8 h

Data Models – Storage, Languages and Programming Interfaces: SQL- NoSQL APIs - The Return of SQL.

Text Books

1 Guy Harrison, 2015, “Next Generation Databases : NoSQL and Big Data”, First APress Edition,

References

1 Kristina Chodorow, “MongoDB – The Definitive Guide”,2nd edition,O'Reilly

2 Pramod Sadalage and Martin Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", 1st Edition, Addison-Wesley Professional

Course Code	Course Name	Category	L	T	P	Credit
194IT1A5DC	DEEP LEARNING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the foundations of Deep Learning.
- the knowledge on Deep Learning Concepts
- optimization strategies to perform experiments in Deep Learning using real-world data.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Apply knowledge of machine and deep learning algorithms	K3
CO2	Implement Deep Feed Forward Networks and algorithms	K1
CO3	Construct the Learning Networks in modeling real world systems of Convolutional Networks	K3
CO4	Explain the Concepts of Recurrent Neural Networks	K3
CO5	Apply optimization strategies for large scale applications with Deep Generative Models	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A5DC	DEEP LEARNING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction To Deep Learning 10 h

Introduction to Deep Learning- Historical Trends in deep learning – Machine learning basics- Learning Algorithms- Capacity, Overfitting and Underfitting- Supervised Learning Algorithms- Unsupervised Learning Algorithms- Stochastic Gradient Descent- Building a Machine Learning Algorithm- Challenges Motivating Deep Learning.

Unit II Applications of Deep Learning & Deep Feed forward Networks 10 h

Applications: Large-Scale Deep Learning - Computer - Speech Recognition - Natural Language Processing - Other Applications. Deep Feedforward Networks: Gradient Descent, Hidden Units- Architecture Design-Backpropagation and other algorithms.

Unit III Convolutional Networks 10 h

Convolutional Networks: The Convolution Operation - Variants of the Basic Convolution Function - Structured Outputs - Data Types - Efficient Convolution Algorithms - Random or Unsupervised Features- LeNet, AlexNet.

Unit IV Recurrent Neural Networks 08 h

Recurrent Neural Networks: Bidirectional RNNs - Deep Recurrent Networks Recursive Neural Networks - The Long Short-Term Memory and Other Gated RNNs.

Unit V Deep Generative Models 10 h

Deep Generative Models: Boltzmann Machines - Restricted Boltzmann Machines - Deep Belief Networks- Deep Boltzmann Machines- Convolutional Boltzmann Machines- Evaluating Generative Models.

Text Books

1 Ian Goodfellow, Yoshua Bengio, Aaron Courville, 2016, “Deep Learning”, MIT Press.

References

1 Jeff Heaton, 2015, "Deep Learning and Neural Networks", Heaton Research Inc.

2 Mindy L Hall, 2011, "Deep Learning", VDM Verlag.

3 Li Deng , Dong Yu, 2009,"Deep Learning: Methods and Applications (Foundations and Trends in Signal Processing)", Now Publishers Inc

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
204IT1A6CA	BIG DATA ANALYTICS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The techniques and tools required for data science and big data analytics.
- The concepts, principles, and techniques applicable to technology and industry.
- The various search methods and visualization techniques using Hadoop.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Define and analyze the characteristics of Big data	K1
CO2	Apply the knowledge of R programming tools and techniques in Bigdata	K2, K3
CO3	Explain the technology landscape behind the Big Data Analytics using Hadoop.	K3
CO4	Solve distributed computing challenges with the help of Hadoop, MongoDB and NoSQL.	K3
CO5	Differentiate between Pig and Hive in terms of processing	K4, K5

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204IT1A6CA	BIG DATA ANALYTICS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Big Data Analytics 08 h

Characteristics of Data - Evolution of Big Data- Definition of Big Data-Challenges with Big Data- What is Big Data-Why Big Data-Traditional Business Intelligence (BI) versus Big Data- A Typical Hadoop Environment- Big Data Analytics- What is Big Data Analytics- Classification of Analytics Why is Big Data Analytics Important.

Unit II Data Analytics Using R 12 h

Introduction to R-R Graphical User Interfaces-Data Import and Export-Attribute and Data Types-Descriptive Statistics. - Exploratory Data Analysis-Visualization Before Analysis- Visualizing a Single Variable-Examining Multiple Variables. Statistical Methods for Evaluation-Hypothesis Testing-Difference of Means.

Unit III Introduction to Hadoop and MapReduce 10 h

Introducing Hadoop-Why Hadoop? -RDBMS versus Hadoop-History of Hadoop-Hadoop Overview-Use Case of Hadoop-Hadoop Distributors-HDFS (Hadoop Distributed File System)-Processing Data with Hadoop-Interacting with Hadoop Ecosystem-Introduction to MAPREDUCE- Mapper- Reducer- Combiner-Partitioner- Searching- Sorting- Compression.

Unit IV Introduction to MongoDB and NoSQL 10 h

What is MongoDB- Why MongoDB? - Data Types in MongoDB- MongoDB Query Language-NoSQL-Introduction-Types of NoSQL Databases-Advantages of NoSQL-SQL Vs NoSQL.

Unit V Introduction to Hive and Pig 08 h

What is Hive- Hive Architecture- Hive Data Types-Hive File Format- Hive Query Language (HQL). Introduction to Pig- The Anatomy of Pig- Pig on Hadoop- Pig Philosophy- Use Case for Pig: ETL Processing- Data Types in Pig- Running Pig-Execution Modes of Pig

Text Books

1 Seema Acharya, Subhashini Chellappan, 2015, ”Big Data and Analytics”, 1st Edition, Wiley.

References

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

2 Vignesh Prajapati, 2013, “Big Data Analytics with R and Hadoop”, Packet Publishing.

3 Tom White, 2012, “HADOOP: The definitive Guide”, O Reilly.

Course Code	Course Name	Category	L	T	P	Credit
194IT1A6CB	CLOUD COMPUTING	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the characteristics of Cloud Computing	K1
CO2	Identify Cloud services and Technologies	K2
CO3	Analyze Cloud Platforms	K3
CO4	Design the Cloud Methodologies	K4
CO5	Understand Cloud Security	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A6CB	CLOUD COMPUTING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Cloud Computing 08 h

Definition - Characteristics of Cloud Computing - Cloud Models: Service Models- Deployment Models - Cloud Services Example : IaaS- PaaS-SaaS

Unit II Cloud-based Services & Application, Concepts & Technologies 10 h

Cloud Computing for Healthcare - Energy Systems-Transportation Systems-Manufacturing Industry-Government-Education-Mobile Communication.

Cloud Concepts & Technologies: Virtualization- Load Balancing- Scalability & Elasticity- Deployment- Replication - Monitoring - Software Defined Networking-Network Function Virtualization- MapReduce- Identity and Access Management-Service level Agreements- Billing.

Unit III Cloud Services & Platforms 10 h

Compute Services - Storage Services- Database Services- Application Services-Content Delivery Services- Analytics Services- Deployment & Management Services- Identity and Access Management Services- Open Source Private Cloud Software

Unit IV Developing for Cloud 10 h

Cloud Application Design- Reference Architectures for Cloud Applications- Cloud Application Design Methodologies- Data Storage Approaches.

Unit V Cloud Security 10 h

Introduction- CSA Cloud Security Architecture- Authentication-Identification & Access Management - Data Security- Key Management- Auditing.

Text Books

1 Arshdeep Bahga, Vijay Madisetti, 2014, "Cloud Computing - A Hands-on Approach", Universities Press.

References

1 Thomas Erl, Zaigham Mahmood, Richard Puttini, 2019, "Cloud Computing Concepts, Technology and Architecture", Pearson Education.

2 Dan C. Marinescu, 2018, "Cloud Computing Theory and Practice", Morgan Kauffmann.

3 Michael Miller, 2019, "Cloud Computing - Web based Applications that Change the Way You Work and Collaborate Online", Pearson Education.

4 Erl, 2014, "Cloud Computing: Concepts, Technology & Architecture", Pearson Edition.

204IT1A6CP	CORE PRACTICAL: DATA ANALYTICS	SEMESTER VI

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Operators
2	Data frames
3	Matrix
4	Functions
5	Import and Export Files
6	Linear and Logistic Regression
7	Visualizing Data
8	Hypothesis Testing
9	File management tasks in Hadoop
10	Big data in MongoDB
11	Hive to create, alter, and drop databases, tables
12	Pig Latin script to Read and Store Data

Note: Out of 12 – 10 Mandatory

194IT1A6CV	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
194IT1A6DA	SOFTWARE TESTING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamental concepts in software testing
- Various software testing issues and solutions in software unit test, integration and system testing.
- Different software testing techniques and strategies

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 and the processes that lead to software testing	K1
CO2	Design test cases from the given requirements using Black box testing techniques	K3
CO3	Identify the test cases from Source code by means of white box testing techniques	K2
CO4	Demonstrate user acceptance testing and generate test cases for it	K3
CO5	Outline the test adequacy criteria to complete the testing process	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A6DA	SOFTWARE TESTING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Software Development Life Cycle Models 10 h

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing.

Unit II Black-Box Testing 10 h

Black-Box Testing: What is Black-Box Testing - Why Black-Box Testing – When to do Black Box Testing – How to do Black-Box Testing – Challenges in Black Box Testing - Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase Testing – Scenario Testing – Defect Bash.

Unit III System And Acceptance Testing 08 h

System and Acceptance Testing: system Testing Overview – Why System testing is done – Functional versus Non-functional Testing - Functional testing - Non-functional Testing – Acceptance Testing – Summary of Testing Phases.

Unit IV Performance Testing 10 h

Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

Unit V Test Planning, Management, Execution And Reporting 10 h

Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting –Best Practices. Test Metrics and Measurements: Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics

Text Books

1 Srinivasan Desikan & Gopalswamy Ramesh, 2018, "Software Testing Principles and Practices", Pearson Education.

References

1 Aditya P.Mathur, 2013, "Foundations of Software Testing", 2nd Edition, Pearson Education.

2 William E. Perry, "Effective Methods of Software Testing", 3rd Edition, Wiley India.

3 Renu Rajani, 2007, "Software Testing", Pradeep Oak, Tata McGraw Hill.

4 Limaye M.G., 2010, "Software Testing Principles, Techniques and Tools", Second Reprint, Tata McGraw Hill Publisher.

Course Code	Course Name	Category	L	T	P	Credit
194IT1A6DB	AUGMENTED REALITY AND VIRTUAL REALITY	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Fundamental computer vision, computer graphics and human-computer interaction techniques related to VR/AR.
- Geometric modeling and Virtual environment.
- Various types of Hardware and software in virtual Reality systems

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Design, create, and integrate audio, visual, and interactive elements into a comprehensive immersive experience.	K3
CO2	Develop content for successful delivery across multiple platforms, including PC, mobile devices and head-mounted displays	K4
CO3	Evaluate current trends of AR and VR media delivery to propose options to potential clients, and discuss the benefits, challenges and misconceptions involved with working in AR and VR.	K2
CO4	Evaluate various interaction schemes common to AR/VR experiences.	K4
CO5	Use immersive effects of visual and audio assets to AR/VR experiences and evaluate implementation methods.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A6DB	AUGMENTED REALITY AND VIRTUAL REALITY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Virtual Reality 10 h

What is VR-Modern experiences-History.Bird's Eye View:Hardware- displays-Software-game engines- human senses.The Geometry of Virtual Worlds: Geometric models-yaw, pitch, roll, axis-angle representation- quaternions- 3D rotation inverses and conversions-canonical view and perspective transforms.

Unit II Light and Optics 10 h

Basic Behavior of Lights: lenses and images- diopters- spherical aberrations- optical distortion- more lens aberrations- spectral properties- the eye as an optical system-cameras- visual displays.The Physiology of Human Vision: Parts of the human eye-photoreceptors and densities- display resolution requirements- eye movements-Implications of VR.

Unit III Motion in Real and Virtual Worlds 08 h

Velocities and Acceleration- vestibular system- virtual world physics- simulation-collision detection- motion and vection. Interaction: Remapping- locomotion-manipulation- social interaction. Audio:Sound propagation-Human Hearing.

Unit IV Augmented Reality 10 h

Introduction: What is Augmented Reality - Augmented Reality - The Relationship Between Augmented Reality and Other Technologies - Augmented Reality Concepts - Augmented Reality Concepts - Ingredients of an Augmented Reality Experience - Augmented Reality Hardware - Augmented Reality Software.

Unit V Interaction in Augmented Reality 10 h

Introduction- What Is Interaction?- Interaction in the Real World- Mobile Augmented Reality- Advantages and Disadvantages of Mobile Augmented Reality-Augmented Reality Applications- Application Areas- Evaluating Augmented Reality Applications- Example Augmented Reality Applications

Text Books

1. Steven M. LaValle, 2020, "Virtual Reality", Cambridge University Press, UNIT(I,II,III)
2. Alan B. Craig, 2013, "Understanding Augmented Reality, Concepts and Applications", Morgan Kaufmann, (UNIT IV,V)

References

1. Paul Mealy, 2018, "Virtual & Augmented Reality For Dummies".
2. Jonathan Linowes, Jesse Glover, 2019, "Complete Virtual Reality and Augmented Reality", Packt Publications.
3. D. Schmalstieg and T. Höllerer., 2016, "Augmented Reality: Principles and Practice", Addison-Wesley, Boston.
4. Alan Craig, William Sherman and Jeffrey Will, 2009, "Developing Virtual Reality Applications, Foundations of Effective Design", Morgan Kaufmann.

Course Code	Course Name	Category	L	T	P	Credit
194IT1A6DC	ROBOTICS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basics and Classification of Robotics
- Architecture and Hardware
- Robot Languages and Programming

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the history and applications of Robotics	K1
CO2	Know the concepts of actuators and grippers	K2
CO3	Understand various types of sensors and vision	K1
CO4	Learn various circuits used in Robots	K2
CO5	Design the architecture of Robot programming	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A6DC	ROBOTICS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Robotics 10 h

History- Robots- Robot Usage- Industrial Robots: Robot Subsystem - Motion Subsystem- Recognition Subsystem - Control Subsystem.

Classification of Robots: Coordinate Systems- Actuation Systems- Control Methods- Robot Programming. Industrial Applications: Material Handling- Welding- Spray Painting - Machining -Assembling.

Unit II Actuators and Grippers 08 h

Electric Actuators : DC Motors - AC Motors - Linear Actuators-Hydraulic Actuators -Pneumatic Actuators-Selection of Motors

Unit III Sensors and Vision 10 h

Sensor Classification - Internal Sensors: Velocity Sensors - Acceleration Sensors - Force Sensors. External Sensors: Contact type - non-contact type. Vision: Elements in a Vision Sensor- Steps in a Vision System- Hierarchy of a Vision System- Difficulties in Vision and Remedies.

Unit IV Signal Conditioning 10 h

Amplifiers- Filters-Modulators and Demodulators- Analog and Digital Conversions- Bridge Circuits- Signal Analyzer - Sensor Selection.

Unit V Transformations and Robot Programming 10 h

Robot Architecture: Links and Joints-Kinematic Chain-Degree of Freedom.

Robot Languages: Different Robot Languages-Generations-Structure-Requirements- Problems-Robot Programming: Online Programming- Offline Programming - Robot Oriented Programming - Task-level Programming

Text Books

1 S K Saha, 2014, "Introduction to Robotics", McGraw Hill Education.

References

1 J.Srinivas, R.V.Dukkipati, K. Ramji, 2012, "Robotics Control and Programming", Narosa Publishing House.

2 John J. Craig, 2016, "Introduction to Robotics Mechanics and Control", Pearson Education.

3 Chi N. Thai, 2017, "Exploring Robotics with ROBOTIS Systems", Springer; 2nd Edition.

4 Robin R. Murphy, 2019, "Introduction to AI Robotics", Kindle Edition, 2nd Edition.

Course Code	Course Name	Category	L	T	P	Credit
194IT1A6DD	ROUTING AND SWITCHING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- basics of Routing and Switching
- the concept of VLANs, its Protocols and its Design
- the perception of Routing and Switching Protocols

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Classify the Basics of Switched networks	K2
CO2	Explain the concept of VLAN	K2
CO3	Apply the basic routing concepts	K2,K3
CO4	Demonstrate the layers in Switching	K3
CO5	Apply the knowledge in Routing Protocols	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A6DD	ROUTING AND SWITCHING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Switched Networks 08 h

Objectives - Key Terms - Introduction- LAN Design - The Switched Environment. Basic Switching Concepts and Configuration : Basic Switch Configuration, Configure Switch Ports

Unit II VLANs 10 h

Introduction ,VLAN Segmentation , VLAN Definitions , Benefits of VLANs , Types of VLANs ,Data VLAN , Default VLAN , Native VLAN , Management VLAN , Voice VLANs , VLAN Trunks, Dynamic Trunking Protocol, VLAN Security and Design

Unit III Routing Concepts 10 h

Functions of a Router, Characteristics of a Network, Routers Interconnect Networks, Routers Choose Best Paths, Connect Devices, Basic Settings on a Router, Switching Packets Between Networks, Analyze the Routing Table

Unit IV Switching 10 h

Introduction to Layer 3 Switching, Troubleshoot Layer 3 Switching, Inter-VLAN Routing with Switch Virtual Interfaces, Routed Ports and Access Ports on a Switch.

Unit V Routing Dynamically 10 h

Dynamic Routing Protocol Operation , Dynamic Versus Static Routing, Routing Protocol Operating Fundamentals, Types of Routing Protocols, Distance Vector Routing Protocol Operation, Types of Distance Vector Routing Protocols

Text Books

1. Cisco Network Academy, 2014, "Routing and Switching Essentials", First Edition.

References

1. Bruce Hartpence, 2011, "Packet Guide to Routing and Switching", O'Reilly Media, First Edition.
2. Narbik Kocharians, 2018, "CCIE Routing and Switching V5.1 Foundations: Bridging the Gap Between CCNP and CCIE" , Pearson Education.
3. Cisco Networking Academy ,2014, "Routing Protocols Companion Guide", Pearson Education, India.
4. Todd Lammle, 2016, "CCNA Routing and Switching Complete Study Guide", Sybex 2nd Edition.

Course Code	Course Name	Category	L	T	P	Credit
194IT1A6DE	BLOCKCHAIN TECHNOLOGY	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of Blockchain Technology
- The Technology use cases & Ethereum
- The Fast-track applications & private blockchain platforms

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 Blockchain Technology	K2
CO2	Remember the Technology Use cases	K1
CO3	Classifying the Technology on Ethereum	K2
CO4	Apply Blockchain concepts to create Fast-Track applications	K3
CO5	Interpreting Blockchain platforms & its challenges	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A6DE	BLOCKCHAIN TECHNOLOGY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Blockchain 10 h

Blockchain: An Information Technology-Satoshi Nakamoto's Blockchain Breakthrough-Types of Blockchain – Blockchain Implementations-Blockchain Collaborative Implementations -Blockchain in Practical Use Today

Unit II Technology Use Cases 8 h

Web Versions 1 and 2-Web 3.0-Distributed Storage Systems-Distributed Computation-Golem-Decentralized Communications-The beginning of Autonomous Law-Smart contract Design example-DAO and Jurisdiction

Unit III Technology on Ethereum 10 h

Ethereum Accounts-Ether the Cryptocurrency-Obtaining Ether-Mining in Ethereum-Ethereum Work-Decentralized Applications-Profile of a Dapp-Decentralized Autonomous Organizations

Unit IV Fast-Track Application 10 h

Introducing Solidity-Run Ethereum Dapps in Your Browser-Develop a Simple Smart Contract-Ethereum Blockchain Development.

Unit V Private Blockchain Platforms, Use Cases& Challenges 10 h

Categories of Blockchain - Private Blockchain Use Cases-Private Blockchain Technology-Chain Core-Corda-Blockchain Governance Challenges-Blockchain Technical Challenges

Text Books

1 Joseph J. Bambara Paul R. Allen, 2018, "Blockchain-A practical guide to developing business, law, and Technology Solutions", McGraw Hill Education.

References

1 Melanie Swan, 2015, "Blockchain blueprint for a new economy", O'Reilly.

2 Tiana Laurence, 2017, "Blockchain for Dummies", John Wiley & Sons, Inc.

3 Chandramouli Subramanian, Asha A George, Abhilash K A, Meena Karthikeyan, 2020, "Blockchain Technology", Universities Press, India.

4 Jai Singh Arun, 2019, "Blockchain for Business" Pearson Education.

Course Code	Course Name	Category	L	T	P	Credit
194IT1A6DF	DATA VISUALIZATION	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concept of Data and its manipulation
- Analyzing the Visualization
- Apply visualization techniques for various data analysis tasks

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts on manipulations in Data Frame	K2
CO2	Design various Visualization Techniques	K3
CO3	Creating interactive Bar plots and Heatmaps	K3
CO4	Apply the Knowledge on Numpy and Matplotlib	K3
CO5	Develop visualizing images, shapes, graphs and networks	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194IT1A6DF	DATA VISUALIZATION	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Visualization with Python 10 h

Introduction-Handling Data with pandas DataFrame: Reading Data from Files - Observing and Describing Data- Selecting Columns from a DataFrame - Adding New Columns to a DataFrame - Applying Functions on DataFrame Columns - Deleting Columns from a DataFrame - Writing a DataFrame to a File- Plotting with pandas and seaborn: Creating Simple Plots to Visualize a Distribution of Variables - Bar Plots -Tweaking Plot Parameters

Unit II Static Visualization – Global Patterns and Summary Statistics 10 h

Introduction- Creating Plots that Present Global Patterns in Data : Scatter Plots - Hexagonal Binning Plots - Contour Plots - Line Plots - Heatmaps- The Concept of Linkage in Heatmaps- Creating Plots That Present Summary Statistics of Your Data: Histogram Revisited - Box Plots - Violin Plots

Unit III Static to Interactive Visualization 10 h

Introduction - Static versus Interactive Visualization - Applications of Interactive Data Visualizations - Getting Started with Interactive Data Visualizations - Interactive Data Visualization with Bokeh - Interactive Data Visualization with Plotly Express - Interactive Scatter Plots

Unit IV Data Visualization with NumPy and Matplotlib 10 h

Matplotlib - Visualization with NumPy and Matplotlib -Single Line Plots - Multiline Plots - Grid, Axes, and Labels - Colors, Styles, and Markers.

Unit V Visualizing Images, 3D Shapes, Graphs and Networks 08 h

Visualizing the Images - Operations on Images - 3 D Visualizations- Graphs and Networks : Graphs in Python 3 - Visualizing Graphs in Python 3 - More Types of Graphs - Assigning Custom Labels to Nodes.

Text Books

1. Abha Belorkar, Sharath Chandra Guntuku, Shubhangi Hora, Anshu Kumar, 2020, "Interactive Data Visualization with Python", Second Edition, Packt Publishing(Unit I,II,III)
2. Ashwin Pajankar, 2021, "Practical Python Data Visualization: A Fast Track Approach To Learning Data Visualization With Python", APress (Unit IV,V)

References

1. Claus O. Wilke, 2019, "Fundamentals of Data Visualization A Primer on Making Informative and Compelling Figures", O'REILLY.
2. Robert Johansson, 2019, "Numerical Python: Scientific Computing and Data Science Applications with Numpy, SciPy and Matplotlib", APress.
3. David S. Brown, 2021,"Statistics and Data Visualization Using R: The Art and Practice of Data Analysis" SAGE Publications, Inc
4. Mario Dobler , Tim Großmann, 2019, "Data Visualization with Python", Packt Publishing Limited.

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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