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

REGULATIONS 2023-24 for Under Graduate Programme
(Outcome Based Education model with Choice Based Credit System)

B.Sc. Degree
(For the students admitted during the academic year 2023-24 and onwards)

Programme: B.Sc. Physics

Eligibility

A pass in Higher Secondary Examination in Academic stream or Vocational stream under Higher Secondary Board of Examination, Tamil Nadu with Physics as one of the subjects and as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent there to by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **Bachelor of Physics Degree Examination** of this College after a program of study of three Academic years.

Programme Educational Objectives

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

1. Producing graduates who are well acquainted with the fundamentals of Physics and requisite skills, in order to use their knowledge in Physics in a wide range of practical applications.
2. Developing creative thinking and the power of imagination to enable graduates work in research in academia and industry for broader applications.
3. Relating the training of Physics graduates to the employment opportunities within the country.
4. To promote societal values through Physics related activities.

PROGRAMME OUTCOMES:

On the successful completion of the program, the following are the expectedoutcomes.

PO Number	PO Statement
PO1	Demonstrate an understanding of basic scientific principles,theories, and laws in Physics as well as an awareness of the changing nature of science.
PO2	Analyze, interpret, and evaluate scientific hypotheses and theories using rigorous methods use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in Physics.
PO3	Demonstrate basic experimental skills by the practice of setting up and conducting experiments with minimizing measurement errors.
PO4	Demonstrate a qualitative understanding of the core physics ideas and the relationship of this physics to the humanities through both written and oral communication.
PO5	Demonstrate an ability to recognize the need for life-long learningfor sustaining professional career.

UG - REGULATION (R5)

(2023-24 and onwards)

(OUTCOME BASED EDUCATION WITH CBCS)

1.NOMENCLATURE

1.1 Faculty: Refers to a group of programmes concerned with a major division of knowledge Eg. Faculty of Computer Science consists of disciplines like Departments of Computer Science, Information Technology, Computer Technology, Computer Applications, Data Analytics, Cognitive Systems, Artificial Intelligence and Machine Learning and Cyber Security

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 2023–26 refers to students belonging to a 3 year Degree programme admitted in 2023 and completing in 2026.

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

a) **Core Course:**A course, which should compulsorily be studied by a candidate as a core requirement

b) **Inter Disciplinary Course (IDC):** A course chosen generally from a related discipline/subject with an intention to seek exposure in the discipline relating to the core domain of the student

c) **Discipline Specific Elective (DSE) Course**: Elective courses offered under main discipline/ subject of study.

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

e) **Ability Enhancement Compulsory Courses (AECC):**Mandatory courses that lead to Knowledge enhancement. Environmental Science, Human Rights and Women's Rights, Basic Tamil/ Advanced Tamil, Innovation and IPR, Innovation, IPR and Entrepreneurship.

f) **Ability Enhancement Elective Course (AEEC)/Generic Elective (GE)** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is Generic Elective.

1.5 Project Work:

Course involving application of knowledge in problem solving / analyzing /exploring a real life situation / difficult problem. The Project work will be given in lieu of a Core paper.

Internship/Industrial Training

Students must undertake industrial / institutional training for a minimum of 15 days during the IV semester summer vacation. The students will submit the report for evaluation during V semester.

1.6 Extra Credits:

Extra credits shall be awarded for achievements in identified curricular/co-curricular/Extracurricular activities executed outside the regular class hours. Extra credits are not mandatory for completing the programme.

2. STRUCTURE OF PROGRAMME

2.1 PART- I: LANGUAGE- I

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

2.2 PART- II: LANGUAGE- II

English will be offered during the first four semesters.

2.3 PART- III:

- Core Course
- Inter Departmental Course (IDC)
- Discipline Specific Elective (DSE)
- Skill Enhancement Course (SEC)
- Industrial Training (IT)

2.4 PART- IV:

2.4.1 Ability Enhancement Compulsory Course (AECC):

The Ability Enhancement Compulsory Courses such as i)Environmental Studies, ii) Human Rights and Womens' Rights, iii) Innovation and IPR/ Innovation, IPR and Entrepreneurship are offered during I,II and VI Semester.

Basic Tamil

a) Those who have not studied Tamil up to XII Std and taken a non-Tamil language under Part-I shall take oneBasic Tamil coursein the second semester.

(OR)

Advanced Tamil

b) Those who have studied Tamil up to XII Std and taken a non-Tamil language under Part-I shall take one Advanced Tamil course in the second semester.

Note: Students who come under the above a+b categories are exempted from Human Rights and Women's Rights in the second semester.

Ability Enhancement Elective Course (AEEC)/Generic Elective (GE) An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is Generic Elective offered in V semester. (Theory/Practical/Non-Lab Practical)

2.5 PART- V: EXTENSION ACTIVITIES

The following extracurricular activities like NSS/YRC/NCC/RRC/Yoga/Sports/Clubs are offered under extension activities during semester I & II. Students will be evaluated based on their active participation in any one of the above activities. 75% Attendance is compulsory for extension activity.

3. CREDIT ALLOTTMENT

The following is the credit allotment:

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

4. DURATION OF THE PROGRAMME

The B.A. /B.Com./B. Sc. Programme must be completed within 3 years (6 semesters) and a maximum of 6 years (12 semesters) from the date of acceptance to the programme. If not, the candidate must enroll in the course determined to be an equivalent by BoS in the most recent curriculum recommended for the Programme.

5.REQUIREMENTS FOR COMPLETION OF A SEMESTER

Every student shall ordinarily be allowed to keep terms for the given semester in a program of his/ her enrolment, only if he/ she fulfills at least seventy five percent (75%) of the attendance taken as an average of the total number of lectures, practicals, tutorials, etc. wherein short and/or long excursions/field visits/study tours organised by the college and supervised by the faculty as envisaged in the syllabus shall be credited to his/her attendance. Every student shall have a minimum of 75% as an overall attendance.

6. EXAMINATIONS

The end semester examinations shall normally be conducted after completing 90 working days for each semester. The maximum marks for each theory and practical course shall be 100 with the following breakup:

a) Mark distribution for Theory Courses

Continuous Internal Assessment (CIA)	: 25 Marks
End Semester Exams (ESE)	: 75 Marks
Total	: 100 Marks

i) Distribution of Internal Marks

S.No.	Particulars	Distribution of Marks
1	CIA I (2.5 Units) (On completion of 45th working day)	5
2	Model (All 5 Units) (On completion of 85th working day)	5
3	Attendance	5
4	Library Usage	5
5	Skill Enhancement *	5
	Total	**25**

Breakup for Attendance Marks:

S.No	Attendance Range	Marks Awarded
1	95% and Above	5
2	90% - 94%	4
3	85% - 89%	3
4	80% - 84%	2
5	75% - 79%	1

Note:
Special Cases such as NCC, NSS, Sports, Advanced Learner Course, Summer Fellowship and Medical Conditions etc. the attendance exemption may be given by principal and Mark may be awarded.

Break up for Library Marks:

S.No	Attendance Range	Marks Awarded
1	10h and above	5
2	9h– less than 10h	4
3	8h – less than 9h	3
4	7h - less than 8h	2
5	6h – less than 7h	1

Note:
In exception, the utilization of e-resources of library will be considered.

***Components for "Skill Enhancement" may include the following:**

Class Participation, Case Studies Presentation/term paper, Field Study, Field Survey, Group Discussion, Term Paper, Presentation of Papers in Conferences, Industry Visit, Book Review, Journal Review, e-content Creation, Model Preparation, Seminar and assignment.

Components for Skill Enhancement

Any one of the following should be selected by the course coordinator

S.No.	Skill Enhancement	Description
1	Class Participation	• Engagement in class • Listening Skills • Behaviour
2	Case Study Presentation/ Term Paper	• Identification of the problem • Case Analysis • Effective Solution using creativity/imagination
3	Field Study	• Selection of Topic • Demonstration of Topic • Analysis & Conclusion
4	Field Survey	• Chosen Problem • Design and quality of survey • Analysis of survey
5	Group Discussion	• Communication skills • Subject knowledge • Attitude and way of presentation • Confidence • Listening Skill
6	Presentation of Papers in Conferences	• Sponsored • International/National • Presentation • Report Submission

7	Industry Visit	• Chosen Domain • Quality of the work • Analysis of the Report • Presentation
8	Book Review	• Content • Interpretation and Inferences of the text • Supporting Details • Presentation
9	Journal Review	• Analytical Thinking • Interpretation and Inferences • Exploring the perception if chosen genre • Presentation
10	e-content Creation	• Logo/ Tagline • Purpose • Content (Writing, designing and posting in Social Media) • Presentation
11	Model Preparation	• Theme/ Topic • Depth of background Knowledge • Creativity • Presentation
12	Seminar	• Knowledge and Content • Organization • Understanding • Presentation
13	Assignment	• Content and Style • Spelling and Grammar • References

ii) Distribution of External Marks (ESE)

Total : 75
Written Exam : 75

Marks Distribution for Practical course

Total : 100
Internal : 40
External : 60

i) Distribution of Internals Marks

S.No.	Particulars	Distribution of Marks
1	Experiments/Exercises	15
2	Test 1	10
3	Test 2	10
4	Observation Notebook	05
	Total	**40**

ii) Distribution of Externals Marks

S.No.	Particulars	External Marks
1	Practical	40
2	Record	10
3	Viva- voce	10
	Total	**60**

Practical examination shall be evaluated jointly by Internal and External Examiners

Mark Distribution for Project/ Internship/ Industrial Training

Total : 100
Internal : 40
External : 60

i) Distribution of Internal Marks

S.No.	Particulars	Internal Marks
1	Review I	15
2	Review II	20
3	Attendance	5
	Total	**40**

ii) Distribution of External Marks

S.No	Particulars	External Marks
1	Project Work /Internship /Industrial training Presentation	40
2	Viva –voce	20
	Total	**60**

Evaluation of Project Work/Internship/ Industrial training shall be shall be done jointly by Internal and External Examiners.

7. Credit Transfer

a. Upon successful completion of **1 NPTEL** Course **(4 Credit Course**) recommended by the department, during Semester I to IV, a student shall be eligible to get exemption of one **4 credit course** during the V or VI semester. The proposed NPTEL course should cover content/syllabus of exempted core paper in V orVI semester.

S. No.	Course Code	Course Name	Proposed NPTEL Course	Credit
1			Option – 1 Paper title	4
			Option – 2 Paper title	
			Option – 3 Paper title	

b. Upon successful completion of **2 NPTEL Courses** (2 Credit each) recommended by the department, during Semester I to IV, a student shall be eligible to get exemption of **one 4 credit course** during the V or VI semester. Out of 2 NPTEL proposed courses, **atleast 1 course** should cover content/syllabus of exempted core paper in V orVI semester.

Mandatory

The exempted core paper in the V or VI semester should be submitted by the students for approval before the end of 4th semester

Credit transfer will be decided by equivalence committee

S. No.	Course Code	Course Name	Proposed NPTEL Course	Credit
1			Option – 1 Paper title	2
			Option – 2 Paper title	
			Option – 3 Paper title	
2			Option – 1 Paper title	2
			Option – 2 Paper title	
			Option – 3 Paper title	

NPTEL Courses to be carried out during semester I – IV.

S.No.	Student Name	Class	Proposed NPTEL Course		Proposed Course for Exemption
			Course I	Option 1- Paper Title Option 2- Paper Title Option 3- Paper Title	Any one Core Paper in **V or VI semester**
			Course II	Option 1- Paper Title Option 2- Paper Title Option 3- Paper Title	

Class Advisor **HoD** **Dean**

8. Innovations

Upon Successful outcome of Design Thinking / Copy right/Product/ Patent by the end of the V Semester, student shall be eligible to get exemption in AECC: Innovation, IPR & Entrepreneurship / Innovation & IPR offered during VI Semester.

9.Internship/Industrial Training

Students must undertake industrial / institutional training for a minimum of 15 days during the IV semester summer vacation. The students shall submit the report for evaluation during V semester.

10. Extra Credits: 10

Earning extra credit is not essential for programme completion. Student is entitled to earn extra credit for achievement in Curricular /Co-Curricular/ Extracurricular activities carried out other than the regular class hours.

A student is permitted to earn a maximum of Ten extra Credits during the programme period.

A maximum of 1 credit under each category is permissible.

Category	Credit
Proficiency in foreign language	1
Proficiency in Hindi	1
Self study Course	1
Typewriting/Short hand	1
CA/ICSI/CMA (Foundations)	1
CA/ICSI/CMA(Inter)	1
Sports and Games	1
Publications / Conference Presentations (Oral/Poster)	1
Lab on Project	1
Innovation / Incubation / Patent / Sponsored Projects / Consultancy	1
Representation in State / National level celebrations	1
Awards/Recognitions/Fellowships	1

Credit shall be awarded for achievements of the student during **the period of study only**.

GUIDELINES

Proficiency in foreign language

A pass in any foreign language in the examination conducted by an authorized agency.

Proficiency in Hindi

A pass in the Hindi examination conducted by Dakshin Bharat Hindi Prachar Sabha.

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

Self study Course

A pass in the self study courses offered by the department.

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

Typewriting/Short hand

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

CA/ICSI/CMA(Foundations)

Qualifying foundation in CA/ICSI/CMA / etc.

CA/ICSI/CMA(Inter)

Qualifying Inter in CA/ICSI/CMA / etc.

Sports and Games

Students can earn extra credit based on their achievements in sports in University/ State / National/ International levels.

Publications / Conference Presentations (Oral/Poster)

Research Publications in Journals
oral/poster presentation in Conference

Lab on Project (LoP)

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

(**Evaluation will be done internally**)

Innovation / Incubation / Patent / Sponsored Projects / Consultancy

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

Representation in State/ National level celebrations

State / National level celebrations such as Independence day, Republic day Parade, National Integration camp.

Awards/Recognitions/Fellowships

Regional/ State / National level awards/ Recognitions/Fellowships

GUIDELINES

100 % CIA Courses:

- **AECC**
- **AEEC**

S.No	Type of Course
1	Environmental Studies (AECC)
2	Human Rights and Women's Rights, Basic Tamil /Advanced Tamil (AECC)
3	Innovation &IPR/ Innovation, IPR and Entrepreneurship(AECC)
4	Generic Elective (AEEC)

Modalities for Implementing Internal Assessment Marks:

- Student pertaining to 2023 Batch (2023-26) UG programme for the above mentioned courses shall secure a minimum of 40% out of the maximum marks in the continuous internal assessment (CIA) i.e., 20 marks out of 50 marks.
- Students who have not acquired the minimum marks shall be allowed to reappear to improve their marks in the exam components only within the time duration of the programme, in the forthcoming semesters.

Distribution of Internal Marks for AECC & AEEC

S.No.	Particulars	Distribution of Marks
1	CIA I (2.5 Units) (On completion of 45th working day)	15
2	Model (All 5 Units) (On completion of 85th working day)	15
3	Assignment	05
4	Attendance	05
5	Library Usage	05
6	Skill Enhancement *	05
	Total	**50**

Distribution of Internal Marks for Generic Elective (AEEC) (Practical)

S.No.	Particulars	Distribution of Marks
1	CIA -I (1-5 Exercise)	5
2	CIA-II (6-10 Exercise)	5
3	Class Participation	10
4	Practical Record	10
5	Test-III & Viva –Voce(10+10)	20
	Total	**50**

Question paper pattern AECC & AEEC

Test	MARKS	DESCRIPTION	TOTAL	Remarks
CIA Test I **1 Hour** **First 2.5 Units**	50 x 1 = 50 Marks	MCQ	50 Marks	Marks secured will be Converted to 15 marks
CIA test II/ Model test **1 Hour** **All five Units**	50 x 1 = 50 Marks	MCQ	50 Marks	Marks secured will be Converted to 15 marks

Question paper pattern		Total Marks - 50	
Basic Tamil		**Advanced Tamil**	
Section -A		**Section -A**	
Choose the correct answer	**10**x2=20	**Choose the correct answer**	**10**x1=10
Section -B		**Section -B**	
True or false	10x2=20	**Fill in the blanks**	10x2=20
Section -C		**Section -C**	
Answer in one page	1x10=10	**Write an essay in two pages**	2x10=20

Question paper pattern for all other courses falling under Part I to Part III

CIA I : [1 ½ Hours-2.5 Units] - 25 Marks

SECTION	MARKS	DESCRIPTION	TOTAL	Remarks
Section – A	8 x 0.5 = 04 Mark	MCQ	25 Mark	Marks secured will be converted To 5 mark
Section - B	3 x 3 = 09 Mark	Answer ALL Questions Either or Type ALL Questions Carry Equal Marks		
Section - C	2 x 6 = 12 Mark			

CIA II /Model: [3 Hours-5 Units] - 75 Mark

SECTION	MARKS	DESCRIPTION	TOTAL	Remarks
Section – A	10 x 1 = 10 Mark	MCQ	75 Mark	Marks secured will be converted To 5 mark
Section - B	5 x 5 = 25 Mark	Answer ALL Questions (Either or Type Questions) Each Questions Carry Equal Mark		
Section - C	5 x 8 = 40 Mark			

End Semester Examination: [3 Hours-5 Units] - 75 Mark

SECTION	MARKS	DESCRIPTION	TOTAL
Section – A	10 x 1 = 10 Mark	MCQ	75 Mark
Section - B	5 x 5 = 25 Mark	Answer ALL Questions (Either or Type Questions) Each Questions Carry Equal Mark	
Section - C	5 x 8 = 40 Mark		

UG - Credit distribution - Common for R5

For students admitted in AY 23-24 and onwards.

Part	Subjects	No. of Papers	Credit	Semester No.
I (12 Credits)	Tamil / Hindi / French/Malayalam	4	4 x 3 = 12	I & IV
II (12 Credits)	English	4	4 x 3 = 12	I & IV
III (108 Credits)	Core (Credits 2,3,4,5)	16-19	70	I to VI
	Inter Departmental Course (IDC)	4	16	I to IV
	Discipline Specific Elective (DSE)	3	3 x 4 =12	V & VI
	Skill Enhancement Course(SEC)	4	8	III,IV,V& VI
	Industrial Training	1	2	V
IV (8 Credits)	Environmental Studies(AECC)	1	2	I
	Basic Tamil/ Advance Tamil /Human Rights &Women's Rights(AECC)	1	2	II
	Innovation & IPR/Innovation, IPR &Entrepreneurship (AECC)	1	2	VI
	Generic Elective(GE) (AEEC)	1	2	V
V (2 Credits)	NSS/NCC/YRC/RRC/Yoga/Sports/Clubs	-	2	I -II
TOTAL CREDITS			**142**	

PROGRAMME NAME – B.Sc. Physics
A.Y:23-24

Course Code	Course Category	Course Name	L	T	P	Exam (hours)	Max Marks			Credits
							CIA	ESE	Total	
First Semester										
Part– I										
231TL1A1TA	Language-I	Tamil-I	4	1	-	3	25	75	100	3
231TL1A1HA		Hindi-I								
231TL1A1MA		Malayalam-I								
231TL1A1FA		French–I								
Part– II										
231EL1A1EA	Language-II	English -I	4	-	1	3	25	75	100	3
Part– III										
232PY1A1CA	Core- I	Properties of Matter and Sound	4	1	-	3	25	75	100	4
232PY1A1CB	Core -II	Mechanics	4	-	-	3	25	75	100	3
232PY1A1CP	Core practical -I	Properties of matter and Mechanics	-	-	4	3	40	60	100	2
232MT1A1IP	IDC -I	Fundamenta of Mathematics with MATLAB			2	3	40	60	100	3
Part-IV										
233MB1A1AA	AECC-I	Environmental Studies	2	-	-		50	-	50	2
Part - V										
232PY1A1XA	Extension Activity	NSS/NCC/ YRC/RRC/ Yoga/Sports/ Clubs					50	-	50	1
Total			**21**	**2**	**7**				**700**	**22**

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12.6.23 14.7.23 5.8.23

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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Second Semester										
Part-I										
231TL1A2TA	Language-I	Tamil-II	4	1	-	3	25	75	100	3
231TL1A2HA		Hindi-II								
231TL1A2MA		Malayalam-II								
231TL1A2FA		French-II								
Part– II										
231EL1A2EA	Language-II	English - II	4	-	1	3	25	75	100	3
Part– III										
232PY1A2CA	Core- III	Heat and Thermodynamics	4	-	-	3	25	75	100	4
232PY1A2CB	Core -IV	Atomic Physics	4	1	-	3	25	75	100	4
232PY1A2CP	Core Practical- II	Heat and Thermodynamics	-	-	4	3	40	60	100	2
232MT1A2EP	IDC- II	Statistical Analysis and Tools	3	-	2	3	40	60	100	4
Part-IV										
231TL1A2AA/ 231TL1A2AB/ 235CR1A2AA	AECC-II	Basic Tamil/ Advanced Tamil / Human Rights and Women's Rights	2	-	-	2	50	-	50	2
Part-V										
232PY1A2XA	Extension Activity	NSS/NCC/ YRC/RRC/ Yoga/Sports/ Clubs					50	-	50	1
		Total	**21**	**2**	**7**				**700**	**23**

18/10/2023
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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Third Semester										
Part-I										
231TL1A3TA	Language - I	Tamil - III	3	1	-	3	25	75	100	3
231TL1A3HA		Hindi - III								
231TL1A3MA		Malayalam - III								
231TL1A3FA		French - III								
Part– II										
231EL1A3EA	Language - II	English - III	3	1	-	3	25	75	100	3
Part– III										
232PY1A3CA	Core - V	Electricity and Magnetism	4	-	-	3	25	75	100	4
232PY1A3CB	Core - VI	Nuclear Physics	3	-	-	3	25	75	100	3
232PY1A3CP	Core Practical - III	Electricity and Magnetism	-	-	4	3	40	60	100	2
232CE1A3EP	IDC - III Practical	Chemistry - I	3	-	4	3	40	60	100	5
232PY1A3SP	SEC - I Practical	Basic Computer Skills	2	-	2	3	40	60	100	2
		Total	**18**	**2**	**10**				**700**	**22**

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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fourth Semester										
Part-I										
231TL1A4TA	Language-I	Tamil-IV	3	1	-	3	25	75	100	3
231TL1A4HA		Hindi-IV								
231TL1A4MA		Malayalam-IV								
231TL1A4FA		French–IV								
Part– II										
231EL1A4EA	Language-II	English -IV	3	1	-	3	25	75	100	3
Part– III										
232PY1A4CA	Core- VII	Optics and Spectroscopy	4	-	-	3	25	75	100	4
232PY1A4CB	Core -VIII	Principles of Electronics and Communication	4	-	-	3	25	75	100	4
232PY1A4CP	Core Practical- IV	Optics and Spectroscopy	-	-	4	3	40	60	100	2
232CE1A4EP	IDC -IV Practical	Chemistry - II	3	-	4	3	40	60	100	5
232PY1A4SA	SEC-II	Concepts and Programming in C	3	-	-	3	25	75	100	2
		Total	**20**	**2**	**8**				**700**	**23**

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Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fifth Semester										
Part–III										
232PY1A5CA	Core- IX	Mathematical Physics	4	1	-	3	25	75	100	5
232PY1A5CB	Core -X	Classical and Statistical Methods of Analysis	4	-	-	3	25	75	100	4
232PY1A5CC	Core -XI	Solid State Physics	4	1	-	3	25	75	100	5
232PY1A5CP	Core Practical- V	Advanced Physics	-	-	4	3	40	60	100	2
232PY1A5CQ	Core Practical -VI	C Programming	-	-	4	3	40	60	100	2
232PY1A5SA	SEC-III	Fundamentals of IoT	2	-	-	3	25	75	100	2
232PY1A5DA	DSE –I	Renewable energy Sources	4	-	-	3	25	75	100	4
232PY1A5DB		Laser Physics								
232PY1A5DC		Physics of Devices and Instrumentation								
232PY1A5TA	IT	Industrial Training					40	60	100	2
Part IV										
	GE		2	-	-	2	50	-	50	2
		Total	**20**	**2**	**8**				**850**	**28**

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part–III										
232PY1A6CA	Core -XII	Relativity and Quantum	4	-	-	3	25	75	100	4
232PY1A6CB	Core -XIII	Digital Electronics and Microprocessors	3	-	-	3	25	75	100	3
232PY1A6CP	Core Practical -VII	Electronics	-	-	4	3	40	60	100	2
232PY1A6CV	Core -XIV	Project	-	-	7	3	40	60	100	4
232PY1A6SA	SEC-IV	Fundamentals of AI	2	-	-	3	25	75	100	2
232PY1A6DA	DSE –II	Nanophysics	4	-	-	3	25	75	100	4
232PY1A6DB		Materials Science								
232PY1A6DC		Radiation Physics								
232PY1A6DD	DSE –III	Solar Photovoltaic Technology	4	-	-	3	25	75	100	4
232PY1A6DE		Astrophysics								
232PY1A6DF		Biomedical Instrumentation								
Part–IV										
233BC1A6AA	AECC-III	Innovation, IPR & Entrepreneurship	2	-	-		50	-	50	2
		Total	**19**	**-**	**11**				**750**	**25**
		Grand Total							4400	142

Total Credit should not exceed 142 credits

Theory : CIA 25: ESE 75
Practical/ IT/ Project : CIA 40: ESE 60

DISCIPLINESPECIFICELECTIVE

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.	232PY1A5DA	Renewable energy Sources
2.	232PY1A5DB	Laser Physics
3.	232PY1A5DC	Physics of Devices and Instrumentation

Semester VI (Elective II)

List of Elective Courses

S.No.	Course Code	Name of the Course
1.	232PY1A6DA	Nanophysics
2.	232PY1A6DB	Materials Science
3.	232PY1A6DC	Radiation Physics

Semester VI (Elective III)

List of Elective Courses

S.No.	CourseCode	Nameof theCourse
1.	232PY1A6DD	Solar Photovoltaic Technology
2.	232PY1A6DE	Astrophysics
3.	232PY1A6DF	Biomedical Instrumentation

GENERIC ELECTIVE COURSE (GE)

The following course offered under Generic Elective Course

Semester V (GE)

S.No.	Course Code	Course Name
1.	232PY1A5GA	Eco Physics

EXTRACREDITCOURSES

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

Semester III

S.No.	Course Code	Course Name
1.	232PY1ASSA	Electrical and Electronic Appliances
2.	232PY1ASSB	Biophysics

Course Code	Course Name	Category	L	T	P	Credit
231TL1A1TA	TAMIL - I	LANGUAGE- I	4	1	-	03

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத் திறன்கள் (Life Skills)- மாணவர்களின் செயலாக்கத் திறனை ஊக்குவித்தல்	K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K4
CO3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A1TA	TAMIL - I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I மறுமலர்ச்சிக் கவிதைகள் 13 h

1. இலக்கிய வரலாறு - மறுமலர்ச்சிக் கவிஞர்களின் தமிழ்ப்பணிகள்
2. பாரததேசம் - பாரதியார்
3. படி - பாரதிதாசன்
4. தமிழரின் பெருமை - நாமக்கல் கவிஞர்
5. தமிழ்க் கொலை புரியாதீர் - புலவர் குழந்தை
6. திரைத்தமிழ்

அ) 'விஞ்ஞானத்த வளர்க்கப் போறண்டி' எனத் தொடங்கும் பாடல் - உடுமலை நாராயண கவி

ஆ) 'சும்மா கிடந்த நிலத்தை' எனத் தொடங்கும் பாடல் - பட்டுக்கோட்டை கல்யாண சுந்தரனார்

இ) 'சமரசம் உலாவும் இடமே' எனத் தொடங்கும் பாடல் - மருதகாசி

ஈ) 'உன்னை அறிந்தால்' எனத் தொடங்கும் பாடல் - கண்ணதாசன்

Unit II புதுக்கவிதைகள் 13 h

1. இலக்கிய வரலாறு - புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும்
2. கடமையைச் செய் - மீரா
3. மலையாளக் காற்று - சிற்பி
4. ஒப்பிலாத சமுதாயம் - அப்துல் ரகுமான்
5. கன்னிமாடம் - மு.மேத்தா
6. கரிக்கிறது தாய்ப்பால் - ஆரூர் தமிழ்நாடன்
7. ஐந்தாம் வகுப்பு 'அ' பிரிவு - நா. முத்துக்குமார்
8. ஹைகூ கவிதைகள் - 10 கவிதைகள்

Unit III பெண்ணியம் 09 h

1. தொலைந்து போனேன் - தாமரை
2. நீரில் அலையும் முகம் - அ. வெண்ணிலா
3. தற்காத்தல் - பொன்மணி வைரமுத்து
4. ஏனிந்த வித்தியாசங்கள் ? - மல்லிகா
5. புதையுண்ட வாழ்க்கை - சுகந்தி சுப்ரமணியன்

Unit IV **சிறுகதைகள்** 15 h

1. இலக்கிய வரலாறு - சிறுகதையின் தோற்றமும் வளர்ச்சியும்
2. கனகாம்பரம் - கு.ப.ராஜகோபாலன்
3. ஆற்றங்கரைப் பிள்ளையார் - புதுமைப்பித்தன்
4. பொம்மை - ஜெயகாந்தன்
5. காய்ச்சமரம் - கி. ராஜநாராயணன்
6. காட்டில் ஒருமான் - அம்பை
7. வேட்கை - சூர்யகாந்தன்

Unit V **பயிற்சிப் பகுதி** 10 h

அ. இலக்கணம்

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

ஆ. படைப்பாக்கம்

1. கவிதை - எழுதுதல் (15 வரிகள் முதல் 30 வரிகள் வரை)
2. சிறுகதை - எழுதுதல் (குறைந்தது 3 பக்கங்கள்)

Text Book

1 தமிழ் மொழிப்பாடம் - 2022-2023, தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, கோயம்புத்தூர் – 641048, வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 600 098.

References

1 பேராசிரியர் புலவர் சோம. இளவரசு , எட்டாம் பதிப்பு - 2014, தமிழ் இலக்கிய வரலாறு – மணிவாசகர் பதிப்பகம், சென்னை – 600 108.

2 பேராசிரியர் முனைவர் பாக்கியமேரி , முதற் பதிப்பு - 2013 , இலக்கணம் - இலக்கிய வரலாறு - மொழித்திறன் - பூவேந்தன் பதிப்பகம், சென்னை-600 004.

3 இணையதள முகவரி: https://www.tamilvu.org

Course Code	Course Name	Category	L	T	P	Credit
231TL1A1HA	HINDI-I	LANGUAGE-1	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The writing ability and develop reading skill
- The various concepts and techniques for criticizing literature
- The techniques for expansion of ideas and translation process

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A1HA	HINDI–I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I 13 h

गद्य - नूतनगद्यसंग्रह(जयप्रकाश)पाठ 1- रजियापाठ 2- मक्रीलपाठ 3- बहतापानीनिर्मला
पाठ 4- राष्ट्रपितामहात्मागाँधी

Unit II 13 h

कहानीकुंज- डॉवी.पी. 'अमिताभ'(पाठ 1-4)

Unit III 12 h

व्याकरण : शब्दविचार (संज्ञा, सर्वनाम,विशेषण)

Unit IV 12 h

अनुच्छेद लेखन

Unit V 10 h

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

Text Books

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

2 प्रकाशक: गोविन्दप्रकाशनसदरबाजार, मथुराउत्तरप्रदेश-281001

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

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

5 प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

Course Code	Course Name	Category	L	T	P	Credit
231TL1A1MA	MALAYALAM- I	LANGUAGE - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The writing ability and develop reading skill
- The various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- The competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A1MA	MALAYALAM - I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I **Novel** 14 h

Pathummayude Adu

Unit II **Novel** 10 h

Pathummayude Adu

Unit III **Short Story** 14 h

Nalinakanthi

Unit IV **Short Story** 10 h

Nalinakanthi

Unit V **Practical Application** 12 h

Expansion of ideas, General Essay and Translation

Text Books

1 Vaikkam Muhammed Basheer, "Pathummayude Adu" (NOVEL), DC Books & Kottayam

2 T.Padmanabhan, "Nalinakanthi" (Short Story), DC Books & Kottayam.

References

1 Malayala Novel Sahithyam.

2 Malayala Cherukatha Innale Innu.

Course Code	Course Name	Category	L	T	P	Credit
231TL1A1FA	FRENCH - I	LANGUAGE - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The competence in general communication skills with oral, written and comprehension & expression
- The culture, life style and the civilization aspects of the French people as well as of France
- The students to acquire competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/Human Values/ Ethics

231TL1A1FA	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 rapides et remplir de taches d'appréciation	• Dans une soirée de recontres rapid comprendre des personnes qui échangent sur elles et sur leurs goût • Comprendre une personne qui parler des goûts de quelqu'un d'autre

Unit IV J'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		
Demander à quelqu'un de faire quelque chose. Demander poliment. Parler d'actions passes. Tu veux bien?	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.

Unit V Practical Application 10 h

Make in Own Sentences

Text Book

1 Regine Merieux, Yves Loiseau. 2012. LATITUDES – 1: Méthode de français (Page No: 9-55) Les Editions Dider, Paris, Imprime en Roumanie par Canale en Janvier

Course Code	Course Name	Category	L	T	P	Credit
231EL1A1EA	ENGLISH - I	LANGUAGE- II	4	-	1	3

PREAMBLE

This course has been designed for students to learn and understand

- The effect of dialogue, imagery and varied genres
- Any spontaneous spoken discourse and respond to them with proper sentence structure
- The transactional concept of English language

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Identify the various aspects in poetry	K2
CO2	Infer linguistic and non-linguistic features of the context for understanding and interpreting	K3
CO3	Construct sentences and convey messages effectively in real life situations	K3
CO4	Apply different reading strategies with varying speed	K3
CO5	Prepare modules with their own ideas and present them coherently in a grammatically correct form	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231EL1A1EA	ENGLISH- I	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Genre Studies **12 h**

Nissim Ezekiel: The Worm- Author's Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques– Annotations

Niyi Osundare: Our Earth Will Not Die- Author's Biography- title indications- outline- paraphrasing the poem- context of poem- form- poetic devices- enjambment- techniques– Annotations

A. G. Gardiner: On Superstitions- Author's biography- Narrative structure- Exploration of the text- passage analysis- insight of ideas- cohesion and context- style- language techniques- Annotation

Nancy Bella: Clever Thief- Author's Biography- Plot Summary- Detailed summary and Analysis- Themes- Important Quotations- Characters- Description - analysis- Terms- Symbols- Critical analysis

H. G. Wells: The Truth about Pyecraft- Author's Biography-narrative structure- passage analysis- insight of ideas- cohesion and context- style- language techniques

Unit II Listening Skills **12 h**

Listening vs. hearing- Types of listening, Tips to enhance Listening Skills, Non-verbal and Verbal signs of active listening - Comprehensive Listening - Listening to pre-recorded audios on speeches, interviews and conversations - Listening Activities- Listening and responding to complaints (formal situation), Listening to problems and offering solutions (informal)

Unit III Speaking Skills **14 h**

Formal occasions- Introducing oneself, Introducing others, Enquiries and Seeking permission, Making short presentations- Informal occasions- Requests, Offering help, Congratulating, Farewell party, graduation speech- Giving instructions to do a task and to use a device, Giving and asking directions

Unit IV Reading Skills **10 h**

Study Skills: Skimming and Scanning- Reading different kinds of texts- Types of reading-Developing a good reading speed, reading aloud, Referencing skill - Word

Power (Denotation and Connotation) - Reading comprehension, Data interpretation -Charts, Graphs, Advertisements

Unit V Writing Skills **12 h**

Sentence patterns, Note- making and note taking-Strategies - Paragraph writing: Structure and Principles - Academic Writing - Formal and Informal Letters, Report, Book /Movie Review

Text Books

1. Gardiner, A. G. 1926. Alpha of the Plough: Second series, J.M. Dent & Sons Ltd., London, United Kingdom. pg.no-151-156. (Unit I)
2. Ezekiel, Nissim. "The Worm," Crazy Romantic Love, www. mianmawaisarain.live/2020/05/poem-worm-nissim-ezekiel.html. Accessed 3 Aug. 2022. (Unit I)
3. < http://livros01.livrosgratis.com.br/ln000835.pdf /> (Unit I)
4. Mithra, S. M. 1919. Hindu Tales from the Sanskrit, Macmillan & Co Ltd., London, United Kingdom. pg.no-127-142. (Unit I)
5. Nation, I. S. P and Jonathan Newton. 2009. Teaching ESL/EFL Listening and Speaking. Routledge, New York, United States. (Unit II)
6. Prabha, Dr. R. Vithya & S. Nithya Devi. 2019. Sparkle. (1st Edn.) McGraw - Hill Education, Chennai, India. (Unit III– V)

References

1. Our Earth Will Not Die By Niyi Osundare." Studocu.Com, studocu.com /in/document/bangalore-university/bachelor-of-computer-applications /1586771577-our-earth-will-not-die/27675462. Accessed 3 Aug. 2022.
2. OnSuperstitions."THEHISTORIAN,thehistorian1947.wordpress.com/2019/0 3/08/on-superstitions-by-a-g-gardiner. Accessed 3 Aug. 2022.
3. Swales, John M. & Feak, Christine B. 2012. Academic Writing for Graduate Students: Essential Tasks and Skills, University of Michigan Press, Michigan, United States.
4. Rudzka, Brygida -Ostyn, 2003. Word Power: Phrasal Verbs and Compounds: A Cognitive Approach, Mouton de Gruyter, New York, United States.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A1CA	PROPERTIES OF MATTER AND SOUND	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic principles, theory and concepts of Properties of Matter and Sound
- The elastic properties of matter and the limits of elastic behavior
- The nature and production of sound waves

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 elastic modulus.	K2
CO2	Utilize the basic properties of matter and do the experiments in laboratory to evaluate the properties.	K2
CO3	Explain the basics of viscosity and compare it using different methods.	K3
CO4	Show experiments in explaining basics of sound waves using sonometer..	K2
CO5	Summarize the production, detection, properties and uses of ultrasonic waves..	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A1CA	PROPERTIES OF MATTER AND SOUND	SEMESTER I

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Elasticity **14 h**

Relation between angle of shear and linear strain - Work done in strain – Relation between the elastic moduli - Bending of beams – Expression for the bending moment - Determination of young's modulus by uniform bending method - Torsion of a body – Expression for torque per unit twist – Torsional oscillations of a body - Rigidity modulus by dynamic torsion method (Torsional pendulum).

Unit II Surface Tension **12 h**

Molecular forces – Explanation of surface tension on kinetic theory – Work done in increasing area of a surface – Pressure difference across a liquid surface - Jaegar's method - Variation of surface tension with temperature - Experimental study of variation of surface tension with temperature.

Unit III Viscosity **12 h**

Poiseuille's formula for the flow of a liquid through capillary tube – Ostwald's viscometer – Stokes method for coefficient of viscosity of a viscous liquid – Friction and lubrication – Modification of Poiseuille's formula for gases - Rankine's method for determination of η of a gas.

Unit IV Oscillation **11 h**

Simple harmonic motion - Free vibration of a body - Damped vibration - Force vibrations - Saw tooth wave - Square wave - Composition of two simple harmonic motion in straight line - Lissajous figure - Experimental methods for obtaining Lissajous figure and uses.

Unit V Ultrasonics and Acoustics **11h**

Ultrasonics – Piezoelectric effect – Piezoelectric crystal method – Magnetostriction method – Applications - Acoustics of building – Sabine's Reverberation formula (No derivation) - Factors affecting acoustics of building - Sound distribution in an auditorium - Requisites for good acoustics.

Text Books

1 Murugeshan R, 2021, "Properties of matter", 3rd Edition, S. Chand & Co, New Delhi. (Unit 1, 2 & 5.

2 BrijLal and Subrahmanyam N, 2017, "Properties of Matter", 7th Edition, S. Chand and Co, New Delhi.

References

1 Subramanyam N, 2019,"Text book of Sound", 3rd Edition, Vikas publications, New Delhi.

2 Gupta A. B, 2019, "Classical mechanics and properties of matter", 4th Edition, S. Chand & Co, New Delhi. (Unit 3 & 4.

3 Murugeshan R, 2016, "Properties Of Matter And Acoustic", 2nd Edition, Chand and Co, New Delhi.

4 Mathur D S, 2014," Elements of Properties of Matter", 3rd Edition, S. Chand and Co, New Delhi..

5 https://archive.nptel.ac.in/courses/105/105/105105177/.

6 https://nptel.ac.in/courses/122105023.

7 https://kanchiuniv.ac.in/coursematerials/Physics%20book_Final%20(1).pdf.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A1CB	MECHANICS	CORE	4	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The basic laws and principles of Newtonian mechanics
- The central forces and conservative nature of central forces
- Apply the laws of mechanics in various application

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Summarize the concept of collisions and impact of Newton's law.	K2
CO2	Utilize the principle of moment of inertia for experimental verification.	K3
CO3	Illustrate the gravitational field and applications related to space	K2
CO4	Solve the problems in central force motions and interpret through derivational values..	K3
CO5	Explain the concept of friction and demonstrate the importance of hydrodynamical functions	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A1CB	MECHANICS	SEMESTER I

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Collisions **10 h**

Collisions - Calculation of final velocities of colliding particle - Elastic collision in two or three dimensions - Collisions - Elastic one-dimensional collision - Impulse of a force - Value of the scattering angle - Impulse and linear momentum – Newton's law of impact - Co-efficient of restitution - Motion of two smooth bodies perpendicular to the line of impact - Definitions for direct and oblique impact

Unit II Dynamics of Rigid Body **8 h**

Moment of inertia – Theorems of perpendicular and parallel axes – Calculation of M.I for Rectangular, Cylindrical and Spherical Bodies – Compound pendulum – Theory – Determination of g and k..

Unit III Gravitation **11 h**

Newton's law of gravitation – G by Boy's method – Acceleration due to gravity - Motion of a planet in an elliptical orbit around the sun - Mass and density of earth - Conservation of angular momentum of a system, a consequence of a rotational invariance of potential energy of the system - Motion of a planet or a satellite in its orbit – Applications: Scattering of a positive particle by a massive nucleus - Effect on linear and angular speeds of a particle on contraction of its orbit - The shape of the galaxy

Unit IV Central Force Motion **9 h**

Torque and angular acceleration – Acceleration of two objects connected by a cord - Acceleration of two connected objects when friction is present – Automobile Antilock Braking Systems (ABS) - Determination of motion of individual particle – System of variable mass.

Unit V Statics and Hydrodynamics **10 h**

Friction - Laws of friction - Experimental method for determining coefficient of friction - Hydrodynamics - Equation of continuity of flow – Bernoulli's theorem and its applications - Venturi meter - Pitot tube

Text Books

1 Mathur D S, 2014, "Mechanics", 4th Edition, S. Chand and Co., New Delhi.

2 Halliday D, Resnick R and Walker J, 2011, "Fundamentals of Physics", 9th Edition, Wiley.

References

1 Duraipandian P, 2005, "Mechanics", 6th edition, S. Chand and Co., New Delhi.

2 Murugesan P, 2014, "Properties of matter", S. Chand and Co., New Delhi.

3 Charles Kittel, Walter Knight, Malvin Ruderman, Carl Helmholz, Burton Moyer, 2007, "Mechanics Berkeley Physics Course", Volume 1, Tata McGraw-Hill, New Delhi.

4 Murugesan R, 2014, "Mechanics and Mathematical Physics", S. Chand and Co., New Delhi..

5 https://www.youtube.com/watch?v=C1XuwHLacao

6 https://holooly.com/solutions/acceleration-of-two-connected-objects-when-friction-is-present-a-block-of-mass-m2-on-a-rough-horizontal-surface-is-connected-to-a-ball-of-mass-m1-by-a-lightweight-cord-over-a-lightweigt-frictionles.

232PY1A1CP	CORE PRACTICAL : PROPERTIES OF MATTER AND MECHANICS LAB	SEMESTER I

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Determination of 'g' and 'K' by compound pendulum.
2	Finding Young's Modulus-Uniform Bending (Microscopic Method)
3	Determination of Rigidity Modulus – Static Torsion
4	Determination of the Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's Method).
5	Determination of Frequency of a tuning fork by Sonometer.
6	Determination of Rigidity modulus of a string.
7	Calculation of the Coefficient of Viscosity of the liquid by Stoke's Method
8	Study of the rate of flow of water through a capillary tube under different pressure heads.
9	Determination of Surface tension of a liquid by drop weight method.
10	Finding Young's Modulus - Cantilever Depression.
11	Determination of Young's Modulus-Uniform Bending (Koenig's Method)
12	Determination of Young's Modulus-Non-uniform Bending (Microscopic Method)

Note: Any 10 experiments

References

1 Ouseph C C, 2014, "Practical Physics and Electronics", Vishwanathan Publications, Chennai.

2 Samir kumar ghosh. Textbook of Advanced Practical Physics, NCBA Publishers.

3 Chattopadhyay .D, 2015, "Advanced Course in Practical Physics", NCBA Publications, Kolkata.

4 Murughesan R, 2014, "Thermal Physics", S Chand and Co, New Delhi.

Course Code	Course Name	Category	L	T	P	Credit
232MT1A1IP	Fundamentals of Mathematics with MATLAB	IDC	3	-	2	3

PREAMBLE

This course has been designed for students to learn and understand

- The techniques to solve Mathematical problems using programming knowledge
- The applications of maxima and minima of functions
- The method of constructing definite integrals

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concept of MATLAB.	K1
CO2	Describe the vector and matrix	K2
CO3	Identify the maxima and minima of functions	K1
CO4	Describe first order and first degree Differential equations	K2
CO5	Recognize the integration by parts	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232MT1A1IP	Fundamentals of Mathematics with MATLAB	SEMESTER I

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I Creating Arrays 9 h

Creating a one dimensional array (vector) - Creating a two dimensional array (matrix) - Variables in Matlab - Transpose operator - array addressing - adding elements to existing variables - deleting elements - built in functions -strings and strings as variables - problems.

1 Creation of vector and matrix

2 Usage of zeros, ones and eye commands

3 Transposing a vector and matrix by transpose Operator

4 Adding element to a vector and matrix.

Unit II Mathematical Operations with Arrays 9 h

Addition and subtraction - array multiplication - array division - element by element operations - using arrays in Matlab - Built in functions for analyzing arrays -generation of random numbers -Matlab applications.

5 Matrix operations such as addition, subtraction and multiplication

6 Inverse of a Matrix

7 Solving three linear equations (array division method)

8 Built in functions for analyzing arrays.

Unit III Differential Calculus 14 h

Maximum and minimum value of a function- necessary conditions for extreme values - sufficient condition - use of second order derivative- applications.

9 Derivative of symbolic expressions

10 Evaluate the derivative at some particular point

11 Finding maxima and minima for a function.

Unit IV Differential equations of first order and first degree 14 h

Introduction-separation of variables-transformation of some equations in the form in which variables are separable-homogeneous equations- working rule-equations reducible to homogeneous form-Pfaffian differential equation-Exact differential equation-Necessary and sufficient condition for a differential equation of first order and first degree to be exact-working rule-solved examples.

12 Solve the Pfaffiandifferential equation

13 Solve the homogeneous differential equation

14 Solve the exact differential equation.

Unit V Integral Calculus 14 h

Properties of definite integral - Integration by parts - reduction formula - Bernoulli's formula.

15 Definite Integrals of Symbolic Expressions

16 Integrals of Matrix Elements

17 Method of integration by Parts.

Text Books

1 Amos Gilat, 2007, "MATLAB An Introduction with applications ", Wiley India Pvt. Ltd., New Delhi.

2 Shanti Narayan, 2003, "Differential Calculus", Eleventh Edition, S.Chand and Company Limited, New Delhi.

3 Raisinghania.M.D,2012,"Ordinary and Partial Differential Equations", S.Chand&co,New Delhi.

4 Narayanan .S and Pillai T.K.M, 2008, "Calculus", Vol 2, Viswanathan Publishers, Chennai

References

1 Narayanan .S and Pillai T.K.M 2008,"Calculus", Vol 1, Viswanathan Publishers, Chennai

2 Shanti Narayan, 2003, "Integral Calculus", Eleventh Edition, S Chand and Company Limited, New Delhi

3 RudraPratap, 2017, "Getting started with MATLAB 7, A Quick Introduction for Scientists and Engineers", Oxford University Press, Oxford

4 William J. Palm III, 2005, "Introduction to MATLAB for Engineers", The McGraw-Hill Companies, Inc., New York.

Course Code	Course Name	Category	L	T	P	Credit
233MB1A1AA	ENVIRONMENTAL STUDIES	CORE	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
- A Causes of Pollution and its control

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the importance of natural resources in order to conserve for the future.	K2
CO2	Infer on Natural resources and its conservation.	K3
CO3	Apply the knowledge on Biodiversity and its conservation	K2
CO4	Relate effects, causes and control of air, water, soil and noise pollution etc...	K3
CO5	Build awareness about sustainable development and Environmental protection	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

233MB1A1AA	ENVIRONMENTAL STUDIES	SEMESTER I

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I **Introduction to Environmental studies & Ecosystems** 5 h

Introduction to Environmental studies& Ecosystems: Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere. Scope and importance; Concept of sustainability and sustainable development. Ecosystem- Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession

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

Natural Resources: Renewable and Non-renewable Resources: Land Resources and land use change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and overexploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs

Unit III **Biodiversity and Conservation** 5 h

Biodiversity and Conservation: Levels of biological diversity: genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hot spots. India as a mega-biodiversity nation; Endangered and endemic species of India. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity

Unit IV **Environmental Pollution, Environmental Policies & Practices** 5 h

Environmental Pollution, Environmental Policies & Practices: Environmental pollution: types, causes, effects and controls; Air, water, soil, chemical and noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measures of urban and industrial waste. Pollution case studies. Climate change, global warming, ozone layer depletion, acid rain and impacts on human

communities and agriculture. Environment Laws: Environment Protection Act; Prevention & Control of Pollution Act - Air & Water. Wildlife Protection Act; Forest Conservation Act;

Unit V Human Communities and the Environment& Field Work 4 h

Human Communities and the Environment& Field Work: Human population and growth: Impacts on environment, human health and welfares. Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness. Visit to an area to document environmental assets; river/forest/flora/fauna, etc. Population explosion - Family Welfare Programmes. Role of Information Technology in Environment and human health. Role of the Colleges, Teachers and Students in village adoption towards clean, green and make in villages in various aspects

Text Books

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

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

References

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

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

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

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

5 McCully, P.1996. Rivers no more: the environmental effects of dams(pp. 29-64). Zed Books

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

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

Course Code	Course Name	Category	L	T	P	Credit
231TL1A2TA	TAMIL - II	LANGUAGE- I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள் (Life Skills) மாணவர்களின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2
CO3	பாடஇணைச்செயல்பாடுகள் (Co-curricular activities)	K2
CO4	சூழலியல் ஆக்கம் (Ecology)	K3
CO5	மொழி அறிவு (Tamil knowledge)	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A2TA	TAMIL - II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I **அற இலக்கியம்** 13 h

1. இலக்கிய வரலாறு- பதினெண்கீழ்க்கணக்குநூல்கள்

2.திருக்குறள்

அ. அறன்வலியுறுத்தல்- அ. எண் 04

ஆ. நட்பாராய்தல் - அ. எண் 80

இ. நாடு- அ. எண் 74

ஈ. குறிப்பறிதல்- அ. எண் 110

Unit II **அற இலக்கியம்** 13 h

1. நாலடியார் - அறிவுடைமை
2. மூதுரை - ஔவையார் - 10 பாடல்கள் 6, 7, 9, 10, 14, 16, 17, 23, 26, 30
3. இனியவைநாற்பது- பூதஞ்சேந்தனார் - முதல் 10 பாடல்கள்

Unit III **அறநெறிக் கட்டுரைகள்** 09 h

1. இலக்கியவரலாறு - தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்

2. கலைகள்-உ.வே.சா

3. சங்க நெறிகள்- வ.சுப.மாணிக்கம்

Unit IV **அறநெறிக் கட்டுரைகள்** 15 h

1. வீர வணக்கம் - க.கைலாசபதி
2. தமிழர் பண்பாடு - டாக்டர் சோ.நா.கந்தசாமி
3. இணையத் தமிழ் வளர்ச்சி - முனைவர் ப.அர.நக்கீரன்

Unit V **பயிற்சிப் பகுதி** 10 h

1.இலக்கணம்-வழு, வழுவமைதி,வழாநிலை

2.அலுவலகம் சார்ந்த கடிதம் -விண்ணப்பங்கள், வேண்டுகோள்,முறையீடு

3.படைப்பாக்கம்-பொதுத்தலைப்பில் கட்டுரைகள் எழுதுதல்

Text Book

1 தமிழ் மொழிப்பாடம்-2023-2024,தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி,கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ்,சென்னை. (Unit I to V)

References

1 பேராசிரியர் புலவர் சோம. இளவரசு,எட்டாம் பதிப்பு. 2014. தமிழ் இலக்கிய வரலாறு- மணிவாசகர் பதிப்பகம்,சென்னை.

2 பேராசிரியர் முனைவர் பாக்கியமேரி,முதற் பதிப்பு. 2013. இலக்கணம்-இலக்கிய வரலாறு- மொழித்திறன்- பூவேந்தன் பதிப்பகம்,சென்னை. .

3 தமிழ் இணையக் கல்விக்கழகம் - TAMIL VIRTUAL ACADEMY. வலைதள முகவரி: https://www.tamilvu.org

Course Code	Course Name	Category	L	T	P	Credit
231TL1A2HA	HINDI - II	LANGUAGE- I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A2HA	HINDI – II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I 13 h

आधुनिकपद्य – शबरी(श्रीनरेशमेहता)

Unit II 13 h

उपन्यास: सेवासदन-प्रेमचन्द

Unit III 12 h

कहानी-किरीट- डा उषा पाठक / डा अचला पाण्डेय

पाठ 1.कफ़न, 3. चीफ़ की दावत

Unit IV 12 h

पत्र लेखन: (औपचारिक या अनौपचारिक)

Unit V 10 h

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

Text Books

1. प्रकाशक: लोकभारती प्रकाशन पहली मंजिल, दरबारी बिल्डिंग,महात्मा गाँधी मार्ग, इलाहाबाद. (Unit I)
2. प्रकाशक: सुमित्र प्रकाशन 204 लीला अपार्ट्मेंट्स, 15 हेस्टिंग्स रोड'अशोक नगर इलाहाबाद. (Unit II)
3. प्रकाशक: राधाकृष्ण प्रकाशन दिल्ली. (Unit III)
4. पुस्तक: व्याकरण प्रदिप – रामदेवप्रकाशक: हिन्दी भवन 36 इलाहाबाद. (Unit IV)
5. प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई. (Unit V)

Course Code	Course Name	Category	L	T	P	Credit
23ITL1A2MA	MALAYALAM - II	LANGUAGE - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A2MA	MALAYALAM - II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I **Novel** 12 h

Enmakaje: Chapter1- Chapter5

Unit II **Novel** 10 h

Enmakaje: Chapter 6- Chapter 10

Unit III **Novel** 12 h

Enmakaje: Chapter 11- Chapter 15

Unit IV **Autobiography** 14 h

NeermathalamPoothaKalam: Chapter 1- Chapter 10

Unit V **Autobiography** 12 h

NeermathalamPootha Kalam: Chapter 11- Chapter 20

Text Books

1 Ambika SuthanMangad, Enmakaje (Novel), DC Books Kottayam, Kerala, India. (Unit I to III)

2 Madhavikkutty, NeermathalamPootha Kalam (Autobiography), DC Books Kottayam, Kerala, India. (Unit IV & V)

References

1 MalayalaNovelSahithyam, DC Books Kottayam, Kerala, India.

2 MalayalaSahithyaCharithram, National Books Kottayam, Kerala, India.

Course Code	Course Name	Category	L	T	P	Credit
231TL1A2FA	FRENCH - II	LANGUAGE - I	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A2FA	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'invitationsurunréponde urtéléphonique. Inviter quelqu'un accepter ourefuserl'invitation.

Unit II

12 h

Prendreet fixer un rendez-vous. Demander etindiquerl'heure.	Organiser une soirée au cinéma avec des amis, par téléphone et par courriel.	Comprendre des personnes qui fixentunrendez-vous par téléphonique. Prendreun rendez-vous par telephone

Unit III

12 h

Exprimer son point de vue positif et négatif. S'informersur le prix. S'informersur la quantitité. Exprimer la quantitité.	En groupes, choisir un cadeau pour un ami.	Exprimer son point de vuesur des idées de cadeau. Faire des achatsdans un magasin

Unit IV

14 h

Demander etindiquerune direction. Localiser (près de, en face de ….). Exprimerl'obligationl' Interdit.Conseiller.	Suivre un itinéraire à l'aided'indications par telephone et d'un plan. Par courrierélectronique, donner des informations et des conseils à un ami qui veut voyager.	Comprendre des indications de direction. Comprendre des indications de lieu. Comprendreune chanson. Comprendre de courts messages qui experiment l'obligationoul'interdictio n.

		Donner des conseils à des personnesdans des situations données.

Unit V 10 h

Make in Own Sentences

Text Book

1 Regine Merieux, Yves Loiseau, "LATITUDES - 1" (Page No: 56-101) (Methode de Français), Goyal Publisher & Distributors Pvt.Ltd., 86 UB Jawahar Nagar (Kamala Nagar), New Delhi-7 Les Editions Dider, Paris, 2008- Imprime en Roumanie par Canale en Janvier 2012. (Unit I to IV)

Course Code	Course Name	Category	L	T	P	Credit
231EL1A2EA	ENGLISH - II	LANGUAGE- II	4	-	1	3

PREAMBLE

This course has been designed for students to learn and understand

- the language for specific purposes through various literary manuscripts
- the process of communicative competencies in academics through authentic contexts
- the different formats of business correspondence with lucidity and accuracy via various media

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Identify and appreciate the eminent writers' works of various genres	K1
CO2	Infer and comprehend complex situational talks	K2
CO3	Relate formal and informal communicative contexts to speak fluently	K2
CO4	Construct the denotative and connotative meanings while reading specialized texts	K3
CO5	Develop the skill of writing through descriptions, narrations and essays	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231EL1A2EA	ENGLISH - II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 60 h

Syllabus

Unit I **Genre Studies** **15 h**

John Keats: To a Friend Who Sent Me Some Roses - Author's Note - title indications- outline-paraphrasing the poem- context of poem- form- poetic devices- techniques- Style

A. G. Gardiner: On Habits - Author's Note- Title indications- Outline -Passage Analysis - context of the Prose - Narrative techniques- Style

Sudha Murthy: The Enchanted Scorpions- Author's Note - title indications-Plot summary- Outline of the story -devices- Narrative techniques- Style

David Pinski: A Dollar- Author's Note- Title indications -Plot Summary- Critical Analysis-Themes- Character analysis - Terms- Symbols

Unit II **Listening Skills** **10 h**

Listening to Talks/Lectures by Specialists on selected subject-specific topics-Listening to Public Announcements- Listening to Instructions and Directions-Listening to Speeches- Listening to process/event descriptions to identify causes & effects

Unit III **Speaking Skills** **11 h**

Small Talk- Mini Presentations and Making Recommendations- Group Discussions, Debates, and Expressing opinions through Role play- Picture Description-Giving Instruction to Use a Product- Presenting a Product- Summarizing a Lecture-Narrating Personal Experiences/ Events- Interviewing a Celebrity- Scientific Lectures- Educational Videos- Debates- Different Viewpoints on an Issue

Unit IV **Reading Skills** **12 h**

Reading Biographies, Newspaper Reports, Technical Blogs- ReadingAdvertisements - Gadget Reviews- Newspaper Articles - Journal Reports – Reading Editorials & Blogs- Case Studies- Excerpts from Literary Texts

Unit V **Writing Skills** **12 h**

Inferring & Interpreting- Predicting Reorganizing Material- Summary Writing Based on the Reading Passages- Writing - Emails & Essay Writing (Descriptive or Narrative)- Grammar - Tenses- Question Types: Wh/ Yes or No/ and Tags

Text Books

1 Keats, John. To a Friend Who Sent Me Some Roses. <https://www.Poets.org , 1820, poets.org/poem/ friend-who-sent-me-some-roses.html/> (Unit I)

2 Gardiner, Alfred George. On Habits (n.d.). <Https://Www. Gutenberg. Org/ Files/47429/47429-H/47429-H.Html/> (Unit I)

3 Murthy, Sudha. The Enchanted Scorpions. (n.d.). <https://www. ssgopalganj.in/online/EBooks/CLASS%20VI/Grandma's%20Bag%20of%20 Stories%20by%20Sudha%20Murthy.pdf/> pp-34-39. (Unit I)

4 Pinski, David. A Dollar - a One-act Play.<www.one-act-plays.com/ comedies/dollar.html/> (Unit I)

5 Hart, Steve, Aravind R. Nair, Veena Bhambhani. 2016. Embark: English for Undergraduates. Cambridge University Press, New Delhi, India. (Unit II)

6 Lakshminarayan. 2012. A Course Book On Technical English. Scitech Publications Pvt. Ltd., New Delhi, India. (Unit III)

7 Raman, Meenakshi & Sangeeta Sharma. 2016. Technical Communication- Principles And Practice, Oxford University Press, New Delhi, India. (Unit IV)

8 Viswamohan, Aysha. 2017. English For Technical Communication (With CD), McGraw Hill (India) Private Limited, New Delhi, India. (Unit V)

References

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

2 Chellammal, V. 2003. Learning to Communicate. Allied Publishing House, New Delhi, India

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

4 Syamala. V. 2002. Effective English Communication for You. Emerald Publishers, Chennai, Tamil Nadu, India.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A2CA	HEAT AND THERMODYNAMICS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic principles, theory and concepts of Heat and Thermodynamics.
- The laws of thermodynamics, entropy, transmission and its properties.
- The thermometric, calorimetric theory and its applications.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Interpret kinetic theory of gases, its concepts and their applications.	K2
CO2	Compare the thermodynamic and statistical principles.	K2
CO3	Illustrate the methods of heat flow.	K3
CO4	Analyze the phenomena of Thermometry and its measurement.	K4
CO5	Experiment with the specific heats of liquid and heat capacities.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A2CA	HEAT AND THERMODYNAMICS	SEMESTER II

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Kinetic Theory of Gases **9 h**

Concept of ideal gas – Expression for pressure exerted on a Gas - Derivation of gas laws – Degrees of freedom - Maxwell's law of equipartition of energy – Relation between molar specific heats and degrees of freedom - Van der waals equation of state: Correction for pressure and correction for volume – Joule Kelvin effect: Temperature of inversion.

Unit II Thermodynamics **10 h**

Zeroth law of thermodynamics – Concept of heat - Internal energy (U) - First law of thermodynamics – Specific heats of a gas – Adiabatic process - Isothermal process – Second law of thermodynamics – Carnot's cycle - Concept of entropy - Change in entropy - Entropy of a perfect gas - Third law of thermodynamics.

Unit III Transmission of Heat **10 h**

Conduction - Coefficient of thermal conductivity – Rectilinear flow of heat along a bar - Forbes Method to find K – Cylindrical flow of heat - Thermal conductivity of rubber – Thermal conductivity of glass - Wiedemann-Franz law - Thermopile – Properties of thermal radiation.

Unit IV Thermometry **9 h**

Concept of heat and temperature – Relation between Celsius, Kelvin, Fahrenheit scale of temperatures - Platinum resistance thermometer - Determination of Cv by Joly's method – Determination of Cp by Regnault's method- – Callender and Griffith's bridge - Peltier effect – Low temperature measurement – High temperature measurement.

Unit V Calorimetry **10 h**

Newton's law of cooling – Specific heat of a liquid: Joule's electrical method - Calendar and Barnes' continuous flow method – Experimental determination of heat capacities - Two specific heats of a gas – Specific heat of a gas by Joly's differential steam calorimeter.

Text Books

1 Brij Lal, Subrahmanyam, 2014, "Heat Thermodynamics and Statistical Physics", 14th Edition, S. Chand and Co., Delhi.

2 Mathur D.S, 2014, "Heat and Thermodynamics", S. Chand and Co., Delhi.

References

1 Holman J.P, 2015, "Heat Transfer (in SI Units)", McGraw Hill Education, New Delhi.

2 Kakani S.L, 2009, "Heat Thermodynamics and Statistical Physics", 3rd Edition S. Chand and Co., Delhi.

3 Murughesan R, 2014, "Thermal Physics", 1st Edition, S. Chand and Co., Delhi.

4 Pramila Shukla, 2021, "Heat Thermodynamics", 1st Edition, Dreamtech Press, kindle eBook

5 Merzbacher E, 2011, "Quantum Mechanics", 3rd edition, John Wiley Interscience Publications

6 https://ncert.nic.in/textbook/pdf/keph204.pdf

Course Code	Course Name	Category	L	T	P	Credit
232PY1A2CB	ATOMIC PHYSICS	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concept of atomic physics with various atom model
- The fine structure of spectral lines
- The properties of X-rays, and photoelectric effect

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the concept of positive rays and atom models	K2
CO2	Interpret the fine spectral notation of the atoms	K3
CO3	Illustrate the fine structure of spectral lines	K2
CO4	Demonstrate the concepts of X-ray and its properties	K3
CO5	Apply the concept of photoelectric effect in its application	K4

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A2CB	ATOMIC PHYSICS	SEMESTER II

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I **Positive Rays and Particle Properties of Waves** **12 h**

Discovery – Properties of positive rays - Thomson's parabola method – Aston's mass spectrograph – Bainbridge's mass spectrograph - Dempster mass spectrograph - Mass defect and packing fraction – Binding energy.

Unit II **Structure of the Atom** **12 h**

Basic concept of Thomson's atom model - Bohr atom model - Bohr interpretation on hydrogen spectrum - Ritz combination principle - Correspondence principle - Sommerfeld's relativistic atom model - Vector atom model - Quantum numbers associated with vector atom model - Coupling schemes: L-S coupling - J-J coupling - The Pauli exclusion principle.

Unit III **Fine Structure of Spectral Lines** **12 h**

Critical potential - Atomic excitation - Experimental determination of critical potential: Franck and Hertz's method - Davis and Goucher's method. Optical spectra: Spectral terms - Spectral notation - Selection rules - Intensity rules - Interval rule - Normal Zeeman effect: Theory and experiment - Larmor's theorem- Anomalous Zeeman effect - Paschen-Back effect - Stark effect.

Unit IV **X-Rays** **12 h**

Production of X-Rays – Properties - Absorption of X-Rays – Laue experiment - Bragg's law – Bragg's X-Ray spectrometer – X-Ray Spectra, Characteristic X-Ray Spectra - Moseley's Law and Its Importance – Compton Scattering: Theory and Experiment.

Unit V **The Photoelectric Effect** **12 h**

Experimental investigation on the Photoelectric Effect - Einstein's Photoelectric Equation – Millikan's Experiment - Photoelectric Cell - Photo Emissive Cell - Photo Voltaic Cell – Photoconductive Cell - Application of Photoelectric Cell.

Text Books

1 Murugesan R, 2014, "Modern Physics", 17th Edition, S. Chand & Co., New Delhi.

2 Aruldhas G, 2013, "Modern Physics", 1st Edition, Prentice Hall India Learning Private Ltd., New Delhi.

References

1 Besier A, Mahajan S and. Choudhury S. R, 2017, " Concepts of Modern Physics", 7th Edition, McGraw Hill Education

2 Theraja B. L, 2014, "Modern Physics" 1st Edition, S. Chand & Co, New Delhi.

3 Sehgal N. K, 2013, "Modern Physics" 9th Edition, S. Chand & Co, New Delhi

4 Basu C.C, 2015, "Atomic and Nuclear Physics" 1st Edition, NCBA, New Delhi

5 Subrahmanyam N, 2014, "Atomic and Nuclear Physics", 1st Edition, S. Chand & Co, New Delhi.

6 Rajam, J.B. ,1999, "Atomic Physics: Criticism of the theory of relativity" 1st Edition , Rajendra Ravindra Printers (Pvt). Ltd., New Delhi

7 https://www.youtube.com/watch?v=lUhJL7o6_cA.

232PY1A2CP	CORE PRACTICAL: HEAT AND THERMODYNAMICS	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Determination of thermal conductivity of a bad conductor using Lee's disc method.
2	Calculation of the temperature coefficient of resistance of the given coil using Carey-Foster's bridge.
3	Determination of specific heat capacity of the liquid using Joule's calorimeter.
4	Study the V-I characteristics of a thermistor.
5	Determination of band gap and resistivity of semiconductor at different temperatures by Four Probe Method.
6	Determination of Temperature Coefficient of Resistance using Post office box.
7	Analyze the variation of resistance with temperature using a thermistor. (Under DBT Star Scheme)
8	Determination of specific resistance of given coil of wire using Carey-Fosters bridge.
9	Determination of specific resistance of coil using post office box method.
10	Determination of temperature coefficient of resistance for given resistors. (Under DBT Star Scheme)
11	Determination of temperature coefficient of resistance for given copper strip. (Under DBT Star Scheme)
12	Band gap energy of a semiconductor by thermal method.

Note: Any 10 experiments

References

1 Ouseph C C, 2014, "Practical Physics and Electronics", Vishwanathan Publications, Chennai.

2 Samir Kumar Ghosh, 2008, "Textbook of Advanced Practical Physics", NCBA publishers.

3 Chattopadhyay D, 2015, "Advanced Course in Practical Physics", NCBA publications, Kolkata

4 Murughesan R, 2014, "Thermal Physics", S. Chand and Co., New Delhi.

Course Code	Course Name	Category	L	T	P	Credit
232MT1A2EP	STATISTICAL ANALYSIS AND TOOLS	IDC	3	-	2	4

PREAMBLE

This course has been designed for students to learn and understand

- the requirements of a good average and differentiate between average and dispersion
- importance and the limitations of Correlation and Regression Analysis
- analysis of Time Series

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Compute the various measures of central tendency	K1
CO2	Identify the measures of dispersion	K2
CO3	Explain the concepts of correlation	K1
CO4	Explain the concepts of regression	K2
CO5	Compute the component of time series	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232MT1A2EP	STATISTICAL ANALYSIS AND TOOLS	SEMESTER II

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus
(Embedded)

Unit I **Measures of Central Tendency** **12 h**

Introduction - Arithmetic Mean - Median - Mode - Characteristics of Mean, Median and Mode - Geometric Mean - Harmonic Mean -Merits and Demerits of Mean, Median and Mode.

Practical

1 Calculate Mean

2 Calculate Geometric Mean and Harmonic Mean

3 Calculate Median

4 Calculate Mode.

Unit II **Measures of Dispersion** **12 h**

Introduction - Range - Interquartile Range - Mean Deviation - Coefficient of Mean Deviation - Standard Deviation.

Practical

5 Determine Range

6 Determine Interquartile Range

7 Determine Mean Deviation

8 Determine Standard Deviation.

Unit III **Correlation** **12 h**

Introduction - Types of Correlation - Karl Pearson's Coefficient of Correlation - Properties - Merits and Demerits - Rank Coefficient of Correlation.

Practical

9 Determine Correlation using Pearson method

10 Determine rank correlation for the given data

11 Determine rank correlation for repeated data.

Unit IV Regression **12 h**

Introduction - Definition - Uses - Method of studying Regression - Graphic Method - Algebraic Method - Regression Line - Regression Equation.

Practical

12 Determine regression line using Graphic Method

13 Determine regression line using Algebraic Method

14 Determine regression equation.

Unit V Analysis of Time Series **12 h**

Meaning - uses - Secular Trend - Seasonal variation - Cyclical variation - Irregular variation - Measurement of Secular Trend - Graphic Method - Semi average Method - Moving average Method - Method of least squares.

Practical

15 Draw a Trend line using Semi average Method

16 Draw a Trend line using Moving average Method

17 Determine polynomial using method of Least Square Curve Fitting.

Text Books

1 Pillai R.S.N and Bagavathi V, 2017, "Statistics", 14th Edition, S. Chand and Company Ltd, New Delhi.

2 Dr.Bharti Motwani, 2021, "Data Analytics with R", Wiley India pvt. Ltd, New Delhi.

References

1 Gupta S.P, 2014, "Statistical Methods", 34th Edition, Sultan chand and sons Educational Publishers, New Delhi.

2 Ken Black, 2009, "Business Statistics for Contemporary Decision Making", John Wiley and sons Pvt. Ltd, New Delhi.

3 Beri G C, 2010, "Business Statistics", Second Edition, Tata McGraw- Hill Pvt Ltd, New Delhi.

4 Sancheti. D.C and Kapoor V.K, 2010, "Statistics", Seventh Edition, S. Chand and Company Ltd, New Delhi.

231TL1A2AA	PART- IV: BASIC TAMIL	SEMESTER II

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2023–24ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

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

(பருவத் தேர்வு இல்லை)

Syllabus

Unit I **தமிழ் மொழியின் அடிப்படைக் கூறுகள்** 05 h

எழுத்துகள் அறிமுகம்

1. உயிர் எழுத்துக்கள் - குறில் , நெடில் எழுத்துகள்

2. மெய் எழுத்துக்கள் - வல்லினம், மெல்லினம், இடையினம்

3. உயிர்மெய் எழுத்துக்கள்

4. பயிற்சி

Unit II **சொற்களின் அறிமுகம்** 05 h

1.பெயர்ச்சொல்

2.வினைச்சொல் – விளக்கம் (எ.கா.)

3.பயிற்சி

Unit III **குறிப்பு எழுதுதல்** 05 h

1. பெயர், முகவரி, பாடப்பிரிவு , கல்லூரியின் முகவரி

2. தமிழ் மாதங்கள்(12), வாரநாட்கள்(7)

3. எண்கள் (ஒன்று முதல் பத்து வரை), வடிவங்கள், வண்ணங்கள்

Unit IV **குறிப்பு எழுதுதல்** 05 h

1. ஊர்வன, பறப்பன, விலங்குகள்

2.மனிதர்களின் உறவுப்பெயர்கள்

3. ஊர்களின்பெயர்கள் (எண்ணிக்கை 10)

Unit V **பயிற்சிப் பகுதி** 04 h

பயிற்சிப் பகுதி (உரையாடும் இடங்கள்)

வகுப்பறை, பேருந்து நிலையம், சந்தை– பேசுதல்,எழுதுதல்.

Notes:

அகமதிப்பீட்டுத்தேர்வு – வினாத்தாள் அமைப்புமுறை- மொத்த மதிப்பெண்கள் - 50

	பகுதி –அ
சரியான விடையைத் தேர்வு செய்தல்	10x2=20
	பகுதி –ஆ
சரியா? தவறா?	10x2=20
	பகுதி – இ
ஒரு பக்க அளவில் விடையளிக்க	1x10=10

குறிப்பு:

- அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ–க்கான வினாக்கள் இதுஅல்லது அதுஎன்ற அடிப்படையில் அமைதல் வேண்டும்

Text Book

1 அடிப்படைத் தமிழ் - 2023-2024,தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி,கோயம்புத்தூர்.வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ்,சென்னை. (Unit I to IV)

References

1 ஒன்றாம் வகுப்பு பாடநூல் - தமிழ்நாடு அரசு பாடநூல் கழகம், சென்னை.

2 தமிழ் இணையக் கல்விக்கழகம் - TAMIL VIRTUAL ACADEMY வலைதள முகவரி: <https://www.tamilvu.org/>

231TL1A2AB	PART- IV: ADVANCED TAMIL	SEMESTER II

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2023– 2024 ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(10 மற்றும் 12 – ஆம் வகுப்புகளில் தமிழ் மொழிப்பாடம் பயின்றவர்களுக்கு உரியது)

(பருவத் தேர்வு இல்லை)

Syllabus

Unit I கவிதைகள் 06 h

1. தமிழ்நாடு - பாரதியார்
2. மனதில் உறுதி வேண்டும் - பாரதியார்
3. இன்பத்தமிழ் - பாரதிதாசன்
4. வேலைகளல்லவேள்விகள் - தாராபாரதி
5. தமிழா! நீ பேசுவது தமிழா! - காசியானந்தன்
6. நட்புக் காலம்(10 கவிதைகள்)- அறிவுமதி கவிதைகள்

Unit II கட்டுரை 05 h

கட்டுரைத் தொகுப்பு -நல்வாழ்வு - டாக்டர் மு.வரதராசன்

1. நம்பிக்கை
2. புலனடக்கம்
3. பண்பாடு

Unit III இலக்கணம் 04 h

1. வல்லினம் மிகும் மற்றும் மிகா இடங்கள்
2. ர,ற,ல,ழ,ள,ந,ண,ன – வேறுபாடு அறிதல்

Unit IV கடிதங்கள் 05 h

1. பாராட்டுக் கடிதம்
2. நன்றிக் கடிதம்
3. அழைப்புக் கடிதம்
4. அலுவலக விண்ணப்பங்கள்

Unit V பயிற்சிப் பகுதி 04 h

படைப்பாக்கப் பகுதி

பொதுத் தலைப்புகளில் கவிதை,கட்டுரை எழுதச்செய்தல்

Notes

அக மதிப்பீட்டுத் தேர்வு - வினாத்தாள் அமைப்பு முறை- மொத்த மதிப்பெண்கள் - 50

	பகுதி –அ
சரியான விடையைத் தேர்வு செய்தல்	10x1=10
	பகுதி –ஆ
கோடிட்ட இடங்களை நிரப்புக.	10x2=20
	பகுதி –இ
இரண்டு பக்க அளவில் விடையளிக்க	2x10=20

குறிப்பு:

- அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ–க்கான வினாக்கள் இதுஅல்லது அதுஎன்ற அடிப்படையில் அமைதல் வேண்டும்

Text Book

1 சிறப்புத் தமிழ் - 2023-2024, தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை. (Unit- I to IV)

References

1 பேராசிரியர் புலவர் சோம. இளவரசு,எட்டாம் பதிப்பு. 2014. தமிழ் இலக்கிய வரலாறு – மணிவாசகர் பதிப்பகம்,சென்னை.

2 டாக்டர் மு.வரதராசன். 2010. நல்வாழ்வு, பாரி நிலையம், சென்னை.

3 பேராசிரியர் முனைவர் பாக்கியமேரி,முதற் பதிப்பு.2013. இலக்கணம் - இலக்கிய வரலாறு - மொழித்திறன்- பூவேந்தன் பதிப்பகம், சென்னை..

4 தமிழ் இணையக் கல்விக்கழகம் - TAMIL VIRTUAL ACADEMY. வலைதள முகவரி : <https://www.tamilvu.org/>

Course Code	Course Name	Category	L	T	P	Credit
235CR1A2AA	HUMAN RIGHTS AND WOMEN'S RIGHTS	AECC	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- Concepts of Human Rights.
- Human Right Violations and Redressal Mechanism.
- Rights to Women and Child.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Human Rights.	K1
CO2	Describe the Fundamental Rights.	K2
CO3	Relate Human Right Violations and Redressal Mechanism.	K3
CO4	State the Rights to Women and Child.	K2
CO5	Apply Civil and Political Rights of Women.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

Course Focuses on

	Skill Development		Entrepreneurial Development
	Employability		Innovations
	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

235CR1A2AA	HUMAN RIGHTS AND WOMEN'S RIGHTS	SEMESTER II

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to Human Rights **04 h**

Meaning - Definition - Nature - Content - Legitimacy of Human Rights - Origin and Development of Human Rights - Theories - Principles of Magna Carta - Modern Movements of Human Rights - The Future of Human Rights. Case studies related to human rights.

Unit II Human Rights in India **05 h**

The Constitution of India: Fundamental Rights - Right to Life and Liberty - Directive Principles of State Policy - Fundamental Duties - Individual and Group Rights - Other facets of Human Rights - Measures for Protection of Human Rights in India.

Unit III Human Right Violations and Redressal Mechanism **05 h**

Human Rights: Infringement of Human Right by State Machinery and by Individual - Remedies for State action and inaction - Constitutional Remedies - Public Interest Litigation (PIL) - Protection of Human Rights Act, 1993 - National Human Rights Commission - State Human Rights Commissions - Constitution of Human Right Courts.

Unit IV Rights to Women and Child **05 h**

Matrimonial protection - Protection against dowry - Protection to pregnancy - Sexual offences - Law relating to work Place - Directive principles of Constitution (Article 39 a, d, e & Article 42, 43 & 46) - Trafficking of women - Constitutional Rights - Personal Laws - Protection of children against Sexual Offences Act, 2012 (POCSO). Case studies related to Sexual offences.

Unit V Civil and Political Rights of Women **05 h**

Right of Inheritance - Right to live with decency and dignity - The Married women's Property Act, 1874 - Women's right to property - Women Reservation Bill - National Commission for Women - Political participation - Pre-independent political participation of women - Participation of Women in post independent period. Kavalan App. Case studies related to women rights.

Text Books

1 Lalit Parmar, 1998, "Human Rights", Anmol Publications Pvt. Limited, New Delhi.

2 Krishna Pal Malik, 2009, "Women & Law ", Allahabad Law University, New Delhi.

References

1 Mandagadde Rama Jois, 2015, "Human Rights", Bharatiya Values, Bharatiya Vidya Bhavan Publications, Mumbai.

2 Paras Diwan and Piyush Diwan, 1994, "Women and Legal Protection", South Asia Books, Andhra Pradesh.

3 Venkataram and Sandhiya. N, 2001, "Research in Value Education", APH Publishing Corporation, New Delhi.

4 Anand A S, 2008, "Justice for Women: Concerns and Expressions", Universal Law Publishing Co., New Delhi.

18/10/2023

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

Dr.N.G.P. Arts and Scie

APPROVED

BoS- 14th	AC - 16th	GB - 21st
18.10.23	13.12.23	05.04.24

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

Course Code	Course Name	Category	L	T	P	Credit
231TL1A3TA	TAMIL- III	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள் (Life Skills)- மாணவர்களின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2
CO3	பாடஇணைச்செயல்பாடுகள் (Co-curricular activities)	K2
CO4	சூழலியல் ஆக்கம் (Ecology)	K3
CO5	மொழி அறிவு(Tamil knowledge)	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A3TA	TAMIL- III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **காப்பியங்கள்** 10 h

1.சிலப்பதிகாரம் –வழக்குரை காதை

2. மணிமேகலை–ஆதிரை பிச்சையிட்ட காதை

Unit II **காப்பியங்கள்** 10 h

1. கம்பராமாயணம் -கும்பகர்ணன் வதைப்படலம்: பா. எண் : 60 முதல் – 100 வரை

2. பெரிய புராணம் - அதிபத்த நாயனார்புராணம்

Unit III **சிற்றிலக்கியங்கள்** 10 h

1.திருக்குற்றாலக்குறவஞ்சி - வசந்தவல்லி பந்தாடிய சிறப்பு (6: 4கண்ணிகள்)

2.கலிங்கத்துப்பரணி-களம்பாடியது: போர்க்களக் காட்சி- பா.எண்: 472 முதல்- 502 வரை

Unit IV **இலக்கிய வரலாறு** 10 h

1.காப்பியம் – வரையறை,ஐம்பெருங் காப்பியங்கள்,ஐஞ்சிறு காப்பியங்கள்

2.கம்பராமாயணம், பெரிய புராணம் – குறிப்பு

3. சிற்றிலக்கியங்களின் தோற்றமும் வளர்ச்சியும்

Unit V **இலக்கணம் &பயிற்சிப் பகுதி** 08 h

அ. இலக்கணம்

1.'பா' வகைகள் : வெண்பா, ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பா - பொது இலக்கணம் மட்டும்.

2. அணி: உவமையணி, உருவக அணி, இல்பொருள் உவமையணி விளக்கம், உதாரணம்.

ஆ. பயிற்சிப் பகுதி

1.வாசகர் கடிதம்: நாளிதழ், வானொலி, செய்தி ஊடகங்களுக்கு விமர்சனம் எழுதுதல்

2.திரைக்கதை விமர்சனம்: மத்திய மற்றும் மாநில அரசு விருது பெற்ற தமிழ்த் திரைப்படங்கள் மட்டும்

Text Book

1 தமிழ் மொழிப்பாடம்-2023 -2024 ,தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி,கோயம்புத்தூர். வெளியீடு: நியூ செஞ்சுரி புக் ஹவுஸ்,சென்னை. (Unit I to V)

References

1 பேராசிரியர் புலவர் சோம. இளவரசு,எட்டாம் பதிப்பு-2014,தமிழ் இலக்கிய வரலாறு-மணிவாசகர் பதிப்பகம்,சென்னை.

2 பேராசிரியர் முனைவர் பாக்கியமேரி,முதற் பதிப்பு- 2013,இலக்கணம்-இலக்கிய வரலாறு- மொழித்திறன்- பூவேந்தன் பதிப்பகம்,சென்னை. .

3 தமிழ் இணையக் கல்விக்கழகம் - TAMIL VIRTUAL ACADEMY. வலைதள முகவரி: https://www.tamilvu.org

Course Code	Course Name	Category	L	T	P	Credit
231TL1A3HA	HINDI- III	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A3HA	HINDI- III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

पद्य – काव्य पराशर (भोलानाथ)

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

Unit II 10 h

हिन्दी साहित्य का इतिहास: (साधारण ज्ञान)

Unit III 10 h

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

Unit IV 10 h

संवादलेखन

Unit V 08 h

अनुवादअभ्यास-III (केवलहिन्दीसेअंग्रेजीमें)

(पाठ10 to 20)

Text Books

1 प्रकाशक: जवाहर पुस्तकालय सदर बाजार, मथुराउत्तर प्रदेश-281001(Unit I)

2 आचार्य रामचन्द्र शुक्ललोकभारती प्रकाशन इलाहाबाद. (Unit II)

3 प्रकाशक: विनोद पुस्तक मंदिरआगरा-282002 (Unit III)

4 पुस्तक: व्याकरणप्रदिप–रामदेवप्रकाशक: हिन्दीभवन36 इलाहाबाद-211024(Unit IV)

5 प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17(Unit V)

Course Code	Course Name	Category	L	T	P	Credit
231TL1A3MA	MALAYALAM- III	LANGUAGE-I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUS ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A3MA	MALAYALAM- III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **Poetry** 10 h

Kumaranasan

Unit II **Poetry** 10 h

Kumaranasan

Unit III **Poetry** 10 h

Kumaranasan

Unit IV **Poetry** 10 h

VayalarRamavarma

Unit V **Poetry** 08 h

VayalarRamavarma

Text Books

1 Kumaranasan. 1998. Chinthavishtayaya Sitha. DC Books Kottayam, Kerala, India.(Unit I to III)

2 Ayisha (Poem), National Book Stall Kottayam, Kerala, India. (Unit IV & V)

Reference

1 Dr.M.Leelavathy.Kavitha Sahithya Charithram. Sahithya Academy Thrissur, Kerala, India.

Course Code	Course Name	Category	L	T	P	Credit
231TL1A3FA	FRENCH- III	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231TL1A3FA	FRENCH- III	SEMESTER III

Total Credits: 3
Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

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

Unit II 10 h

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

Unit III 10 h

Raconter. ° Décrire les étapesd'une action.	Raconterune scene insolite à l'oreal et à l'écrit.	Comprehendre le récit d ún voyage. Raconterses actions quotidiennes.	Ecrire une biographie a partir d'eléments écrits.

Unit IV 10 h

Exprimer l'intensité et la quantité. ° Interroger.	Raconterune scene insoliteà l'oreal et à l'écrit.	Comprehendre le récit d ún voyage. Raconterses actions quotidiennes.	Ecrire une biographie a partir d'eléments écrits.

Unit V 08 h

Make in Own Sentences based on the above Lessons

Text Book

1 LATITUDES 1 (Méthode de français) Pages from 102-127, Author : ReginеMérieux, Yves Loiseau(Unit I to IV)

Course Code	Course Name	Category	L	T	P	Credit
231EL1A3EA	ENGLISH - III	LANGUAGE- II	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Infer the specific usage of while-listening process	K2
CO2	Organize the various abilities and sub-skills involved in reading	K3
CO3	Utilize the importance of speaking skills and developing it through various practices	K3
CO4	Master diverse business communication formats and skills	K4
CO5	Acquire all-round mature outlook to function effectively in different context	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1			✓		✓
CO2	✓	✓		✓	
CO3	✓		✓		✓
CO4	✓		✓		]
CO5	[]	[✓]	[]	[✓]	[]

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

231EL1A3EA	ENGLISH - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Listening and Reading 09 h

Listening in casual conversation, Small group and Conference setting - Listening for Factual Information- Barriers of Listening- Developing Listening skills- Poor listening vs Effective Listening - Basics of Reading- Efficient and Inefficient Readers- Advantages of Reading- Four Basic steps of Effective Reading- Stumbling blocks in becoming an effective Reader- Strategies for Comprehending and Retaining content- Effective Note Taking while Reading

Unit II Speaking 09 h

Purpose of General Conversations- Advantages, Features of a good conversation- Tips for improving Conversation- Public Speaking- Importance of Public Speaking- Benefits, Tips, Overcoming fear of Public Speaking- Preparatory steps - Structuring the contents- Audience Awareness- Mode of Delivery

Unit III Writing Skills 10 h

Preparing an Effective CV or a Resume with Job Applications- Employers expectation - Organize the material– Useful suggestions- Cover Letter- Content to be included– Tone of the letter- Report Writing- importance– features- Types – main parts– Feasibility report– Accident report- Scientific report- Memos – Introduction– Structure- Proposal Writing

Unit IV English for Communication & Skill for Employment 12 h

Notices, Agendas and Minutes- Business correspondence- Speeches- Meetings, Vocabulary Development- Editing Skills, and Reference Skills- Reading and Replying to E-Mails- Making Presentations- Interview Techniques- Group Discussion, and Oral Presentation Skills- Interacting with Superiors, and Listening to Reports and Customer Complaints- Preparing the minutes of a meeting- Presenting Data in Verbal and Non-verbal modes- The Correct Attitude of Employment

Unit V Soft Skills 08 h

Importance of soft skills- Attributes- Social Skills- Thinking- Negotiating- Exhibiting- Identifying - Soft Skills training -Train Yourself- Practicing soft skills- Measuring attitude – Self-Discovery: Importance of knowing yourself- Process - SWOT analysis – Benefits – Usage – SWOT Analysis grid- Art of Negotiation

Text Books

1. Camp and Satterwhite. 1998. College English and Communication. 7th Edition Glencoe Mchrawttill Publishers, New York, Unites States of America. (Unit I, II, III)
2. Kumar, Sanjay and Lata Pushp. 2018. Language and Communication Skills for Engineers. First Edition, Oxford University Press, India. (Unit I, II, III)
3. Mohan, Krishna and Banerji, Meera. 2009. Developing Communication skills. 2nd Edition, Macmillcan, India. (Unit I, II, III, IV)
4. Alex. Soft Skills. 2009. S. Chand Publishing, New Delhi, India. (Unit V)

References

1. Ghosh, B.N. Editor. 2017. Managing Soft Skills for Personality Development. McGraw- Hill Education, Chennai, India.
2. Miles Craven. 2008. Cambridge English Skills Real Listening and Speaking. First Edition, Cambridge University Press, United Kingdom.
3. Mishra, Gauri and Ranjana Kaul.2016. Language Through Literature. Primus Books, India.
4. Pillai G, Radhakrishna. 2000. English for Success. Emerald Publishers, Chennai, India.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A3CA	ELECTRICITY AND MAGNETISM	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic principles, theories and concepts of electricity and magnetism.
- The basic concept of thermoelectricity and electrical conductivity.
- The concept of Maxwell's Equation & Electromagnetic Waves.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Identify the magnetic flux through Biot-savart law and galvanometer.	K2
CO2	Relate the thermal and chemical effect of electric current.	K2
CO3	Explain the laws and concept of electromagnetic induction.	K3
CO4	Make use of the LCR in AC circuits.	K3
CO5	Examine the wave equations in electric and magnetic field.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1					□
CO2	✓		✓		
CO3	✓		✓		✓
CO4	✓		✓		
CO5	✓		✓	✓	✓

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A3CA	ELECTRICITY AND MAGNETISM	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I **Magnetic Effect of Electric Current** **10 h**

Magnetic field - Magnetic flux - Biot Savart law - Helmholtz tangent galvanometer construction and theory - Magnetic induction at any point on the axis of a solenoid - Method of Images and its application to: (1) Plane Infinite Sheet and (2) Sphere - Force on a current carrying conductor in a magnetic field - Moving coil Ballistic galvanometer construction and theory.

Unit II **Thermoelectricity and Chemical Effect of Electric Current** **10 h**

Seebeck effect - Laws of thermo e.m.f - Measurement of thermo e.m.f using potentiometer - Peltier effect S.G. starling method - Thomson effect and coefficient - Thermo electric diagram – Electrical conductivity of an electrolyte - Kohlrausch's bridge method of determining the specific conductivity of an electrolyte.

Unit III **Electromagnetic Induction** **10 h**

Faraday's laws of electromagnetic induction - Faraday's laws of electromagnetic induction in vector form - Self-inductance of a long solenoid – Determination of self-inductance (L) by Rayleigh's methods - Mutual induction - Mutual inductance between two co-axial solenoids - Experimental determination of mutual inductance - Ruhmkorff's induction coil.

Unit IV **Electromagnetic Waves** **10 h**

Alternating current - J operator method – LCR series resonance circuit - Parallel resonant circuit - Comparison between series and parallel resonant circuits - Wattless current - A.C. circuit containing resistance only - Inductance only - Capacitance only - Capacitance and Resistance in series - Parallel resonant circuit - A.C. Watt meter.

Unit V **Maxwell's Equation & Electromagnetic Waves** **8 h**

Basic laws - Maxwell's equations - Maxwell's correction in ampere's law - Displacement current - Poynting vector - Maxwell's equations for electric and magnetic properties - Monochromatic plane waves in vacuum - Energy and momentum of electromagnetic wave.

Text Books

1. Murugeshan R, 2012, "Electricity and Magnetism", 6th Edition, S Chand & Co, New Delhi.
2. D.C. Tayal, 2019, "Electricity and Magnetism", Himalaya Publishing Co, New Delhi.

References

1. Chattopadhyan D, Rakshit P.C, 2011, "Electricity and Magnetism", 3rd edition, New central book agency, London.
2. Sehgal, Chopra, Sehgal, 2013, "Electricity and Magnetism", 6th Edition, Sultan chand & sons, New Delhi.
3. Satya Prakash, 2013, "Electricity and Magnetism", 2nd Editions, Pragati Prakashan, Delhi.
4. Ashutosh pramanik, 2012, "Electromagnetism problems with solutions", 3rd Edition. PHI Learning Private Limited, Delhi.
5. http://www.pas.rochester.edu/~stte/phy415F20/units/unit_1-3.pdf

Course Code	Course Name	Category	L	T	P	Credit
232PY1A3CB	NUCLEAR PHYSICS	CORE	3	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The properties of nucleus and nuclear model
- The reaction of nuclear reactors and particle accelerators
- The radioactivity nature, nuclear reactions and elementary particles

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Interpret the basic properties of nucleus	K2
CO2	Explain the principle of detector and accelerators	K2
CO3	Apply the fundamentals of radioactivity	K3
CO4	Develop knowledge of nuclear energy fission and fusion	K3
CO5	Summarize the concept of elementary particle and cosmic rays	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A3CB	CORE: NUCLEAR PHYSICS	SEMESTER III

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I **Introduction to Nucleus** **7 h**

Introduction - Classification of nuclei - General properties of nucleus - Binding energy - Nuclear stability - Theory of nuclear composition - Liquid drop model - Semi-empirical mass formula - The shell model - Evidence for shell model- Magic numbers - Prediction of the shell model - Collective model

Unit II **Detectors of Nuclear Radiation and Particle Accelerators** **7 h**

Interaction between energetic particles and matter - Ionization chamber - Geiger Muller counter - Wilson cloud chamber - Bubble chamber - Radiation hazards - Cyclotron - Synchrocyclotron - Betatron

Unit III **Theory of Radioactivity** **7 h**

Natural radioactivity - Properties of alpha, beta, gamma rays - Geiger Nuttal law - Nuclear isomerism - Soddy Fajan's displacement law - Law of radioactive disintegration - Half life - Mean life - Unit of radioactivity - Law of successive disintegration - radioactive dating - The age of the earth

Unit IV **Nuclear Fusion and Fission** **7 h**

Nuclear fusion - Energy released in fission - Bohr and Wheelers theory of nuclear fission - nuclear chain reaction - Atom Bomb - Nuclear reactor - Use of nuclear reactor - Nuclear fusion - Source of stellar energy - Thermonuclear reactions - Hydrogen bomb

Unit V **Elementary Particle and Cosmic Rays** **8 h**

Classification of elementary particles - Fundamental interactions - Elementary particles - Quantum numbers - Conservation laws and symmetry - Quark model - Type of quarks - Primary cosmic rays - Secondary cosmic rays - Cosmic Ray showers - Van Allen belt - Origin of cosmic rays

Text Books

1 Murugesan.R, Kiruthiga.S, 2005, "Modern Physics" 18th Edition, S.Chand & Co, New Delhi

2 Theraja.B.L, 2014,"Modern Physics", 1st Edition, S.Chand & Co, New Delhi

References

1 Subrahmanyam.N, 2014, "Atomic and Nuclear Physics", 1st Edition, S.Chand & Co, New Delhi

2 Segal.N.K, 2013,"Modern Physics", 9th Edition, S.Chand & Co, New Delhi

3 Aruldhas.G, 2013, "Modern Physics", 1st Edition, Prentice Hall India Learning Private Limited, New Delhi

4 Basu.C.C, 2015, "Atomic and Nuclear Physics", 1st Edition, NCBA, New Delhi

5 D.C.Tayal, 2011, Nuclear Physics, Himalaya Publishing House, New Delhi

6 M.L.Pandya and R.P.S. Yadav, 2015, Elements of Nuclear Physics, KNRN Publication, New Delhi

7 https://www.youtube.com/watch?v=IUhJLo6_cA

232PY1A3CP	CORE PRACTICAL - III : ELECTRICITY AND MAGNETISM	SEMESTER III

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Determination of M and H -Deflection Magnetometer.
2	Find the magnetic field along the axis of a circular coil carrying current.
3	Calculate the moment of magnet – Tan C Position.
4	Calibration of low range voltmeter- Ballistic galvanometer.
5	Study the frequency response and to find resonant frequencies of L-C-R series and parallel circuits.
6	Determination of thermo-electric power at a certain temperature of a given thermocouple.
7	Determine the wavelength and particle size - LASER source of He-Ne. (Under DBT Star College Scheme)
8	Calculate the low resistance using Carey Foster's Bridge
9	Determine the low range Voltmeter calibration using potentiometer.
10	Compare the emf's of two given cells using potentiometer.
11	Calibration of ammeter by using potentiometer.
12	Calculate the B and M by magnetic hysteresis loop tracer equipment. (Under DBT Star College Scheme).

Note: Any 10 experiments

1 Geeta Sanon, R., 2009. "B.Sc. Practical Physics", 2nd Edition., S.Chand &Co., New Delhi,

2 B. L. Flint and H. T. Worsnop, Advanced Practical Physics for students, Asia Publishing House, 2000.

3 I. Prakash & Ramakrishna, 2011, "A Textbook of Practical Physics", 11th Edition, Kitab Mahal.

4 Bell D.A. 2009. Laboratory manual for electronic devices and circuits, 4th Edition, oxford university press.

5 https://byjus.com/physics/to-compare-the-emf-of-two-given-primary-cells-using-potentiometer-experiment/

6 https://psbrahmachary.files.wordpress.com/2009/05/l-c-r-circuit-series-and-parallel1.pdf

Course Code	Course Name	Category	L	T	P	Credit
232CE1A3EP	CHEMISTRY - I	IDC PRACTICAL	3	-	4	5

PREAMBLE

This course has been designed for students to learn and understand

- About the solutions and volumetric analysis
- The types, method of preparation of polymers
- The adsorption process, acid and bases

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Outline the making of solution and principles of volumetric analysis	K2
CO2	Explain the preparation and properties of simple polymers	K2
CO3	Infer the properties and preparation of organic compounds	K3
CO4	Relate the various adsorption process	K2
CO5	Examine the Solubility and concept of acid and bases	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	✓	Gender Sensitization
✓	Social Awareness/ Environment	✓	Constitutional Rights/ Human Values/ Ethics

232CE1A3EP	IDC PRACTICAL : CHEMISTRY - I	SEMESTER III

Total Credits: 5

Total Instruction Hours: 60 h

Syllabus

Unit I Solutions 12 h

Normality, molarity, molality, mole fraction, mole concept. Primary and secondary standards – Preparation of standard solutions. Principle of volumetric analysis (with simple problems). Indicators – Theory of indicators

1 Estimation of Sodium hydroxide using HCl

2 Estimation of Ferrous sulphate.

Unit II Polymer Chemistry 12 h

Introduction – Mechanism of polymerization- Types of polymerization – Addition, Condensation and Copolymerization - Plastics - Compounding of plastics. Preparation, properties and uses of cellulose nitrate, cellulose acetate, Poly Vinyl Chloride (PVC), Poly Vinyl Alcohol (PVA), Nylon -66, Polyethylene Terephthalate (PET), Polyacrylonitrile (PAN). Conducting polymers

3 Determination of molecular weight of polymer by using viscometer

4 Preparation of polystyrene

Unit III Basic Organic Chemistry 12 h

Structure, Nomenclature, preparation and properties of Carboxylic acids, Phenols, Amides, Amines and Carbohydrates

5 Identification of simple organic Compounds-I

6 Identification of simple organic Compounds-II

7 Identification of simple organic Compounds-II

Unit IV Adsorption 12 h

Adsorption - Physisorption and Chemisorption - Factors influencing adsorption of gases on solids - Langmuir adsorption isotherm

8 Verification of Frendlich Adsorption isotherm of oxalic acid

9 Verification of Frendlich Adsorption isotherm of acetic acid

Unit V Solubility Product and Acids and Bases 12 h

Solubility and ionic equilibria, solubility product, applications of solubility product. Acids – Bases, Arrhenius, Bronsted - Lowry and Lewis concepts and relative strength of acids and bases, pH scale

10 Determination of solubility product constant of Silver acetate

11 Determination of Equivalent conductance at infinite dilution of strong electrolyte

12 Determination of Equivalent conductance at infinite dilution of weak electrolyte

Text Books

1 Puri. B.R, Sharma. L.R and Pathania. M.S, 2017, "Principles of Physical Chemistry", 47th Edition, John Wiley and Sons & USA.

2 Madhan. R.D, 2016, "Modern Inorganic Chemistry", 10th Edition, Mc Graw Hill Company & USA

References

1 Lee. J.D, 2002, "A New Concise Inorganic Chemistry", 5th Edition, ELBS & UK

2 Jain. M.K and Sharma. S.C, 2012, "Modern Organic Chemistry", Vishal publishing Co & New Delhi

3 Puri. B.R, Sharma. L.R and Kalia. K.C, 2016, "Principles of Inorganic Chemistry", Vishal Publishing & Co & New Delhi

4 Venkateswaran. V, Veeraswamy. R and Kulandaivelu. A.R, 2017, "Principles of Practical Chemistry", 1st Edition, Sultan Chand & Sons & New Delhi.

5 https://instruct.uwo.ca/chemistry/020inter/SolubilityProductNotes.pdf

6 https://www.chem.uwec.edu/chem101_s01/pages/Lecturenotes/C101_notes07.pdf

Course Code	Course Name	Category	L	T	P	Credit
232PY1A3SP	BASIC COMPUTER SKILLS	SEC PRACTICAL	2	-	2	2

PREAMBLE

This course has been designed for students to learn and understand

- To have an insight in to the basic computer concepts of internet
- To acquire knowledge on the basics of web, HTML
- To develop skills to handle HTML

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Acquires knowledge on world wide web	K2
CO2	Learns about basics of HTML	K3
CO3	Design using HTML	K2
CO4	Develops frames and ordered lists	K2
CO5	Create table using HTML and handle the table	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A3SP	SEC PRACTICAL: BASIC COMPUTER SKILLS	SEMESTER III

Total Credits: 2

Total Instruction Hours: 36 h

Syllabus

Unit I Introduction to World wide web **6 h**

Internet Principles – Basic Web Concepts – Client/Server model – Retrieving data from Internet – Internet – Protocols and Applications.

Unit II Introduction to HTML **7 h**

History of HTML - HTML Generations, Documents - Anchor Tag - Hyper Links - Header Section - Title, Prologue, Links - Colorful webpage - Comment lines.

1 Create a web page which displays the wage of style attributes and event function with demo.

2 Create a web page which receives suggestions from customers for a software development and consultancy agency using necessary functions.

Unit III Designing the Body section **8 h**

Heading Printing - Aligning the Headings - Horizontal rule - Paragraph - Tab settings - Images and Pictures - Embedding PNG Format images.

3 Create a web page with necessary formats, images, and marquees.

4 Create a web page which displays the mouse co–ordinates and image co– ordinates.

Unit IV Ordered, Unordered lists and frames **8 h**

Lists - Unordered lists - Heading in a list - Ordered Lists - Nested Lists - Frames: Frameset Definition, Frame definition - Nested framesets.

5 Create a web page with lists (Ordered, Unordered and Definition Lists.

6 Using frames, create web page for a travel agency.

Unit V Table Handling **7 h**

TABLES: Table Creation – Table creation in HTML – Width of the Table and cells - Cell spanning multiple rows/columns - Coloring cells - Column specification.

7 Create a web page with table content

8 Create a web page site using links for text and images.

Text Books

1 Xavier. C, 2000 "World Wide Web design with HTML", Tata McGraw Hill Publishing Limited, New Delhi.

2 Gopalan N.P. and Akilandeswari J., 2011 ,"Web Technology", Prentice Hall of India.

References

1 Rajaraman, V., Fundamental of Computers, New Delhi: Prentice Hall India Pvt. Limited, 2014

2 Jon Ducket, 2011, "HTML & CSS Design and build Websites", John Wiley & Sons, Inc.

3 Deitel H.M. and Deitel P.J., 2012, "Internet and World Wide Web How to program", Pearson International, 4th Edition

4 https://www.youtube.com/watch?v=h_RftxdJTzs

5 https://www.youtube.com/watch?v=TeV2eDHtVa0

232PY1ASSA	SELF STUDY: ELECTRICAL AND ELECTRONIC APPLIANCES	SEMESTER III

Total Credits: 1

Total Instruction Hours: h

Syllabus

Unit I Basic Electrical Instruments and Units

Galvanometer-Ammeter-Voltmeter- Multimeter- Transformers -Voltage-Current, Resistance-Capacitance-Inductance-Electrical conductors and insulators.

Unit II Electrical Safety Measurement

Electric Shock- First aid for electric shock- Overloading - Earthing and its necessity- Short circuiting- Fuses, MCB, ELCB, insulation, inverter, UPS.

Unit III Home Appliances

Principles and working: electric fan-Electric iron box-Water heater- Induction heater- Microwave oven- Refrigerator.

Unit IV Household Wirings

House Hold Wiring – Short circuit protection – Current consumption of household appliances – Power distribution – AC load – DC load - Advantages and limitations of DC load.

Unit V Electrical Machines

D.C. Motor: working, principle, and construction- Single phase A.C. motor : working, principle, and construction - Rewinding-Maintenance.

Text Books

1 B.L.Theraja, (2019), Basic Electronics, S.Chand & Co., New Delhi.

2 K. C. Agrawal, (2020), Industrial Power Engineering and Applications Hand Book, Newnes publications.

References

1 K.B. Bhatia (2019) Study of Electrical Appliances & Devices, Khanna Publications.

2 K.P.Anwar, (2020) Domestic Appliances Servicing, Scholar Institute Publications..

3 S. P. Bali, (2017) Consumer Electronics-Pearson Education.

4 Sing S. N, (2010), Basic Electrical Engineering, PHI Learning Pvt. Ltd.

5 Albert Malvino, David J. Bates (2007) "Electronic Principles", Tata McGraw Hill.

232PY1ASSB	SELF STUDY: BIOPHYSICS	SEMESTER III

Total Credits: 1

Syllabus

Unit I Introduction To Biophysics

Methods of biophysics-scope of biophysics- Primary bonds -Secondary bonds-Ionic bonds, covalent bonds-Metallic bonds- van der Waals bonds-Hydrogen bond.

Unit II Centrifugation In Biological Studies

Introduction -Ordinary centrifugation-Types of centrifugations-Differential centrifugation -Ultracentrifugation; principle-Application.

Unit III Principle of Optics in Biological Studies

Introduction -Optical microscope-Ultraviolet microscope- Transmission electron microscope-Scanning electron microscope

Unit IV Radiation Physics In Biology

Introduction-Radioactive isotopes-Radioactivity-Effects of radiation on biological system-Beneficial effects of radiation-Radiation dosimetry.

Unit V Principle of Kinetics of Molecules

Diffusion-Factors affecting diffusion biological significance of diffusion -Osmosis - Osmatic pressure-Biological significance of osmosis

Text Books

1 Arumugam N. and Kumaresan V M, 2013, "Biophysics and Bioinstrumentation", Saras Publications. Unit I-IV

2 Subramanian M.A, 2006, "Biophysics: Principles and Techniques" MJP Publishers, Chennai. Unit V

References

1 Khandpur R.S., 2014, " Handbook of Biomedical instrumentation", TMH Publication Ltd.

2 Murugesan, R, 2003, "Modern Physics", 11th Edition, S. Chand & Company Ltd, New Delhi.

3 Pattabhi, V. and Gowtham, 2011, 2nd Edition "Biophysics", Narosa Publishing House, New Delh.

4 Daniel M., 1998, "Basic Biophysics for Biologist", Agro-bios, Jodhpur.

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

Course Code	Course Name	Category	L	T	P	Credit
231TL1A4TA	TAMIL - IV	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத் திறன்கள் (Life Skills)- மாணவர்களின் செயலாக்கத் திறனை ஊக்குவித்தல்	K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K4
CO3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	-	Entrepreneurial Development
✓	Employability	-	Innovations
-	Intellectual Property Rights	-	Gender Sensitization
-	Social Awareness/ Environment	-	Constitutional Rights/ Human Values/ Ethics

231TL1A4TA	TAMIL - IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **எட்டுத்தொகை** 10 h

1. நற்றிணை – குறிஞ்சித் திணை

I.பா.எண் : 01 – கபிலர்

II.பா.எண் : 88 – நல்லந்துவனார்

III.பா.எண் : 102 – செம்பியனார்

2. குறுந்தொகை – முல்லைத்திணை

I.பா.எண் : 65 – கோவூர்கிழார்

II. பா.எண் : 167 – கூடலூர்கிழார்

மருதத்திணை

I.பா.எண் : 08 – ஆலங்குடி வங்கனார்

II.பா.எண் : 61 – தும்பிசேர்கீரனார்

III.பா.எண் :196 – மிளைக் கந்தன்

நெய்தல் திணை

I.பா.எண் : 57 – சிறைக்குடி ஆந்தையார்

Unit II **எட்டுத்தொகை** 08 h

1. கலித்தொகை – பாலைக்கலி

I.பா.எண் : 09 – பெருங்கடுங்கோ

2. அகநானூறு - மருதத்திணை

I.பா.எண் : 86 – நல்லாவூர்கிழார்

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

II.பா.எண் : 192 – கணியன் பூங்குன்றனார்

III.பா.எண் : 279 – ஒக்கூர் மாசாத்தியார்

IV.பா.எண் : 312 – பொன்முடியார்

Unit III **பத்துப்பாட்டு** 10 h

1. பட்டினப் பாலை – கடியலூர் உருத்திரங் கண்ணனார் -1முதல் 218 வரிகள் வரை மட்டும்.

Unit IV **இலக்கிய வரலாறு** 10 h

1. எட்டுத் தொகை நூல்கள்
2. பத்துப்பாட்டு நூல்கள்

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

I. இலக்கணம்

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

II. பயிற்சிப் பகுதி

சங்கப் பாடல்கள் குறித்து திறனாய்வு செய்தல்.

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது.

Text Book

செய்யுள் திரட்டு - மொழிப் பாடம் - 2023- 24

1 தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி,(Unit I - V)

References

1 பேராசிரியர் புலவர் சோம. இளவரசு, எட்டாம் பதிப்பு -2014, தமிழ் இலக்கிய வரலாறு - மணிவாசகர் பதிப்பகம், சென்னை.

2 பேராசிரியர் முனைவர் பாக்கியமேரி, முதற் பதிப்பு- 2013, இலக்கணம் -இலக்கிய வரலாறு - மொழித்திறன் -பூவேந்தன் பதிப்பகம், சென்னை.

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

Course Code	Course Name	Category	L	T	P	Credit
231TL1A4HA	HINDI - IV	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	-	Entrepreneurial Development
✓	Employability	-	Innovations
-	Intellectual Property Rights	-	Gender Sensitization
-	Social Awareness/ Environment	-	Constitutional Rights/ Human Values/ Ethics

231TL1A4HA	HINDI- IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

नाटक

Unit II 10 h

एकांकी

Unit III 10 h

काव्य मंजरी

Unit IV 10 h

सूचना लेखन

Unit V 08 h

अनुवाद अभ्यास- III

Text Books

1. लडाई – सर्वेश्वरदयाल सक्सेना प्रकाशक: वाणी प्रकाशन 21-A, दरियागंज नई दिल्ली-110002. (Unit I)
2. एकांकी पंचामृत – डॉ राम कुमार (भोर और तारा छोड्कर) प्रकाशक: जवाहर पुस्तकालय सदर बाजार, मथुरा उत्तर प्रदेश-281001. (Unit II)
3. काव्य मंजरी- (डा मुन्ना तिवारी) मैथिलीशरण गुप्त- मनुष्यता, जयशंकर प्रसाद- बीती विभावरी जागरी सूर्यकान्त त्रिपाठी निराला- तोडती पत्थर और भिक्षुक. (Unit III)
4. सूचना लेखन पुस्तक: व्याकरण प्रदिप – रामदेव प्रकाशक: हिन्दी भवन 36 इलाहाबाद -211024. (Unit IV)
5. अनुवाद अभ्यास (केवल अंग्रेजी से हिन्दी में) (पाठ 10 to 20) प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17 (पाठ10 to 20). (Unit V)

Course Code	Course Name	Category	L	T	P	Credit
231TL1A4MA	MALAYALAM- IV	LANGUAGE - I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- the writing ability and develop reading skill
- the various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process
- the competency in translating simple Malayalam sentences into English and vice versa

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUS ON

✓	Skill Development	-	Entrepreneurial Development
✓	Employability	-	Innovations
-	Intellectual Property Rights	-	Gender Sensitization
-	Social Awareness/ Environment	-	Constitutional Rights/ Human Values/ Ethics

231TL1A4MA	MALAYALAM- IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **Drama** 10 h

Saketham- Sreekandan Nair

Unit II **Drama** 10 h

Saketham- Sreekandan Nair

Unit III **Drama** 10 h

Saketham- Sreekandan Nair

Unit IV **Screen Play** 10 h

Perumthachan- Vasudevan Nair

Unit V **Screen Play** 08 h

Perumthachan- Vasudevan Nair

Text Books

1 Nair, Sreekandan C.N. 2023. Saketham, Drama. DC Books Kottayam, Kerala, India. (Unit I to III)

2 Nair, Vasudevan M.T. 1994. Perumthachan- Screenplay. DC Books Kottayam, Kerala, India. (Unit IV & V)

Reference

1 Sankarapillai. 2005. Malayala Nataka Sahithya Charithram, Kerala Sahithya Akademi Publishers, Kerala, India.

Course Code	Course Name	Category	L	T	P	Credit
231TL1A4FA	FRENCH - IV	LANGUAGE- I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

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

COURSE OUTCOMES

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

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

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	-	Entrepreneurial Development
✓	Employability	-	Innovations
-	Intellectual Property Rights	-	Gender Sensitization
-	Social Awareness/ Environment	-	Constitutional Rights/ Human Values/ Ethics

231TL1A4FA	FRENCH - IV	SEMESTER IV

Total Credits: 3
Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

°Décrirequelqu'un. ° Comparer	En milieu professional, recruiter quelquún et justifier sonchoix.	S'exprimersur les styles de vêtemantReconnaitre des personnes à partit de descriptions.	Comprendre la description de personnesdans un extrait de roman.

Unit II 10 h

ExprimerPaccord ou le désaccord. ° Se situerdans le temps.	En milieu professional, recruiter quelquún et justifier sonchoix.	Décrire des personnes. Comprendre des personnes qui experiment leur accord ouleurdésaccord.	Comprendre des différences de points de vueexprimétesdans de message électronique. Raconter unsourvenir.

Unit III 10 h

° Parler de Pavenir.	Discuter de l'organisation d'un voyage de groupepuispréparerune fiche projet et la templit.	Comprendreune chanson. Echangersursesprojets de vacancy	Comprendre le message d'une carte d'anniversaire

Unit IV 10 h

° Exprimer des souhaits. ° Décrirequelq u'u n	Discuter de l'organisation d'un voyage de groupepuispréparerune fiche projet et la templit.	Discuter du programme de la soire à venir. Addresser des souhaits à quelqu'un.	Comprendre le message d'une carte d'anniversaire

Unit V 08 h

Make in Own Sentences based on the above Lessons

Text Book

1 LATITUDES 1 (Méthode de français) Pages from 128-151, Author : Regine Mérieux, Yves Loiseau (Unit I to IV)

Course Code	Course Name	Category	L	T	P	Credit
231EL1A4EA	ENGLISH - IV	LANGUAGE II	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- how language shapes society, enhancing critical reading, writing, and thinking skills through various literary forms
- the fundamentals of writing, including essay composition, persuasive communication, and creative expression
- the process of critical thinking through the analysis of literature

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Summarize main points and supporting details from listening to public addresses and demonstrate poem comprehension.	K2
CO2	Demonstrate clear and expressive speech while engaging in role-play and dramatization activities.	K3
CO3	Interpret textual elements such as themes, tone, and authorial intent in various reading materials.	K3
CO4	Produce clear summaries and paraphrases, maintaining the essence of the original text.	K3
CO5	Prepare for job interviews by employing appropriate interview techniques, confidence, and professionalism.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

231EL1A4EA	ENGLISH - IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **Listening** 10 h

Nissim Ezekeil - Goodbye Party for Miss Pushpa T.S.
D.H. Lawrence - Last Lessons of the Afternoon
Dr. APJ Abdul Kalam's speech at European Union
Listening for subtext – Tone and Emotion – Vivid Language and Pacing – Listening for Vision and Hope – Use of Storytelling
Punctuations: Periods, Commas, Semicolons, Colons, Apostrophes, Ellipses, Exclamation Points

Unit II **Speaking** 10 h

Oscar Wilde - The Importance of Being Earnest
Direct Speech and Indirect Speech - Commands and Requests, Exclamations and Wishes, Conversion of Indirect to Direct
Rules for changing direct speech into indirect speech

Unit III **Reading** 09 h

Gita Hariharan - The Remains of the Feast -
Langston Hughes - Thank You M'am
Making Inferences and Predictions - Identifying Author's Purpose and Tone- Contextual Vocabulary Building
Tenses: The Uses of Present, Past and Future Tenses

Unit IV **Writing Skills** 10 h

George Orwell - Why I Write
Summarizing vs. Paraphrasing - Expressing Purpose and Intent in Writing- Constructing Strong Arguments and Opinions
Grammar - Paraphrasing - Use of Paraphrasing, Characteristics of a good paraphrase, The Paraphrase of Poetry, Special Hints, Method of Procedure

Unit V **Soft Skills** 09 h

Steve Jobs - 2005 Stanford Commencement Address - Effective Communication - Presentation Skills
Business Corporate Soft Skills - Six common corporate conversation faux pas, Decision making Techniques, Negotiation Styles Job Interviews - Preparatory Steps for Job Interviews - Interview Skill Tips

Text Books

1. Straus, Jane, Lester Kaufman, and Tom Stern, editors. The Blue Book of Grammar and Punctuation: An Easy-to-Use Guide with Clear Rules, Real-World Examples, and Reproducible Quizzes. 12th ed., Jossey-Bass, 2021. (Unit I)
2. Wilde, Oscar. The Importance of Being Earnest. Edited by Norman Page, 2nd ed., Penguin Classics, 2000. (Unit II)
3. Hariharan, Gita. The Remains of the Feast. 1st ed., Penguin Books India, 1992. (Unit III)
4. Orwell, George. "Why I Write." George Orwell: An Anthology of His Prose, edited by John Carey, Harcourt, 2000. pp. 232-237. (Unit IV)
5. Meyer, John. The Soft Skills Handbook for Corporate Success: Essential Strategies for Business Professionals. 2nd ed., Business Insights, 2020. (Unit V)

References

1. Lawrence, D.H. The Complete Poems of D.H. Lawrence. Edited by V.J. Harding, 1st ed., Heinemann, 1992.
2. Buczynski, Mark. Soft Skills for the Workplace: How to Build Successful Relationships and Advance Your Career. 2nd ed., Wiley, 2018.
3. Hughes, Langston. "Thank You, M'am." The Penguin Anthology of American Poetry, edited by Rita Dove, Penguin Books, 2006, pp. 530-533.
4. Nelson, Brian. The Soft Skills Handbook: Essential Skills for the Workplace. 3rd ed., Business Publishing, 2019.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A4CA	OPTICS AND SPECTROSCOPY	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concept of geometrical optics and defects of lenses
- The behavior of light and their applications.
- The basic of molecular spectroscopy and their applications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Identify the aberrations and the dispersive power of prism	K2
CO2	Interpret the importance of pattern forms and interferometers	K3
CO3	Demonstrate the Fresnel, Fraunhofer diffraction and Resolving power	K3
CO4	Analyze the plane, circularly and elliptically polarized light	K4
CO5	Apply the Principle of Spectroscopy in the respective applications.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A4CA	OPTICS AND SPECTROSCOPY	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I **Geometrical Optics** **09 h**

Aberrations: Spherical aberrations in lens - Methods of minimizing spherical aberration - Coma - Astigmatism - Chromatic aberration - Expression for an object at infinity - Achromatic lens - Condition for achromatism of two thin lenses separated by a finite distance - Dispersion by a prism - Angular dispersion and dispersive power.

Unit II **Interference** **09 h**

Interference in thin films due to reflected and transmitted light – Fringes produced by a wedge - shaped thin film – Newton's Rings: Expression for the radii of rings - Determination of wavelength of sodium light by Newton's rings- Refractive index of the liquid in Newton`s ring – Michelson interferometer – Measurement of wavelength, difference in the wavelength of two waves of Michelson interferometer – Fabry-Perot interferometer - Fresnel biprism.

Unit III **Diffraction** **10 h**

Fresnel's assumptions - Rectilinear propagation of light - Half period zone –The zone plate - Fresnel and Fraunhofer diffraction - Fraunhofer diffraction at double slit - Theory of plane diffraction grating - Determination of Wavelength of light using Transmission Grating - Resolving power: Rayleigh`s criterion - Resolving power of telescope, prism, and grating.

Unit IV **Polarization** **10 h**

Polarization of Light: Brewster's law - Huygen's Theory and condition for double refraction in Uniaxial crystals – Production and detection of linear polarized light- Quarter wave plate and half wave plate- Production and detection of elliptical, circular polarized light - Application of polarized light - Optical activity: Optical rotation – Fresnel's theory of optical rotation- Specific rotation: - Laurent's half shade polarimeter - Specific rotation of Sugar solution.

Unit V **Spectroscopy** **10 h**

Types of Spectra: Infrared spectroscopy - Ultraviolet spectroscopy- Rayleigh's Scattering - Origin of pure rotational spectrum of a molecule - Theory of the origin of vibration, rotation spectrum of a molecule - Electronic spectra of molecules – Raman effect: Experimental study of Raman effect - Quantum theory of Raman effect – Application of Raman spectra.

Text Books

1 BrijLal and Subrahmanyam N, 2014, "A Textbook of Optics", S. Chand and Co., New Delhi.

2. Murugeshan R and Kiruthiga Sivaprasath, 2014, "Optics and Spectroscopy" S. Chand and Co., New Delhi.

References

1 David W Ball, 2013, "Basics of Spectroscopy", PHI Pvt. Ltd., New Delhi.

2 Murugesan R, 2014, "Optics and Spectroscopy", S. Chand and Co., New Delhi.

3 Aruldhas G, 2007, "Molecular structure and spectroscopy", PHI Pvt. Ltd, II Edition, New Delhi.

4 AjoyGhatak, 2006, "Optics", 3rd Edition, Tata McGraw Hill Publishing Company Ltd., New York.

5 https://www.youtube.com/watch?v=RZOtVmFgMlA

Course Code	Course Name	Category	L	T	P	Credit
232PY1A4CB	PRINCIPLES OF ELECTRONICS AND COMMUNICATION	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The electronics components of diode, transistor and IC's
- The modulation, demodulation and transmitter, receiver
- The various communication types and their applications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the concept of special diodes and transistor	K2
CO2	Illustrate the various types and importance of transistor and IC's	K3
CO3	Interpret the concept of modulation and AM, FM	K3
CO4	Outline the operations of AM Transmitter and Receiver	K4
CO5	Connect the concept of satellite communication, radar and fiber optics communications.	K4

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill **Development**	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A4CB	PRINCIPLES OF ELECTRONICS AND COMMUNICATION	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I **Diodes and Transistors** 10 **h**

PN Junction diode - Zener diode - Light emitting diode- Photo diode - Tunnel diode - Shockley diode. Transistor: terminals, facts, actions, symbols - Characteristics of CB, CE - Transistor testing.

Unit II **Field Effect Transistors and IC's** 10 **h**

Type of Field Effect Transistors- Principle and working of JFET - Output characteristics of JFET – Metal oxide semiconductor FET -Types of MOSFET - Integrated Circuits - Advantage and disadvantage of IC's - IC classifications, Making monolithic IC's - IC packing's - IC symbols.

Unit III **Modulations** and **Demodulations** 09 **h**

Modulation – Necessity for modulation – Types of modulation – Amplitude modulation - Modulation factor – Theory of Frequency modulation - Comparison of AM and FM Demodulation - Essentials in demodulation.

Unit IV **AM Transmitter and Receiver** 09 **h**

AM detector - AM receiver - Types of AM receiver - TRF receiver – Superheterodyne receiver – Image frequency rejection – S/N ratio – Sensitivity – Selectivity – RF amplifier – Mixer – Detection and AGC.

Unit V **Satellite communication, Radar and Fibre Optics** 10 **h**

Communication – Components of a communication system – Satellite Orbits - Satellite communication system - Satellite applications. Up Link – Down Link – RADAR: Principle, Transmitting and reception systems – Applications - Fiber Optics: Principle, Structure, Acceptance Angle, and Numerical Aperture.

Text Books

1 Mehta V.K, Rohit Mehta, 2014, "Principles of Electronics", S. Chand Publications, New Delhi.

2 Wayne Tomasi, 2012, "Electronic Communication Systems", 5th Edition. Pearson Education, New Delhi.

References

1 Robert J. Schoenbeck, 1992, "Electronic communication, Modulation and Transmission", Universal Book Stall, New Delhi.

2 George Kennedy, 2006, "Electronic Communication Systems", 4th Edition, Tata McGraw Hill, New Delhi.

3 Anokh Singh, 1999, "Principles of Communication Engineering" S.Chand & Co. Delhi.

4 Despande N.D. et. al., 2004, "Communication Electronics", Tat McGraw Hill, New Delhi.

5 E-Book: Dennis Roddy and John Coolen, 1995, "Electronic Communication", 4th Edition, Prentice Hall Career and Technology, New Delhi.

232PY1A4CP	CORE PRACTICAL: OPTICS AND SPECTROSCOPY	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
1	Determination of the wavelength of sodium light and the number of lines per centimeter using diffraction grating
2	Determination of dispersive power and resolving power using plane diffraction grating. (Under DBT Scheme)
3	Find the thickness of a thin paper by measuring the width of interference fringes produced by a wedge-shaped Film
4	Determination of the refractive index of a prism using (i-d) curve
5	Determination of the radius of curvature of lens using Newton's Rings.
6	Determine the wavelength of a source using Michelson's interferometer. (Under DBT Scheme)
7	Determination of the resolving power of the material of a prism using mercury source.
8	Find the values of the Cauchy constants of the material of a prism using mercury source.
9	Comparison of the Refractive indices of two different liquids using hollow prism.
10	Determination of the Refractive index of water using hollow prism.
11	Determination of the wavelength of sodium light using Newton's Rings.
12	Determine the dispersive power of the material of a prism using mercury Source. (Under DBT Scheme)

Note: Any 10 Experiments

References

1 Chattopadhyay D, 2015, "Advanced course in Practical Physics", 8th Edition, NCBA publishers, Kolkata.

2 Samir Kumar Ghosh, 2013, "Textbook of Advanced Practical Physics", NCBA Publishers, Kolkata.

3 Arora C.L, 2013, "B.Sc. Practical Physics", S. Chand and Company Limited, New Delhi.

4 Ouseph C.C, 2014, "Practical Physics and Electronics", Viswanathan publishers, Chennai.

Course Code	Course Name	Category	L	T	P	Credit
232CE1A4EP	CHEMISTRY - II	IDC Practical	3	-	4	5

PREAMBLE

This course has been designed for students to learn and understand

- The basic knowledge about conductance and electrolytic cells
- The classification of the electrodes
- About the qualitative and gravimetric analysis

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the types of conductance and electrolytic cells	K2
CO2	Outline the types of electrodes	K2
CO3	Relate the one and two component systems	K2
CO4	Examine the qualitative analysis in inorganic salt mixture	K3
CO5	Infer the various types of precipitation methods	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232CE1A4EP	CHEMISTRY - II	SEMESTER IV

Total Credits: 5

Total Instruction Hours: 72 h

Syllabus

Unit I **Electrochemistry - I** **14 h**

Types of conductance - Electrolytic conductance- Specific conductance- Molar conductance- Equivalent conductance - Cell constant - Ionic mobility - Transport number. Half-cell reaction - Oxidation and reduction-Electrochemical cells - Galvanic and electrolytic cells - Reversible cells

1 Determination of strength of strong acid using Conductometer

2 Determination of strength of mixture of acids using Conductometer

Unit II **Electrochemistry - II** **14 h**

Electrochemical series - Single electrode potential - Types of electrodes - Calomel electrode- Standard hydrogen electrode- Ag/AgCl electrode - EMF cell representation – EMF and free energy

3 Determination of strength of iron using potentiometer

4 Determination of strength of strong acid using potentiometer

Unit III **Phase Rule** **14 h**

Introduction-Degrees of freedom-Phase reactions- Conditions for equilibrium - Derivation of phase rule - One and two component system

5 Determination of critical solution temperature using phenol water system

6 Determination of transition temperature using naphthalene - biphenyl system

Unit IV Qualitative Analysis **15 h**

Introduction - Dry reactions (Heating, flame tests)- Wet reactions: Test tubes-Centrifuge tube-Centrifugation-Washing the precipitates through Buckner funnel - Sintered crucible- Precipitation with ammonium sulphide- Interfering anions and its elimination - Classification of cations into analytical groups (group separation only)

7 Qualitative analysis of Inorganic salt - I

8 Qualitative analysis of Inorganic salt - II

Unit V Gravimetric Analysis **15 h**

Precipitation method- Super saturation and precipitate formation - Conditions of precipitation-Precipitation from homogeneous solution - Fractional precipitation-Sequestering agents

9 Estimation of Nickel as Nickel DMG

10 Estimation of Lead as lead sulphate

Text Books

1 Puri. B.R, Sharma. L.R and Pathania. M.S, 2017, "Principles of Physical Chemistry", 47th Edition, John Wiley and Sons & USA

2 Malik W. U. Tuli G. D. and Madan R.D, 2012, "Selected topics in Inorganic Chemistry", S. Chand & Co. Ltd., New Delhi

References

1 Madhan. R.D, 2016, "Modern Inorganic Chemistry", 10th Edition, Mc Graw Hill Company & USA

2 Soni, P.L. 2000, "Text book of Inorganic Chemistry", 20th Edition, S. Chand & Co. Ltd., New Delhi

3 Sarah J. Tracy, 2013, "Qualitative research methods", 1st Edition, John Wiley & Sons, Ltd, UK.

4 E. N. Lambert, M. J. Mohammed 1978 , Comprehensive Qualitative Analysis for Advanced Level Chemistry, Heinemann publishers, Halley court, Jordan hill, Oxford.

5 https://serc.carleton.edu/research_education/equilibria/phaserule.html

6 https://personal.utdallas.edu/~son051000/chem1312/Chapter18a.pdf

Course Code	Course Name	Category	L	T	P	Credit
232PY1A4SA	CONCEPTS AND PROGRAMMING IN C	SEC	3	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- The basic principles of programming.
- The concepts of C Programming language.
- The usage of C program into Physics problems.

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 C programming.	K1
CO2	Understand the strength of C through its rich set of operators.	K2
CO3	Apply the knowledge of control structure as decision making and looping.	K3
CO4	Build programs using arrays and functions.	K3
CO5	Expose the concepts of C programming in Physics problem solving.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
✓	Intellectual Property Rights	-	Gender Sensitization
-	Social Awareness/ Environment	-	Constitutional Rights/ Human Values/ Ethics

232PY1A4SA	CONCEPTS AND PROGRAMMING IN C	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 36 h

Syllabus

Unit I Basic Structure of C programming 7 h

Character sets – Constants – Keywords and Identifiers – Variables – Data types – Declaration of Variables – Assigning values to Variables – Defining symbolic constants.

Unit II Operators and Expression 7 h

Arithmetic operators – Relational operators – Logical operators – Assignment operators – Increment and Decrement operators – Conditional operators – Special operators – Arithmetic expression – Evaluation of expression – Precedence of arithmetic operators – Some computer problems – Type conversion in expression – Operator precedence and associatively – Mathematical functions.

Unit III Control statements 7 h

Reading and writing character – Formatted input and output – Decision making: IF statement: Simple IF – IF ELSE – Nesting of IF..ELSE..ELSE - IF Ladder – Switch Statement – Operator – go to statement – while - Do..While – for loop – Jumps in loops – Simple programs.

Unit IV Arrays 7 h

One dimensional array – Declaration of array – Initiating on two and multidimensional arrays – Declaring and initializing string variables – Reading strings from terminal – Writing strings on the screen – Arithmetic operations on characters – Simple programs - Sorting, searching program using one dimensional array, matrix manipulation.

Unit V Physics Problems into C programming 8 h

Conversion of temperature from C to F and F to C – Determination of Velocity of Light by Foucalt's Rotating Mirror method – Determination of G by Boy's Method – Young's Modulus – Uniform and Non Uniform method – Determination of Frequency: Sonometer – Spectrometer: Refractive index and Dispersive power of Prism – Newton's rings: Radius of Curvature.

Text Books

1. Balagurusamy E, 2012, "Programming in ANSI C", 6th Edition, Tata McGraw Hill Publishing Company Ltd, New York.
2. Yaswanth Kanitkar, 2012, "Let Us C", 13th Edition, BPB Publication, New Delhi.

References

1. Karthikeyan E., 2008, "A Textbook on C", Prentice Hall India, New Delhi.
2. Palaniswamy S, 2004, "Physics Through C Programming", Pragati Publication, Meerut.
3. Ashok N. Kamthane, 2011, "Programming in C", 2nd Edition, Pearson Education, Chennai.
4. Gotfried B, 2010, "Programming with C", 3rd Edition, Tata McGraw Hill Publishing Company Ltd, New York.
5. NPTEL video : www.youtube.com/watch?v=t9WKOcRB63Q&list=PLJ5C_6qdAvBFzL9su5J-FX8x80BMhkPy1
6. https://www.w3schools.com/c/c_getstarted.php
7. https://www.geeksforgeeks.org/c-programming-language/

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Course Code	Course Name	Category	L	T	P	Credit
232PY1A5CA	MATHEMATICAL PHYSICS	CORE - IX	4	1	-	5

PREAMBLE

This course has been designed for students to learn and understand

- The physical phenomena in different matrices
- The Eigen functions and vector calculus importance
- The basic of mathematical function using integral calculus and special functions

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Represent linear transformations as matrices and understand basic properties of matrices.	K2
CO2	Apply vector spaces and matrices in the quantum world.	K3
CO3	Understand the basic properties of the vector operations.	K2
CO4	Understand the concept of gradient of scalar field and divergence and curl of vector fields.	K2
CO5	Interpret about gamma and beta functions and their applications.	K3

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A5CA	MATHEMATICAL PHYSICS	SEMESTER V

Total Credits: 5

Total Instruction Hours: 60 h

Syllabus

Unit I **Matrices** **12 h**

Special types of matrices: Diagonal, scalar and unit matrices - Upper triangular and lower - triangular matrices - Transpose of a matrix - Conjugate of a matrix - Conjugate transpose of a matrix - Symmetric and antisymmetric matrices - Hermitian and skew Hermitian matrices - Singular and nonsingular matrices - Orthogonal and unitary matrices - Rank of a matrix.

Unit II **Eigen Values and Eigen Vectors** **12 h**

Eigen values and Eigen vectors of matrix - Diagonalization of matrices - Properties of Eigen values and Eigen vectors of orthogonal - Hermitian and unitary matrices - Cayley Hamiliton theorem (Statement only). Inverse of a matrix using Cayley Hamiltion theorem - Application of matrices: Solving ordinary second order differential equations - Coupled linear ordinary differential equations of first order.

Unit III **Vector Calculus** **12 h**

Addition of vectors - Multiplication of vectors by a scalar - Orthogonal resolution of vectors - Rotation of coordinates - Product of two vectors - Physical applications - Work done by force - Activity of a force - Torque about a point - Angular velocity of rigid body – reciprocal system of vectors.

Unit IV **Integral Calculus** **12 h**

Line integral, surface integral and volume integral – Fundamental theorem of gradients – The divergence of a vector - Gauss's divergence theorem (Statement only) – The fundamental theorem of curl – Stoke's theorem (Statement only). Divergence less and curl less fields. Curvilinear coordinates: Spherical polar coordinates – Cylindrical coordinates (Basics).

Unit V **Special Functions** **12 h**

Definitions – The Beta function – Gamma function – Evaluation of Beta function – Other forms of Beta function – Evaluation of Gamma function – Other forms of Gamma function - Relation between Beta and Gamma functions – Dirac's delta function.

Text Books

1 Gupta B D, 2018, "Mathematical Physics", 3rd Edition, Vikas Publishing House, New Delhi.

2 Sathya Prakash, 2016, "Mathematical Physics", 8th Edition, S. Chand and Co, New Delhi.

References

1 Rajput B S, 2017, "Mathematical Physics", 23rd Edition, Pragati Prakashan, New Delhi.

2 Dass H K, 2015, "Mathematical Physics", 7th Edition, S Chand and Co, New Delhi.

3 Bhattacharyya B, 2010, "Mathematical Physics", 3rd Edition, NCBA, West Bengal.

4 Arfken G, Weber H, Harris F E, 2017, "Mathematical Methods for Physicists: A Comprehensive Guide", 7th Edition, Academic Press, United Kingdom.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A5CB	CLASSICAL AND STATISTICAL METHODS OF ANALYSIS	CORE - X	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The mechanics of systems of particles and conservation theorems
- The basic Lagrangian and Hamiltonian formulations and equations
- The concept of classical and quantum statistics of molecules

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Demonstrate the linear momentum, angular momentum and energy for particles and a system of particles.	K3
CO2	Apply the theory of Lagrangian for oscillator and pendulums.	K3
CO3	Discuss the Hamiltonian functions and canonical transformations	K2
CO4	Explain the classical Maxwell's Boltzmann statistics.	K4
CO5	Express the Bose-Einstein and Fermi Dirac quantum statistics	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A5CB	CLASSICAL AND STATISTICAL METHODS OF ANALYSIS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I **Mechanics of a Particle and a System of Particles** **10 h**

Conservation of linear momentum - Conservation of angular momentum - Conservation of energy: Work - Kinetic energy and work energy theorem - Conservative force and potential energy - Conservation theorem. Mechanics of a system of particles - External and internal forces - Centre of mass - Conservation of linear momentum - Frame of reference - Conservation of angular momentum - Conservation energy.

Unit II **Lagrangian Formulation** **10 h**

Constraints and degrees of freedom – Generalized coordinates – Generalized displacement – Velocity – Acceleration – Momentum – Force – Potential energy – D'Alembert's principle – Lagrangian equation from D'Alembert's principle – Application of Lagrange's equation of motion: Simple pendulum - Compound pendulum.

Unit III **Hamiltonian Formulation** **10 h**

Phase space – Hamiltonian function – Hamiltonian principle – Hamilton's canonical equations of motion - Physical significance of H – Applications of Hamiltonian equations of motion: Simple pendulum - Compound pendulum - Linear harmonic oscillator – Canonical transformations

Unit IV **Classical Statistics** **09 h**

Phase space – Ensembles - Density of distribution in the phase space - Statistical Equilibrium – Microstate and Macrostates - Stirling's Formula – Maxwell's Boltzmann distributive law - Maxwell distributive law of velocities.

Unit V **Quantum Statistics** **09 h**

Postulates of Quantum mechanics – Quantum statistics of identical particles – Bose Einstein statistics: Bose Einstein distribution law - Fermi Dirac statistics: Fermi Dirac distribution law – Comparison of three statistics – Black body radiation and Planck's radiation

Text Books

1 Gupta, Kumar, Sharma, 2005, "Classical Mechanics", 3rd Edition, Pragati Prakashan Publishers, Meerut.

2 e-Book: Sathyaprakash, 1981, "Statistical Mechanics", 6th Edition, Kedar Nath and Ram Nath, Meerut.

References

1 Gupta. B.D, Satyaprakash, 1991, "Classical Mechanics" Kedar Nath and Ram Nath, Meerut.

2 Upadhyaya. J. C, 2018, "Classical Mechanics", 2nd Edition, Himalaya Publishing House, Mumbai.

3 Brijlal, Subramaniam, 2002, "Heat and Thermodynamics", S.Chand and Company Ltd., New Delhi

4 Goldstein. H, Poole. C, Safko. J, 2002, "Classical Mechanics", Dorling Kindersley Pvt Ltd., India.

5 Weblink: https://www.youtube.com/watch?v=zgs75Qc347I

Course Code	Course Name	Category	L	T	P	Credit
232PY1A5CC	SOLID STATE PHYSICS	CORE - XI	4	1	-	5

PREAMBLE

This course has been designed for students to learn and understand

- The basic of crystalline materials, the interatomic forces, and bonds between solids
- Various aspects of the behavior of solids with their magnetic properties
- The importance of superconducting materials in engineering applications

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Express the fundamentals of crystal and crystal structures	K2
CO2	Examine the fundamental of bonding and the different types of bonding in solids	K3
CO3	Develop knowledge on the basics of magnetic phenomena on materials and various types of magnetizations	K3
CO4	Infer the magnetic and dielectric properties of crystalline structures	K2
CO5	Explain the properties of superconducting materials	K4

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A5CC	SOLID STATE PHYSICS	SEMESTER V

Total Credits: 5

Total Instruction Hours: 60 h

Syllabus

Unit I Crystal Structures **12 h**

Crystallography - Distinction between crystalline and amorphous solids – Crystal lattice – Basis - Crystal structure – Unit cell – Types of crystal - Bravais lattices - Unit cell characteristics for SC, BCC, FCC, HCP - Interplanar distance - Miller indices – Lattice constant and density - NaCl crystal - Structure of diamond

Unit II Bond Theory and Thermal Properties of Solids **12 h**

Classification of solids - Basics of Bond theory in crystals – Ionic, Covalent, Metallic, Molecular and Hydrogen bonding - Specific heat capacity of solids – Einstein's theory of specific heat of solids – Debye's theory of specific heat capacity of a solid - Hall Effect: Hall voltage and Hall coefficient – Mobility and Hall angle – Importance of Hall effect – Experimental determination of Hall coefficient

Unit III Magnetic Properties **12 h**

Dia, para, and ferromagnetic materials - Langevin's theory of diamagnetism – Langevin's theory of paramagnetism – Ferromagnetism – Domain theory of ferromagnetism - Hysteresis based on domains – Antiferromagnetism – Ferrimagnetism – Structure of Ferrites

Unit IV Dielectric Properties **12 h**

Band theory of solids – Polarization - Types of polarizabilities - Dielectric constant and displacement vector - Dielectric loss - Clausius Mosotti relation - Properties of dielectrics in alternating fields - Ionic polarizability as a function of frequency - Effects of dielectrics

Unit V Superconductivity **12 h**

Introduction - General properties of superconductors - Effect of magnetic field - Meissner effect - Specific heat - Isotope effect - London equations – Type I and Type II superconductors - Explanation for the occurrence of superconductivity - BCS theory - High temperature superconductors

Text Books

1 A.M.Wahab, 2007, "Structure and Properties of Materials", 2nd Edition, Narosa Publishing house, New Delhi, India.

2 Pillai S.O, 2010, "Solid State Physics", 6th Edition, New Age Publisher, New Delhi.

References

1 E-book: Murugeshan R. and Kiruthiga Sivaprasath Er, 2008," Modern Physics", S Chand and Co, New Delhi.

2 Gupta, Kumar, 2012, Solid State Physics, K.Nath and Co, Meerut.

3 Charles Kittel, 2004, Introduction to Solid State Physics, 8th Edition, John Wiley and Sons, New York

4 Raghavan V, 2004, Materials Science and Engineering, Prentice Hall of India Private Limited, New Delhi.

5 https://www.youtube.com/watch?v=OTDVov_kw6A

232PY1A5CP	CORE PRACTICAL - V : ADVANCED PHYSICS	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No.	List of Experiments
1	Study the Hall coefficient of given p- type materials and obtain the charge carrier density in each case and study the Hall mobility
2	Study the Hall coefficient of given n- type materials and obtain the charge carrier density in each case and study the Hall mobility
3	Find the Specific resistance of a semiconductor –Thermal Method
4	Determination of the velocity of sound in the given liquid using ultrasonic interferometer
5	Study the magnetic susceptibility of given diamagnetic substances (Under DBT Star College Scheme)
6	Draw and analyze the I-V Characteristics of a PN junction diode (Under DBT Star College Scheme)
7	Determine the breakdown voltage of the given Zener diode.
8	Analyze the I-V Characteristics of a solar cell (Under DBT Star College Scheme)
9	Study the characteristics of transistor
10	Verify the truth table and determine the logic gates OR, AND, NOT, NOR and NAND Gates (Under DBT Star College Scheme)
11	Verify the truth table and determine the logic gates of NAND gate as a universal gate (Under DBT Star College Scheme)
12	Verify the truth table and determine the logic gates of NOR gate as a universal gate (Under DBT Star College Scheme)

Note: Any 10 Experiments

References

1 Geeta Sanon R., 2009. "B.Sc. Practical Physics", 2nd Ed., S. Chand and Co., New Delhi.

2 Prakash I., and Ramakrishna, 2011, "A Textbook of Practical Physics", 11th Edition, Kitab Mahal.

3 Flint B. L., Worsnop H. T., 2000, "Advanced Practical Physics for Students", Asia Publishing House.

4 Sathya Prakash, 2010, Practical Physics and Electronics, S. Chand. and Co., New Delhi.

232PY1A5CQ	CORE PRACTICAL - VI : C PROGRAMMING	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No.	List of Programme
1	Write a C program to find the roots of Quadratic Equation Ax2+Bx+C=0.
2	Write a C program to convert Celsius scale into Fahrenheit scale.
3	Write a C program to find resultant value of the three resistances R1, R2 and R3 connected in (i) series and (ii) parallel.
4	Write a C program to calculate refractive index of the material of the prism.
5	Write a C program to measure resonant frequency of the LCR series circuit.
6	Write a C program to calculate De Broglie wavelength of a material for the given value of momentum p.
7	Write a C program for Matrix addition.
8	Write a C program for Matrix multiplication.
9	Write a C program for Average of set of numbers.
10	Write a C program to determine Area of triangle.
11	Write a C program to find the largest of 'N' numbers in the given array.
12	Write a C program to perform i) String Copy ii) String Concatenation iii) String Reverse.

Note: Any 10 Programme

References

1 Balagurusamy E, 2012, "Programming in ANSI C", 6th Edition, Tata McGraw Hill Publishing Company Ltd, New York.

2 Yaswanth Kanitkar, 2012," Let Us C", 13th Edition, BPB Publication, New Delhi.

3 Karthikeyan E, 2008, "A Textbook on C", Prentice Hall India, New Delhi.

4 Palaniswamy S, 2004," Physics Through C Programming", Pragati Publication, Meerut.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A5SA	FUNDAMENTALS OF IoT	SEC - III	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- The fundamental concepts of IoT.
- The various architectures and protocols for connecting smart devices.
- The role of IoT in various domains of industry.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Outline the fundamentals of IoT	K2
CO2	Classify the basic architecture of IoT	K2
CO3	Utilize various protocols for design of IoT systems	K3
CO4	Outline the various techniques of data analytics in IoT	K2
CO5	Categorize various applications of IoT	K4

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A5SA	FUNDAMENTALS OF IoT	SEMESTER V

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I **Basics of IoT** **4 h**

Genesis of IoT - Connected roadways - Connected factory - Smart connected buildings - Convergence of IT and IoT – IoT challenges.

Unit II **IoT Architecture** **5 h**

Drivers behind new network architectures – Scale - Security - Constrained devices and networks - Simplified IoT architecture - Core IoT functional stack - Fog computing - Edge computing - Fog and cloud.

Unit III **Smart Objects** **5 h**

Sensors – Actuators – Smart Objects – MEMS - Connecting smart objects – Communications criteria - Topology - IoT Access Technologies - IEEE 802.15.4 - LoRaWAN - NB - IoT and other LTE variations

Unit IV **Data and Analytics for IoT** **6 h**

Introduction to data analytics for IoT – Structured versus unstructured data - Data in motion verses data at rest - Machine learning overview - Machine learning and getting intelligence from big data - Big Data analytics tools and technology - Edge streaming analytics - Network analytics

Unit V **Applications of IoT** **4 h**

Home automation - Smart cities - Logistics - Agriculture - Industrial IoT - IoT design ethics - IoT in environmental protection.

Text Books

1 David H, Gonzalo S, Patrick G, Robert B, Jerome H, 2017, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", First Edition, Cisco Press.

2 Vijay M, Arshdeep B, 2014, "Internet of Things (A Hands-on-Approach)", 1 st Edition, VPT.

References

1 Adrian, M, Hakin, C, 2014, "Designing The Internet of Things", Ist Edition, Wiley.

2 Peter, W, 2018, "Mastering Internet of Things: Design and create your own IoT applications using Raspberry Pi 3", First Edition, Packt Publishing.

3 Olivier H, David B, Omar E, 2012,"The Internet of Things: Key Applications and Protocols", Ist Edition, Wiley Publications.

4 Biron J and Follett J, 2016, "Foundational Elements of an IoT Solution", O'Reilly Media.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A5DA	RENEWABLE ENERGY SOURCES	DSE - I	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The present energy crisis and various available energy sources.
- The basic principles and applications of different forms of energy.
- The different nonconventional energy sources and the methods of harnessing energy from them.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Discuss various sources of energy for harvesting.	K3
CO2	Understand the need of energy conversion and the various methods of energy storage.	K2
CO3	Explain the fundamental properties of silicon cell.	K2
CO4	Explain bio gas and the generation of bio gas.	K2
CO5	Learn the concepts of energy from wind and other sources.	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development	✓	Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A5DA	RENEWABLE ENERGY SOURCES	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Alternate Sources of Energy 10 h

Fossil fuels and nuclear energy their limitation - Need of renewable energy - Nonconventional energy sources - An overview of developments in offshore wind energy - Tidal energy - Wave energy systems - Ocean thermal energy conversion - Solar energy – Biomass - Biochemical conversion - Biogas generation - Geothermal energy tidal energy - Hydroelectricity.

Unit II Solar Energy 10 h

Solar energy and its importance - Storage of solar energy - Solar pond – Non convective solar pond - Applications of solar pond and solar energy - Solar water heater - Flat plate collector - Solar distillation - Solar cooker - Solar greenhouses - Solar cell - Absorption air conditioning - Need and characteristics of photo-voltaic (PV) systems - PV models and equivalent circuits and sun tracking systems.

Unit III Photovoltaic Systems 10 h

Introduction – Photovoltaic principle – Basic silicon solar cell – Power output and conversion efficiency – Limitation to photovoltaic efficiency – Basic photovoltaic system for power generation – Advantages and disadvantages – Types of solar cells – Application of solar photovoltaic systems – PV Powered fan – PV powered area lighting system – A hybrid system - Dye sensitized solar cells.

Unit IV Energy from Biomass 9 h

Introduction – Biomass conversion technologies – Biogas generation – Factors affecting bio digestion – Working of biogas plant – Advantages and disadvantage of floating and fixed dome type plant – Biogas from plant wastes – Methods for obtaining energy from biomass – Advantages and disadvantages of biological conversion of solar energy.

Unit V Energy Sources and Indigenous Practices 9 h

Wind energy conversion – Classification and description of wind machines - wind energy collectors – Energy storage – Wind data – Energy audit – Energy and power from waves – Wave energy conversion devices – Fuel cells and application of fuel cells – Batteries – Advantages of battery for bulk energy storage – Supercapacitors - Hydrogen as alternative fuel for motor vehicles.

Foundations of energy in Indian thought - Solar energy in ancient Indian knowledge - Wind and hydro energy practices - Biomass and bio energy in indigenous practices.

Text Books

1 Kothari D.P., K.C. Singal and Rakesh Ranjan, 2008, "Renewable energy sources and Emerging Technologies", Prentice Hall of India, New Delhi.

2 Garg H.P. and Prakash J., 2006, "Solar Energy Fundamentals and Application", 7th Reprint Tata McGraw Hill Publishing, United States.

References

1 Chetan Singh Solanki, 2011, "Solar Photvoltaics Fundamentals", Technologies and Applications, 2nd Edition, PHI Learning Private Limited, New Delhi.

2 Rai G. D, 2010, "Non conventional Energy sources", 4th Edition, Khanna Publishers, New Delhi.

3 Jeffrey M. Gordon, 2013, "Solar Energy: The State of the Art", Earthscan.

4 Kalogirou S.A., 2013, "Solar Energy Engineering: Processes and Systems", 2nd Edition, Academic Press, New Delhi.

5 Weblink: www.digimat.in/nptel/courses/video/121106014/L01.html

6 https://www.sciencedirect.com/science/article/pii/S0960148125013771

https://IKS

Course Code	Course Name	Category	L	T	P	Credit
232PY1A5DB	LASER PHYSICS	DSE - I	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concept and special properties of lasers
- The working mechanism of various types lasers
- The important applications of laser in industrial and medical field

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the three different emission modes in laser physics.	K2
CO2	Solve the condition of lasing action.	K3
CO3	Identify different types of lasers on the basis of medium.	K3
CO4	Summarize the industrial applications of lasers.	K2
CO5	Outline the medical applications of lasers in eye surgery and skin treatment	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
✓	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A5DB	LASER PHYSICS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Principles of Laser **10 h**

Lasers - Interaction of radiation with matter – Absorption and emission of light – Three processes: Induced absorption, spontaneous emission, stimulated emission - Difference between spontaneous and stimulated emission - Einstein's co-efficient (derivation) - Population inversion – Pumping methods – Active medium – Metastable states - Pumping schemes.

Unit II Properties of Lasers **10 h**

Amplification and gain – Optical resonator and its action – Threshold condition for lasing – Condition for steady-state oscillation – Gain saturation - Laser operating frequencies – Cavity configurations – Levels of laser action: 2 level system - 3 level system.

Unit III Types of Lasers **9 h**

Classification of lasers - Solid state laser - Ruby laser - Nd:YAG laser - Gas lasers - He-Ne laser – CO_2 laser - Dye lasers - Semiconductor lasers, Semiconductor diode lasers: Homo-junction and Hetero-junction lasers.

Unit IV Industrial Applications of Lasers **9 h**

Characteristics and applications of some common lasers – Lasers in material processing – Surface treatments – Drilling – Cutting – Different methods of cutting – Welding – Heat treating – Lasers in electronic industry – Scribing – Soldering - Photolithography – Laser in nuclear energy - Bar code reader.

Unit V Medical Applications of Lasers **10 h**

Laser in medicine and surgery – Eye laser surgery – Photocoagulations – Light induced biological hazards: Eye and skin – Eye damage: Wavelength dependence – Ocular damage mechanism - Human skin and damages – Skin conditioning using laser - Laser applications in dentistry – Laser angioplasty – Different laser therapies - Laser endoscopy

Text Books

1 Avadhanulu M.N., P.S. Hemne, 2017, "An Introduction to Lasers theory and applications", S. Chand and Co., New Delhi

2 E-Book: Murugasen R. and Kiruthiga Sivaprakash, 2014,"Modern Physics", S. Chand and Company Pvt. Ltd., New Delhi.

References

1 Laud B.B., "Lasers and Nonlinear Optics", New Age International (P) Ltd., New Delhi.

2 Thyagarajan, 2016, "Lasers: Fundamentals and Applications", Infinity press.

3 Nair K. P. R., 2009, "Atoms, Molecules and Lasers", Narosa Publishers, New Delhi.

4 Walter Koechner, 1993, "Solid state Laser Engineering", 6th edition, Springer.

5 Weblink: www.nitttrc.edu.in/nptel/courses/video/115102026/L33.html

6 https://www.youtube.com/watch?v=DA7a_v96Jsw

7 https://link.springer.com/journal/40516

Course Code	Course Name	Category	L	T	P	Credit
232PY1A5DC	PHYSICS OF DEVICES AND INSTRUMENTATION	DSE - I	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The theory behind the working of various electronic devices.
- The basic principles and working mechanism of different electrical appliances.
- The importance of modulation techniques involved in communication systems.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Discuss various electronic devices for instrumentation.	K3
CO2	Understand the principle of filters and power supply systems.	K2
CO3	Explain the processing techniques involved in IC fabrication.	K4
CO4	Explain the working mechanism of various electrical appliances.	K4
CO5	Learn the concepts involved in communication system	K2

MAPPING WITH PROGRAMME OUTCOMES

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

COURSE FOCUSES ON

✓	Skill Development		Entrepreneurial Development
✓	Employability	✓	Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

232PY1A5DC	PHYSICS OF DEVICES AND INSTRUMENTATION	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Devices **10 h**

Characteristic and small signal equivalent circuits of UJT and JFET - Metal semiconductor junction - Metal oxide semiconductor (MoS) device - Ideal MoS and flat band voltage - Tunnel diode.

Unit II Power Supply and Filters **10 h**

Block diagram of a power supply - Qualitative idea of C and L filters - IC regulators - Line and load regulation - Short circuit protection - Active and passive filters - Low pass, high pass, band pass and band reject filters - Astable and monostable - Multivibrators using transistors.

Unit III Processing of Devices **10 h**

Basic process flow for IC fabrication - Electronic grade silicon - Crystal plane and orientation - Defects in the lattice - Oxide layer - Oxidation technique for SI - Metallization technique - Positive and negative masks - Optical lithography - Electron lithography - Feature size control and wet anisotropic etching - Lift off technique - Diffusion and implantation.

Unit IV Physics of Electrical Appliances **9 h**

Refrigeration, air conditioning - Home security system - CCTV device - Vacuum cleaning and microwave heating - Electric heating - Induction heating (General principles and working).

Unit V Introduction to Communication Systems **9 h**

Block diagram of electronic communication system - Need for modulation - Amplitude modulation - Modulation index - Analysis of amplitude modulated wave - Sideband frequencies in AM wave - Demodulation of AM wave using diode detector

Text Books

1 Sze S.M. and Know K. NG, 2008, "Physics of Semiconductor Devices", 3rd Edition, John Wiley and Sons. USA.

2 Ryder J.D., 2004, "Electronics: Fundamentals and Applications", Prentice Hall.

References

1 Salivahanan S. and Kumar N.S., 2012, "Electronic devices and circuits",Tata McGraw Hill, New Delhi.

2 Ajay Kumar Singh, 2011, "Electronic devices and integrated circuits", PHI Learning Pvt. Ltd

3 Kennedy G., 1999, "Electronic communication systems", Tata McGraw Hill New Delhi.

4 Weblink: https://www.youtube.com/watch?v=1uPTyjxZzyo

232PY1A5GA	ECO PHYSICS	SEMESTER V

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I **Ecosystems in Physics** **4 h**

Ecosystems: Energy flow in ecosystem – Ecosystem productivity – Carbon cycle, Oxygen cycle – Biological control of chemical factors in the environment.

Unit II **Soil Physics** **5 h**

Soil strength and its measurements – Soil pollution – Control of soil pollution – Principles of Bioremediation – Biodegradation in soil ecosystem

Unit III **Environmental Physics** **5 h**

Physical, chemical and biological characteristics of waste water – Calculation of chlorine dosage – Sludge processing and disposal methods – Radiation hazards – Deforestation.

Unit IV **Renewable Energy Sources** **5 h**

Geo thermal energy - Tidal energy - Wind energy - Solar energy - Hydroelectricity - Bio mass energy.

Unit V **Solar Energy and Its Applications** **5 h**

Photoelectric effect - Silicon wafers - Solar water heater – Solar cooking - Working of hybrid solar cells – New generation solar cells.

Text Books

1 Halliday, Resnick, Walker, 2019. Fundamentals of Physics, 11th Edition Wiley India Pvt. Ltd, New Delhi.

2 Rai G.D., 2004, Solar Energy Utilization, Khanna Publishers, New Delhi.

References

1 Lal and Subrahmanyam, N, 1994, A Textbook of Optics, 4th Edition. S Chand and Co, New Delhi.

2 Sukhatme. S.P, 1997, Solar Energy: Principles of thermal collection and storage, 2nd Edition, Tata McGraw-Hill Publishing Co. Ltd., New Delhi.

3 Lal and N. Subrahmanyam, 2008, A Text Book of Sound, 2nd Edition, Vikas Publishing House, New Delhi.

4 Mathur, D.S. 2002. Heat and Thermodynamics. S Chand and Co, New Delhi

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