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)

B.Sc Mathematics Degree

(For the students admitted during the academic year 2021-22 and onwards)

Programme: B.Sc Mathematics

Eligibility:

Candidate for admission to the first year of the **B.Sc. Mathematics** degree course shall be required to have passed the higher secondary examination conducted by the Govt. of Tamil Nadu with Mathematics as one of the subjects are only eligible or other examinations accepted as equivalent there to by the academic council, subject to such other conditions as may be prescribed there for. Business Mathematics, General Mathematics and Statistics subject at HSC cannot be considered as equivalent to Mathematics.

Programme Educational Objectives:

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

1. Mathematics is the key to success in the field of science and engineering.
2. Today, the students need a thorough knowledge of fundamental basic principles, methods, results and a clear perception of the power of mathematical ideas and tools to use them effectively in modeling, interpreting and solving the real world problems.
3. Mathematics plays an important role in the context of globalization of Indian economy, modern technology and we find the applications of Computers in all walks of life from Agriculture to Atomic research.
4. This course is aimed at preparing the students to cope with the latest developments and compete with students from other universities and put them on the right track.

PROGRAMME OUTCOMES:

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

PO Number	POStatement
PO1	The learner will able to relate the concept underlying standard applications of Mathematics, Physics and Statistics
PO2	The learner will have an understanding on basic pure and applied Mathematics and able to formulate the Mathematical arguments in logical manner
PO3	They can be able to illustrate Mathematical concepts effectively by oral, written, computing and graphical means
PO4	The learner will make use of the theories of Mathematics and their applications in real world problems
PO5	The learners can able to identify the complex physical problems and apply the mathematical techniques to solve them

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

Part	Subjects	No.of Papers	Credit	Semester No.
I	Tamil / Hindi / French/Malayalam	4	4 x 3 = 12	I to IV
II	English	4	4 x 3 = 12	I to IV
III	Core (2/3/4 Credit)	(14-16)	58	I to VI
	Inter Departmental Course (IDC)	-	16	I to IV
	Discipline Specific Elective (DSE)	3	3 x 4 =12	V & VI
	Skill Enhancement Course(SEC)	4	12	III ,IV,V & VI
	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 & III
	General Awareness(On-Line Exam) (AECC)	1	2	IV
	RM (AECC)	1	2	V
	Innovation, IPR, Entrepreneurship (AECC)	1	2	VI
V	Extension Activity NCC / NSS / Sports / Department Activity	-	1	I to VI
TOTAL CREDITS			**140**	

CURRICULUM

B.Sc. MATHEMATICS PROGRAMME

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
First Semester										
Part - I										
211TL1A1TA	Language - I	Tamil-I	4	1	-	3	25	75	100	3
201TL1A1HA		Hindi-I								
201TL1A1MA		Malayalam-I								
201TL1A1FA		French – I								
Part - II										
211EL1A1EA	Language - II	Professional English – I	4	-	1	3	25	75	100	3
Part - III										
202MT1A1CA	Core-I	Advanced Calculus	4	2	-	3	25	75	100	4
202MT1A1CB	Core-II	Trigonometry and Analytical Solid Geometry	3	2	-	3	25	75	100	3
192PY1A1IA	IDC-I	Properties of Matter, Thermal Physics and Optics	3	-	-	3	25	75	100	3
202PY1A1IP	IDC-Practical-I	Physics Practical - I	-	-	4	3	40	60	100	2
Part – IV										
193MB1A1AA	AECC -I	Environmental studies	2	-	-	3	-	50	50	2
Total			**20**	**5**	**5**				**650**	**20**

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

Dr.N.G.P. Arts and Science College
APPROVED
BoS- 11th 13-05-2021 | AC - 11th 09-08-2021 | GB - 15th 17-08-2021

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										
211EL1A2EA	Language - II	Professional English – II	4	-	1	3	25	75	100	3
Part – III										
202MT1A2CA	Core-III	Differential Equations	4	2	-	3	25	75	100	4
202MT1A2CB	Core-IV	Integral Transforms	3	2	-	3	25	75	100	3
202PY1A2IA	IDC-II	Electricity, Electronics, Atomic and Nuclear Physics	3	-	-	3	25	75	100	3
202PY1A2IP	IDC Practical-II	Physics Practical - II	-	-	4	3	40	60	100	2
Part - IV										
196BM1A2AA	AECC-II	Human Rights	2	-	-	3	-	50	50	2
		Total	**20**	**5**	**5**	-	-	-	**650**	**20**

Third Semester										
Part – I										
191TL1A3TA/ 191TL1A3HA/ 191TL1A3MA/ 201TL1A3FA	Language - I	Tamil - III/ Hindi - III/ Malayalam - III/ French - III	4	-	-	3	25	75	100	3
Part – II										
191EL1A3EA	Language - II	English - III	4	-	-	3	25	75	100	3
Part – III										
192MT1A3CA	Core – V	Numerical Methods	4	1	-	3	25	75	100	4
192MT1A3CB	Core – VI	Statistics - I	4	1	-	3	25	75	100	4
195C I1A3IA	IDC - III	Business Accounting – I	3	1	-	3	25	75	100	3
192MT1A3SA	SEC - I	Operations Research - I	4	-	-	3	25	75	100	4
	GE - I	Vedic Mathematics - I	2	-	-	2	-	50	50	2
Part – IV										
191TL1A3AA/ 191TL1A3AB/ 195CR1A3AA	AECC - III	Basic Tamil / Advanced Tamil/ Women's Rights	2	-	-	3	-	50	50	2
		Total	**27**	3	-				**700**	**25**

Fourth Semester										
Part – I										
191TL1A4TA/ 191TL1A4HA/ 191TL1A4MA/ 201TL1A4FA	Language -I	Tamil - IV/ Hindi - IV/ Malayalam - IV/ French – IV	4	-	-	3	25	75	100	3
Part – II										
191EL1A4EA	Language -II	English - IV	4	-	-	3	25	75	100	3
Part – III										
192MT1A4CA	Core - VII	Discrete Mathematics	4	1	-	3	25	75	100	4
192MT1A4CB	Core – VIII	Statistics - II	4	1	-	3	25	75	100	4
195C I1A4IA	IDC - IV	Business Accounting – II	3	1	-	3	25	75	100	3
192MT1A4SA	SEC - II	Operations Research – II	4	-	-	3	25	75	100	4
	GE - II	Vedic Mathematics - II	2	-	-	2	-	50	50	2
Part – IV										
191TL1A4AA/ 191TL1A4AB/ 192PY1A4AA	AECC - IV	Basic Tamil / Advanced Tamil/ General Awareness	2	-	-	3	-	50	50	2
		Total	**27**	**3**	-				**700**	**25**

Fifth Semester											
Part – III											
192MT1A5CA	Core – IX	Real Analysis - I	4	-	-	3	25	75	100	4
192MT1A5CB	Core – X	Complex Analysis - I	4	-	-	3	25	75	100	4
192MT1A5CC	Core – XI	Abstract Algebra	4	-	-	3	25	75	100	4
192MT1A5CD	Core - XII	Programming in Python	4	-	-	3	25	75	100	4
192MT1A5CP	Core Practical - I	Programming in Python Lab	-	-	4	3	40	60	100	2
192MT1A5SP	SEC - III	Accounting Software	-	-	4	3	40	60	100	2
192MT1A5DA / 192MT1A5DB/ 192MT1A5DC	DSE - I	Fuzzy logic / Astronomy - I / Combinatorics	4	-	-	3	25	75	100	4
192MT1A5TA	IT	Industrial Training	**Grade A to C**							
192MT1A5LA	LoP	Lab on Project	-	-	-	-	50	-	50	1
Part – IV										
192MT1A5AA	AECC - V	Research Methodology	2	-	-	3	-	50	50	2
		Total	**22**	**0**	**8**				**800**	**27**

Sixth Semester										
Part-III										
192MT1A6CA	Core - XIII	Real Analysis - II	4	1	-	3	25	75	100	4
192MT1A6CB	Core - XIV	Complex Analysis - II	4	1	-	3	25	75	100	4
192MT1A6CP	Core Practical - II	R Programming Lab	-	-	4	3	40	60	100	2
192MT1A6SP	SEC - IV	Linear Programming using Spreadsheet	-	-	4	3	40	60	100	2
192MT1A6DA	DSE - II	Graph Theory	4	1	-	3	25	75	100	4
192MT1A6DB		Astronomy-II								
192MT1A6DC		Special Functions								
192MT1A6DD	DSE - III	Automata Theory and Formal Languages	4	1	-	3	25	75	100	4
192MT1A6DE		Linear Algebra								
192MT1A6DF		Number Theory								
Part – IV										
193BC1A6AA	AECC - VI	Innovation, IPR and Entrepreneurship	2	-	-	3		50	50	2
Part-V										
192MT1A6XA		Extension Activity	-	-	-	-	50	-	50	1
		Total	**18**	**4**	**8**				**700**	**23**
		Grand Total							**4200**	**140**

DISCIPLINE SPECIFIC ELECTIVE

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

Semester V (Elective I)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	192MT1A5DA	Fuzzy logic
2.	192MT1A5DB	Astronomy - I
3.	192MT1A5DC	Combinatorics

Semester VI (Elective II)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	192MT1A6DA	Graph Theory
2.	192MT1A6DB	Astronomy - II
3.	192MT1A6DC	Special Functions

Semester VI (Elective III)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	192MT1A6DD	Automata Theory and Formal Languages
2.	192MT1A6DE	Linear Algebra
3.	192MT1A6DF	Number Theory

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	192MT1A3GA	Vedic Mathematics - I

Semester IV (GE-II)

S. No.	Course Code	Course Name
1	192MT1A4GA	Vedic Mathematics - II

EXTRA CREDIT COURSES

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

S. No.	Course Code	Course Name
1	192MT1ASSA	Mathematical Economics
2	192MT1ASSB	Introduction to Vedic Mathematics

CERTIFICATE PROGRAMMES

The following are the programme offered to earn extra credits:

S. No.	Programme Code and Name	Course Code	Course Name
1	2MT5A Certificate course on Documentation by Latex	202MT5A1CP	Documentation by Latex
2	2MT5B Certificate course on Computations using Mat lab	202MT5A2CP	Computations using Matlab

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
211TL1A1TA	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

211TL1A1TA	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. ஐந்தாம் வகுப்பு 'அ' பிரிவு - 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. 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 . 2021. 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/ >

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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)

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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.

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13-05-2021	09-08-2021	17-8-2021

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.

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Course Code	Course Name	Category	L	T	P	Credit
211EL1A1EA	PROFESSIONAL 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

211EL1A1EA	PROFESSIONAL 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.

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Course Code	Course Name	Category	L	T	P	Credit
202MT1A1CA	ADVANCED CALCULUS	CORE	4	2	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The different forms of Integration
- The method of integrating the integrands with polar co-ordinates.
- The behavior of solutions of power series

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	understand the methods of integrations	K1
CO2	explain convergence or divergence through comparison test	K2
CO3	Examine the power series for values.	K3
CO4	identify the parameterize curves	K3
CO5	illustrate the applications of vector calculus	K2

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

202MT1A1CA	ADVANCED CALCULUS	SEMESTER I

Total Credits: 4

Total Instruction Hours: 72 h

Syllabus

Unit I Indefinite integrals 18 h

Indefinite integrals - Integration by substitution - estimating with finite sums - substitution in definite integrals.

Unit II Comparison test 16 h

Limits of sequence of numbers - theorems for calculating limits of sequences - infinites series - integral test for series of non-negative terms -comparison tests for series of non-negative terms.

Unit III Applications of power series 14 h

Ratio and Root tests for series of non-negative terms - Alternating series, Absolute and conditional convergence - power series - applications of power series.

Unit IV Integration in polar coordinates 12 h

Parametrization of plane curves - calculus with parameterized curves - graphing in polar coordinates - polar equations for conic sections - Integration under polar coordinates.

Unit V Divergence theorem 12 h

Path independence, potential functions and conservative fields - Green's theorem in the plane - Parameterized surfaces - Stoke's theorem - The Divergence theorem and a unified theory.

Text Books

1 Thomas and Finney. 2007. "Calculus and Analytical Geometry", 9th Edition, Pearson Education Publishers(P)Ltd , New Delhi

References

1 Tom M. Apostol. 2014. "Calculus", Wiley India Pvt. Ltd,New Delhi.

2 Shanthi Narayanan and Kapoor. J.N. 2003. "A Text Book of Calculus", S. Chand & Co, New Delhi.

3 Gerald. B. Follard. 2011. "Advanced Calculus", Pearson Education India Ltd,New Delhi

4 Chaurasya. P. 2011. "Calculus", Campus Books International ,New Delhi.

20/5/21

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BoS- 11th	AC - 11th	GB - 15th
13-05-2021	09-08-2021	14-08-2021

Course Code	Course Name	Category	L	T	P	Credit
202MT1A1CB	TRIGONOMETRY AND ANALYTICAL SOLID GEOMETRY	CORE	3	2	-	3

PREAMBLE

This course has been designed for students to learn and understand

- trigonometric functions with unit circle approach
- some trigonometrical identities
- geometrical applications of conicoids

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	illustrate inverse trigonometric functions through graphs	K1
CO2	apply trigonometric identities	K2
CO3	explain the various forms of sphere	K3
CO4	apply the basic geometrical concepts to study conicoids	K2
CO5	explain the nature of conicoids in ruled surfaces	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

202MT1A1CB	TRIGONOMETRY AND ANALYTICAL SOLID GEOMETRY	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Trigonometric Functions: Unit Circle Approach 12 h

Unit circle - Trigonometric functions of real numbers - Trigonometric graphs - more trigonometric graphs - Inverse trigonometric functions and their graphs –Modeling harmonic motions

Unit II Analytic Trigonometry 10 h

Trigonometric identities - addition and subtraction formulas - Double-Angle, Half-Angle, and Product-Sum Formulas - Basic trigonometric equations - More trigonometric equations

Unit III The Sphere 12 h

Different forms of a sphere – Points, lines, planes and spheres in relation to a sphere – system of spheres – Tangent planes and normal.

Unit IV Conicoids 13 h

The cone – Cylinder – Ellipsoid – Hyperboloid – Paraboloid – Surfaces of revolutions.

Unit V Ruled Surfaces 13 h

Tangents and Normals – Ruled Surfaces, Generators – Diameters, Diametral Planes and Conjugate Diameters – Sections of Conicoids , Umbilics.

Text Books

1 James Stewart, Lothar Redlinand Saleem Watson, 2014,"Algebra and Trigonometry", 4th Edition, Cengage Learning, Boston.

2 Dipak Chatterjee, 2003,"Analytic Solid Geometry", Prentice Hall of India Private Limited, New Delhi.

References

1 Richard N.Aufmann, Vemon C. and Richard D.Nation, 2011,"College Algebra and Trigonometry", Cenage Learning, Boston..

2 Ron Larson, 2011, "Algebra and Trigonometry",Cenage Learning, Belmond..

3 Abraham Albert, 2016,"Solid Analytic Geometry", Dover Publications, New York.

4 Shanti Narayan and Mittal. P.K. 2014,"Analytical Solid Geometry", S. Chand & company Pvt. Ltd, Ram nagar, New Delhi

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BoS- 11th	AC - 11th	GB - 15th
13-05-2021	09-08-2021	14-08-2021

Course Code	Course Name	Category	L	T	P	Credit
192PY1A1IA	PROPERTIES OF MATTER, THERMAL PHYSICS AND OPTICS	IDC	3	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the basic properties of matter like elasticity, viscosity and surface tension.
- the mode of heat transfer and the basic laws in thermodynamics.
- the Optical properties and its applications.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	explain the importance and applications of elasticity modulus	K2
CO2	utilize the basic properties of matter and do the experiments in laboratory to evaluate the properties	K3
CO3	demonstrate the differences in heat transfer mechanisms.	K2
CO4	classify the Reversible and irreversible process in thermodynamics.	K2
CO5	experiment with the application of Interference and Diffraction.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192PY1A1IA	PROPERTIES OF MATTER, THERMAL PHYSICS AND OPTICS	SEMESTER I

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Properties of Matter 8 h

Young's Modulus - Rigidity Modulus - Poisson's Ratio (definition alone) - Bending of Beams - Expression for Bending Moment - Determination of Young's Modulus - Uniform and Non-Uniform Bending - Torsional Oscillations of a Body - Rigidity Modulus of a Wire - M.I. of a Disc by Torsion Pendulum.

Unit II Viscosity 7 h

Viscosity - Viscous force - Co-efficient of viscosity -Poiseuilles formula for co-efficient of viscosity of a liquid - determination of co-efficient of viscosity using burette and comparison of Viscosities.

Unit III Conduction, Convection and Radiation 7 h

Specific heat capacity of solids and liquids - Dulong and Petit's law - Newton's law of cooling - thermal conduction -coefficient of thermal conductivity by Lee's disc method.Black body radiation - Planck's radiation law - Rayleigh Jean's law, Wien's displacement law.

Unit IV Thermodynamics 7 h

Zeroth and I Law of Thermodynamics - II Law of Thermodynamics - Carnot's Engine and Carnot's Cycle - Efficiency of a Carnot's Engine - Entropy - Change in Entropy in Reversible and Irreversible Process - Change in Entropy of a Perfect Gas.

Unit V Optics 7 h

Interference - Conditions for Interference Maxima and Minima - Air Wedge - Thickness of a Thin Wire - Newton's Rings - Determination of Wavelength using Newton's Rings - Diffraction - Difference between Diffraction and Interference - Theory of Transmission Grating - Normal Incidence.

Text Books

1 Murugesan R., 2017, "Properties of Matter and Sound", 5th Edition, S.Chand and Co, New Delhi.

2 BrijlalSubramanyam&Hemne P.S., 2017, "Heat Thermodynamics and Statistical Physics", 3rd Edition, S.Chand and Co, New Delhi.

References

1 AjoyGhaktak, 2012, "Optics", 5th Edition, Tata McGraw-Hill Education private limited, New Delhi.

2 David Halliday, Robert Resnick, Jearl Walker, 2019, "Fundamentals of Physics", 11th Edition, John Willy Company Hoboken, New Jersey, United States.

3 Murugesan R., 2016, "Modern Physics", 18th Edition, S.Chand and Co, New Delhi.

4 Manna A, 2011, "Heat and Thermodynamics", 1st Edition, Pearson India Pvt.Ltd., New Delhi.

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BoS- 11th	AC - 11th	GB - 15th
13-05-2021	09-08-2021	17-08-2021

202PY1A1IP	IDC PRACTICAL : PHYSICS - I	SEMESTER I

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Young's Modulus-Uniform Bending (Microscopic Method)
2	Young's Modulus-Non-uniform Bending (Microscopic Method)
3	Meter Bridge- Specific resistance of a coil
4	Determination of Rigidity modulus of a string
5	Compound Pendulum – determination of 'g' and 'K'
6	Rigidity Modulus – Static Torsion-Scale and Telescope
7	Spectrometer – Refractive Index of a glass Prism
8	Moment of a Magnet – Tan C position
9	Viscosity – Poiseuille's Method
10	Sonometer – Frequency of a tuning fork
11	Post office box- Determination of Specific Resistance
12	Sonometer – Frequency of a alternating current

Note: Any 10 out of 12 Experiments

References

1. Chattopadhyay. D, 2011, "Advanced course in practical physics", 8th Revised Edition, NCBA publishers & New Delhi.
2. Samir kumar ghosh, 2008, "Textbook of Advanced Practical Physics", 4th Revised Edition, NCBA publishers & New Delhi.
3. Arora. C.L, 2010, "B.Sc. Practical Physics", Revised Edition, S. Chand and Co & New Delhi.
4. Harnam singh and Heme. P.S, "B.Sc. Practical Physics", Revised Edition, S. Chand and Co & New Delhi.

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

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

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

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

Text Books

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

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

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

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

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

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

7 McCully, P.1996. Rivers no more: the environmental effects of dams(pp. 2964). Zed Books.

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

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

References

1. Pepper, I.L., Gerba, C.P. &Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
2. Rao, M.N. &Datta, A.K. 1987. Waste Water Treatement. Oxford and IBH Publishing Co. Pvt. Ltd.
3. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
4. Rosencranz, A., Divan, S., & Noble, M.L. 2001. Environmental law and policy in India. Tripathi 1992.

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BoS- 11th	AC - 11th	GB - 15th
13-05-2021	09-08-2021	17-08-2021

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/>

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BoS- 12th	AC - 12th	GB - 17th
18-12-2021	23-03-2022	28-03-2022

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

Dr.N.G.P. Arts and Science College APPROVED BoS- 12th 18-12-2021 AC - 12th 23-03-2022 GB - 17th 28-03-2022

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Chairman/HoD

Department of Mathematics

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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

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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 Books

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

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Course Code	Course Name	Category	L	T	P	Credit
211EL1A2EA	PROFESSIONAL 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

211EL1A2EA	PROFESSIONAL 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.

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Course Code	Course Name	Category	L	T	P	Credit
202MT1A2CA	DIFFERENTIAL EQUATIONS	CORE	4	2	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the method of solving linear differential equations with constant coefficients
- application of differential equations
- the solvability of linear and non-partial differential equations of order one

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	recognize and classify ordinary differential equations.	K1
CO2	solve linear second-order ordinary differential equations	K2
CO3	apply the differential equations in real world problems	K2
CO4	solve linear partial differential equations of order one	K3
CO5	analyzethe solution of non-linear partial differential equations of order one	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

202MT1A2CA	DIFFERENTIAL EQUATIONS	SEMESTER II

Total Credits: 4

Total Instruction Hours: 72 h

Syllabus

Unit I Linear differential equations with constant coefficients 15 h

Linear differential equations with constant coefficients - determination of complementary function - working rule for finding C.F. - the symbolic function 1/f(D) - general method of getting P.I - working rule for finding P.I - methods of finding P.I X=exp(ax), sinax,cosax, mth power of x, exp(ax)V,xV.

Unit II Linear differential equations of second order 17 h

General form - complete solution of y"+Py'+Qy=R - rule for getting an integral belonging to C.F of y"+Py'+Qy=R - working rule for finding complete primitive solution - removal of first derivative reduction to normal form - transformation of the equation by changing the independent variable - method of variation of parameters - solutions by operators

Unit III Application of Differential equations 12 h

Introduction - Newton's second law and Hooke's law - differential equation of the vibrations of a mass on a spring - Free, undamped motion - Free, damped motion - forced motion - resonance phenomena - electric circuit problems.

Unit IV Linear partial differential equations of order one 13 h

Lagrange's equation - Lagrange's method of solving Pp+Qq=R - Type 1 based on rule I - Type 2 based on rule II - Type 3 based on rule III - Type 4 based on rule IV

Unit V Non-linear partial differential equations of order one 15 h

Complete integral - particular integral - singular and general integral - geometrical interpretation - method of getting singular integral - compatiable system of first order equations - Charpit's method - special methods of solutions applicable to certain standard forms - standard forms I, II, IIIand IV.

Text Books

1 Raisinghania, M. D, 2012,"Ordinary and partial differential equations",S. Chand & Company Pvt.Ltd, New Delhi.

References

1 Narayanan. S and Manicavachagam Pillay.T.K, 2014,"Differential Equations and Its Applications", S.Viswanathan (Printers and Publishers) Pvt. Ltd, Chennai.

2 Bali N.P, 2004, "Differential Equations", Laxmi Publication Ltd, New Delhi

3 Zafar Ahsan, 2016,"Differential Equations and Their Applications", PHI Learning Private Limited, New Delhi.

4 Kandasamy. P and Thilagavathi. K, 2004,"Mathematics for B. Sc. – Branch – I Volume III", S. Chand and Company Ltd, New Delhi.

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Course Code	Course Name	Category	L	T	P	Credit
202MT1A2CB	INTEGRAL TRANSFORMS	CORE	3	2	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the different types of integral transforms
- the method of solving difference equations using Z-transforms
- the method of solving boundary value problem using transforms

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Define the formation of Fourier Transform	K1
CO2	Illustrate the application of Inverse Fourier Transform	K2
CO3	Describe the properties of Laplace transform	K2
CO4	Apply the concept of Inverse Laplace transform to solve differential equations	K3
CO5	Determine the solution of difference equation by Z-Transform	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

202MT1A2CB	INTEGRAL TRANSFORMS	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Fourier Transforms 12 h

Fourier Transforms-Fourier sine and cosine transforms-linearity property -change of scale property- Modulation theorem-evaluation by means of inversion theorems-Fourier transform of some particular functions-convolution of functions-convolution theorem -Parseval's relations

Unit II Inverse Fourier Transforms and applications 11 h

Fourier transforms of rational functions-examples - solution of integral equations of Convolution Type-Fourier transformof functions of several variables-application of Fourier transform to Boundary Value Problems

Unit III Laplace Transform 13 h

Definitions-Sufficient conditions -linearity property -Laplace transforms of some elementary functions-first shift theorem-second shift theorem-The change of scale property-examples-Laplace transform of derivatives and integrals-Laplace transform of $t^n f(t)$ and $f(t)/t$-Laplace transform of a periodic function- initial and final value theorems-examples-Laplace transform of some special functions-convolution of two functions.

Unit IV Inverse Laplace Transform and application 12 h

Introduction-Laplace inversion of some elementary functions-method of partial fractions -general evaluation technique- application of Laplace transform

Unit V The Z-Transform 12 h

Introduction-Z - transform: definition-some operational properties of Z-transform-application of Z-transforms.

Text Books

1 BaidyanathPatra(2018)An Introduction to Integral Transforms,CRC Press, Taylor & Francis Group, FL, London.

References

1 Lokenath Debnath & Dambaru Bhatta, 2014, "Integral Transforms and their applications", third edition, CRC Press, Taylor & Francis Group, FL, London.

2 Parman and Gupta, 2019, "Topics in Laplace and Fourier Transforms", first edition, Laxmi Publications Pvt. Ltd., New Delhi.

3 Lokenath Debnath, 1995, "Integral Transforms and Their Applications", CRC Press,Taylor & Francis Group, FL, London.

4 Srivastava A.N, Mohammad Ahmad, 2012, "Integral Transforms and Fourier Series", Alpha Science International, Limited, Oxford, UK.

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Course Code	Course Name	Category	L	T	P	Credit
202PY1A2IA	ELECTRICITY, ELECTRONICS, ATOMIC AND NUCLEAR PHYSICS	IDC	3	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the concepts of current electricity, inductance and circuit connections.
- the structure of atom and properties of nucleus.
- the basic operations of semiconductor devices and digital electronic circuits.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the basic circuit connections and charge flow in them.	K2
CO2	Infer knowledge about induction of current in magnetic field.	K2
CO3	Identify the structure model of atoms and properties of nucleus.	K3
CO4	Explain the fundamentals and applications of transistors.	K2
CO5	Construct different logic gates.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

202PY1A2IA	ELECTRICITY, ELECTRONICS, ATOMIC AND NUCLEAR PHYSICS	SEMESTER II

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Current Electricity 7 h

Ohm's law - Kirchoff's laws - Applications of Krichhoff's laws to Wheatstone's network - Condition for balance - Carey-Foster's bridge - Measurement of resistance - Measurement of specific resistance - Determination of temperature coefficient of resistance - Potentiometer - Calibration of Voltmeter.

Unit II Electromagnetism 7 h

Electromagnetic Induction - Faraday's laws - Self Inductance - Mutual Inductance - Experimental determination of mutual Inductance - A.C. Circuits - Mean value - RMS value - Peak value - LCR in series circuit - Impedance - Resonant frequency - Sharpness of resonance.

Unit III Atomic and Nuclear Physics 8 h

Bohr's atom model - Bohr Formula and Total energy - Atomic excitation - Ionization potential - Experimental determination of critical potentials by Frank and Hertz Method-Nucleus - Nuclear properties - Mass defect - Binding energy - Radio isotopes (Definition)- Applications of radio isotopes

Unit IV Analog Electronics 7 h

Semiconductor - PN junction diode - V-I characteristics of a Junction diode - Zener diode - Regulated power supply - Bridge rectifier -Transistor - Working of an NPN transistor - Common Emitter characteristics of a Transistor - Current gain - Applications of Transistor.

Unit V Digital Electronics 7 h

Number system - Binary - Octal and Hexadecimal system - Conversion of one number system to another number system - Binary addition, subtraction - Logic gates - OR, AND, NOT, XOR, NAND and NOR gates - Truth tables - Half adder and Full adder - Laws of Boolean's algebra - De Morgan's theorems.

Text Books

1 Murugesan. R, 2014, "Electricity and Magnetism", S. Chand and Co.

2 Murugesan. R and Kiruthiga Sivaprasath, 2014, "Modern Physics", S. Chand and Co.

References

1 David Halliday, Robert Resnick, Jearl Walker, 2015, "Fundamentals of Physics", 6th Edition, John Willy Company, Hoboken, New Jersey, United States.

2 Tayal, D.C, 2017, "Nuclear Physics", 2nd Edition, Himalaya Publishing House, Mumbai.

3 Theraja B.L., 2012, "Basic Electronics", 2nd Edition, S Chand & Co, New Delhi.

4 Malvino and Leach, 2016, "Digital Principles and Applications", Tata McGraw Hill Publishing Company Ltd, New York.

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202PY1A2IP	IDC PRACTICAL: PHYSICS II	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48h

S.No	List of Experiments
1	Determination of resistivity of semiconductors using Four Probe method.
2	Study and verify the I-V characteristics of a PN junction diode.
3	Calibration of low range voltmeter using potentiometer.
4	Calibration of low range Ammeter using potentiometer.
5	Study and verify the I-V characteristics of a Zener diode.
6	Design of Regulated Power supply for fixed voltage using IC 7805.
7	Verification of Truth tables of IC gates: OR, AND, NOT, XOR, NOR and NAND.
8	Verification of Truth tables of IC gates : NAND as universal building block- AND, OR, NOT.
9	Verification of Truth tables of IC gates : NOR as universal building block - AND, OR, NOT.
10	Verification of Truth tables of IC gates through De Morgan's theorem.

Note: Any Eight Experiments

References

1. Chattopadhyay.D, 2015, "Advanced course in practical physics", 8th Edition, NCBA publishers, Kolkata.
2. Samir kumarghosh, 2013, "Textbook of Advanced Practical Physics", NCBA publishers.
3. Arora. C.L., 2013, "B.Sc. Practical Physics", 19 Edition, S.Chand and Company limited, New Delhi.
4. Ouseph C.C., 2014, "Practical physics and Electronics", S.Chand and Company limited, New Delhi.

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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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ourse Code	Course Name	Category	L	T	P	Credit
191TL1A3TA	தமிழ்த் தாள்– III	மொழி-I	3	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 இணைச்செயல்பாடுகள் (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

191TL1A3TA	பகுதி – 1 : தமிழ் தாள் : 3	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

1. காப்பியங்களின் தோற்றமும் வளர்ச்சியும்
2. சிலப்பதிகாரம் – மனையறம் படுத்த காதை
3. மணிமேகலை – வஞ்சிமாநகர் புக்க காதை

Unit II 10 h

1. கம்பராமாயணம் – கும்பகர்ணன் வதைப்படலம் (பா. எண் : 60 – 100)
2. பெரிய புராணம் – அதிபத்தநாயனார் புராணம்

Unit III 10 h

1.சிற்றிலக்கியங்களின் தோற்றமும் வளர்ச்சியும்

2.தமிழ்விடு தூது – தூதுப்பொருள்கள் மட்டும் 101 முதல் 112 வரை(12 கண்ணிகள்)

3.திருக்குற்றாலக்குறவஞ்சி – வசந்தவல்லி பந்தாடிய சிறப்பு (6: 4கண்ணிகள்)

4.கலிங்கத்துப்பரணி – களம் பாடியது (போர்க்களக் காட்சி –பா.எண்: 472–502)

Unit IV 10 h

1. நாடகங்களின் தோற்றமும் வளர்ச்சியும்
2. நாடகம் - ஔவை–ஆசிரியர் இன்குலாப்

Unit V 08 h

1. 'பா' வகைகள் : வெண்பா, ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பா - பொது இலக்கணம் மட்டும்.
2. அணி: உவமையணி, உருவக அணி, இல்பொருள் உவமையணி விளக்கம், உதாரணம்.

3. பயிற்சிப்பகுதி

அ) அலுவலகம் சார்ந்த கடிதம்: விண்ணப்பங்கள், வேண்டுகோள், முறையீடு

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ஆ) வாசகர் கடிதம்: நாளிதழ், வானொலி, செய்தி ஊடகங்களுக்கு விமர்சனம் எழுதுதல்.

Text Books

1. மொழிப்பாடம் - 2020, தொகுப்பு : தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி.
2. இன்குலாப் – 2017. ஔவை (நாடகம்), அன்னம் வெளியீடு, சென்னை.

References

1. புலவர் சோம. இளவரசு - 2014. இலக்கிய வரலாறு , மணிவாசகர் பதிப்பகம் , சென்னை – 108,
2. பேராசிரியர் முனைவர் பாக்யமேரி – முதற் பதிப்பு 2013 , இலக்கணம் இலக்கிய வரலாறு மொழித்திறன், பூவேந்தன் பதிப்பகம், சென்னை.
3. இணையதள முகவரி : www.tamilvirtual.com

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BoS- 12th	AC - 12th	GB - 14th
18-12-2021	28-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
191TL1A3HA	HINDI-III	Language - I	3	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

191TL1A3HA	HINDI-III	SEMESTER III

Total Credits: 03

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

पद्य – काव्य पराशर (भोलानाथ)

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

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तर प्रदेश - 281001

Unit II 10 h

हिन्दी साहित्य का इतिहास: (साधारण ज्ञान)

आचार्य रामचन्द्र शुक्ल

लोकभारती प्रकाशन इलाहाबाद

Unit III 10 h

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

प्रकाशक: विनोद पुस्तक मंदिर

आगरा - 282002

Unit IV 10 h

संवाद लेखन

पुस्तक: व्याकरण प्रदिप - रामदेव

प्रकाशक: हिन्दी भवन 36 इलाहाबाद - 211024

Unit V 08 h

अनुवाद अभ्यास-III (केवल हिन्दी से अंग्रेजी में)

(पाठ 10 to 20)

प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

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BoS- 12th	AC - 12th	GB - 17th
18-12-2021	23-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
191TL1A3MA	MALAYALAM - III	Language - I	3	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

191TL1A3MA	MALAYALAM - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

Kumaranasan

Unit II 10 h

Kumaranasan

Unit III 10 h

Kumaranasan

Unit IV 10 h

Kavyanchali Collection of Poems.

Unit V 08 h

Kavyanchali Collection of Poems.

Text Books

1 Chinthavishtayaya Sitha By Kumaranasan DC.Books Kottayam

2 Kavyanchali -Group of Authors DC.Books Kottayam

References

1 Kavitha Sahithya Charithram –Dr.M.Leelavathy Sahithya academy Thrissur.

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BoS- 12th	AC - 12th	GB - 17th
18-12-2021	23-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
201TL1A3FA	FRENCH -III	LANGUAGE- 1	3	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

201TL1A3FA	FRENCH - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I — 10 h

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

Unit II — 8 h

° Raconter. ° Décrire les étapesd'une action.	Raconterune scene insoliteà l'oreal et à l'écrit.	Comprehendrele récitdún voyage. Raconterses actions quotidiennes.	Décrireunebiographie a partird'elémentsécrits.

Unit III — 10 h

° EsprimerI'intensit éet la quantité. ° Interroger.	Raconterune scene insoliteà l'oreal et à l'écrit.	Comprehendrele récitdún voyage. Raconterses actions quotidiennes.	Décrireunebiographie a partird'elémentsécrits.

Unit IV — 10 h

° Décrirequelqu'un. ° Comparer ° ExprimerPaccord ou le désaccord. ° Se situerdans le temps.	En milieu professional, recruiter quelquún et justifier sonchoix.	S'exprimersur les styles de vêtemantReconnaitre des personnes à partit de descriptions. Décrire des personnes. Comprendre des personnes qui experiment leur accord ouleurdésaccord.	Comprendre la description de personnesdans un extrait de roman. Comprendre des différences de points de vueexprimétesdans de message électronique. Raconter unsourvenir.

Unit V

10 h

° Parlerde Pavenir. ° Exprimer des souhaits. ° Décrirequelqu'un.	Discuter de l'organisation d'un voyage de groupepuispréparerune fiche projet et la templit.	Comprendreune chanson. Echangersursesprojets de vacancy Discuter du programme de la soire à venir. Addresser des souhaits à quelqu'un	Comprendre le message d'une carte d'anniversaire.

Text Books

1 LATITUDES 1 (Méthode de français) Pages from 102-151, Author : Regine Mérieux, Yves Loiseau

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Course Code	Course Name	Category	L	T	P	Credit
191EL1A3EA	ENGLISH - III	Language II	4	0	0	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn English grammar and its specific usage	K2
CO2	Know the methods of improving reading skills	K3
CO3	Understand the importance of speaking skills and developing it through various practices	K3
CO4	Comprehend the basic steps of reading and its necessity	K3
CO5	Acquire the writing skills and mandatory similar practices	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

191EL1A3EA	ENGLISH - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Basics of English 10 h

Phrasal verb - Notions and Conventional Idiomatic Expressions - One-Word Substitution - Word Formation - Homophones - Spelling - Sentence Completion – Sentence Pattern

Unit II Listening 08 h

Listening and Hearing - Principles of listening - Types of listening - incidental listening - active and effective listening - discriminative listening - critical listening - listening vs practice - Barrier to Listening - Guidelines for Improving Listening

Unit III Speaking 10 h

Monologues - Dialogue - Role Play - JAM (Just A Minute talk) - Debate - Public Speaking - Group Discussion - Interview - Showing Directions - Accent and Neutralization

Unit IV Reading 10 h

Mechanics of Reading - Types of Reading - Summarization - Paraphrasing - Analysis and Interpretation - Reading Comprehension – Reading with purpose and making predictions - Cloze Passage

Unit V Writing 10 h

Paraphrase Writing - Techniques and Methods of Paraphrasing - Precis Writing - Difference between Paraphrase and Precis - review writing - Hints Developing - Editorial Writing - Tabloid - Column Writing

Text Books

1 Bhatnagar R. P. 2013. English for Competitive Examinations. Macmillan Publishers, Chennai.

2 KoneruAruna. 2011. English Language Skills. McGraw Hill Education, Chennai.

References

1 Radhakrishna Pillai G. 2000. English for Success. Emerald Publishers, Chennai.

2 Gauri Mishra, Ranjana Kaul. 2016. Language Through Literature. Primus Books, New Delhi.

3 Miles Craven. 2008. Cambridge English Skills Real Listening and Speaking. First Edition, Cambridge University Press, India.

4 Teaching Adult: A Literary Resource Book. 2012. New Readers Press, New York, United States.

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BoS- 12th	AC - 12th	GB - 17th
18-12-2021	23-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
192MT1A3CA	NUMERICAL METHODS	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the method of solving algebraic and transcendental equations.
- the effectiveness of numerical solution over analytical solution.
- error analysis of a method to examine its accuracy.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	discuss numerical solution of Algebraic and Transcedental Equation.	K1
CO2	discusserrors in polynomial interpolation & detection of errors bydifference table.	K1
CO3	apply the concept of numerical differentiation and integration.	K3
CO4	compute the solution of system of equations by Gauss eliminationand Seidal method.	K3
CO5	Estimate the solution of ordinary differential equations.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A3CA	NUMERICAL METHODS	SEMESTER III

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Solution of Algebraic and Transcendental Equations 12 h

Introduction - The Bisection method - The Iteration method - The Method of False Position -Newton-Raphson method - Ramanujan's method - Graeffe's Root-Squaring method.

Unit II Solution of Linear Systems 13 h

Direct Methods: Gaussian Elimination method- Gauss Jordan Method - Modification of Gauss Method to Compute the Inverse - LU Decomposition Method - Solution of Tridiagonal systems - Solution of Linear Systems:Iterative methods - Householder's method.

Unit III Interpolation 12 h

Introduction - Errors in Polynomial Interpolation - Finite Differences - Detection of Errors by Difference Tables - Differences of Polynomial - Newton's Formulae - Gauss's Central Difference Formulae - Stirling's Formula - Interpolation with unevenly spaced point's: Lagrange's interpolation formula - Error in Lagrange's Interpolation Formula - Hermite's Interpolation Formula.

Unit IV Numerical Differentiation and Integration 12 h

Introduction - Numerical Differentiation - Maximum and minimum values of a Tabulated Function - Numerical Integration - Trapezoidal Rule - Simpson's 1/3 Rule - Simpson's 3/8 Rule - Boole's and Weddle's Rule - Use of Cubic Splines - Romberg Integration

Unit V Numerical Solution of Ordinary Differential Equations 11 h

Introduction - Solution by Taylor's series - Picard's Method - Euler's Method - Runge-Kutta Methods - Predictor Corrector Methods.

Text Books

1 Sastry, S.S., 2012,"Introductory methods of Numerical Analysis", 5th Edition,Prentice-Hall of India, NewDelhi.

References

1 VenkataramanM.K.,1999,"Numerical Methods in Science and Engineering", Fifth Edition, National Publishing Company,Chennai.

2 Grewal B.S.,2010,"Numerical Methods in Engineering & Science: with Programs in C and C++", Tenth Edition, Khanna Publishers, New Delhi.

3 Jain, M.K.,Iyengar,S.R.K. and Jain, R.K., 2012, "Numerical methods for Scientific and Engineering Computation", New Age International, New Delhi.

4 Curtis F.Gerald, 2007, "Applied Numerical Analysis", Pearson Education India Ltd., New Delhi.

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18-12-2021	23-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
192MT1A3CB	STATISTICS - I	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the method of defining random variables
- applications of expectation and variance
- measure the relationship between two random variables

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	define the basic concepts of probability theory.	K1
CO2	describe random variables and its corresponding functional forms.	K2
CO3	compute mathematical expectation and variance for analyzing the relation between variables.	K3
CO4	employ the concept of correlation and regression Analysis	K2
CO5	illustrate generating functions corresponding to random variables with theorems.	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	M	S	S	M	M
CO5	S	M	S	M	S

S Strong M Medium L Low

192MT1A3CB	STATISTICS - I	SEMESTER III

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Probability 12 h

Basic terminology- Mathematical probability- Statistical probability- Subjective probability- Mathematical tools-theorems on probability- Addition and Multiplication theorems onprobability-Conditional probability-Independent events.

Unit II Random variables 12 h

Introduction - Discrete and Continuous random variables - Distribution function-properties - Probability mass function, Probability density functions - Two Dimensional random variable - Joint probability mass function-marginal and conditional probability distributions - Independence of random variables.

nit III Mathematical Expectation 12 h

Introduction- expected value of a random variable - expected function of a random variable- Properties of Expectation and Variance – Covariance - addition and multiplication theorems on expectations. Moments of Bivariate probability distributions - conditional expectationand conditional variance.

Unit IV Generating Functions 12 h

Moment generating functions - Cumulants –Properties ofScumulants-characteristic functions and their properties-uniqueness theorems of characteristic function - Hall-Bray theorem- Chebychev's inequality -Weak law of large numbers.

Unit V Correlation &linear regression 12 h

Correlation – scatter diagram – Karl Pearson's coefficient of correlation – Calculation of the correlation coefficient for a bivariate frequency distribution – probable error on correlation coefficient - Rank correlation - linear regression

Text Books

1 Gupta S.C. and Kapoor.V.K, 2007,Fundamentals of Mathematical Statistics, S. Chand &Co,New Delhi

References

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

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

3 Veerarajan. T. 2017. Fundamentals of Mathematical Statistics, Yes Dee Publishing Pvt. Ltd ,Chennai.

4 Paul G.Hoel, 2018, Introduction to Mathematical Statistics, John-Wiley India Ltd.,NewDelhi.

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BoS- 12th	AC - 12th	GB - 17th
18-12-2021	23-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
195CI1A3IA	BUSINESS ACCOUNTING - I	IDC	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The accounting aspects of finance in business
- The business transactions from an accounting viewpoint
- To recognize, record, and classify new accounting data

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Know the concepts, conventions and rules of accounting to pass journal entries and prepare ledger accounts and cash books.	K1
CO2	Obtain knowledge to prepare the final accounts of a company	K2
CO3	Capture the procedures relating to bill of exchange.	K2
CO4	Understand the principles related to various field of accounting for consolidations.	K3
CO5	Discuss the methods of cost accounting and know about cost sheets.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

195CI1A3IA	BUSINESS ACCOUNTING - I	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Fundamentals of Book Keeping 9 h

Fundamentals of Book Keeping: Definition, objectives, methods of accounting, Branches of accounting, Types of Accounts and Accounting rules -Accounting Concepts and Conventions-Journal-Ledger- Subsidiary books: Purchases Book, Sales Book, Purchases Returns, Sales Return book, Cash Book (Single Column, Double Column and Triple Column) - Trial balance.

Unit II Final Accounts 9 h

Final accounts of a sole trader with adjustments: Trading Account, Profit and loss account, Balance Sheet, Adjustments.

Unit III Bill of exchange 10 h

Bill of exchange: Definition of bill of exchange, essentials of Bill of exchange, classification of bill of exchange, Accounting Treatment Of Bill Of Exchange (bill retained, bill discounted with bank, bill endorsed, bill sent for collection, renewal of bill, Accommodation bills).

Unit IV Accounting for consignments and Joint ventures 10 h

Accounting for consignments and Joint ventures: Consignment Meaning, definition, features, account sales, valuation of unsold stock, goods sent on consignment at cost price and invoice price.Joint venture: Meaning, features, distinction between joint venture and partnership, joint venture and consignment, accounting treatment for joint venture: when keeping separate sets of books is kept and without keeping separate set of books (only theory).

Unit V Cost Concept and cost sheet 10 h

Cost accounting - Meaning - definition - Difference between cost accounting and financial accounting- Advantages and disadvantages- Element of cost - preparation cost sheet - stock levels-EOQ-Methods of pricing of stock issue-FIFO-LIFO Simple average method - weighted average method.

Text Books

1 Vinayakam N., Mani P.L., and Nagarajan K.L, 2003, "Principles of Accountancy" , S.Chand& Company Ltd., New Delhi

2 Jain S P and Narang K L, 2000, "Cost accounting", Kalyani publishers, New Delhi.

References

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

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

3 Reddy,T.S., and Hari Prasad Reddy,Y. 2011, "Cost Accounting", Margham Publications, Chennai

4 Reddy,T.S., and Hari Prasad Reddy,Y. 2014, "Financial Accounting", Margham Publications, Chennai

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A3SA	OPERATIONS RESEARCH-I	SEC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The optimal use of available resources.
- the concept of simplex and duality in linear programming
- One way in which machineries are replaced in the industries

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	define the problem in the form of linear programming problem.	K1
CO2	discuss the way of getting optimum solution in arithmetic progression.	K2
CO3	explain the duality in linear programming problem.	K2
CO4	compute the optimum solution for any form of transportation problem.	K3
CO5	analyzing the replacement of machines and labors.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A3SA	OPERATIONS RESEARCH-I	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Linear Programming Problem 10 h

Introduction. - Basic assumptions - advantages - applications areas - formulation of LPP - Examples of LP model - Graphic method - Some special cases

Unit II Simplex method and Duality 10 h

Introduction - basic terms - Computational aspect - Special situations - Two Phase method - construction of dual from primal - advantages - Interpreting Primal dual optimal solution

Unit III Transportation Problem 10 h

Formulation - LP formulation – solution procedure – methods -test for optimality - variations - maximization – sensitivity analysis

Unit IV Assignment Problem 10 h

Introduction - mathematical model - solution methods –assignment algorithm - special variations

Unit V Replacement Problem 8 h

Introduction – Failing mechanisms - Solving methods = Replacement of item that deteriorates gradually, Replacement of items that fails suddenly – Staff replacement problem.

Text Books

1 Kapoor.V.K. 2012,Operations Research- Quantitative Techniques for Management , Sultan Chand & Sons , New Delhi

References

1 Kandi Swarup, Gupta.P.K, Man Mohan. 2018. "Operations Research", 19th Edition, Sultan Chand & Sons , New Delhi

2 Panneerselvam.R, 2009, "Operations Research", 2nd Edition, PHI Learning Private Limited , Delhi

3 Taha, H.A. 2006. Operations Research: An Introduction. 5th Edition. Prentice Hall of India Private Limited ,New Delhi

4 Man Mohan, Gupta. P.K, 2004. "Problems in Operations Research", 14th Edition, Sultan Chand & Sons , New Delhi.

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192MT1A3GA	GENERIC ELECTIVE: VEDIC MATHEMATICS -I	SEMESTER III

Total Credits: 2
Total Instruction Hours: 24 h

Syllabus

Unit I Simple techniques 5 h

Subtraction from 100/1000/10000 - Normal method - Vedic method - Multiplication with a series of 9s.

Unit II Operations with 9 5 h

Computation of remainder on dividing a number by 9: Basic method - First enhancement- Second enhancement – Verification of the product of two numbers, sum of two numbers.

Unit III Operations with 11 5 h

Multiplication – Divisibility Test of numbers by 11 – Multiplication with 111

Unit IV Multiplication (Nikhilam) 4 h

Secondary Bases of 50 – Secondary Bases of 500

Unit V Multiplication (UrdhaTiryak) 5 h

2 Digit Multiplication – 3 Digit Multiplication

Text Books

1 AtulCupta. 2005. The power of vedicmaths, Jaico Publishing House, Mumbai

References

1 TirthajiBharati Krsna,2015,"VedicMathematics",original Edition, Motilal Banarsidass Publisher & New Delhi.
2 Rajesh Kumar Thakur,2013,The Essentials of Vedic Mathematics,firstedition,Rupa Publications India.
3 Atul Gupta,2010, "Thhe Power of Vedic Maths", second edition, Jaico Publishing House, Mumbai.
4 Dhaval Bathia, 2005, "Vedic Mathematics made easy", firstedition, Jaico Publishing House, Mumbai.

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192MT1ASSA	SELF STUDY : MATHEMATICAL ECONOMICS	SEMESTER III

Total Credit: 1

Syllabus

Unit I Basic mathematics

Numbers - Fractions, decimal numbers and the use of a calculator - Algebraic properties of real numbers - Equalities, inequalities and intervals - Powers - An imaginary number and complex numbers - Factorisation.

Unit II Basic mathematics

Equations - Functions - Simultaneous equations: the demand and supply analysis - Logic.

Unit III Financial mathematics

Limits - Summation - A geometric series - Compound interest - The exponential function - Logarithms - Annuities - Perpetuity.

Unit IV Differential calculus

Cost function -The marginal cost and the average costs - Production function - Firm's supply curve - From a one-unit change to an infinitesimally small change - The relative positions of MC, AC and AVC revisited - Profit maximisation - Curve sketching - The differential - Elasticity.

Unit V Integral Calculus

An anti-derivative and the indefinite integral - The fundamental theorem of integral calculus - Application of integration to finance -Demand and supply analysis - The deadweight loss of taxation.

Text Books

1 Akihito Asano, 2013, "An Introduction to Mathematics for Economics", Cambridge University Press, UK.

References

1 Akira Takayama,1985, "Mathematical Economics", Cambridge University Press, UK.

2 Taro Yamane, 2012, "Mathematics for Economists: An Elementary Survey", Literary Licensing, LLC, US.

3 Ian Jacques, 2018,"Mathematics for Economics and Business", 9th edition, Pearson Education, England.

4 Michael C. Lovell, 2004, "Economics With Calculus", World Scientific Publishing Company, Singapore.

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192MT1ASSB	SELF STUDY: INTRODUCTION TO VEDIC MATHEMATICS	SEMESTER III

Total Credits: 1

Syllabus

Unit I Multiplication

Simple method - Criss cross multiplication - squaring numbers - cube root of perfect cubes -

Unit II Perfect squares and Squaring

Square root of perfect squares- Base method of multiplication - base method of squaring

Unit III Dates and Calendars

Digit sum method. - Magic squares - Dates and Calendars

Unit IV Simultaneous Linear Equations]

General equations-Simultaneous linear equations-Square roots of imperfect squares

Unit V Division]

Cubing numbers - Base method of division

Text Books

1 Dhaval Bathia,2005, Vedic Mathematics made easy, first edition,Jaico Publishing House, Mumbai.i

References

1 Tirthaji Bharati Krsna, 1990, "Vedic Mathematics", original Edition, Motilal Banarsidass Publisher, New Delhi.

2 Rajesh Kumar Thakur, 2019, "Advanced Vedic Mathematics", first edition, Rupa Publications New Delhi.

3 Atul Gupta, 2010, "The Power of Vedic Maths", second edition, Jaico Publishing House, Mumbai.

4 Ramnandhan Shastri, 2012, "For competitive Exams Vedic Mathematics Made Easy", Arihant Pubishers, New Delhi.

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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

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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

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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

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

2 Publishing Co.

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Course Code	Course Name	Category	L	T	P	Credit
191TL1A4TA	பகுதி-1: தமிழ் - தாள்- IV	மொழி	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாகத் 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 இணைச்செயல்பாடுகள் (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

191TL1A4TA	பகுதி-1: தமிழ் - தாள்- IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **எட்டுத்தொகை** 10 h

1. இலக்கிய வரலாறு - எட்டுத்தொகை நூல்கள்

2. நற்றிணை – குறிஞ்சித் திணை

I.பா.எண் : 01 – கபிலர்

II.பா.எண் : 88 – நல்லந்துவனார்

III.பா.எண் : 102 – செம்பியனார்

2. குறுந்தொகை – முல்லைத்திணை

I.பா.எண் : 65 – கோவூர்கிழார்

II. பா.எண் : 167 – கூடலூர்கிழார்

மருதத்திணை

I.பா.எண் : 08 – ஆலங்குடி வங்கனார்

II.பா.எண் : 61 – தும்பிசேர்கீரனார்

III.பா.எண் :196 – மிளைக் கந்தன்

நெய்தல் திணை

I.பா.எண் : 57 – சிறைக்குடி ஆந்தையார்

Unit II **எட்டுத்தொகை** 08 h

1. கலித்தொகை – பாலைக்கலி

I.பா.எண் :9 – பெருங்கடுங்கோ

2. அகநானூறு – மருதத்திணை

I.பா.எண் : 86 – நல்லாவூர்கிழார்

குறிஞ்சித் திணை

I.பா.எண் :198 – பரணர்

2. புறநானூறு - I.பா.எண் : 188 – பாண்டியன் அறிவுடை நம்பி

II.பா.எண் : 192 – கணியன் பூங்குன்றனார்

III.பா.எண் : 279 – ஒக்கூர் மாசாத்தியார்

IV.பா.எண் : 312 – பொன்முடியார்

Unit III **பத்துப்பாட்டு** 10 h

1. இலக்கிய வரலாறு - பத்துப்பாட்டு நூல்கள்
2. பட்டினப் பாலை – கடியலூர் உருத்திரங் கண்ணனார்

Unit IV **புதினம்** 10 h

1. புதினத்தின் தோற்றமும் வளர்ச்சியும்
2. புதினம்
   1.புத்துமண் — சுப்ரபாரதிமணியன்

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

I.இலக்கணம்

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

II.பயிற்சிப் பகுதி

புதினத் திறனாய்வு – கொங்கு வட்டாரப் புதினங்கள்

1. நாகம்மாள் – ஆர். சண்முகசுந்தரம்
2. மானாவாரி மனிதர்கள் – சூர்யகாந்தன்
3. ஈரம் கசிந்த நிலம் – சி. ஆர். ரவீந்திரன்
4. ஒண்டிக்காரன் பண்ணையம் – மா. நடராசன்

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது

Text Books

செய்யுள் திரட்டு - மொழிப் பாடம் - 2020- 21

1 தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, வெளியீடு : நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 600 098.

2 சுப்ரபாரதிமணியன், முதற் பதிப்பு -2019, புத்துமண் புதினம் – நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 600 098. (Unit-IV)

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 தமிழ் இணையக் கல்விக்கழகம்.http://www.tamilvu.org/

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Course Code	Course Name	Category	L	T	P	Credit
191TL1A4HA	Part- I : HINDI - Paper-IV	Language	3	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

191TL1A4HA	Part- I : HINDI - Paper-IV	SEMESTER IV

Total Credits: 03

Total Instruction Hours: 48 h

Syllabus

Unit I — 10 h

नाटक – लडाई – सर्वेश्वरदयाल सक्सेना

प्रकाशक: वाणी प्रकाशन

21-A, दरियागंज

नई दिल्ली-110002

Unit II — 10 h

एकांकी: एकांकी पंचामृत – डॉ राम कुमार

(भोर और तारा छोड़कर)

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तर प्रदेश-281001

Unit III — 10 h

काव्य मंजरी- (डा मुन्ना तिवारी)

मैथिलीशरण गुप्त- मनुष्यता, जयशंकर प्रसाद- बीती विभावरी जागरी

सूर्यकान्त त्रिपाठी निराला- तोडती पत्थर और भिक्षुक

Unit IV — 10 h

सूचना लेखन

पुस्तक: व्याकरण प्रदिप – रामदेव

प्रकाशक: हिन्दी भवन 36 इलाहाबाद-211024

Unit V — 08 h

अनुवाद अभ्यास-III (केवल अंग्रेजी से हिन्दी में)

(पाठ 10 to 20)

प्रकाशक: दक्षिण भारत प्रचार सभा चेन्नैई -17

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Course Code	Course Name	Category	L	T	P	Credit
191TL1A4MA	Part- I : MALAYALAM - Paper-IV	Language	3	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

191TL1A4MA	Part- I : MALAYALAM - Paper-IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

Drama

Unit II 10 h

Drama

Unit III 10 h

Drama

Unit IV 10 h

Screen Play

Unit V 08 h

Screen Play

Text Books

1 Manju Poloru Penkutty, Screen Play By Kalavoor Ravikumar, Published by DC.Books, Kannur.

2 Lankalakshmi, Drama By C.N.Sreekandan Nair Published by D C.Books Kottayam

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Course Code	Course Name	Category	L	T	P	Credit
201TL1A4FA	FRENCH -IV	LANGUAGE- 1	3	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

201TL1A4FA	FRENCH - IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Trèsdrôle I, Page 10 — 10 h

* Exprimersa certitude et son incertitude. * Exprimer son approbation et son indifference.	Ecrire un courriel à un journal pour prendre position surl'application d''uneloil.	* Comprendreun reportage radiophonique. * Interviewer un personage public. * Raconterune experience personnel

Unit II Vousavezdit Culture ?, Page 20 — 8 h

* Exprimer et demander un point de vue. * Exprimer son intention de faire quelque chose (1).	Monte rune animation dans son centre de langue pourpromouvoir la culture française.	* Comprendreune conversation entre plusieurspersonnes. * Donner son point de vue. * Créer dialogues sur des themes donnés.

Unit III Envied'ailleurs, Page 30 — 10 h

* Justifier unchoix. * Exprimer son intention de faire quelque chose (2). * Exprimer la restriction.	Monter un projetd'échanges avec un centre de langue francophone.	* Comprendreune interview. * Expliquerseschoix. * Expliquerses intentions d'actions face à une situation. * Présenterunprojet.

Unit IV Voilà l'eté !, Page 40 — 10 h

* Exprimer le fait d' aimer, de préférer. * Comparer.	Préparer un programme de séjourlinguistique.	* Comprendreun bulletin d'informationradiophonique.

Unit V Voilà l'eté !, Page 40 — 10 h

* Exprimer as joleetsatristesse.	Préparer un programme de séjourlinguistique	* Comprendre des témoignages. * Exprimerses sentiments à partird'une situation illustrée.

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Text Book

1 Reference Book : LATITUDES 2, Méthode de français By – Régine Emmanuel laine, Yves Loiseau, Pages : 9 - 55

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Course Code	Course Name	Category	L	T	P	Credit
191EL1A4EA	ENGLISH- IV	LANGUAGE	4	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Learn English grammar and its specific usage	K2
CO2	Know the ways of improving English language vocabulary	K3
CO3	Understand the importance of English language in competitive exams	K3
CO4	Acquire the basic needs of communication skills and methods	K3
CO5	Comprehend the composition writing and similar skills	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

191EL1A4EA	ENGLISH- IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Grammar 10 h

The use of correlatives - The perfect tense - appended questions - the infinitive - negative verbs - redundant conjunctions - use of make and do - fairly and rather

Unit II Vocabulary 10 h

Words and contextual uses - Synonyms - Antonyms - Add one out - inflectional - infix- telescoping - loanwords - British and American words - Thesaurus

Unit III Language Use 08 h

Spotting Errors - Words often confused - Reconstructing a Passage - Clause - Idioms and colloquialism - Language aptitude - Clipping

Unit IV Communication 11 h

Different Types of Asking - Oral rehearsal - Describing person, Diagram, Data, Table - Vote of thanks - Small talk - Refusal and Apology

Unit V Composition 09 h

General Essay writing - Mind map - Reviews - Title expansion - Creative writing - Content writing - Translation - Abstracting - Flash Fiction

Text Books

1 Wood F.T. 2010. A Remedial Grammar for Foreign Students. Macmillan Publishers, India. [Unit I and II]

2 Bhatnagar R.P. 2013. English for Competitive Examinations. 3rd Edition. Trinity Press, New Delhi. [Unit III, IV and V]

References

1 Radhakrishna Pillai G. 2000. English for Success. Emerald Publishers, Chennai.

2 Krishnaswamy N. 2000. Modern English a Book of Grammar Usage and Composition. Macmillan Publishers, India.

3 Arulselvi Evangelin. 2012. Teaching of Special English. Saratha Pathippagam, Chennai.

4 Rawdon Wyatt. 2008. Check Your Vocabulary for TOFEL. Macmillan Publishers, India.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A4CA	DISCRETE MATHEMATICS	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the concepts of relations and functions
- the application of group theory
- the method of designing finite state machines

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	define the relations and functions	K1
CO2	discuss the applications of functions	K2
CO3	explain the concept of Lattices & Boolean algebra	K2
CO4	illustrate the theory of groups and semigroups	K3
CO5	construct the regular grammar and finite state machine	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A4CA	DISCRETE MATHEMATICS	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Relations and Digraphs 10 h

Product sets and partitions-relations and digraphs - paths in relations and digraphs - properties - equivalence relations - operations on relations.

Unit II Functions 10 h

Functions - functions for Computer Science - growth of functions - permutation functions.

Unit III Order relations and Structures 12 h

Partially order sets - extremal elements of partially ordered sets - Lattices - finite Boolean Algebra - functions on Boolean Algebra.

Unit IV Semigroups and Groups 14 h

Binary operations - semigroups - products and quotients- Groups - products and quotients of groups - other Mathematical structures.

Unit V Languages and finite state machines 14 h

Languages - representations of special Grammars and Languages - Finite State Machines - Monoids, Machines and Languages - Machines and regular languages - Simplification of Machines.

Text Books

1 Kolman B, Busby R.C. and Ross S.C, 2018, "Discrete Mathematical Structures", 6th Edition, Prentice hall of India Pvt. Ltd, New Delhi.

References

1 Tremblay J.P and Manohar R.P, 1995, "Discrete Mathematical Structures with applications to computer science", McGraw Hill, New Delhi.

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

3 Seymour Lipschutz, Marc Lipson, 2009, "Schaums Outline of Discrete Mathematics", McGraw-Hill, New Delhi.

4 Susanna S. Epp., 2019, "Discrete Mathematics with Applications", 5th Editon, Cengage Learning.

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18-12-2021	23-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
192MT1A4CB	STATISTICS - II	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the concepts of various discrete and continuous probability distributions.
- the concepts of exact sampling distributions.
- the theory of estimates.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	define the theoretical distributions based on situation.	K1
CO2	explain the discrete and continuous probability distribution.	K1
CO3	examine the validity of hypothesis using sampling tests.	K2
CO4	explain the relation between various distributions.	K3
CO5	compute the estimators and study its properties.	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	S	S	S	S
CO4	S	S	M	M	M
CO5	S	S	M	M	M

S Strong M Medium L Low

192MT1A4CB	STATISTICS - II	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Discrete Probability Distributions 10 h

Introduction - discrete uniform distribution -Bernoulli distribution - Binomial distribution –Poisson distribution.

Unit II Continuous Probability Distributions 14 h

Introduction - normal distribution –rectangular distribution - gamma distribution.

Unit III Exact Sampling Distributions-I 10 h

Introduction - Derivation of the Chi-Square Distribution- moment generating function - theorems -linear transformation – Applications.

Unit IV Exact Sampling Distributions- II 12 h

Introduction- Student's t-distribution- Applications - F-distribution and itsapplications - relation between t and F-distributions - relation between F and Chi-Square Distributions.

Unit V Statistical Inference 14 h

Introduction – characteristics of estimators– Cramer-Rao inequality – complete family of distributions - MVUE and Blackwellisation.

Text Books

1 Gupta S.C. and V.K. Kapoor, 2017, "Fundamentals of Mathematical Statistics", Sultan Chand and Co, New Delhi.

References

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

2 D.C. Sanchetti & V.K. Kapoor, 2010 , "Statistics", S.Chand & Co., New Delhi.

3 T.Veerarajan, 2017, "Fundamentals of Mathematical Statistics", Yes Dee Publishing Pvt. Ltd., Chennai.

4 Robert V. Hogg, Joseph W. McKean, Allen T. Craig., 2019, "Introduction to Mathematical Statistics", 8th Edition, Pearson, New Delhi.

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GB - 17th 28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
195CI1A4IA	BUSINESS ACCOUNTING-II	IDC	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To know the various methods of depreciations and preparation of single entry accounts
- To introduce accounting methods for hire purchase system and branch accounts
- To learn the preparation of various budgets and budgetary control

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	classify and apply appropriate methods of depreciation	K1
CO2	demonstrate the accounting for incomplete system	K2
CO3	apply the concepts of accounting in a real time business entity.	K2
CO4	understand hire purchase system.	K2
CO5	acquire knowledge about budget accounts	K1

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

195CI1A4IA	BUSINESS ACCOUNTING-II	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Depreciation 9 h

Depreciation - Meaning- Features- Methods- Straight Line Method– Written Down Value Method - Annuity Method

Unit II Single Entry system 9 h

Single Entry System – Meaning and Features –Limitations- Advantages- Statement of Affairs Method and Conversion Method.

Unit III Branch Accounts 10 h

Branch Accounts - Introduction – Meaning – Objectives – Types of Branches - Dependent Branches – Features – Supply of Goods at Cost Price - Invoice Price – Branch Account in the books of Head Office -Debtors System Only (Excluding foreign branches).

Unit IV Hire Purchase 10 h

Hire Purchase and Installment Systems- Accounting treatment–Calculation of interest –Default and repossession (Excluding Hire Purchase Trading Account)

Unit V Budgeting 10 h

Budgeting- meaning and definition- advantages and disadvantages – production budget, sales budget, Cash budget, flexible budget.

Text Books

1 Gupta R.L., Gupta V.K., and Shukla M.C., 2008, "Financial Accounting", Sultan Chand & Sons, New Delhi.

2 Maheswari S.N, 2004, "Management Accounting", Sultan Chand & Sons, New Delhi.

References

1 Maheswari S.N, 2004, "Management Accounting", Sultan Chand & Sons, New Delhi.

2 Jain S.P., 2010, "Principles of Accountancy", Kalyani Publishers, New Delhi.

3 Reddy,T.S and Hari Prasad Reddy,Y. 2014, "Financial Accounting", Margham Publications, Chennai.

4 Vinayakam N, Mani P.L and Nagarajan K.L, 2003, "Principles of Accountancy", S.Chand& Company Ltd., New Delhi.

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18-12-2021	23-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
192MT1A4SA	OPERATIONS RESEARCH-II	SEC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- application of sequencing problems.
- thedecision-making process
- the strategies thinking to be applied in business.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	identify a number of different situations which can be characterized as sequencing problems.	K1
CO2	understand various components of a queuing system	K2
CO3	explainthe way of making decisions under certainty.	K2
CO4	computevalue of the game with mixed strategies.	K3
CO5	analyzingthe PERT and CPM network technique.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A4SA	OPERATIONS RESEARCH-II	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Sequencing Problem 8 h

Introduction - Sequencing problem - solution to sequencing problems - Johnson's rule

Unit II Queuing Theory 10 h

Introduction - elementary queuing system - single channel queuing model - queuing cost behavior analysis - Poisson exponential multi-channelqueuing model - Poisson arrivals and erlang service distribution

Unit III Decision Analysis 10 h

Introduction - management applications - Steps - structure of decision-making problem - types of decision-making environments - posterior probabilities and bayesian analysis - decision tree analysis

Unit IV Theory of Games 10 h

Introduction - solution methods of pure strategy games - Principle of dominance - solution methods of mixed strategy games

Unit V Project Network Analysis 10 h

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

Text Books

1 Kapoor,V.K., 2012, "Operations Research- Quantitative Techniques for Management", Sultan Chand & Sons, New Delhi.

References

1 KantiSwarup, Gupta.P.K, Man Mohan., 2018, "Operations Research", 19th Edition, Sultan Chand & Sons, New Delhi.

2 PanneerselvamR., 2009, "Operations Research", 2nd Edition, PHI Learning Private Limited,NewDelhi.

3 Taha, H.A., 2006, "Operations Research: An Introduction", 5th Edition,Prentice Hall of India Private Limited, New Delhi.

4 Man Mohan, Gupta P.K., 2004, "Problems in Operations Research", 14th Edition, Sultan Chand & Sons, New Delhi.

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BoS- 12th	AC - 12th	GB - 14th
18-12-2021	23-03-2022	28-03-2022

192MT1A4GA	GENERIC ELECTIVE: VEDIC MATHEMATICS II	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Division 5 h

Division by a flag of one digit (no remainder) - Division by a flag of one digit (with remainder)

Unit II Simple Squares 5 h

Numbers ending with 5 - Two numbers starting with same digit and ending digits adding upto 10

Unit III Square of any number 5 h

Definition - Dwandwa or Duplex - Square of any Number

Unit IV Square root of a number 5 h

Steps - Perfect square root

Unit V Cubes and Cube Roots 4 h

Computing cubes of 2 digits numbers - Cube roots of 2 digit numbers

Text Books

1 AtulCupta, 2005, "The Power of Vedic Maths", Jaico Publishing House, Mumbai.

References

1 Tirthaji Bharati Krisna, 2015, "VedicMathematics", Motilal Banarsidass Publisher, New Delhi.

2 Rajesh Kumar Thakur, 2013, "The Essentials of Vedic Mathematics", 1st edition, Rupa Publications, India.

3 Atul Gupta, 2010, "The Power of Vedic Maths", 2nd edition, Jaico Publishing House, Mumbai.

4 Dhaval Bathia, 2005, "Vedic Mathematics made easy", 1st edition, Jaico Publishing House, Mumbai.

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BoS - 12th	AC - 12th	GB - 17th
18-12-2021	23-03-2022	28-03-2022

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

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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

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18-12-2021	23-03-2022	28-03-2022

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.

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BoS- 12th	AC - 12th	GB - 19th
18-12-2021	23-03-2022	28-03-2022

Course Code	Course Name	Category	L	T	P	Credit
192MT1A5CA	REAL ANALYSIS-I	CORE	4		-	4

PREAMBLE

This course has been designed for students to learn and understand

- the concept of real number system
- the notion of metric spaces
- the application of continuity in real number system

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	describe the real number system and its extended form	K1
CO2	define the various forms of sets assigned to real number system	K1
CO3	demonstrate an ability to understand and manipulate the theorems in point set topology	K2
CO4	explain the concept of metric spaces and the influence of limits in it	K3
CO5	apply the concept of continuity in examining the connectedness of sets	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	M
CO4	S	M	S	S	S
CO5	M	S	S	M	S

S Strong M Medium L Low

192MT1A5CA	REAL ANALYSIS-I	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I The Real and Complex number system 9 h

Introduction - field and order – geometric representation -unique factorization theorem –Supremum and its properties - completeness axiom – some properties – Archimedean property – Rational numbers with finite decimal representation and approximations– Infinite decimal representation– absolute values and the triangle inequality –Cauchy-Schwarz inequality- extended real number system.

Unit II Basic notions of Set theory 10 h

Introduction - ordered pairs – Cartesian product– Relations and functions – one-to-one functions and inverses – Composite functions – Sequences – similar sets – finite and infinite sets – countable and uncountable sets – uncountability of the real number system – Set algebra – countable collection of countable set.

Unit III Point Set Topology 10 h

Introduction - Euclidean space –open balls and open sets - structure of open sets - closed sets – adherent and accumulation points – closed sets and adherent points – Bolzano – Weierstrass theorem – Cantor"s intersection theorem - Lindelof covering theorem –Heine-Borel covering theorem – Compactness in R^n- spaces.

Unit IV Metric spaces and Limits 10 h

Metric spaces-point set topology in metric spaces- compact subsets– boundary of a set - limits - convergent sequences in a metric space – Cauchy sequences – complete metric spaces – limit of a function and vector valued functions

Unit V Continuity 9 h

Continuous functions – continuity of composite functions – examples - continuity and inverse image of sets - functions continuous on compact sets - Topological mappings - .Bolzano's theorem - connectedness - arcwise connectedness -uniform continuity and compact sets - Fixed point theorems - Monotonic functions.

Text Book

1 Tom M. Apostol. 2002. Mathematical Analysis.Narosa Publishing House Pvt. Ltd. Second Edition, New Delhi.

References

1 Somasundaram.D and Choudhary.B.2015. A first course in Mathematical Analysis,Narosa publishing house, New Delhi.

2 Mainak Mukherjee. 2015. A course in Real Analysis, Narosa publishing house. New Delhi.

3 Shanti Narayan and Dr.M.D. Raisinghania.2014. Elements of Real Analysis, S.Chand and company Pvt. Ltd.,New Delhi.

4 Dipak Chatterjee.2005. Real Analysis. Prentice- Hall of India Pvt. Ltd., New Delhi..

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A5CB	COMPLEX ANALYSIS -I	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the integration method for complex functions
- the singularities and method to find them with its applications
- the applications of power series

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Complex plane and Sets of complex points.	K1
CO2	To understand the Analytic functions.	K2
CO3	To understand the Power Series and Elementary Function.	K2
CO4	Apply the Elementary and conformal mappings.	K3
CO5	Apply the Complex Integration.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A5CB	COMPLEX ANALYSIS - I	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Complex plane 10 h

Representation of complex numbers - representation - roots - Angle between two rays – equations of straight lines and circles – elementary Transformation – Infinity and Extended Complex Plane – Stereographic projection- closed sets – open sets – theorems on bounded Infinite sets - examples.

Unit II Analytic functions 10 h

Complex functions - limits – continuity – uniform continuity – differentiability and analyticity – necessary conditions for differentiability – sufficient conditions for differentiability – C-R equation in Polar coordinates -complex function as a function of z and conjugate – examples.

Unit III Power Series 9 h

Power series - absolute and uniform convergence - analyticity of Power Series – uniqueness of Representation of a function- elementary functions -exponential functions – Logarithmic functions and function a^z - Branch point – trigonometric, hyperbolic and harmonic functions – examples.

Unit IV Elementary and Conformal mappings 9 h

Bilinear transformation – special Bilinear transformations – Circles and inverse points-transformations
$w = z^2, w = \sqrt{z}, w = e^z, w = \frac{z+1}{z}, w = \log z, w = \sin z \; and \; w = \cos z$ -conformal mappings – examples.

Unit V Complex Integration 10 h

Simple Rectifiable oriented curves – Integration of Complex functions –definite Integrals – Interior and Exterior of closed curve - simply connected region – Cauchy's fundamental theorem – Integral along an arc joining two points - Cauchy's integral formula and formula for derivatives -zero of a function.

Text Book

1 Durai Pandian. P and Kayalal Pachaiyappa., 2014. Complex Analysis: S.Chand and Company Pvt. Ltd., New Delhi.

References

1 Shanthi Narayan and Mittal. P.K., 2008., Theory of functions of complex variables, S. Chand and Company Pvt. Ltd, New Delhi.

2 Pundir S.K. and Gupta K.P., Goyal J.K., 2014., Complex Analysis., Pragati Prakashan, Meerut.

3 Lars V. Ahlfors, 1979,"Complex Analysis", Third Edition, Mc Graw-Hill Book Company, New York

4 Joseph Bak and Donald J. Newman, 2010, "Complex Analysis", Third Edition, Springer, New York

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A5CC	ABSTRACT ALGEBRA	CORE	4		-	4

PREAMBLE

This course has been designed for students to learn and understand

- the concept of mappings and its influence in group theory
- the applications of group and semi-group concepts
- the concepts of ring theory, field and integral domain

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	describe the application of mappings in group theory	K1
CO2	elaborate the properties of groups and subgroups	K2
CO3	explain the theories that lead to permutation group	K2
CO4	illustrate the concepts of Rings and polynomial rings through examples	K3
CO5	determine the concept of Euclidean ring	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A5CC	ABSTRACT ALGEBRA	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Group Theory 9 h

Set theory - Mappings - examples of mappings - integers - unique factorization theorem - group - some examples of groups- some preliminary lemmas.

Unit II Subgroups 10 h

Subgroups -Euler theorem - Fermat theorem - counting principle - Normal subgroups and quotient groups - Homomorphisms.

Unit III Automorphisms and Permutation groups 11 h

Automorphisms - Inner automorphism - Cayley's theorem - Permutation groups - another counting principle.

Unit IV Ring Theory 9 h

Definition and examples of rings-some special classes of rings - Homomorphisms - Ideals and Quotient rings - more Ideals and Quotient rings.

Unit V Polynomial Rings 9 h

The field of Quotients of an integral domain - Euclidean rings - particular Euclidean ring - Polynomial rings - polynomials over the rational field -polynomial rings over commutative rings.

Text Book

1 Herstein I. N., 2006. "Topics in Algebra", John Wiley & Sons, New York.

References

1 Surjeet Singh and Qazi Zameeruddin, 1992, "Modern Algebra", Vikas Publishing House.

2 Vasishtha, A.R., 1994, "Modern Algebra", Krishna Prakashan Mandir, Meerut.

3 Arumugam. S and Thangapandi Isaac. A., 2014, "Modern Algebra", Scitech Publications (India) Pvt. Ltd.

4 Venkatachalapathy. S. G, "Modern Algebra (For B.Sc Mathematics Major)", Margham Publications, Chennai.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A5CD	PROGRAMMING IN PYTHON	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- computing and problem solving
- the basic operations in Python programming language
- the concepts of Object Oriented Programming in Python

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	recognize Digital computer as Data Analytics tool through Python	K1
CO2	Illustrating Problem solving strategies	K2
CO3	demonstrate the method of solving simple problems through Python	K3
CO4	apply the theory behind Lists, Tuples and Dictionaries	K3
CO5	construct working knowledge of Object Oriented Programming in Python	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	S	S	S	M
CO4	S	S	M	S	M
CO5	S	M	S	S	M

S Strong M Medium L Low

192MT1A5CD	PROGRAMMING IN PYTHON	SEMESTER V

Total Credits: 4]
Total Instructions Hours: 48 H

Syllabus

Unit I Introduction to Digital Computer and Problem Solving Strategies, Introduction to Python 10H

Introduction to Digital Computer: Von Neumann concept - Storage - Programming Languages - Translators - Problem Solving Strategies: Problem Analysis - Algorithms - Flow Charts - Introduction to Python: Introduction - Python overview- Comments – Python Identifiers – Reserved keywords – Variables – Standard data types – Operators - Statements and Expressions - String Operations - Boolean Expressions

Unit II Control Statements, Iteration and Functions 9 H

Control Statements: Iteration - The for loop – While statement – if else statement – Input from keyboard - Functions: Introduction – Built-in functions –Composition of 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 - Writing Python Scripts

Unit III Strings and Lists 8 H

Strings: Compound data type – len function – String slices – String traversal – Escape characters – String formatting operator – String formatting functions.Lists – Values and accessing elements – Traversing a list – Deleting elements from list – Built-in list operators – Built-in list methods.

Unit IV Tuples and Dictionaries 11 H

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 values in a dictionary –Updating dictionary – Deleting elements from dictionary – Operations in dictionary – Built-in dictionary methods.

Unit V Files and Exceptions, Classes and Objects 10H

Files and Exceptions: Text Files - Directories - Exceptions - Exception with Arguments -User Defined Exceptions - Classes and Objects: Overview of OOP - Class Definition - Creating Objects - Objects as Arguments - Objects as Return Values - Built in Class Attributes - Inheritance - Method Overriding - Data Encapsulation - Data Hiding

Text Book

1 E. Balagurusamy, 2016, Introduction to Computing and Problem Solving Using Python, First Edition, McGrawHill publication, New Delhi,.

References

1 Fabio Nelli , 2018, Python Data Analytics , Second Edition, Apress, New York,.

2 Wes McKinney , 2011, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPythony, O'Reilly, USA.

3 Zed Shaw, 2014, Learn Python the Hard Way, 3rd Edition, Addison-Wesley, USA,.

4 Mark Summerfield , 2018, Programming in Python 3, Second Edition, Pearson India Education Services Pvt. Ltd, Noida,.

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192MT1A5CP	PROGRAMMING IN PYTHON LAB	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Programs
1	Write a Python program to print the prime numbers for a user provided range.
2	Write a Python program that demonstrates the built-in functions.
3	Write a Python program to implement recursion for factorial of a number that demonstrates the user defined function and return statement.
4	Write a Python program to transpose a Matrix.
5	Write a Python program to demonstrate various string functions and operations.
6	Write a Python program to demonstrate List functions and operations.
7	Write a Python program to demonstrate tuple functions and operations.
8	Write a Python program to demonstrate Dictionaries functions and operations.
9	Write a Python program to demonstrate Inheritance and method overriding.
10	Write a Python program to demonstrate exception Handling that could be raised when the username entered by the user less than 8 character.
11	Write a Python program for finding roots of f(x)=0 by bisection method.
12	Write a Python program to Solve Systems of Linear Equations.

Note: Out of 12 - 10 Mandatory.

References

1. E. Balagurusamy, 2016, Introduction to Computing and Problem Solving Using Python, First Edition, McGrawHill publication, New Delhi,.
2. Mark Summerfield , 2018, Programming in Python 3, Second Edition, Pearson India Education Services Pvt. Ltd, Noida,.
3. Wes McKinney , 2011, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPythony, O'Reilly, USA.
4. Fabio Nelli , 2018, Python Data Analytics , Second Edition, Apress, New York,.

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192MT1A5SP	ACCOUNTING SOFTWARE	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Programs
1	Creation of a new company and alteration of a company
2	Creation of ledgers and groups..
3	Creation of vouchers.
4	Preparation of trial balance
5	Preparation of Profit and Loss A/c and Balance Sheet
6	Preparation of subsidiary books.
7	Ratio Analysis
8	Preparation of Stock Summary.
9	Stock summary with final accounts.
10	Preparation of bill wise details.
11	Bank reconciliation Statement.
12	Preparation of inventory statement using FIFO and LIFO.

Note: Out of 12 – 10 Mandatory.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A5DA	FUZZY LOGIC	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the basic knowledge of fuzzy set theory.
- the construction of fuzzy logic theory
- the relations between crisp and fuzzy in applications.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	describe the concept of crisp and fuzzy set	K1
CO2	explain the various operations on fuzzy sets	K2
CO3	construct the theory of fuzzy equations through fuzzy numbers	K3
CO4	illustrate the concept of fuzzy relations	K3
CO5	employ fuzzy logic to construct quantified propositions	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	S	S	S	S
CO4	M	M	S	S	S
CO5	M	M	M	S	S

S Strong M Medium L Low

192MT1A5DA	FUZZY LOGIC	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Classical Sets and Fuzzy Sets 10 h

Crisp sets - Fuzzy sets - types - concepts - characteristics and significance - Properties of α-cuts – Representation theorem - Extension Principle for fuzzy sets.

Unit II Operations on Fuzzy sets 8 h

Standard fuzzy operations – Union - intersection - complement - combinations of operations - aggregation operations.

Unit III Fuzzy Arithmetic Operations 10 h

Fuzzy numbers - linguistic variables - arithmetic operations on Intervals and Fuzzy numbers - Fuzzy equations.

Unit IV Series and product developments 10 h

Crisp and Fuzzy Relations - projections-binary fuzzy relations- binary relations on a single set - Fuzzy relations: equivalence-compatibility-ordering-fuzzy morphisms.

Unit V Fuzzy Logic 10 h

Multi-valued logics - Fuzzy quantifiers and propositions - linguistic hedges - inference from conditional fuzzy propositions, conditional and quantified propositions, quantified propositions.

Text Book

1 Klir G. J. and Yuan B., 1996, "Fuzzy sets and Fuzzy Logic: Theory and Applications", PHI Leaning Private Limited, New Delhi.

References

1 Zimmermann H. J., 2011, "Fuzzy Set Theory and its Applications", 4th Edition, Springer, New York.

2 Bhargava A. K., 2013, "Fuzzy Set Theory, Fuzzy Logic and their Applications", S. Chand Pvt. Limited, New Delhi.

3 Rajasekaran S, Vijayalakshmi Pai G.A., 2003, "Neural Networks, Fuzzy Logic and Genetic Algorithms - Synthethesis and Applications" Prentice Hall of India Pvt. Ltd., New Delhi.

4 Timothy and Ross J., 2011, "Fuzzy Logic with Engineering Applications", 3rd Edition, Wiley, New Delhi.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A5DB	ASTRONOMY I	DSE	4		-	4

PREAMBLE

This course has been designed for students to learn and understand

- the basics of Astronomy.
- the formation of solar system and its functioning.
- the concepts of stellar spectra.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamental properties of the planets of the solar system.	K1
CO2	Understand the various laws of planetary motion.	K1
CO3	Demonstrate the planets of the solar system and planetary properties.	K2
CO4	Demonstrate different kinds of telescope and its uses.	K2
CO5	Apply the properties of telescope to observe the Universe.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A5DB	ASTRONOMY I	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Astronomy, an Observational Science 9 h

Introduction –celestial sphere and stellar magnitudes – celestial coordinate system - Precession - Time - the laws of planetary motion - measuring the astronomical unit - Isaac Newtons and his universal law of gravity - gravity today - conclusion

Unit II Our Solar System 1 - The Sun 8 h

Formation of the solar system - The sun - Nuclear fusion - Solar neutrino problem - Solar atmosphere and wind - Sun's magnetic fields and the sunspot cycle - Prominences, flares and interaction of the solar wind with the earth's atmosphere - solar eclipses

Unit III Our Solar System 2 - The Planets 9 h

What is a planet? - Planetary orbits - Planetary properties - Planetary atmosphere - Planets of the solar system - Comets

Unit IV Extra-Solar Planets 10 h

The radical velocity method - Planetary transits - Gravitational microlensing - Astrometry - discovery space - selection effects and the likelihood of finding solar systems like ours

Unit V Observing the Universe 12 h

Thinking about optics - The human eye - use of a telescope or pair of binoculars - using a telescope to see more detail in an image - magnification of a telescope - Image contrast - classic Newtonian telescope - Cassegrain telescope - Catadioptric telescope - Active and adaptive optics - Some significant optical telescopes.

Text Book

1 Ian Morison, 2008. "Introduction to Astronomy and Cosmology", A John Wiley and Sons, Ltd., Publication, UK.

References

1 Hannu Karttunen , Pekka Kroger, Heikki Oja, Markku Poutanen, Karl Johan Donner, 2016, "Fundamental Astronomy", Sixth Edition, Springer, New York

2 Stacy.E.Palen, (2020), Schaum Outline of Astronomy,McGraw Hill, New Delhi.

3 Suresh Chandra and Mohit Kumar Sharma, (2019), A textbook of Astronomy and Astrophysics, Dreamtech Press, New Delhi.

4 Peter Aughton, (2011), The story of Astronomy, Quercus Publishers, London.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A5DC	COMBINATORICS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the concepts of generating permutations and combinations
- the applications of various forms of combinatorics
- formation of recurrence relations and its solution technique

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	define the permutations and combinations of multi-sets	K1
CO2	describe the equivalence relation through generating permutations and combinations	K2
CO3	compute the binomial coefficient for partial ordered sets	K2
CO4	explain the application of Inclusion-Exclusion principle	K3
CO5	solve various forms of recurrence relations	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	M	S	S
CO4	S	M	S	S	S
CO5	S	S	S	S	M

S Strong M Medium L Low

192MT1A5DC	COMBINATORICS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Permutations and Combinations 10 h

Four basic counting principles-Permutations of sets-Combinations (Subsets) of sets-Permutations of multi-sets-Combinations of multi-sets- finite probability.

Unit II Generating Permutations and Combinations 9 h

Generating Permutations-inversions in Permutations-generating Combinations-generating r- subsets- partial orders and equivalence relations

Unit III The Binomial Coefficients 10 h

. Pascal's triangle- Binomial theorem- Unimodality of binomial coefficients-multinomial theorem- Newton's Binomial theorem- more on partially ordered Sets

Unit IV The Inclusion-Exclusion Principle and Applications 9 h

The Inclusion-Exclusion principle-Combinations with repetition-derangements-Permutations with forbidden positions-another forbidden position problem-Mobius inversion

Unit V Recurrence relations and Generating functions 10 h

Number sequences - Generating functions - exponential generating functions - solving linear homogeneous recurrence relations - nonhomogeneous recurrence relations - a geometry example

Text Book

1 Richard A. Brualdi .2019, Introductory Combinatorics, Fifth Edition , Pearson Education, , New Delhi .

References

1 Chuan Chong Chen and Khee-meng Koh, (1992), Principles and Techniques in Combinatorics, World Scientific Publishing, Singapore..

2 Allan Tucker. 2016, Applied Combinatorics, sixth edition , Wiley, New Delhi.

3 Miklos Bona, (2006),A walk through Combinatorics, (Second Edition), World Scientific Publishing, Singapore.

4 Vasudev. C, (2006) Theory and Problems of Combinatorics, New Age International Private Limited, New Delhi.

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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 researchproposals 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 thebasics 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	S
CO2	M	S	S	S	S
CO3	S	S	M	S	S
CO4	S	S	M	M	M
CO5	S	S	M	M	S

S Strong M Medium L Low

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 PerterPruzan, (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..

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A6CA	REAL ANALYSIS - II	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- about limits, continuity of a function and its applications
- the concept of bounded variation and Riemann - Stieltjes integral
- the properties of Multiple Riemann Integrals

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	state the properties of derivatives and Riemann-Stieltjes integral	K1
CO2	measure the bounded variation of derivatives and bounded interval of multiple Riemann integral	K2
CO3	interpret the Riemann integral in the form of summation of series	K2
CO4	derive the theorems involving derivatives and Riemann-Stieltjes integrals	K3
CO5	solve the problems on derivatives, bounded variation and Riemann-Stieltjes integrals	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A6CA	REAL ANALYSIS - II	SEMESTER VI

Total Credits: 4
Total Instructions Hours: 60 h

Syllabus

Unit I Derivatives 13h

Introduction- derivatives and continuity – Algebra – The chain rule – one-sided derivatives and infinite derivatives – Functions with non-zero derivative – Zero derivatives and local extrema – Rolle's theorem – The Mean- Value theorem – Intermediate-value theorem for derivatives – Taylor's formula with remainder.

Unit II Function of Bounded Variation 10 h

Introduction - Properties of monotonic functions – functions of bounded variation – total variation – Additive property – total variation on [a, x] as a function of x - functions of bounded variation expressed as the difference of increasing functions – Continuous functions of bounded variation - curves and paths - Rectifiable paths and arc length.

Unit III The Riemann–Stieltjes Integral 12 h

Introduction - Riemann-Stieltjes integral – Linear properties – Integration by parts – change of variables in a Reimann-Stieltjes Integral – reduction to a Riemann Integral - step functions - Reduction to a finite sum - Euler's summation formula - Monotonically increasing integrators - additive and linearity properties - Riemann's condition - comparison theorems - Integrators of bounded variation.

Unit IV Properties of Riemann–Stieltjes Integral 13 h

Necessary and Sufficient condition for existence of Riemann–Stieltjes - Mean value theorem - integral as a function of the interval - second fundamental theorem - change of variable - second mean value theorem - integral depending on a parameter - differentiation under the integral sign - interchanging the order of integration - Lebesgue's criterion for existence of Riemann Integrals - Complex valued Riemann–Stieltjes Integrals.

Unit V Multiple Riemann Integrals 12h

Introduction - measure of a bounded interval - Integral of a bounded function - sets of measure zero and Lebesgue's criterion - Evaluation of a multiple integral - Jordan measurable in R power n - Multiple integration over Jordan measurable set - Jordan content expressed as a Riemann Integral - Additive property - Mean value theorem.

Text Book

1 Tom M.Apostol, 2002, "Mathematical Analysis", Second Edition, Narosa Publishing House Pvt Ltd., New Delhi.

References

1 Somasundaram.D and Choudhary.B. 2015, "A first course in Mathematical Analysis", Narosa publishing house, New Delhi.

2 Mainak Mukherjee, 2015, "A course in Real Analysis", Narosa publishing house, New Delhi.

3 Shanti Narayan and Raisinghania. M.D, 2014, "Elements of Real Analysis", S.Chand and company Pvt. Ltd., New Delhi.

4 Dipak Chatterjee, 2005, "Real Analysis", Prentice- Hall of India Pvt. Ltd., New Delhi.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A6CB	COMPLEX ANALYSIS - II	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the method of approaching complex integration.
- the types of singularities and its applications.
- the properties of meromorphic functions and Riemann Zeta function

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	identify the type of singularities and method of calculating residues	K1
CO2	estimate the value of integrals involving complex functions through series method	K2
CO3	show the necessity of meromorphic and Zeta functions in complex integration	K2
CO4	demonstrate the properties of residues and entire functions along with its solution methods	K3
CO5	prove the theorems on complex integration and the theory that leads to entire function	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A6CB	COMPLEX ANALYSIS - II	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Complex integration 14 h

Cauchy's integral formula and formulas for derivatives - Zeros of a function – related integral theorem – term by term differentiation and integration of uniformly convergent series.

Unit II Taylor's series and Laurent's series 10 h

Taylor's series – Zeros of an analytic function – Laurent's series - Cauchy's Product and Division.

Unit III Singularities 11 h

Singularity – isolated and removable singularity – pole - essential singularity – behaviour of a function at an isolated singularity – nature of singularities – nature of singularity at infinity.

Unit IV Residues & Meromorphic Functions 13 h

Residues – calculation - real definite integral – examples - Meromorphic functions –Meromorphic in the extended plane.

Unit V Entire Functions & Riemann Zeta Function 12 h

Jensen's formula - Hadamard's theorem - product development - extension of $\xi(s)$ to the whole plane - Functional equation- zeros of the Zeta function.

Text Books

1 Durai Pandian and Kayalal Pachaiyappa, 2014, "Complex Analysis", S. Chand and Company Pvt Ltd. New Delhi. (Unit 1 to Unit 4)

2 Lars V.Ahlfors, 2013, "Complex Analysis", 3rd Edition, Mc-Graw Hill Education Pvt Ltd. New Delhi. (Unit-5)

References

1 Shanthi Narayan and Mittal. P.K, 2008, "Theory of Functions of Complex variables", S. Chand and Company, New Delhi.

2 Pundir S.K. Gupta K.P and Goyal. J.K ,2014,"Complex Analysis", Pragati Prakashan, Meerut.

3 Ponnusamy S, 2005, "Foundations of Complex Analysis", Narosa Publishing House, New Delhi.

4 Vasishtha A.R., 2020, Complex Analysis, Krishna Prakashan Media Pvt., Limited, Meerut.

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192MT1A6CP	R PROGRAMMING LAB	SEMESTER VI

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Create and modify R data sets
2	Write their own R functions and use available package in R
3	Perform and interpret Correlation Analysis
4	Perform and interpret Simple and multiple Linear Regression
5	Perform and interpret one and two sample z-tests
6	Perform and interpret two sample population proportions tests
7	Perform and interpret two sample population Standard deviation tests
8	Perform and interpret one and two sample t – tests
9	Perform and interpret Chi - Square test for 2x2 tables
10	Perform and interpret Paired t and U –test
11	Perform and interpret Chi - Square test for Goodness of Fit
12	Perform and interpret sign test

Note: Out of 12 - 10 is Mandatory.

References

1. Kerns G.J, 2010, "Introduction to Probability and Statistics Using R", 1st Edition, Jay Kerns G, USA.
2. Matthias Kohl, 2015, "Introduction to Statistical Analysis With R", 1st Edition, Bookboon The eBook Company, London.
3. Brain S. Everitt and Torsten Hothorn, 2005, "A Hand book of Statistical Analyses Using R", Taylor & Francis Group, LLC, New York.
4. Norman Matloff, 2011, "The Art of R Programming", Chapman & Hall/CRC Taylor & Francis Group, New York.

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192MT1A6SP	LINEAR PROGRAMMING USING SPREADSHEET	SEMESTER VI

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Formulation of linear programming problem using LibreOffice Calc
2	Solve linear programming problem using LibreOffice Calc
3	Solve simplex problem using LibreOffice Calc
4	Obtain a solution for quadratic programming problem
5	Solve integer programming problem using LibreOffice Calc
6	Obtain a solution for goal programming problem
7	Solve balanced transportation problem using LibreOffice Calc
8	Obtain a solution for unbalanced transportation problem
9	Solve balanced assignment problem using LibreOffice Calc
10	Obtain a solution for unbalanced assignment problem
11	Solve queuing problems using LibreOffice Calc
12	Find the shortest route using LibreOffice Calc

Note: Out of 12 - 10 is mandatory

References

1. LibreOffice Documentation Team, 2020, "LibreOffice Calc 7.0 Guide", The Document Foundation, Germany.
2. Ecclestone T, 2015, "Use LibreOffice Calc: A Beginners Guide", Createspace Independent Publishing Platform, California.
3. LibreOffice Documentation Team, 2019, "Getting Started with LibreOffice 6.0", Friends of OpenDocument, Inc., Australia.
4. Jean Hollis Weber, 2013, "LibreOffice 4.1 Calc Guide", The Document Foundation, Germany.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A6DA	GRAPH THEORY	DSE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the way of representation and properties of graphs
- the concept of trees and its applications
- the metrics of coloring graphs and its applications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	draw and recognize the various forms of graphs and trees	K1
CO2	show the applications of graphs and trees in real world situations	K2
CO3	demonstrate the properties of various forms of graphs and digraphs	K3
CO4	construct the isomorphism of graphs and the method of solving	K3
CO5	demonstrate the coloring of graphs with its applications	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	M	S	S
CO5	S	M	S	M	S

S Strong M Medium L Low

192MT1A6DA	GRAPH THEORY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction of Graphs 12 h

Graphs and Graph Models - Connected graphs - Common classes of graphs - Multi graphs and digraphs - The degrees of a vertex - Regular graphs - Degree sequences - Excursion: graphs and matrices.

Unit II Isomorphic Graphs 10 h

The definition of Isomorphism - Isomorphism as a relation - Excursion: Graphs and groups - Reconstruction and solvability.

Unit III Trees and Connectivity 13 h

Bridges - Trees - The minimum spanning tree problem - Excursion: the number of spanning trees - Cut - Vertices - Blocks - Connectivity - Menger's theorem.

Unit IV Traversability and Digraphs 13 h

Eulerian Graphs - Hamiltonian graphs - Hamiltonian walks - Strong digraphs - Tournaments - Exploration: wine bottle problems.

Unit V Coloring of Graphs 12 h

The four color problem - Vertex coloring - Edge coloring - Excursion: The Heawood map coloring theorem - Exploration: modular coloring.

Text Book

1 Gary Chartrand and Ping Zhang, 2012, "A first course in Graph Theory", 2nd Edition, Dover Publications Inc, New york.

References

1 Narsingh Deo, 1999, "Graph Theory with Applications to Engineering and Computer Science", Prentice Hall of India, New Delhi.

2 Robin J. Wilson, 2010, "Introduction to Graph Theory", 5th Edition, Pearson Education Limited, Essex.

3 Reinhard Diestel, 2017, "Graph Theory", 5th Edition, Springer, Berlin.

4 Harary, 2001, "Graph Theory", Narosa Publishing House Pvt. Ltd, New Delhi.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A6DB	ASTRONOMY - II	DSE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the radio telescopes.
- the properties of stars.
- the galaxies and the large-scale structure of the universe.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	identify the evolution pattern of stars and galaxies	K1
CO2	interpret the theory of stars and its influence in galaxies and cosmology	K2
CO3	demonstrate the forms of stars under various circumstances.	K3
CO4	explain the operations of stars on universe	K3
CO5	demonstrate the theory of Milky way and its influence	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A6DB	ASTRONOMY - II	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Observing the Universe 12 h

Radio telescopes - Observing in other wavebands - Observing the universe without using electromagnetic radiation.

Unit II The Properties of Stars 13 h

Stellar luminosity - Stellar distances - Proper motion - The absolute magnitude scale - Colour and surface temperature - Stellar photometry - Stellar spectra - Spectroscopic parallax - The Hertzsprung - Russell Diagram - The size of stars - The masses and densities of stars - The stellar mass - Luminosity relationship - Stellar lifetimes.

Unit III Stellar Evolution - The Life and Death of Stars 12 h

Low mass stars - Mid mass stars - Variable stars - Planetary nebula - White dwarfs - The evolution of a sun-like star - Evolution of close binary system - High mass stars - Type II supernova - Neutron stars and black holes - The discovery of pulsars - Pulsars as tests for general relativity - Black holes.

Unit IV Galaxies and the Large-scale structure of the Universe 12 h

The Milky Way: open star and globular clusters - Size, shape and structure - Other galaxies: Elliptic and spiral galaxies - Weighing a galaxy - Irregular galaxy - The universe: the cosmic distance scale - Measuring the distance of large Magellanic cloud - The structure of the universe.

Unit V Cosmology - The Origin and Evolution of the Universe 11 h

Einstein's blunder - Big bang models of the universe - The blue shifts and red shifts - The expansion of the universe - The steady state model - The cosmic microwave background - Inflation - The big bang and the formation of the primeval elements - The ripples in the cosmic microwave background - The hidden universe - A universe fit for intelligent life - Intelligent life in the universe - The future of the universe.

Text Book

1 Ian Morison, 2008, "Introduction to Astronomy and Cosmology", John Wiley and Sons, Ltd., Publication, UK.

References

1 Hannu Karttunen, Pekka Kroger, Heikki Oja, Markku Poutanen, Karl Johan Donner, 2016, "Fundamental Astronomy", 6th Edition, Springer-Verlag, Berlin Heidelberg.

2 Stacy E Palen, 2020, "Schaum's Outline of Astronomy", McGraw Hill, New Delhi.

3 Suresh Chandra and Mohit Kumar Sharma, 2019, "A textbook of Astronomy and Astrophysics", Dreamtech Press, New Delhi.

4 Peter Aughton, 2011, "The story of Astronomy", Quercus Publishers, London.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A6DC	SPECIAL FUNCTIONS	DSE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the importance of Hermite polynomial, Legendre's polynomial and Laguerre polynomial
- the influence of Bessel's function in applied Mathematics
- the applications of Hypergeometric function.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	recognize the form of Hermite, Legendre and Laguerre polynomials	K1
CO2	identify the solutions of Bessel's function and Hyper-Geometric function	K1
CO3	interpretation of polynomials through generating functions	K2
CO4	express the various forms of Bessel's function and Hypergeometric function and study their characteristics	K2
CO5	demonstrate the applications of different forms of polynomials and functions	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A6DC	SPECIAL FUNCTIONS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Legendre polynomials 12 h

Legendre function of the first kind: Legendre's equation and its solution - Legendre function of the first kind or Legendre polynomial of degree n - Generating function for Legendre polynomials - Trigonometric series for $P_n(x)$ - Laplace's definite integrals for $P_{-n}(x)$.

Unit II Bessel functions 13 h

Bessel's equations and its solution - Bessel's function of the first kind of order n - List of important results of Gamma and Beta functions - Relation between $J_n(x)$ and $J_{-n}(x)$, n being an integer - Bessel's function of the second kind of order n=0.

Unit III Hermite polynomials 12 h

Hermite equation and its solution - Hermite polynomial of order n - Generating function for Hermite polynomials - Alternative expressions for the Hermite polynomials Rodrigue's formula for Hermite polynomials - Hermite polynomials for some special values of n.

Unit IV Laguerre polynomial 11 h

Laguerre equation and its solution - Laguerre polynomial of order (or degree) n - Generating function for Laguerre polynomials - Alternating expression for the Laguerre polynomials - First few Laguerre polynomials.

Unit V Hypergeometric function 12 h

Pochhammer symbol - General hypergeometric function - Confluent hypergeometric (or Kummer) function - Hypergeometric function - Gauss's hypergeometric equation - Solution of hypergeometric equation.

Text Books

1 Raisinghania M.D, 2015, "Advanced Differential Equations", S. Chand and Company Pvt Ltd. New Delhi.

References

1 George E Andrews, Richard A and Ranjan Roy, 2000, "Special Functions", Cambridge University Press, UK.

2 Raisinghania M.D, 2014, "Ordinary and Partial Differential Equations", S. Chand and Company Pvt. Ltd., New Delhi.

3 Wang Z.X and Guo G.R, 2010, "Special Functions", World Scientific, Singapore.

4 Temme N.M, 1996, "Special Functions: An Introduction to the Classical Functions of Mathematical Physics", John Wiley & Sons Inc., New York.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A6DD	AUTOMATA THEORY AND FORMAL LANGUAGES	DSE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the terminologies of grammar, languages that forms basis for compiler design.
- the state diagrams that represents the languages.
- the application of pumping lemma in validating the type of language.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	recognize the type of grammar and thereby language	K1
CO2	convert the non-deterministic form of finite automata into deterministic form	K2
CO3	express the given language in to normal forms and explain the properties of context free languages	K2
CO4	construction of deterministic finite automata and push-down automata for languages	K3
CO5	demonstrate the type of language using pumping lemma	K4

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A6DD	AUTOMATA THEORY AND FORMAL LANGUAGES	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Finite Automata 13 h

Three basic concepts - Applications - Deterministic and Non-deterministic Finite accepters - Equivalence of Deterministic and Nondeterministic Finite accepters - Reduction of the number of states.

Unit II Regular Languages and Properties 13 h

Regular expressions - Connection between regular expressions and regular languages - Regular grammars - Closure properties - Elementary questions - identifying Nonregular languages.

Unit III Context-Free Languages 11 h

Context-Free grammars - Parsing and Ambiguity - Context-Free Grammars and programming languages - Methods for transforming grammars.

Unit IV Normal Forms and Pushdown Automata 12 h

Two normal forms - Membership algorithm - Nondeterministic Pushdown automata - Pushdown automata and context-free languages - Deterministic Pushdown automata and deterministic context-free languages - Grammars for deterministic context-free languages.

Unit V Properties of Context-Free Languages 11 h

Two Pumping lemmas - Closure properties and decision algorithms for context - Free languages.

Text Book

1 Peter Linz, 2016, "An Introduction to Formal Languages and Automata", 6th Edition, Jones & Bartlett Learning, Burlington.

References

1 Rani Sriomoney, 1984, "Formal Languages and Automata", The Christian Literary Society, Madras.

2 John E Hopcroft, Rajeev Motwani and Jeffery D Ullman, 2013, "Introduction to Automata Theory, Languages and Computation", Pearson Education, New Delhi.

3 Kan R.Y, 1993, "Automata theory: Machines and Languages", McGraw Hill, New York.

4 Xavier S.P Eugune, 2004, "Theory of Automata, Formal Languages and Computation", New Age International Private Limited Publishers, New Delhi.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A6DE	LINEAR ALGEBRA	DSE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the applications of vector space, dual spaces and linear functional
- the concepts of linear transformations along with the properties
- the determinant functions and its applications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	learn about the linear transformations and its influence on polynomials and canonical transformations	K1
CO2	demonstrate the application of vector spaces in linear transformations	K2
CO3	estimate the determinant function and its relation with canonical forms of polynomial	K2
CO4	construct the linear functional and its applications through transformation	K3
CO5	demonstrate the prime factorization of polynomial and the theory of subspaces	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A6DE	LINEAR ALGEBRA	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Linear Equations and Vector Spaces 14 h

Fields - System of linear equations - Matrices and Elementary row operations - Row reduced echelon matrices - Matrix multiplication - Invertible matrices - Vector spaces - Subspaces - Bases and dimensions - Coordinates - Summary - Computations concerning subspaces.

Unit II Linear Transformations 12 h

Linear transformations - Algebra of linear transformations - Isomorphism - Representation by matrices - Linear functional - Double dual - Transpose of a linear transformations.

Unit III Polynomials 12 h

The algebra of polynomials - Lagrange interpolation - Polynomial ideals - The prime factorization of a polynomial.

Unit IV Determinants 11 h

Commutative rings - Determinant functions- Permutations and the uniqueness of determinants - Additional properties - Modules.

Unit V Elementary Canonical Transforms 11 h

Introduction - Characteristic values - Annihilating polynomials - Invariant subspaces.

Text Book

1 Kenneth Hoffman and Ray Kunze, 2006, "Linear Algebra", 2nd Edition, Prentice Hall of India Private Limited, New Delhi.

References

1 Herstein I.N, 2002, "Topics in Algebra", 2nd Edition, Narosa Publishing House, New Delhi.

2 Serge Lang, 2011, "Linear Algebra", 2nd, Springer Verlag Publisher House, New York.

3 Gilbert Strang, 2005, "Linear Algebra and its Applications", 4th edition, Brooks Cole, Singapore.

4 Gilbert Strang, 2016, "Introduction to Linear Algebra", 5th Edition, Wellesley - Cambridge Press, Wellesley.

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Course Code	Course Name	Category	L	T	P	Credit
192MT1A6DF	NUMBER THEORY	DSE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- the concept of number, its forms and laws regarding its behavior
- the applications of various theorems on prime numbers
- the different forms of functions and symbols related to the numbers

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	identify the g.c.d, Primes and values of number theoretic functions	K1
CO2	recognize the importance of primitive roots and Legendre symbol	K1
CO3	interpret the Euler's criterion and generalization through primes and congruence theory	K2
CO4	demonstrate Euclidean algorithm, Chinese remainder theorem and Fermat's theorem	K3
CO5	derive the properties of primitive roots and construct quadratic reciprocity law	K3

MAPPING WITH PROGRAMME OUTCOMES

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

S Strong M Medium L Low

192MT1A6DF	NUMBER THEORY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Preliminaries and Divisibility Theory in the Integers 12 h

Mathematical induction - Binomial theorem - Division Algorithm - Greatest common divisor - Euclidean Algorithm - Diophantine equation ax+by=c.

Unit II Primes and the theory of Congruence 12 h

Fundamental theorems of Arithmetic - Sieve of Eratosthenes - Gold back conjecture - Properties of congruence - Binary and decimal representations - Linear Congruence and the Chinese remainder theorem.

Unit III Fermat's Theorem and Number-Theoretic Functions 12 h

Pierre da Fermat - Fermat's Little theorem and Pseudo primes – Wilson's theorem - Sum and number of divisors - Mobius Inversion formula - Greatest integer function.

Unit IV Euler's Generalization , Primitive Roots and Indices 12 h

Euler's Phi function - Euler's theorem - Order of an Integer modulo 'n' Primitive roots for primes - Composite numbers having Primitive roots.

Unit V The Quadratic Reciprocity law 12 h

Euler's criterion - Legendre symbol - Properties - Quadratic reciprocity law - Quadratic congruence with composite module.

Text Book

1 David M Burton, 2010, "Elementary Number Theory", Sixth Edition, Tata McGraw Hill, New Delhi.

References

1 Ivan Nivan and Herberts Zucherman, 2011, "An Introduction to Theory of Numbers", 5th Edition, Wiley Eastern Limited, New Delhi.

2 Melvyn B Nathanson, 2006, "Methods in Number Theory", Springer International Edition, New York.

3 Kenneth H Rosen, 1983, "Elementary Number Theory and its Applications", Addison-Wesley Publishing Company, London.

4 George E Andrews, 1994, "Number Theory", Dover Publications, America.

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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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