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 Computer Technology Degree

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

Programme: B.Sc. Computer Technology

Eligibility

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

Programme Educational Objectives

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

1. Demonstrating significant understanding the Key Concepts of various Computer technologies.
2. To stimulate the interest among the learners on various technologies through Lab sessions.
3. Inculcating professional competence in technologies, software design, database and Quality Assurance.
4. To facilitate the learners to develop skills to meet the requirements of the corporate.
5. To develop competency in research and in current technologies.

PROGRAMME OUTCOMES:

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

PO Number	PO Statement
PO1	Understand proficient, ethical, and social issues and community responsibilities
PO2	Capability to intend, execute and assess a computer based system on par with the industry standards through the ability to identify the problem and capability to provide a solution
PO3	Correlate the knowledge of mathematics and computing in the field of project development and apply the obtained knowledge in real – time platform using latest tools and technologies
PO4	Improve the ability to communicate effectively and to work as individual or team in the industry / enterprise / community
PO5	Ability to excel in the field of IT and ITES by enduring learning to accomplish their goals

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, Womens' Rights) (AECC)	2	4	II and III
	General Awareness(On-Line Exam) (AECC)	1	2	IV
	Research Methodology (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. COMPUTER 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
194CT1A1CP	Core Practical - I	C Programming	-	-	4	3	40	60	100	2
204CT1A1CQ	Core Practical - II	Digital Media	-	-	4	3	40	60	100	2
202MT1A1IB	IDC - I	Discrete Mathematical Structure	4	1	-	3	25	75	100	4
Part - IV										
193MB1A1AA	AECC - I	Environmental Studies	2	-	-	3	-	50	50	2
Total			**18**	**3**	**9**	-	-	-	**650**	**20**

16/5/2020

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

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

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
194CT1A2CA	Core-III	C++ Programming	4	-	-	3	25	75	100	4
204CT1A2CP	Core Practical-III	Programming in Data Structure using C++	-	-	4	3	40	60	100	2
192MT1A2IC	IDC-II	Numerical Methods and Statistics	4	1	-	3	25	75	100	4
Part–IV										
196BM1A2AA	AECC-II	Human Rights	2	-	-	3	-	50	50	2
Total			**22**	**3**	**5**	**-**	**-**	**-**	**650**	**22**

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Third Semester										
Part–III										
194IT1A3CA	Core - IV	Java Programming	4	1	-	3	25	75	100	4
194CT1A3CA	Core - V	Operating System	4	1	-	3	25	75	100	4
194CT1A3CP	Core Practical-IV	Programming in Java	-	-	4	3	40	60	100	2
192PY1A3IA	IDC-III	Digital Electronics	4	-	-	3	25	75	100	4
204CT1A3SA	SEC-I	Web Design and Development	4	-	-	3	25	75	100	4
204CT1A3SP	SEC Practical-I	Web Design Lab	-	-	4	3	40	60	100	2
	GE-I		2	-	-	3	-	50	50	2
	LoP	Lab on Project	-	-	-	-	-	-	-	-
Part–IV										
191TL1A3AA	AECC - III	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A3AB		Advanced Tamil								
195CR1A3AA		Women's Rights								
Total			**20**	**2**	**8**	**-**	**-**	**-**	**700**	**24**

EXTRA CREDIT COURSES

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

S. No.	Course Code	Course Name
1	194CT1ASSA	Social Networking
2	194CT1ASSB	Personality Development

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fourth Semester										
Part - III										
194CT1A4CA	Core-VI	C#.Net Programming	4	1	-	3	25	75	100	4
204CT1A4CB	Core -VII	Relational Data base Management System	4	1	-	3	25	75	100	4
194CT1A4CP	Core Practical - V	Programming in C#.NET and RDBMS	-	-	4	3	40	60	100	2
195BI1A4IA	IDC - IV	E-Commerce	4	-	-	3	25	75	100	4
194CS1A4SA	SEC - II	Python Programming	4	-	-	3	25	75	100	4
194CT1A4SP	SEC Practical - II	Programming in Python	-	-	4	3	40	60	100	2
	GE - II		2	-	-	3	-	50	50	2
	LoP		-	-	-	-	-	-	-	-
Part - IV										
191TL1A4AA	AECC -IV	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A4AB		Advanced Tamil								
192PY1A4AA		General Awareness								
Total			**20**	**2**	**8**	-	-	-	**700**	**24**

8/6/2021
BoS Chairman/HoD
Department of Computer Technology
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Academic Council
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Dr. N.G.P. Arts and Science College

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	TOTAL	
Fifth Semester										
Part-III										
194CT1A5CA	Core - VIII	Data Communication and Networks	4	-	-	3	25	75	100	4
194CT1A5CB	Core -IX	Data Analytics using R	4	-	-	3	25	75	100	4
204CT1A5CC	Core - X	Fundamentals of Android	4	-	-	3	25	75	100	4
194CT1A5CP	Core Practical - VI	Programming in Data Analytics using R	-	-	4	3	40	60	100	2
204CT1A5CQ	Core Practical - VII	Android Programming	-	-	4	3	40	60	100	2
194CT1A5CR	Core Practical- VIII	Hardware and Networking	-	-	4	3	40	60	100	2
194CT1A5DA	DSE-I	Artificial Intelligence	4	-	-	3	25	75	100	4
194CT1A5DB		Cloud Computing								
194CT1A5DC		Cyber Security								
194CT1A5TA	IT	Industrial Training	**GRADE A TO C**							
194CT1A5LA	LoP	Lab on Project	-	-	-	-	50	-	50	1
Part-IV										
192MT1A5AA	AECC - V	Research Methodology	2	-	-	3	-	50	50	2
Total			**18**	**-**	**12**	**-**	**-**	**-**	**800**	**25**

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part – III										
204CT1A6CA	Core - XI	Open Source Software	4	-	-	3	25	75	100	4
194CT1A6CB	Core – XII	Software Engineering	4	-	-	3	25	75	100	4
204CT1A6CP	Core Practical-IX	Open Source Software	-	-	4	3	40	60	100	2
194CT1A6CV	Core-XIII Project	Project Work	-	-	8	3	40	60	100	4
194CT1A6DA	DSE-II	Mobile Computing	4	-	-	3	25	75	100	4
194CT1A6DB		Internet of Things								
194CT1A6DC		Natural Language Processing								
194CT1A6DD	DSE-III	Network Security	4	-	-	3	25	75	100	4
194CT1A6DE		Block Chain Technology								
194CT1A6DF		Soft Computing								
Part – IV										
193BC1A6AA	AECC-VI	Innovation, IPR and Entrepreneurship	2	-	-	3	-	50	50	2
Part – V										
194CT1A6XA		Extension Activity	-	-	-	-	-	-	50	1
Total			**18**	**-**	**12**	**-**	**-**	**-**	**700**	**25**
Grand Total									**4200**	**140**

DISCIPLINE SPECIFIC ELECTIVE

(Student 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.	194CT1A5DA	Artificial Intelligence
2.	194CT1A5DB	Cloud Computing
3.	194CT1A5DC	Cyber Security

Semester VI (Elective II)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194CT1A6DA	Mobile Computing
2.	194CT1A6DB	Internet of Things
3.	194CT1A6DC	Natural Language Processing

Semester VI (Elective III)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194CT1A6DD	Network Security
2.	194CT1A6DE	Block Chain Technology
3.	194CT1A6DF	Soft Computing

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	194CT1A3GA	Multimedia

Semester IV (GE-II)

S. No.	Course Code	Course Name
1	194CT1A4GA	Internet Technologies

EXTRA CREDIT COURSES

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

S. No.	Course Code	Course Name
1	194CT1ASSA	Social Networking
2	194CT1ASSB	Personality Development

CERTIFICATE PROGRAMMES

The following are the programmes offered to earn extra credits:

S. No.	Programme Code and Name	Course Code	Course Name
1	4CT6A Diploma in Cyber Security	204CT6A1CA	Computer Fundamentals and the Internet
		204CT6A1CB	Network Security and Management
		204CT6A1CP	Computer Fundamentals Lab
		204CT6A1CQ	Offensive Security Lab
		204CT6A1CR	Defensive Security Lab
2	4CT5A Certificate on Android	204CT5A1CP	Android Programming

MOOC (NPTEL/SWAYAM/ SPOKEN TUTORIAL)

The following are the online courses offered:

Please refer the following link to select the courses

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

REGULATION 2019-20

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

1. NOMENCLATURE

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

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

1.3 Batch: Refers to the starting and completion year of a programme of study. Eg. Batch of 2015–2018 refers to students belonging to a 3 year Degree programme admitted in 2015 and completing in 2018.

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

a) Core Courses

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

b) Inter Disciplinary Course (IDC)

   A course chosen generally from a related discipline/subject, with an intention to seek exposure in the discipline relating to the core domain of the student.

c) Discipline Specific Elective (DSE) Course: DSE courses are the courses offered by the respective disciplinary/ interdisciplinary programme.

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

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

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

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

1.5 Lab on Project (LoP)

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

1.6 Project work

It is considered as a special course involving application of knowledge in problem solving / analyzing /exploring a real life situation / difficult problem. The Project work will be given in lieu of a Core paper.

Extra credits

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

Advanced Learner Course (ALC):

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

2. STRUCTURE OF PROGRAMME

2.1 PART – I: LANGUAGE

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

2.2 PART – II : ENGLISH

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

2.3 PART – III :

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

2.4 PART IV

2.4.1 Ability Enhancement Compulsory Course

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

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

(OR)

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

(OR)

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

2.5 PART V: EXTENSION ACTIVITIES

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

a) Institutional

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

b) Department Association

Membership and active participation in the department association activities.

c) Clubs

Membership and active participation in any one club activities.

1. CREDIT ALLOTTMENT

The following is the credit allotment:

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

2. DURATION OF THE PROGRAMME

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

3. REQUIREMENTS FOR COMPLETION OF A SEMESTER

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

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

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

4. EXAMINATIONS

- The end semester examinations shall normally be conducted after completing 90 working days for each semester.
- The maximum marks for each theory and practical course (including the project work and Viva-Voce examination in the final Semester) shall be 100 with the following breakup.

(i) Theory Courses

Continuous Internal Assessment (CIA) : 25 Marks

End Semester Exams (ESE) : 75 Marks

(ii) For Practical/ Courses

Continuous Internal Assessment (CIA) : 40 Marks

End Semester Exams (ESE) : 60 Marks

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

Continuous Internal Assessment for Practical Courses:

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

Project viva-voce / Industrial Training

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

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

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

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

Part – IV

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

6.1CONTINUOUS ASSESSMENT EXAMS

6.1 Theory courses

a) Continuous Internal Assessment test (CIA)

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

b) Utilization of Library

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

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

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

c) Class Participation

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

d) Papers / Reports/ Assignments/ Class Presentation

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

Continuous Assessment OBE Rubrics Score Sheet

Degree: _____ Branch: _____ Semester: _____

Course Code: _____ Course: _____

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

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

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

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

7. FOR PROGRAMME COMPLETION

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

Student has to complete the following:

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

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

Based on the performance Grade will be awarded as follows:

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

iii) Skill Enhancement Training

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

8. EXTRA CREDITS

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

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

8.1 Proficiency in foreign language

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

8.2 Proficiency in Hindi

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

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

8.3 Self-study Course

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

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

8.4 Typewriting/Short hand

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

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

8.5 Diploma / Certificate

Courses offered by any recognized University / NCVRT

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

8.6 CA/ICSI/CMA

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

8.7 Sports and Games

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

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

8.8 Online Courses

Pass in any one of the online courses

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

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

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

8.10 Innovation / Incubation / Patent / Sponsored Projects / Consultancy

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

8.11 Representation

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

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

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள் (Life Skills) – மாணவனின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1,K2,K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2,K4
CO3	பாட இணைச் செயல்பாடுகள் (Co-curricular activities)	K2,K3,K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5, K6

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

191TL1A1TA	தமிழ்த்தாள் - I	SEMESTER I

Total Credits: 03

Total Instruction Hours: 60 h

Syllabus

Unit I மறுமலர்ச்சிக் கவிதைகள் 12 h

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

அ) சும்மா கிடந்த நிலத்தை எனத்தொடங்கும் பாடல் -

_ பட்டுக்கோட்டை கல்யாண சுந்தரனார்

ஆ) சமரசம் உலாவும் இடமும் எனத்தொடங்கும் பாடல் - மருதகாசி

இ) உன்னை அறிந்தால் எனத்தொடங்கும் பாடல் - கண்ணதாசன்

Unit II புதுக்கவிதைகள் 12 h

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

Unit III பெண்ணியம் 08 h

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

Unit IV சிறுகதைகள் 15 h

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

Unit V இலக்கியவரலாறு, இலக்கணம் மற்றும் பயிற்சிப் பகுதி 13 h

அ. இலக்கிய வரலாறு

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

ஆ. இலக்கணம்

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

இ. படைப்பாக்கப் பயிற்சி

1. கவிதை, சிறுகதை எழுதுதல்

Text Books

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

References

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

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

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

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

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

PREAMBLE

This course has been designed for students to learn and understand

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

  communicate Hindi

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

201TL1A1HA	HINDI-I	SEMESTER I

Total Credits: 03

Total Instruction Hours: 60 h

Syllabus

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

पाठ 1- रजिया

पाठ 2- मक्रील

पाठ 3- बहता पानी निर्मला

पाठ 4- राष्ट्रपिता महात्मा गाँधी

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

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

Unit III व्याकरण 12 h

शब्द विचार (संज्ञा, सर्वनाम, कारक, विशेषण)

Unit IV अनुच्छेद लेखन 12 h

अनुच्छेद लेखन

Unit V अनुवाद 12 h

अभ्यास-III (केवल अंग्रेजी से हिन्दी में)

Text Books

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

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

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

201TL1A1MA	MALAYALAM - I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Novel 12 h

1. Alahayude penmakkal

Unit II Novel 12 h

1. Alahayude penmakkal

Unit III Short Story 14 h

2. Nalinakanthi

Unit IV Short Story 10 h

2. Nalinakanthi

Unit V 12 h

Composition & Translation

Text Books

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

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

3 Expansion of ideas,General Essay And Translation.

References

1 Malayala Novel Sahithyam

2 Malayala cherukatha Innale Innu.

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

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

201TL1A1FA	FRENCH- I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Salut I Page 10 12 h

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

Unit II Enchanté I Page 20 12 h

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

Unit III J'adore I Page 30 12 h

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

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

Unit IV J'adore I Page 30 14 h

Objectifs de Communication	Tâche	Activités de réception et de production orale
• Présenter quelqu'un	Dans un café, participer à une soirée de rencontres rapides et remplir de taches d'appréciation	• Exprimer ses goûts. • Comprendre une demande laissée sur un répondeur téléphonique. • Parler de ses projets de week-end.
Autoévaluation du module I Page 40 – Préparation au DELF A1 page 42		

Unit V Tu veux bien? Page 46 10 h

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

Text Books

1 Regine Merieux, Yves Loiseau, LATITUDES 1(Methode de Français), Goyal Publisher & Distributors Pvt.Ltd., 86 UB Jawahar Nagar (Kamala Nagar),Delhi-7 Les Editions Dider, Paris,2008- Imprime en Roumanie par Canale en Janvier 2012.

Course Code	Course Name	Category	L	T	P	Credit
191EL1A1EA	ENGLISH - I	Language - II	4	0	1	3

PREAMBLE

This course has been designed for students to learn and understand

- To experience the effect of dialogue, the brilliance of imagery and the magnificence of varied genre
- To strengthen the student's English vocabulary and understanding of English sentence structure
- To communicate effectively and acquire knowledge on the transactional concept of English language

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Extend interest in and appreciation of the works of eminent writers from various literatures	K2
CO2	Interpret the genres in literature through the master works of great visionaries	K3
CO3	Perceive the language gaps through a clear model of the grammatical structure	K5
CO4	Analyze the concepts of texts in the course of different lessons which are realistic and discursive in nature	K4
CO5	Value the integral concepts of English grammar necessarily required in their linguistic competence	K5

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

191EL1A1EA	ENGLISH - I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Genre Studies - I 10 h

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

Unit II Genre Studies - II 11 h

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

Unit III Grammar - I 14 h

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

Unit IV Genre Studies - III 11 h

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

Unit V Grammar - II 14 h

If Conditionals

Modal Auxiliary Verbs

Question Types/Tags

Voice

Direct and Indirect Speech

Text Books

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

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

References

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

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

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

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

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

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204CT1A1CA	PROBLEM SOLVING USING C PROGRAMMING	SEMESTER I

Total Credits: 4
Total Instruction Hours: 60 h

Syllabus

Unit I Program Development Style and Basic of C 10 h

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

Unit II C Declaration 12 h

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

Unit III Decision Making Statements, Arrays and Strings 12 h

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

Unit IV Functions, Pointers 14 h

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

Unit V Structures, Unions and File Management 12 h

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

Text Books

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

2 E. Balagurusamy, 2017, “Programming in ANSI C”, Seventh Edition, Tata McGraw Hill, NewDelhi.

References

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

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

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

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

194CT1A1CP	CORE PRACTICAL: C PROGRAMMING	SEMESTER I

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Program to calculate simple interest and compound interest with flowchart
2	Program to generate n-prime numbers with flowchart
3	Program to generate Fibonacci series
4	Program to implement i. Conditional Operator ii. Bitwise Operator
5	Program to implement formatted and unformatted Input / Output functions
6	Program to print alphabets pyramid using iteration statement
7	Program to compute multiplication of matrix using array
8	Program to implement string handling functions
9	Program to find the factorial of a number using recursive function
10	Program using pointer to check whether the given string is a palindrome or not
11	Program to print the student's marksheet assuming rollno, name, and marks in 5 subjects as array of structures and print the marksheet
12	Program to implement copying of file contents to new file

Note: Out of 12 – 10 Mandatory

References

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 Hill, NewDelhi
3. www.tutorialpoint.com

204CT1A1CQ	CORE PRACTICAL: DIGITAL MEDIA	SEMESTER I

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Create Water Drops and See thru text with sceneries using Photoshop
2	Animate Plane Flying in the Clouds using Photoshop
3	Create Plastic Surgery for Nose using Photoshop
4	Create Stone Texture and Ice Text using Photoshop
5	Create Web Page using Photoshop
6	Create Fog Effects using Photoshop
7	Create Event brochure using MS-Publisher
8	Create a Greeting card using MS-Publisher
9	Create simple Animation using GIMP tool
10	Create Luminosity Masks using GIMP tool
11	Design a Flex for college day function using GIMP tool
12	Design a Business card using GIMP tool

Note: Out of 12 - 10 Mandatory

References

1. Barbara Obermeier, 2012, "Photoshop CS6 All-in-One For Dummies", First edition, Wiley Publications.
2. https://www.gimp.org/tutorials/
3. https://www.lfpl.org/jobshop/docs/Introduction-Publisher.pdf

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

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
194CT1A2CA	Core - III	C++ Programming	4	-	-	3	25	75	100	4
204CT1A2CP	Core Practical - III	Programming in Data Structure using C++	-	-	4	3	40	60	100	2
192MT1A2IC	IDC - II	Numerical Methods And Statistics	4	1	-	3	25	75	100	4
Part - IV										
196BM1A2AA	AECC -II	Human Rights	2	-	-	3	-	50	50	2
		Total	**22**	**3**	**5**	**-**	**-**	**-**	**650**	**22**

26/11/20

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

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

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
194CT1A2CA	C++ PROGRAMMING	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the OOPs Concept and remember the Control Structures
- functions, classes & objects , constructor & destructor, overloading and inheritance
- the pointers, array , strings and files

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the OOPs concept	K1
CO2	Learn classes & objects , constructor & destructor	K1, K2
CO3	Understand operator overloading and inheritance	K1, K2, K3
CO4	Apply pointer, array concepts and learn virtual functions	K3
CO5	Apply string and file concepts	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A2CA	C++ PROGRAMMING	SEMESTER II

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction, I/O and Control Structures 12 h

Introduction to C++: Key concepts of Object-Oriented Programming – Advantages of OOP.

I/O in C++ : Streams in C++ - Predefined Streams - Buffering – Stream Classes - Formatted and Unformatted data - Unformatted Console I/O Operation – Type casting with cout statements

C++ Declarations: Tokens - Variable Declaration and Initialization – Data types - Operators - Scope Access Operator – Namespace - Memory Management Operator

Control Structures: - Decision Making and Statements: The If statement – Multiple Ifs- the If..else statement- Nested If..else statement- the else.. If ladder Switch statements.

Loops in C++: For loop, While loop, Do..while loop.

Unit II Functions, Classes & Objects , Constructor & Destructor 10 h

Functions in C++: Parts of Function – Passing Arguments – Return by reference - Inline functions.

Classes and Objects: Classes in C++ - Declaring Objects – Defining Member Functions – Static Member variables and functions – Array of objects – Friend functions - Function Overloading.

Constructor and Destructor: Constructor and Destructor - Characteristics –

Application with constructors - Overloading Constructor - Destructors.

Unit III Operator Overloading and Inheritance 10 h

Operator Overloading: The Keyword Operator - Overloading unary, binary operators – Overloading Friend functions

Inheritance: Introduction - Types of Inheritance : Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes

Unit IV Arrays, Pointers and Virtual Functions 8 h

Arrays: Introduction - Characteristics – One-dimensional array declaration and initialization- Initialization of arrays using functions – Two dimensional array -

Three dimensional array.

Pointers: Declaration – this pointer – Pointers to derived classes and Base classes

Virtual Functions: Rules for Virtual Functions - Pure Virtual Functions.

Unit V String and Files 8 h

String – Declaring and Initializing string objects - Handling String Object – String Attributes.

Files – File stream classes – Steps of File Operations - File Opening modes – Sequential Access Files - Random Access Operation- Error Handling Functions.

Text Books

1 Ashok N. Kamthane, 2003, "Object-Oriented Programming with ANSI and Turbo C++", 3rd Edition, Pearson Education Publication.

2 Balagurusamy, E, 2014, "Object-Oriented Programming with C++", 6th Edition, Tata Mc-Graw Hill Publication.

References

1 Yashvant. P. Kanetkar., 2003, "Let us C++", New Delhi: BPB Publications.

2 https://mcdtu.files.wordpress.com/2016/09/e_balagurusamy-object_oriented_programming_with_c.pdf

204CT1A2CP	CORE PRACTICAL: PROGRAMMING IN DATA STRUCTURE USING C++	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Program to count the number of objects using the Static member functions.
2	Program to find the largest of the members in an array. Use constructor to initialize the array.
3	Program to overload arithmetic operators to perform arithmetic operations on objects.
4	Program to find the area and perimeter of various shapes using multiple inheritances.
5	Program to handle Strings.
6	Program to merge the contents of two files.
7	Program to convert infix to postfix.
8	Create a single linked list of integer elements. Delete a specific element and display the list.
9	Create an array list of integers. Sort the elements using Bubble Sort and display.
10	Program to implement insert operation in Binary Search Tree.
11	Program to solve the single source shortest path problem using Dijkstra's algorithm.
12	Program to implement simple Breadth First Traversal of a graph.

Note: Mandatory - 10 Programs out of 12

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 .

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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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Third Semester										
194IT1A3CA	Core - IV	Java Programming	4	1	-	3	25	75	100	4
194CT1A3CA	Core - V	Operating System	4	1	-	3	25	75	100	4
194CT1A3CP	Core Practical - IV	Programming in Java	-	-	4	3	40	60	100	2
192PY1A3IA	IDC - III	Digital Electronics	4	-	-	3	25	75	100	4
204CT1A3SA	SEC - I	Web Design and Development	4	-	-	3	25	75	100	4
204CT1A3SP	SEC Practical - I	Web Design	-	-	4	3	40	60	100	2
	GE - I		2	-	-	3	-	50	50	2
	LoP	Lab on Project	-	-	-	-	-	-	-	-
Part - IV										
191TL1A3AA	AECC - III	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A3AB		Advanced Tamil								
195CR1A3AA		Women's Rights								
		Total	**20**	**2**	**8**	**-**	**-**	**-**	**700**	**24**

EXTRA CREDIT COURSES

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

S. No.	Course Code	Course Name
1	194CT1ASSA	Social Networking
2	194CT1ASSB	Personality Development

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

PREAMBLE

This course has been designed for students to learn and understand

- The object-oriented paradigm in the Java programming language.
- The 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	Understand 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	M	S	S	S	M
CO2	M	M	S	S	S
CO3	M	S	S	M	S
CO4	M	S	S	S	S
CO5	M	S	S	S	S

S Strong M Medium L Low

194IT1A3CA	JAVA PROGRAMMING	SEMESTER III

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Java 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 Class and methods, Inheritance, Interface 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, Multithreading, Packages and Strings 14 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 File, 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 Introduction to JavaFX 10 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", 10th Edition Deitel & Associates, Inc Publications.

Course Code	Course Name	Category	L	T	P	Credit
194CT1A3CA	OPERATING SYSTEM	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Evolution of OS, its functions and process.
- The Process scheduling and Deadlock techniques.
- The Memory and Storage management.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the evolution of OS functions and process	K1
CO2	Learn Process scheduling	K1, K2
CO3	Understand Deadlock techniques	K2, K3
CO4	Acquire knowledge on Memory management	K3
CO5	Ascertain facts on Storage management.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A3CA	OPERATING SYSTEM	SEMESTER III

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Operating Systems 12 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 12 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 14 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 10 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", Seventh Edition, Prentice Hall publication.

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

194CT1A3CP	CORE PRACTICAL PROGRAMMING IN JAVA	SEMESTER III

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Program to demonstrate Method Overloading and Overriding.
2	Program to implement Singleton class.
3	Program to implement User define package.
4	Program to implement the concept of Multiple Inheritance using Interfaces.
5	Program to create an own Exception.
6	Program to implement the concept of Multithreading with the use of any three multiplication tables and assign three different priorities to them.
7	Program to open an existing file and append text to that file.
8	Program to create a simple JDBC application.
9	Program to create a RMI Java application.
10	Program to display a login page in JavaFX.
11	Program to load an image in JavaFX and set multiple views.
12	Program to draw several shapes in the created windows in JavaFX.

Note: Out of 12 - 10 Mandatory

References

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.
3. Schildt, 2010, "The Complete Reference Java", Eighth Edition, Tata McGraw Hill Publications.
4. www.tutorialpoints.com

Course Code	Course Name	Category	L	T	P	Credit
192PY1A3IA	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	L	M	S	M	M
CO2	L	S	S	S	S
CO3	M	S	S	S	S
CO4	L	M	M	M	M
CO5	M	S	S	M	S

S Strong M Medium L Low

192PY1A3IA	DIGITAL ELECTRONICS	SEMESTER III

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 Architecture, Programming, and Applications with the 8085", 5th Edition, New Delhi

References

1. Thomas Floyd L., 2015, "Digital Fundamentals", 11th Edition, Pearson Publication Ltd, New Delhi
2. S.Salivahanan and S Arivazhagan, 2018, "Digital Circuits and Design", 5th Edition, Oxford University Press, Noida
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

Course Code	Course Name	Category	L	T	P	Credit
204CT1A3SA	WEB DESIGN AND DEVELOPMENT	SEC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basics of HTML and CSS
- The concepts of JavaScript and XML
- The PHP and MySQL

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Know about the basics of HTML	K2
CO2	Learn the concepts of CSS	K3
CO3	Understand JavaScript and jQuery	K3
CO4	Acquire Knowledge in XML	K3
CO5	Web development using PHP and MySQL	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204CT1A3SA	WEB DESIGN AND DEVELOPMENT	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Web basics & HTML 10 h

Web Basics: Internet - Intranet - WWW - Static and Dynamic Web Page - Web Clients Web Servers

HTML: HTML structure – Basic HTML elements: Paragraphs- Headings – Lists – Links – Images – Divs and Spans – Semantic Elements – Tables - Forms – Frames

Unit II CSS & Bootstrap 10 h

CSS structure: Example – Selectors – Pseudo classes – Pseudo elements – CSS cascade hierarchy - Using CSS to size and space elements – Text formatting: Font - Color -Text shadow – Position - Display – Navigation bar – HTML forms.

Bootstrap: Introduction – Grid.

Unit III JavaScript and jQuery 10 h

Javascript: Introduction – Variables – Operators – Global Variables – Document Object Model – Expressions – Conditionals – Looping – Functions - Objects – Arrays.

jQuery: Introduction - Syntax - jQuery Selectors - Events

Unit IV XML 8 h

XML : Introduction – XML structure – XML Elements – First Document – Organizing XML data – Creating Well formed XML – Attributes – Namespaces – DTDs and Validation – Adding DTDs to your documents – Understanding DTD entities – XML Style Sheet basics – CSS via XML – XML Schema – Comparing DTD with Schema

Unit V PHP & MySQL 10 h

PHP: Introduction – Structure of PHP – Expressions – Operators – Conditionals – PHP functions – Including and Requiring files – Arrays.

Accessing MySQL using PHP: Querying a MySQL database with PHP – Practical MySql

Text Books

1. David DuRocher, 2021, "HTML / CSS QuickStart Guide", Clydebank Media LLC)
2. Robin Nixon, 2012, "Learning PHP, MySQL, Javascript and CSS", O'Reilly Publication, 2nd Edition

References

1. Heather Williamson, 2008, "XML the complete Reference ",11th reprint, TMH
2. Deitel and Deitel and Nieto, 2011,"Internet and World Wide Web - How to Program", 5th Edition, Prentice Hall.
3. Jeffrey C and Jackson, 2011,"Web Technologies A Computer Science Perspective", Pearson Education.
4. Gopalan N.P. and Akilandeswari J., 2011, "Web Technology", Prentice Hall of India.

204CT1A3SP	SEC PRACTICAL: WEB DESIGN	SEMESTER III

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Design a simple web page using HTML lists.
2	Create a web page using HTML tables.
3	Create image gallery with CSS.
4	Create different types of shadow effects to text using CSS.
5	Create a responsive web page using Bootstrap Grid.
6	Create a JavaScript program using functions.
7	Create a web page using jQuery Selectors.
8	Validate an XML program using DTD.
9	Create an XML program with Extensible Style Sheet.
10	Create a program in PHP to upload a file.
11	Create a program in PHP to add 2 numbers using functions.
12	Create, Insert and Select records to/from a table using PHP and MySQL.

Note: Mandatory - 10 Programs out of 12

References

1 David DuRocher, 2021, "HTML / CSS QuickStart Guide", Clydebank Media LLC

2 Robin Nixon, 2012, "Learning PHP, MySQL, Javascript and CSS", O'Reilly Publication, 2nd Edition

3 http://w3schools.com

194CT1A3GA	GENERIC ELECTIVE: MULTIMEDIA	SEMESTER III

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Text Concepts 4 h

Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats.

Unit II Image Concepts 4 h

Image: Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera.

Unit III Audio Concepts 5 h

Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Sound Card – Audio Transmission – Audio File formats.

Unit IV Video Concepts 5 h

Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software.

Unit V Basics of Animation 6 h

Animation: Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web.

Text Books

1 Ranjan Parekh, 2013, "Principles of Multimedia", 2nd Edition, TMH Publication.

194CT1ASSA	SELF STUDY: SOCIAL NETWORKING	SEMESTER III

Total Credits: 1

Syllabus

Unit I Introduction to Social Networking

Social Networking: Introduction - History – Features-Types – Impact on Social Networks among people - Advantages of Social Networking - Issues.

Unit II Facebook

Facebook: Evolution of Facebook - Design - Facebook IPO - Five hidden dangers of Facebook - Security tips for users and Application Developers - Facebook Security Settings.

Unit III Google Applications

Google Applications: History of Google apps - Gmail - Calendar - Drive - Docs - Sheets - Slides - Hangouts - Advantages of Google Applications.

Unit IV Mobile Applications

Mobile Applications: Introduction – Definition - Overview - Messenger - Truecaller - Share it - Xender - Adobe reader - INDpay - EPFO.

Unit V Search Engines

Search Engines: Google - Yahoo - Bing - Qwant. P2P Search Engines - Meta Search Engines.

Text Books

1 https://en.wikipedia.org/wiki/Social Networks.

2 http://www.google.com/Google Applications.

194CT1ASSB	SELF STUDY: PERSONALITY DEVELOPMENT	SEMESTER III

Total Credits: 1

Syllabus

Unit I Basics of Communication

Communication - Types of communication - Elements of communication - Ways to improve communication - Effective Communication – Public Speaking.

Unit II Self development

Attitude – Motivation - Self-confidence - Strategies for developing confidence- Personality Dimensions - Positive Thinking - Body language - Active Listening.

Unit III Problem Solving

Life Skills - Targeting life skills (TLS) model - Stress Relaxation Techniques - Critical Thinking - Decision making – Problem Solving.

Unit IV Character Building

Character Building - Aims of education and value education - Emotional Intelligence - Social intelligence – Assertiveness - Developing Assertiveness.

Unit V Interview Skills

Group Discussion - Structured Group Discussion - Unstructured Group Discussion - Resume Preparation - Focus areas of personal interview - Do's and Don'ts in interview.

Text Books

1 http://en.wikipedia.org/wiki/Personality Development.

2 www.indiabix.com/group-discussion/topics.

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
194CT1A4CA	C#.NET PROGRAMMING	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- .NET Environment and Classes & Objects
- array, string and constructor and learn properties, indexer
- multithread, collections, delegates and web based applications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Obtain knowledge on .NET platform	K2
CO2	Remember arrays, strings, properties and indexer	K3
CO3	Analysis and Apply inheritance, multithread, collections and delegates	K4
CO4	Apply web controls in web based applications	K4
CO5	Apply the CRUD operation using ADO.NET	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A4CA	C#.NET PROGRAMMING	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Understanding .NET 10 h

Understanding .NET: The C# environment - Over view of C# - Control statements - Methods in C# - Classes and Objects - Categories of Class Members - Adding variables -Adding methods- creating objects - Access Modifiers

Unit II Array, String and Constructor 14 h

Array: Jagged Array- String Handling : Mutable and Immutable – Regular Expression – Reflection– Constructor - Destructor -Member Initialization - Constant member - Read only member – Properties - Indexer

Unit III Inheritance ,Threading and Collections 14 h

Inheritance : Introduction - Multiple Inheritance – Multithreading - Synchronization - C# Collections –Generics –Delegates and Events in C# - Anonymous Method - DateTime in C#

Unit IV Web Based Application Development 12 h

Windows and Web-based Application Development on .NET : Web Forms in C#- Buttons – Text boxes - Labels –File Upload - Place holders – Check box – Radio buttons – Tables – Panels – Images – Image Buttons – Image Maps – List box Controls– Drop-down list – hyperlinks – link buttons – Tree view – Menu – Form Validation

Unit V ADO.Net 10 h

Architecture of ADO.NET- Connected and Disconnected database – Creating and Establish database connectivity, CRUD operations using Connection Oriented Model with SqlCommand and SqlDataReader, Navigation of data in data objects using Disconnection oriented model with SqlDataAdapter DataSet, Data Table Working with Data Binding and Data sets

Text Books

1. Balagurusamy, E. 2010, “Programming in C# A Primer", 3rd Edition, Tata McGraw Hill.
2. Matt Telles, "C# 2005 Programming - Black Book”, Dreamtech press.

References

1. John Sharp, 2013, "Visual C# 2005 step by step” , Microsoft, Prentice Hall of India (P) Ltd.
2. Art Gittleman, 2008, "C#.Net Illuminated", Jones & Bartlett Publishers.
3. Geff Ferguson, 2007, "C# Programming Bible", 1st Edition, Wiley India

Course Code	Course Name	Category	L	T	P	Credit
204CT1A4CB	RELATIONAL DATABASE MANAGEMENT SYSTEM	CORE	4	1	0	4

PREAMBLE

This course has been designed for students to learn and understand

- the knowledge about database and various DDL commands
- the data management and retrieval operations.
- the knowledge of PL/SQL data base operations

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the database concepts, modeling, dependencies and normalization.	K1
CO2	Learn Oracle 9i concepts and apply various DDL operations	K2
CO3	Apply DML commands and join operation in database tables	K3
CO4	Acquire knowledge of PL/SQL to develop, organize and manage a database with huge data.	K3
CO5	Knowledge of cursor, package , functions an triggers	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204CT1A4CB	RELATIONAL DATABASE MANAGEMENT SYSTEM	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Database Concepts 12 h

Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design – Normal forms: First normal form – Second normal form–Third normal form- Dependency Diagrams – De -normalization.

Unit II Oracle9i 12 h

Oracle9i: Oracle9i an introduction – SQL. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

Unit III Data Management and Retrieval 12 h

Data Management and Retrieval: DML – adding a new Row/Record – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting - Transactions–Locking rows for update-Controlling Access. Functions and Grouping: Built-in functions – Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations.

Unit IV PL/SQL 12 h

PL/SQL: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQL in PL/SQL – Data Manipulation – Transaction Control statements.

Unit V PL/SQL Cursors, Exceptions, PL/SQL Named Blocks 12 h

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.

Text Books

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

References

1 Arun Majumdar & Pritimoy Bhattacharya, 2017, "Database Management Systems", McGraw Hill Education

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

194CT1A4CP	CORE PRACTICAL: PROGRAMMING IN C#.NET AND RDBMS	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Create a C# program implementing the various types of parameters.
2	Create a C# program demonstrating boxing and un-boxing.
3	Create a C# program implementing properties, delegate and events.
4	Apply the following concepts: (i) Multiple Inheritance (ii) Multithread (iii) Collections
5	Develop a C# application for a simple Quiz.
6	Develop a C# application for Student detail manipulation.
7	a) Create DEPARTMENT, DESIGNATION, EMPLOYEE tables with required constraints. DEPARTMENT :Deptid (pk) : varchar2, Deptname (nn) : varchar2 DESIGNATION :Desid (pk): varchar2, Designation (nn): varchar2 EMPLOYEE : Empid(pk): varchar2 Empname (nn): varchar2 Deptid(fk): varchar2 Desid(fk): varchar2 Gender(nn): char Dob (nn): date Doj (nn): date Contactnumber: number Bpay (nn): number b) Add a new column mailid of varchar type in the EMPLOYEE table
8	a) Insert necessary records in the above tables. b) Update the designation id of the employee with empid ‘e5’ as ‘CLS’.
9	Create a report to display the details of the employee of the accounts department.
10	Create a cursor to display all employee IDs and names from the EMPLOYEE table.

11	Write a procedure to update the basic pay. Senior Manager: 25% , Junior Manager : 20% , Junior Clerk: 15%, Senior Clerk:12%, Senior Assistant: 10%, Junior Assistant: 8%.
12	Write a database trigger before delete for each row not allowing deletion on employee table and give appropriate message. Display the constraint details of all the above three tables.

Note: Mandatory - 10 out of 12 programs

Course Code	Course Name	Category	L	T	P	Credit
195BI1A4IA	E-COMMERCE	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The technical and business-related implications of electronically mediated commerce
- The development of electronic business from its origins in electronic data interchange to its current growing importance
- The potential of electronic business for future development and the development of the 'Information Society' and ethical issues facing business organizations in their daily use of the Internet

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand basis of E-Commerce	K2
CO2	Apply various business applications of E-Commerce	K3
CO3	Gain knowledge of business models and Electronic Data Interchange	K2
CO4	Learn E-marketing and E-Advertising concepts	K2
CO5	Understand the E-Commerce Security issues	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

195BI1A4IA	E-COMMERCE	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to E-Commerce 9 h

Definition of E-Commerce - E-Business - Categories of E-Commerce Applications - Difference between traditional commerce and E-Commerce- Advantages of E-Commerce - Advantages to Business, Consumers, Society and Nation - Disadvantages of E-Commerce - Scope of E-Commerce-Evolution of E-Commerce—Growth of E-Commerce in India - Classification of E-Commerce.

Unit II Business Applications 9 h

Introduction - Trade cycle - Supply chain - E-Procurement - Implementing E-Procurement - Competitive advantage - E-Commerce applications in Manufacturing, Wholesale, Retail and Service sector - E-Commerce implementation - Problems, solutions and popularity in managing supply chain.

Unit III Business Models 10 h

Introduction - Need for Business models - (B2B) Business to Business- (B2C) Business to Customer - (C2B) Customer to Business - (G2B)Government to Business - Electronic Data Interchange (EDI) - Process of Electronic Data Interchange - Working of Electronic Data Interchange - Components -Reasons for slow acceptability of EDI for trading - Traditional Electronic Data Interchange and E-Commerce - Benefits.

Unit IV E-Marketing 10 h

E-Marketing - Advantages - Market segmentation - E-Marketing Mix - Marketing strategies - E-Marketing plan. Role of Social media in E-Commerce industry - E-Advertising - Format for web advertising - Intelligent agents - features of Intelligent agents - advantages for buyers and sellers - E-Customer Relationship Management (E-CRM).

Unit V Security Issues 10 h

Introduction - E-Commerce Security issues - Risk involved with E-Commerce - Protecting E-Commerce system - Common E-Commerce security tools - Client Server network security - Data and message security - Mobile commerce security.

Text Books

1. Dr.U.S.Pandey, Er.Saurabh Shukla, 2014, "E-Commerce and Mobile Commerce Technologies", S.Chand Publishers, New Delhi.
2. Dr.Abirami Devi.K, Dr.Alagammai.M, 2017, "E-Commerce", Margham Publications, Chennai.

References

1. Puja Walia Mann, Nidhi, "E-Commerce", MJ Publishers.
2. Dr.P.Rizwan Ahamed, 2018, "E-Commerce & E-Business", Margham Publications, Chennai.
3. Dr.C.S.Rayudu, 2018, "E-Commerce & E-Business", Himalaya Publishing House, New Delhi.
4. Daniel Minoli, Emma Minoli, 2012, "Web Commerce Technology Handbook", Tata McGraw Hill Publishing, New Delhi

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

PREAMBLE

This course has been designed for students to learn and understand

- fundamental of python and control statements
- functions, lists, tuples, strings and dictionary
- NumPy and Panda packages

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of python	K1
CO2	Learn about functions and strings	K2
CO3	Apply the knowledge list, strings and tuples	K3
CO4	Demonstrate NumPy package	K3
CO5	Analyze files using Pandas.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CS1A4SA	PYTHON PROGRAMMING	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Python 8 h

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

Unit II Functions and Strings 10 h

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

Unit III Lists, Tuples and Dictionaries 10 h

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

Unit IV NumPy Library 10 h

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

Unit V Pandas 10 h

Pandas: The Python Data Analysis Library: Installation- Getting Started with pandas - Pandas Data Structures - Other Functionalities on Indexes - Operations between Data Structures - Function Application and Mapping - Sorting and Ranking - "Not a Number" Data. Pandas: Reading and Writing Data: CSV and

Textual Files - Reading Data in CSV or Text Files - Reading and Writing HTML Files

Text Books

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

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

References

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

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

3 www.spoken-tutorial.org

194CT1A4SP	SEC PRACTICAL: PROGRAMMING IN PYTHON	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Program to implement basic built-in functions
2	Program to display n rows of Pascal's triangle
3	Program to implement array methods
4	Program to perform string manipulation using Python.
5	Program to access a range of items in a tuple by using slicing operator using Python.
6	Program to insert the element in the list. Find and display the positive and negative element
7	Program to remove duplicates from Dictionary.
8	Read two set of coordinate values using NumPy and generate different types of charts
9	Program to perform stacking and splitting operation using NumPy
10	Read a set of array values and create series and data frame using Pandas
11	Program to find the missing values using Pandas
12	Program to apply reading operation in CSV file

Note: Mandatory - 10 out of 12 programs

194CT1A4GA	GENERIC ELECTIVE: INTERNET TECHNOLOGIES	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Internet 4 h

Internet Overview -Intranet Overview- Extranet Overview-Internet reference Models-Internet Domain Name System-Internet Services -Internet Connectivity - Internet Protocols

Unit II Email Basics 5 h

Electronic Mail Basics: E-Mail Overview-E-Mail Protocols-E-Mail Working- E-Mail Operations-E-mail Features -E-mail Security -E-mail Providers

Unit III World Wide Web 6 h

WWW Overview : WWW Architecture-WWW Operation-Web Pages: Static Web page-Scripting Languages -Web Browsers-Architecture-Web Servers-Web Server Working-Architecture-Proxy Servers-Search Engines

Unit IV Internet Collaboration 4 h

Internet Collaboration: Collaboration Overview-Mailing List-Usenet Newsgroup-Online Education-Social Networking

Unit V Internet Programming 5 h

HTML: -HTML Tags- Basic tags-Formatting Tags-Table Tags-List tags-Frames-Forms - CSS: Embedding CSS into HTML-Inline Style Sheets -Embedded Style Sheets-External Style Sheets-Imported Style

Text Books

1 P.J. Deitel & H.M. Deitel, 2011, "Internet and World Wide Web - How to program", Fifth Edition, Pearson Publication.

2 Steven Holzner, 2000, "HTML Black Book", Dreamtech Press Publication.

References

1 Knuckles, 2006, "Web Applications: Concepts and Real World Design", Wiley-India Publication.

2 https://www.tutorialspoint.com/internet_technologies/mailing_list.htm.

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
194CT1A5CB	DATA ANALYTICS USING R	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamentals of R
- The concepts of Loading, Data Handling and Exploring data in R
- The idea on applying Regression and Time Series in R

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 R	K1, K2
CO2	Knowledge on Loading and Handling data	K1, K2
CO3	Understand about Exploring data and Visualization	K2, K3
CO4	Apply Linear and Logistic Regression	K3
CO5	Apply Time Series Analysis	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A5CB	DATA ANALYTICS USING R	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Basics of R 8 h

Introduction: Downloading and Installing R - IDEs and Text Editors - Handling Packages in R.

Getting Started with R: Data Types in R - Few Commands for Data Exploration.

Loading and Handling Data in R: Introduction - Challenges of Analytical Data Processing - Expression, Variables and Functions - Missing Values Treatment in R - Using the "as" Operator to change the Structure of Data.

Unit II Loading and Data Handling 10 h

Loading and Handling Data in R: Vectors – Matrices – Factors – List -Few Common Analytical Tasks - Aggregating and Group Processing of a Variable - Simple Analysis Using R - Methods for Reading Data.

Unit III Exploring Data 8 h

Exploring Data in R: Introduction - Data Frames - R Functions for Understanding Data in Data Frames - Load Data Frames - Exploring Data -Data Summary - Finding the Missing Values -Invalid Values and Outliers - Descriptive Statistics - Spotting Problems in Data with Visualization.

Unit IV Linear and Logistic Regression 12 h

Linear Regression using R: Introduction - Model Fitting - Linear Regression - Assumptions of Linear Regression - Validating Linear Assumption - Case Study: Recommendation Engines.

Logistic Regression: Introduction - Introduction to Generalized Linear Models - Logistic Regression - Binary Logistic Regression - Diagnosing Logistic Regression - Multinomial Logistic Regression Models.

Case Study: Audience/Customer Insights Analysis.

Unit V Time Series 10 h

Time Series in R: Introduction - Time Series Data - Reading Time Series Data - Plotting Time series Data - Decomposing Time Series Data - Forecasts Using Exponential Smoothing - ARIMA Models.

Case Study: Insurance Fraud Detection.

Text Mining: Sentiment Analysis.

Text Books

1 Seema Acharya, 2018, "Data analytics using R", McGraw Hill Education (India) Private Limited, Chennai, First Edition.

References

1 Hadley Wickham, Garrett Grolemund, 2017, "R for Data Science: Import, Tidy, Transform, Visualize, and Model Data Paperback", O'Reilly Publishers.

2 Robert L.Kabacoff, 2015, "R in Action", Dreamtech Press Publisher, Second Edition.

Course Code	Course Name	Category	L	T	P	Credit
204CT1A5CC	FUNDAMENTALS OF ANDROID	SEC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The Android environment and basic concepts.
- The UI Widgets, Activity, Menu and Layout.
- The Android service and multimedia, SQLite , XML & JSON.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Familiarize the basics of Android.	K1,K2
CO2	Learn UI Widgets.	K2
CO3	Understand Activity, Menu and Layout concepts.	K2, K3
CO4	Knowledge on Adaptor and Android service	K2,K3
CO5	Discover the concepts on Multimedia, SQLite, XML & JSON.	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204CT1A5CC	FUNDAMENTALS OF ANDROID	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Basics of Android 10 h

Android - History and Version - Installing software - Setup Eclipse - Hello Android example - Internal Details - Dalvik VM - Software Stack - Android Core Building Blocks - Android Emulator - AndroidManifest.xml - R.java file - Hide Title Bar - Screen Orientation.

Unit II UI Widgets 10 h

Working with Button - Toast - Custom Toast - Button - Toggle Button - Switch Button - Image Button - Check Box – Alert Dialog - Spinner – Auto Complete Text View – Rating Bar – Date Picker – Time Picker – Progress Bar - File Download.

Unit III Activity, Menu & Layout 10 h

Activity Lifecycle - Activity Example - Implicit Intent - Explicit Intent - Fragment Lifecycle - Fragment Example - Dynamic Fragment.

Android Menu: Option Menu -Context Menu - Popup Menu.

Layout Manager: Relative Layout - Linear Layout -Table Layout - Grid Layout.

Unit IV Adaptor and Android Service 10 h

Adaptor: Array Adaptor - Array List Adaptor - Base Adaptor. View: Grid View - Web View - Search View - Dynamic List View - Expanded List View.

Android Service - Android Service API - Android Started Service - Android Bound Service - Android Service Life Cycle - Android Service Example

Unit V Multimedia ,SQLite , XML & JSON 8 h

Multimedia: Wallpaper - Live Wallpaper - Multimedia API - Playing Audio - Creating Audio Player Playing Video - Gallery.

SQLite API - SQLite Spinner - SQLite ListView.

XML & JSON: XML Parsing SAX - XML Parsing DOM - JSON Parsing.

Text Books

1 Rick Boyer, 2018, "Android 9 Development Cookbook", Third Edition, Packt Publishing Ltd.

References

1 Erik Hellman, 2013, "Android Programming: Pushing the Limits", First Edition, John Wiley & Sons Publication.

2 John Horton, 2018, "Android Programming for Beginners", Second Edition, Packet Publication.

3 Barry A. Burd, 2011, "Android Application Development All-in-One For Dummies", Second Edition, John Wiley & Sons Publication

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

194CT1A5CP	CORE PRACTICAL: PROGRAMMING IN DATA ANALYTICS USING R	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	R program to read the .csv file and display the content
2	Program to apply data explore functions summary(), str(), head(), tail(), view(),edit() to explore a dataset
3	R program to reorder a given data frame by column name
4	R program to find sum, mean and product of a vector
5	Program to represent vector values in the form of bar-plot, scatterplot and contour plot
6	R program to create a list containing a vector, a matrix, a list and update the last element.
7	Program to create Logistic Regression model using Iris dataset.
8	Program to implement the operations of loading, reading and merging in data frames
9	Demonstrate the relationship model between predictor and response variables.The predictor vector stores the heights of persons, whereas the Response vectorstores the weights of persons. Print the summary of the relationship and determinethe weights of new persons. Visualize the regression graphically.
10	Program to demonstrate generic functions for fitted model objects
11	Program to implement Linear Filtering using the filter() command
12	Program to determine the Standard Deviation

Note: Mandatory - 10 programs out of 12

204CT1A5CQ	CORE PRACTICAL: ANDROID PROGRAMMING	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	CONTENTS
1	Program to create a simple Android Application
2	Program to demonstrate toast in an application.
3	Program to implement option menu.
4	Program to create a simple implicit intent that displays a web page.
5	Program to create a Relative Layout and Linear Layout in android.
6	Program to display web page using web view in android.
7	Program to demonstrate spinner control in android.
8	Program to create an animation in android.
9	Program to demonstrate seek bar
10	Program to play audio in android
11	Program to develop a personal database using SQLite.
12	Program to develop a personal database using JSON Parsing.

Note: Out of 12 - 10 Mandatory

194CT1A5CR	CORE PRACTICAL: HARDWARE AND NETWORKING	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Identify Internal components of CPU
2	Configure BIOS setup program and troubleshoot the typical problems using BIOS utility.
3	Install and configure any Operating System
4	Install and configure a new Printer, Share and Troubleshoot it.
5	Identify and study the different parts of motherboard.
6	Execute the basic commands in Disk Operating System
7	Find IP address of a URL using Java
8	Demonstrate a Java program to get the file size from the server.
9	Implement a Java program to check whether any port is being used as a server or not by creating a Socket Object.
10	Implement Client – Server chat using Java
11	Develop Remote Procedure Call using Java
12	Program to Encrypt and Decrypt the given text

Note: Mandatory - 10 programs out of 12

Course Code	Course Name	Category	L	T	P	Credit
194CT1A5DA	ARTIFICIAL INTELLIGENCE	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamentals of AI
- The concepts of problem solving and heuristic search
- Machine learning and Expert systems

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 AI	K1,K2
CO2	Knowledge on problem solving through AI	K1,K2
CO3	Understand Heuristic Search and Knowledge	K2
CO4	Knowledge on Machine Learning	K2
CO5	Understand the Expert Systems	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A5DA	ARTIFICIAL INTELLIGENCE	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Fundamentals of AI 8 h

Introduction - Artificial Intelligence: Concepts and Definition -History of AI- Related concepts of AI- Physical Symbol System Hypothesis - Components of AI- The Mind Body Problem - The Chinese Room Experiment-Parallel and Distributed AI.

Unit II Problem Solving through AI 10 h

Introduction - Representation of AI Problems - Production Systems- Algorithm of Problem Solving

Examples of AI Problems: Tic-Tac-Toe-Water-jug Problem- Monkey and Banana Problem

Nature of AI Problems-Searching Techniques.

Unit III Heuristic Search 10 h

Basic concepts of Heuristic Search- Concept of Heuristic Knowledge - Designing of Heuristic function

Types of Heuristic Search Techniques: Generate and Test – Best first Search-Hill Climbing Search

Introduction to Knowledge: Types of Knowledge- Knowledge Representation-Knowledge Storage-Knowledge -Acquisition.

Unit IV Machine Learning 10 h

Machine Learning - Introduction-Type of Learning: Rote Learning-Learning by Taking Advice-Learning by Introduction-Symbol Based Learning-Identification Trees - Genetic Algorithm -Planning.

Unit V Expert Systems 10 h

Introduction- Experts and Expert Systems-Overview of Expert System-Human Experts Vs Expert Systems-Characteristics-Architecture-Inference Engine-Design of Expert systems- Types of Expert systems.

Text Books

1 Ela Kumar, reprint 2010, " Artificial Intelligence ", I. K. International Pvt Ltd

References

1 Saroj Kaushik, 2011," Artificial Intelligence ",Third Edition,Thomson Press (India) Ltd.

Course Code	Course Name	Category	L	T	P	Credit
194CT1A5DB	CLOUD COMPUTING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basics, benefits, limitations of Cloud Computing
- The concepts of cloud computing services and cloud infrastructure and platforms
- Developing cloud application

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics, benefits, limitations of Cloud computing	K1,K2
CO2	Understand the concepts of Cloud computing services	K1,K2
CO3	Knowledge on Cloud storage and standards	K2
CO4	Understand software services	K2
CO5	Knowledge on developing Cloud applications	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A5DB	CLOUD COMPUTING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Cloud Basics 8 h

Overview of Cloud Computing: Introduction - Definition-History- Characteristics-Advantages and Disadvantages

Cloud Service Models-Cloud Computing Deployment-Cloud Computing Companies

Unit II Cloud Computing Service 10 h

Cloud Architecture and Applications: Cloud Architecture-Front End - Back End

Components of Cloud Computing Architecture- Working of Cloud Computing-Applications of Cloud Computing

Scalability and Redundancy-Key features of Cloud Scalability-Types of Scalability-Benefits of Scalability-Concepts and benefits of Redundancy

Unit III Cloud Storage and Standards 10 h

Cloud Services: Cloud Service Introduction - Benefits- Types of Cloud Service models: Software as a Service-Platform as a Service-Infrastructure as a Service-Network as a Service

Cloud Deployment Models: Public Cloud-Hybrid Cloud-Multi Cloud

Unit IV Software Service 10 h

Virtualization- Definition- Features-Benefits-Difference between Cloud Computing and Virtualization-Types of Virtualization-Hardware Virtualization-Software Virtualization-Server Virtualization-Storage Virtualization

Unit V Application Development 10 h

Data Storage and Security: Cloud Storage basics-Types of Cloud Storage-Advantages and risks of Cloud Storage-Infrastructure-Data protection process-Cloud Security- Measures and controls in Cloud Security

Cloud Operation and Challenges: Definition - Objectives - Management- Benefits-Challenges related to Cloud Computing

Text Books

1 Surbhi Rastogi, 2021, "Cloud Computing Simplified", First Edition, BPB Publications.

References

1 Anthony T Velte, Toby J Velte, Robert Elsenpeter, 2009, "Cloud Computing - A lab approach", Tata McGraw-Hill.

Course Code	Course Name	Category	L	T	P	Credit
194CT1A5DC	CYBER SECURITY	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic concepts of Cyber Security and Cyber Attacks
- Information Security, Application Security and Security Threats
- Security policies

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 cyber crime	K1,K2
CO2	Learn cybercrime methods and tools	K1,K2
CO3	Knowledge on information and application security	K2
CO4	Understand about security threats	K2
CO5	Knowledge on security policies	K2

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	M	S
CO4	S	S	S	S	M
CO5	S	S	S	M	S

S Strong M Medium L Low

194CT1A5DC	CYBER SECURITY	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Fundamentals of Cyber Security 8 h

Cyber Security Fundamentals- Cyber Security definition- Importance of Cyber Security-Cyberspace- Cybercrime and Information Security- Cybercriminals- Classifications of Cybercrimes

Cybercrime: The legal Perspectives and Indian Perspective - Cybercrime and the Indian ITA 2000 - A Global Perspective on Cybercrimes.

Unit II Cyber Security Breaches 10 h

Cyber Security Breaches: Phishing -Identity Theft - Harassment –Cyber stalking

Types of Cyber Attacks-Password Attacks -Denial of Service Attacks - Passive Attack - Penetration Testing.

Botnets: The Fuel for Cybercrime, Attack Vector.

Unit III Security Threats and Security System 10 h

Introduction to Security Threats- Malware- Types of Malwares: Virus- Worms- Trojan Horse - Bombs- Trapdoor- E-mail Spoofing - E-mail Virus: Virus Life-cycle- How Virus Works- Macro Viruses - Malicious software

Information Security System: Introduction – Importance of information system security - Developing Secure Information System - Key Elements of an Information Security Policy - Information System Development Life Cycle - Application

Unit IV Cyber Threats and Hackers 10 h

Critical Cyber Threats: Critical Cyber Threats - Cyber terrorism - Cyberwarfare - Cyberespionage

Defense against Hackers: Cryptography - Digital Forensics - Intrusion Detection - Legal Recourse

Unit V Prevention and Social Network Security 10 h

Prevention: Craft a Strong Password - Two- Step Verification - Mobile Protection - No Credit Card Numbers- Place Lock on Phone - Don't Save Passwords -No Personalized Contacts Listed.

Social Network Security: Don't Reveal Location - Keep Birthdate Hidden - Have Private Profile - Don't Link Accounts.

Prevention Software: Firewalls - Virtual Private Networks - Anti- Virus & Anti-Spyware - Routine Updates.

Text Books

1 Nina Godbole, 2011, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Publication

2 Mayank Bhushan, Rajkumar Singh Rathore, Aatif Jamshed, 2018, "Fundamental of Cyber Security", Kindle Edition, BPB Publication

References

1 Josiah Dykstra, 2016, "Essential Cyber Security Science- Build, Test and Evaluate Secure Systems", O'Reilly Publication

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
204CT1A6CA	OPEN SOURCE SOFTWARE	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Open Source and the basics of Django.
- Forms and Database connectivity in Django
- Connecting Django with MySQL and MongoDB

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Remember Python and Understand Basic of Django	K1, K2
CO2	Infer knowledge on Django Forms	K2, K3
CO3	Understand Database connectivity in Django.	K2, K3
CO4	Acquire skills on MySQL Programming	K2
CO5	Discover usage of MongoDB	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

204CT1A6CA	OPEN SOURCE SOFTWARE	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Python OOPs & Introduction to Django 10 h

Python OOPs: OOPs Concepts-Classes and Object.

Introduction- Django Installation - Project - Apache Configuration - Virtual Environment Setup - Admin Interface - Apps Life Cycle - Django MVT - Django Model - Django View - Django Template - URL Mapping - Static Files Handling

Unit II Django Forms 10 h

Model Forms - Django Forms - Form Validation - File Upload - Database Connectivity - Database Migrations - Django Middleware - Request and Response - Django Exceptions - Django Session- Django Cookie - Django CSV Output - Django PDF Output - Django and Bootstrap - Django Mail Setup

Unit III Django Database Connection 10 h

CRUD Application - Django Class Based Generic Views - Django User Creation Form - Django Image Upload- Django ORM Queries - Django Form Widget- Django User Registration with Email Confirmation- Django Widget Tweaks-MySQL to Django-F() Expression.

Unit IV MySQL 10 h

MySQL: Introduction - Accessing MySQL via Command line - Accessing MySQL using Django: Connection - Create Database - Drop Database - Select Database - Data Types - Create Tables - Drop Tables - Insert Query - Select Query - Where Clause - Update Query - Delete Query.

Unit V MongoDB 8 h

MongoDB: Overview- Advantages - Data Modeling - Create Database - Drop Database - Create Collection - Drop Collection. Data Types - Insert Document - Query Document - Update Document - Delete Document - Projection - Limiting Records - Sorting Records - Indexing - MongoDB with Django.

Text Books

1. Williams S. Vincent, 2020, "Django for Beginners: Build websites with Python and Django", 1st Edition, Welcometocode Publisher.(UNIT I to IV)
2. Peter Membrey, David Hows, Eelco Plugge, 2014, "MongoDB Basics", 1st Edition, Apress. (UNIT V)

References

1. Andrew M. St. Laurent, 2004, "Understanding Open Source and Free Software Licensing", O'Reilly Media.
2. https://www.javatpoint.com/django-tutorial, https://www.javatpoint.com/MySQL-tutorial, https://www.javatpoint.com/MongoDB-tutorial
3. Jeff Forcier , Paul Bissex , Wesley J Chun , 2008, "Python Web Development with Django", 1st Edition, Addison Wesley Publisher
4. Andrew Pinkham, 2015,"Django Unleashed", 1st Edition, SAMS Publishing.

Course Code	Course Name	Category	L	T	P	Credit
194CT1A6CB	SOFTWARE ENGINEERING	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basics of Software engineering and Requirements engineering.
- Concepts of Design and Architectural engineering and to learn Software Coding and Metrics.
- Software Testing, Maintenance and Agile concepts.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basics of Software engineering.	K1, K2
CO2	Acquire the knowledge on Design and Architectural engineering.	K2
CO3	Understand Software Coding and Software Metrics.	K2
CO4	Learn various Software Testing strategies.	K2
CO5	Knowledge on Software Maintenance and Agile Software Development.	K2, K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A6CB	SOFTWARE ENGINEERING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Software Engineering 10 h

Software Engineering: Introduction - Components of Software - Role of Software - Phases of Software- Characteristics of Software - Changing nature of Software - Software Myths - Generic view of Software Engineering - Role of Management Software Engineering - Software Process - Process Models - Software Product.

Requirements Engineering: Principles: Requirements Engineering - Importance of requirements - Types of requirements - Steps involved. Modeling: Analysis modeling - Structured analysis - Object Oriented analysis.

Unit II Design and Architectural Engineering 10 h

Design and Architectural Engineering: Design process and concepts - Basic issues in Software Design - Characteristics of a good design - Software Design and Software Engineering - Function-Oriented System vs Object-Oriented System - Modularity, Cohesion, Coupling, Layering.

User Interface Design: Concepts - Elements - Designing the User Interface.

Unit III Software Coding & Metrics 10 h

Software Coding: Programming Principles - Programming Guidelines - Coding Conventions - Key Concepts.

Software Metrics and Estimation: Introduction - Measurement - Metrics - Lines of Code - Function Point Count. Software Estimation: Definition - Importance of Accurate Estimation - Efforts and Duration - Estimation Process.

Unit IV Software Testing 9 h

Software Testing: Introduction - Scope - Objectives - Strategic Approach to Software Testing - Types of Software Testing.

Software Testing Plan and Test Case Preparation: Introduction - Test Plan - Test Case. Test Automation: Expectations from Test Automation - Limitations - Automation Strategy - Automation Frameworks - Automation Metrics.

Unit V Software Maintenance & Agile Software development 9 h

Software Maintenance: Introduction - Maintenance Activities - Maintenance Process - Maintenance Cost - Maintenance Strategies.

Agile Software Development: Introduction - Various Characteristics of Agile Projects - Agile manifesto - Generic Agile Project Life Cycle - Agile-related Concepts - Epics, Features, User Stories.

Text Books

1. Saikat Dutt, Chandramouli Geetha, Chandramouli Subramanian, 2015, "Software Engineering", Pearson Education, India

References

1. Roger S. Pressman and Bruce Maxim, 2020, "Software Engineering, A Practitioner's Approach", 9th Edition, Mc Graw Hill, International Edition.
2. Sommerville , 2011, "Software Engineering", 9th Edition, Pearson Education.
3. https://www.tutorialspoint.com/software_engineering/index.htm
4. https://www.geeksforgeeks.org/software-engineering/

204CT1A6CP	CORE PRACTICAL: OPEN SOURCE SOFTWARE	SEMESTER VI

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Program to implement Classes and Objects using Python programming.
2	Program to implement URL mapping using Django.
3	Program to implement Django Template Language (DTL).
4	Program to implement Cookie and Session in Django.
5	Program to apply filter operations in Django ORM.
6	Program to create a Login form using Django.
7	Program to validate a Form using Django.
8	Program to upload a File using Django.
9	Program to send an simple Email using Django
10	Program to connect database using Django and MySQL.
11	Program to implement CRUD operations using MongoDB.
12	Program to connect database using Django and MongoDB.

Note: Mandatory - 10 programs out of 12

194CT1A6CV	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 diary were in weekly work carried out has to be written. Guide should review the work every week and put his/her signature. The work diary along with project report should 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 done to the respective guide in the three reviews. The guide will give the marks for CIA as per 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
194CT1A6DA	MOBILE COMPUTING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The applications of Mobile Computing and Medium Access Control methods
- Broadcast Systems and Wireless LAN
- Mobile Network layer and Transport layer

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn the Applications of Mobile Computing and the basics of Wireless Transmission	K2
CO2	Understand the Medium Access Control methods and Telecommunication systems	K1,K2
CO3	Interpret knowledge on Broadcast systems and Wireless LAN	K1, K2
CO4	Discover the goals and working of Mobile Network Layer	K2,K3
CO5	Identify the functionality of Mobile Transport Layer	K2,K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A6DA	MOBILE COMPUTING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 10 h

Applications – Mobile and Wireless devices - Wireless Transmission: Frequencies for Radio Transmission – Signals – Antennas – Multiplexing – Modulation – Spread Spectrum – Cellular Systems.

Unit II Medium Access Control 10 h

Medium Access Control: Motivation – SDMA – FDMA – TDM – CDMA.

Telecommunication Systems: GSM: Services – Architecture – Radio Interface – Protocols – Localization and Calling - Handover – Security. DECT – UMTS and IMT 2000.

Unit III Broadcast Systems & Wireless LAN 10 h

Broadcast Systems: Overview – Cyclical Repetition of Data – Digital Audio Broadcasting – Digital Video Broadcasting – Convergence of Broadcasting and Mobile Communications.

Wireless LAN: Infrared vs Radio Transmission – IEEE 802.11 – HiperLAN – Bluetooth.

Unit IV Mobile Network Layer 10 h

Mobile IP: Goals – IP Packet Delivery – Agent Discovery – Registration – Tunnelling and Encapsulation – Optimization – Reverse Tunnelling – IpV6 – IP Micro-Mobility Support - DHCP – Mobile Ad hoc Networks: Routing – Destination Sequence Distance Vector – Dynamic Source Routing.

Unit V Mobile Transport Layer 8 h

Traditional TCP: Congestion Control – Implication of TCP Improvement – Support for Mobility: Indirect TCP – Snooping TCP– Mobile TCP – Transaction oriented TCP - TCP over Wireless – Performance.

Text Books

1 J. Schiller, 2003, "Mobile Communications", 2nd edition, Pearson Education, Delhi.

References

1 Hansmann, Merk, Nicklous, Stober, 2004, "Principles of Mobile Computing", 2nd Edition, Springer, India.

2 Pahlavan, Krishnamurthy, 2003, "Principle of Wireless Networks: A Unified Approach", Pearson Education, Delhi.

3 Martyn Mallick, 2004, "Mobile and Wireless Design Essentials", Wiley Dreamtech India Pvt. Ltd., New Delhi

4 W. Stallings, 2004, "Wireless Communications and Networks", 2nd Edition, Pearson Education, Delhi

Course Code	Course Name	Category	L	T	P	Credit
194CT1A6DB	INTERNET OF THINGS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basic concepts on IoT and domain specific IoTs
- IoT Platform design methodology and Physical devices
- Data Analytics and supporting services of IoT.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of IoT.	K1, K2
CO2	Associate knowledge on Domain specific IoTs.	K2
CO3	Identify IoT platform design methodology.	K2,K3
CO4	Interpret IoT Physical devices.	K2, K3
CO5	Discover Data analytics knowledge and supporting services of IoT	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A6DB	INTERNET OF THINGS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 9 h

IoT : Introduction - Physical design of IoT - Logical design of IoT: IoT Functional blocks - IoT Communication models - IoT Communication APIs - IoT Enabling Technologies: Wireless Sensor Networks - Cloud Computing - Big Data Analytics. IoT Levels and deployment.

Unit II Domain Specific IoTs 9 h

Introduction - Home Automation - Cities - Environment - Energy - Retail - Logistics - Agriculture - Industry - Health and Lifestyle

IoT and M2M: Introduction - M2M - Difference between IoT and M2M - Software Defined Networking for IoT - Network Function Virtualization for IoT.

Unit III IoT Platforms Design Methodology 10 h

IoT Design Methodology: Specifications: Purpose & Requirements - Process - Domain Model - Information Model - Service - IoT Level - Functional View - Operational view - Device and Component Integration - Application Development.

Case Study: IoT System for Weather Monitoring

Unit IV IoT Physical devices 10 h

IoT Device: Introduction - Building blocks - Exemplary device: Raspberry Pi - About the board - Controlling LED with Raspberry Pi.

Arduino: Overview - Board description - Installation - Program Structure - Blinking LED with Arduino - Humidity Sensor with Arduino.

Unit V Data Analytics & Supporting Services 10 h

Data Analytics: IoT Data Analytics Challenges - Data Acquiring - Organizing in IoT/M2M - Supporting Services: Computing Using a Cloud Platform for IoT/M2M Applications/Services - Everything as a Service and Cloud Service Models - Case Study illustrating IoT Design.

Text Books

1. Vijay Madisetti and Arshdeep Bahga, 2014, “Internet of Things - A Hands-on Approach”, 1st Edition, VPT

References

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, 2014, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press.
2. Francis daCosta, 2013, “Rethinking the Internet of Things: A Scalable Approach to Connecting Everything”, 1st Edition, A press Publications.
3. Rajkamal, 2017, "Internet of Things: Architecture, Design Principles and Applications", McGraw Hill Higher Education
4. https://www.tutorialspoint.com/internet_of_things/index.htm

Course Code	Course Name	Category	L	T	P	Credit
194CT1A6DC	NATURAL LANGUAGE PROCESSING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamentals of Natural Language Processing
- The role of Syntactic and semantics of sentences.
- The NLP techniques to IR applications.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand how to tag a given text with basic language features	K1,K2
CO2	Describe how to design an innovative application using NLP components	K1, K2
CO3	Infer a rule based system to tackle morphology of a language.	K2, K3
CO4	Relate tag set to be used for statistical processing in real-time applications	K2, K3
CO5	Discover the use of different statistical approaches for different types of NLP applications.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A6DC	NATURAL LANGUAGE PROCESSING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 10 h

Origins and Challenges of NLP – Language modeling: Grammar based LM - Statistical LM – Regular Expressions, Finite Sate Automata – English Morphology - Transducers for Lexicon and Rules – Tokenization - Detecting and Correcting Spelling Errors.

Unit II Word Level Analysis 8 h

Unsmoothed N Grams - Evaluating N Grams - Smoothing, Interpolation and Backoff- Word Classes - Part of Speech Tagging - Rule Based, Stochastic and Transformation Based Tagging - Issues in PoS Tagging – Hidden Markov Model.

Unit III Syntactic Analysis 10 h

Context Free Grammars - Grammar Rules for English - Tree Banks - Normal Forms for Grammar – Dependency Grammar – Syntactic Parsing – Ambiguity - Dynamic Programming Parsing – Shallow Parsing

Unit IV Semantics and Pragmatics 10 h

Requirements for Representations - First Order Logic - Description Logics – Syntax – Driven Semantic Analysis - Semantic Attachments – Word Senses - Relation between Senses - Thematic Roles - Selectional Restrictions – Words Sense Disambiguation - WSD Using Supervised, Dictionary and Thesaurus - Bootstrapping Methods – Word Similarity using Thesaurus and Distributional Methods

Unit V Discourse Analysis and Lexical Resources 10 h

Discourse Segmentation - Coherence – Reference Phenomena - Conference Resolution – Resources: Porter Stemmer – Lemmantizer - Penn Treebank - Brills Tagger – WordNet – PropBank – FrameNet - Brown Corpus

Text Books

1 Daniel Jurafsky, James H. Martin, 2014, "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech", Pearson Publication.

References

1 Breck Baldwin, 2015, "Language Processing with Java and LingPipe CookBook", Atlantic Publisher

2 https://www.tutorialspoint.com/natural_language_processing/index.htm

3 https://www.javatpoint.com/nlp

4 https://towardsai.net/p/nlp/natural-language-processing-nlp-with-python-tutorial-for-beginners-1f54e610a1a0

Course Code	Course Name	Category	L	T	P	Credit
194CT1A6DD	NETWORK SECURITY	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The risks involved with computer networks
- Various security tools and techniques.
- The basic concepts of User Authentication Mechanisms and methods.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Associate the various risks involved with network computers	K1, K2
CO2	Infer knowledge on various security tools and techniques	K1, K2
CO3	Discover internet security protocols.	K2
CO4	Describe the basic concepts of Public Key Infrastructure	K2
CO5	Interpret User Authentication Mechanisms and methods.	K2, K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A6DD	NETWORK SECURITY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Computer Security 10 h

Introduction – Need for security - Security approaches – Principles of security – Types of attacks. Cryptography: Concepts and techniques - Introduction – Plain text and Cipher text – Substitution techniques - Transposition techniques - Encryption and Decryption - Symmetric and Asymmetric key cryptography- Steganography.

Unit II Symmetric Key Algorithms 8 h

Introduction - Algorithm Types and modes – An overview of Symmetric key cryptography – Data encryption Standard (DES) – International Data Encryption Algorithm (IDEA) - Asymmetric Key Algorithms - RSA.

Unit III Internet Security Protocols 10 h

Introduction – Basic concepts – Secure Socket Layer (SSL) – Transport Layer Security (TLS) – Secure Hyper Text Transfer Protocol (SHTTP) – Time Stamping Protocol (TSP) – Secure Electronic Transaction (SET) – SSL Versus SET–3 - D-Secure Protocol –Electronic Money - Email security – Wireless Application Protocol.

Unit IV Public Key Infrastructure (PKI) 10 h

Introduction - Digital Signature - Digital Certificates - Private Key management - Public Key management - PKIX Model - Public Key Manager - Public Key Cryptography standards (PKCS) XML - PKI and Security.

Unit V User Authentication Mechanisms 10 h

Introduction - Authentication Basics - Passwords - Authentication Tokens - Certificate based Authentication - Kerberos - Network Security:- Fire Walls - IP Security -Virtual Private Network (VPN).

Text Books

1 Atul Kahate, 2003, "Cryptography and Network Security", Second Edition, Tata McGraw Hill.

References

1 Roberta Bragg, 2017, "Network Security: The Complete Reference", 1st edition, Tata McGraw Hill Education.

2 William Stallings, 2010, "Cryptography and Network Security: Principles and Practice", 5th edition, PHI

3 https://www.tutorialspoint.com/network_security/index.htm

4 https://www.javatpoint.com/computer-network-security

Course Code	Course Name	Category	L	T	P	Credit
194CT1A6DE	BLOCK CHAIN TECHNOLOGY	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basics of Blockchain and Decentralized system.
- The Components of Blockchain and about Bit coins.
- The Allied technologies of Blockchain.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Infer the basics of Blockchain.	K1, K2
CO2	Discover knowledge on decentralized system and hash functions	K2, K3
CO3	Interpret the components of Blockchain and Cryptography concepts.	K3
CO4	Describe about bitcoins.	K2, K3
CO5	Analyze the allied technologies of blockchain.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A6DE	BLOCK CHAIN TECHNOLOGY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Basics of Blockchain 10 h

Basics of Blockchain: Concept of Blockchain - Definition of Blockchain - Fundamentals of Blockchain - Characteristics of Blockchain - Distributed Ledger Technologies - DLT Decentralized - Applications and Databases - Architecture of Blockchain - Transactions - Chaining Blocks - Value Proposition of Blockchain Technology.

Unit II Decentralized System and Hash Functions 10 h

Decentralized System: Distributed Decentralized Databases - Decentralized Enterprise - Decentralization.

Hash Functions: Hashing - Message Authentication Code - Secure Hash Algorithms (SHA-1) - Distributed Hash Tables - Hashing and Data Structures.

Consensus: Consensus Approach - Consensus Algorithms.

Unit III Blockchain Components and Cryptography 9 h

Blockchain Components - Ethereum - Ethereum Virtual Machine - Working of Ethereum - Ethereum Transactions - Ethereum Development Tools.

Cryptography: Cryptography Primitives - Symmetric Cryptography - Asymmetric Cryptography.

Unit IV Bitcoins 10 h

Smart Contracts - Characteristics. Bitcoins: Introduction - Working of Bitcoin - Bitcoin Block Structure - Bitcoin Transactions - Bitcoin Network - Bitcoin Wallets - Bitcoin Payments - Bitcoin Clients - Bitcoin Supply.

Blockchain Vertical Solutions and Use Cases: Blockchain - Blockchain in Insurance - Healthcare - Assets Management - Smart Assets - Electronic Currency – Manufacturing.

Unit V Blockchain and Allied Technologies 9 h

Blockchain and Allied Technologies: Blockchain and Cloud Computing - Characteristics of Blockchain Cloud - Blockchain and Artificial Intelligence - Blockchain and IoT - Blockchain and Machine Learning - Blockchain and Robotic Process Automation.

Text Books

1 Kumar Saurabh, Ashutosh Saxena, 2020, "Blockchain Technology: Concepts and Applications", First Edition, Wiley Publishers.

References

1 Don Tapscott, Alex Tapscott, 2016, "Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies is Changing the World", Portfolio Penguin.

2 Alan Wright, 2021, "Blockchain: Uncovering Blockchain Technology, Cryptocurrencies, Bitcoin and the Future of Money: Blockchain and Cryptocurrency Exposed".

3 Josh Thompson, 2017, "Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming", Create Space Independent Publishing Platform

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

Course Code	Course Name	Category	L	T	P	Credit
194CT1A6DF	SOFT COMPUTING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamentals of Artificial Neural Network, basic models and learning methods.
- The Fuzzy logic concepts, various fuzzy systems and the concept of Genetic Algorithm.
- Hybrid Soft Computing techniques and their applications.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Infer the concepts of Neural Network and learning methods	K1,K2
CO2	Interpret the fuzzy logic and concept of fuzziness in various system and fuzzy set theory.	K2
CO3	Discover Genetic algorithm and its operations.	K2
CO4	Describe hybridization of Neuro-Fuzzy-Genetic based systems	K3
CO5	Apply the Soft Computing techniques in real time applications.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

194CT1A6DF	SOFT COMPUTING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to ANN 10 h

Introduction: Soft Computing - Difference between Hard and Soft Computing.

Artificial Neural Network (ANN): Fundamentals of ANN - Evolution of ANN, Basic Models of an Artificial Neuron - Terminologies of ANN - Hebb network.

Supervised Learning Network: Perceptron network - Learning rule - Training and testing Algorithm - Back propagation neural network - Architecture - BPN Training and testing Algorithm

Unsupervised Learning Network: Self Organizing feature map.

Unit II Fuzzy Logic 10 h

Fuzzy Set theory: Crisp sets - Fuzzy sets - Crisp relations - Fuzzy relations - Methods of Fuzzification and Defuzzification - Fuzzy truth values and tables in fuzzy logic - Fuzzy propositions - Fuzzy rules formation and reasoning - Fuzzy Inference system- Mamdani FIS - Sugeno FIS - Fuzzy decision making - Fuzzy logic control system design and application

Unit III Genetic Algorithm 8 h

Introduction - Biological background - Traditional optimization and Search techniques - Operators in Genetic algorithm: Encoding - Selection - Cross over - Mutation - Stopping Condition of Genetic Algorithm

Unit IV Hybrid Soft Computing Techniques 10 h

Introduction - Neuro-Fuzzy hybrid systems - Genetic-Neuro hybrid systems - Genetic fuzzy and Fuzzy Genetic hybrid systems - Simplified fuzzy ARTMAP.

Unit V Applications of Soft Computing 10 h

Introduction - Fusion approach for multispectral SAR Images - Optimization of Travelling Salesman problem using GA approach - Simple Fuzzy logic implementation

Text Books

1. S.N. Sivanandan and S.N. Deepa., 2018, "Principles of Soft Computing", 3rd Edition, Wiley India.

References

1. S. Rajasekaran, G.A. Vijayalakshmi Pai, 2011, "Neural Networks, Fuzzy Logic, and Genetic Algorithm (synthesis and Application)", PHI learning Private limited.
2. J.S.R. Jang, C.T. Sun, E. Mizutani., 2004, "Neuro-Fuzzy and Soft Computing", Pearson Education, PHI
3. Timothy J. Ross, 1997, "Fuzzy Logic with Engineering Applications", McGraw-Hill, International Edition, Electrical Engineering Series, Singapore.
4. S.N. Sivanandan and S.N. Deepa., 2008, "Introduction to Genetic Algorithm", 1st Edition, Springer Publication.

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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