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. CHEMISTRY

Eligibility

A candidate who has A pass in Higher Secondary Examination with Mathematics, Physics, Chemistry, Biology/Computer Science 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 there to are permitted to appear and qualify for the **Bachelor of Science (CHEMISTRY)** Degree Examination of this College after a course study of three academic years.

Programme Educational Objectives

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

1. To understand the interdisciplinary nature of Chemistry and to integrate knowledge of Mathematics, Physics and other disciplines to a wide variety of chemical problems.
2. To enable the students to learn laboratory skills to design, safely conduct and interpret chemical research.
3. To develop the ability to effectively communicate scientific information and research results in written and oral formats.
4. To provide a broad foundation in Chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.
5. To make students learn professionalism, including the ability to work in teams and apply basic ethical principles.

PROGRAMME OUTCOMES:

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

PO Number	PO Statement
PO1	Apply knowledge in scientific concepts, fundamental principles and varied theories to extend their relevance in day-to-day life.
PO2	Build the foundation in the current trends of chemistry with experimental skills
PO3	Make use research based knowledge in multidisciplinary approaches.
PO4	Extend the role and need of the chemist in societal, environmental contexts and demonstrate the knowledge for sustainable development.
PO5	Plan and organize as a member or leader in the diverse team and ability to engage in independent life – long learning in the broadest context of technological change.

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		

Credit distribution - Common for R5

For students admitted in AY 23-24 and onwards.
Credit distribution for all UG programmes

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**	

CURRICULUM

PROGRAMME NAME –B.Sc Chemistry
A.Y: 2023-24

Course Code	Course Category	Course Name	L	T	P	Exam (h)	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										
232CE1A1CA	Core- I	General Chemistry - I	4	1	-	3	25	75	100	4
232CE1A1CP	Core Practical- I	Volumetric Analysis and Preparation	-	-	6	3	40	60	100	3
232PY1A1IP	IDC- I	Physics - I	3	-	4	3	40	60	100	5
Part - IV										
233MB1A1AA	AECC- I	Environmental studies	2	-	-		50	-	50	2
Part - V										
232CE1A1XA	Extension Activity	NSS/NCC/ YRC/RRC/ Yoga/Sports/Clubs	-	-	-		50	-	50	1
Total			**17**	**2**	**11**				**600**	**21**

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

Dr.N.G.P. Arts and Science College
APPROVED
BoS- 13th 08/06/23 | AC- 15th 14/07/23 | GB- 20th 05/08/23

Dr.NGPASC
COIMBATORE | INDIA

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COIMBATORE | INDIA

B.Sc. Chemistry(Students admitted during the AY 2023-24)

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										
232CE1A2CA	Core - II	General Chemistry - II	3	-	-	3	25	75	100	3
232CE1A2CB	Core- III	General Chemistry - III	4	-	-	3	25	75	100	4
232CE1A2CP	Core Practical- II	Organic Chemistry	-	-	4	3	40	60	100	2
232PY1A2EP	IDC– II	Physics - II	3	-	4	3	40	60	100	5
Part - IV										
231TL1A2AA	AECC- II	Basic Tamil	2	-	-		50	-	50	2
231TL1A2AB		Advanced Tamil								
235CR1A2AA		Human Rights and Women's Rights								
Part - V										
232CE1A2XA	Extension Activity	NSS/NCC/ YRC/RRC/ Yoga/Sports/ Clubs	-	-	-		50	-	50	1
Total			20	1	9				700	23

17.10.23
BoS Chairman/HoD
Department of Chemistry
Dr.N.G.P. Arts and Science College
COIMBATORE - 641 048

Dr.N.G.P.ASC
Dr. N.G.P. Arts and Science College
COIMBATORE | INDIA

Dr.N.G.P. Arts and Science College
APPROVED
BoS- 14th 17.10.23 | AC - 16th 13.12.23 | GB - 21st 05.01.24

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

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
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										
232CE1A3CA	Core- IV	Applied Chemistry	4	-	-	3	25	75	100	4
232CE1A3CB	Core- V	Analytical Chemistry	4	-	-	3	25	75	100	4
232CE1A3CP	Core Practical-III	Inorganic Chemistry	-	-	6	3	40	60	100	3
232CE1A3SP	SEC - I Practical	Computer Applications for Chemistry	-	-	4	3	40	60	100	2
232MT1A3EP	IDC - III Practical	Mathematics with MATLAB	2	-	2	3	40	60	100	3
Total			**16**	**2**	**12**				**700**	**22**

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

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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										
232CE1A4CA	Core - VI	Inorganic Chemistry - I	4	1	-	3	25	75	100	5
232CE1A4CB	Core- VII	Spectroscopy and Chromatography	4	-	-	3	25	75	100	4
232CE1A4CP	Core Practical- IV	Gravimetric Analysis	-	-	6	3	40	60	100	3
232CE1A4SA	SEC- II	Green Chemistry	3	-	-	3	25	75	100	2
232MT1A4EP	IDC- IV Practical	Statistical Analysis and Tools	2	-	2	3	40	60	100	3
Total			**19**	**3**	**8**				**700**	**23**

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

Dr.N.G.P. Arts and Science College
APPROVED
BoS- 16th 07-11-24
AC - 18th 26-11-24
GB -

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

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fifth Semester										
Part - III										
232CE1A5CA	Core- VIII	Inorganic Chemistry - II	4	-	-	3	25	75	100	4
232CE1A5CB	Core- I X	Organic Chemistry - I	4	-	-	3	25	75	100	4
232CE1A5CC	Core- X	Physical Chemistry - I	4	-	-	3	25	75	100	4
232CE1A5CP	Core Practical– V	Physical Chemistry	-	-	6	3	40	60	100	3
232CE1A5CQ	Core Practical- VI	Applied Chemistry	-	-	4	3	40	60	100	2
232CE1A5SA	SEC- III	Nanomaterials and Nanotechnology	2	-	-	3	25	75	100	2
232CE1A5DA	DSE- I	Industrial Chemistry	4	-	-	3	25	75	100	4
232CE1A5DB		Agricultural Chemistry								
232CE1A5DC		Forensic Chemistry								
232CE1A5TA	IT	Industrial Training					40	60	100	2
Part - IV										
	GE		2	-	-	3	50	-	50	2
Total			**20**	**-**	**10**				**850**	**27**

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part - III										
232CE1A6CA	Core- XI	Organic Chemistry - II	4	1	-	3	25	75	100	5
232CE1A6CB	Core- XII	Physical Chemistry - II	4	1	-	3	25	75	100	5
232CE1A6CV	Core- XIII	Project	-	-	8	-	40	60	100	4
232CE1A6SA	SEC- IV	Chemistry of Consumer Products	2	-	-	3	25	75	100	2
232CE1A6DA	DSE- II	Polymer Chemistry	4	-	-	3	25	75	100	4
232CE1A6DB		Food Chemistry								
232CE1A6DC		Medicinal Chemistry								
232CE1A6DD	DSE- III	Dye and Textile Chemistry	4	-	-	3	25	75	100	4
232CE1A6DE		Dairy Chemistry								
232CE1A6DF		Pharmaceutical Chemistry								
Part - IV										
233BC1A6AA	AECC-III	Innovation,IPR & Entrepreneurship	2	-	-		50		50	2
Total			**20**	**2**	**8**				**650**	**26**
***Grand Total**									**4200**	**142**

Total Credit should not exceed 142 credits

First year Tamil/ English : 5 hrs
Second year Tamil/ English : 4 hrs

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

DISCIPLINE SPECIFIC ELECTIVE

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

Semester V (Elective I)

List of Elective Courses

S. No.	Course Code	Name of the Course
1	232CE1A5DA	Industrial Chemistry
2	232CE1A5DB	Agricultural Chemistry
3	232CE1A5DC	Forensic Chemistry

Semester VI (Elective II)

List of Elective Courses

S. No.	Course Code	Name of the Course
1	232CE1A6DA	Polymer Chemistry
2	232CE1A6DB	Food Chemistry
3	232CE1A6DC	Medicinal Chemistry

Semester VI (Elective III)

List of Elective Courses

S. No.	Course Code	Name of the Course
1	232CE1A6DD	Dye and Textile Chemistry
2	232CE1A6DE	Dairy Chemistry
3	232CE1A6DF	Pharmaceutical Chemistry

GENERIC ELECTIVE COURSE (GE)

The following are the course offered under Generic Elective Course

Semester V

S. No.	Course Code	Course Name
1	232CE1A5GA	Chemistry in Daily life

EXTRA CREDIT COURSES

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

Semester III

S. No.	Course Code	Course Name
1	232CE1ASSA	Chemistry in the Service of Mankind
2	232CE1ASSB	Cosmetic Chemistry

CERTIFICATE PROGRAMMES

The following are the programme offered to earn extra credits:

S. No.	Programme Code and Name	Course Code	Course Name
1	2CE5A Chemical Treatment Processes	232CE5A1CA	Chemical Treatment Processes
2	2CE5B Water and waste water treatment	232CE5B1CA	Water and waste water treatment

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
232CE1A1CA	GENERAL CHEMISTRY-I	CORE	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The chemical bonding and the concept of hybridization
- The fundamentals of thermodynamics
- The concepts of organic chemistry

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Compare the different atomic model structures	K2
CO2	Relate the types of bonding nature in various molecules based on their hybridization	K2
CO3	Classify the Kinetic theory of gases	K2
CO4	Summarize the concept of thermodynamics to different systems	K2
CO5	Illustrate the concepts of organic chemistry	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

232CE1A1CA	GENERAL CHEMISTRY-I	SEMESTER I

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Atomic Structure 12 h

Rutherford atomic model – Bohr theory of hydrogen atom – Sommerfeld theory – Particle and wave character of electrons – de Broglie's equation – Davisson- Germer experiment - Heisenberg's uncertainty principle - Compton effect – Schrödinger wave equation – Eigen values and Eigen functions – Quantum numbers – Pauli's exclusion principle – Hund's rule and Aufbau principle

Unit II Chemical Bonding 12 h

Types of bonds – ionic, covalent, coordinate and metallic bonds - Hybridization involving s, p and d orbitals – Properties of ionic, covalent and coordinate compounds – Valence bond theory – VSEPR theory. Molecular orbital theory – Molecular orbital configurations of simple homo nuclear and hetero nuclear diatomic molecules – Comparison between VBT and MOT

Unit III Gaseous State 12 h

Kinetic molecular theory of gases – Maxwell's distribution of molecular velocities (derivation not needed) – Collision diameter – Collision number, collision frequency – Mean free path – Real and ideal gases – Deviation of real gases from ideal behavior-Equations of state -Derivation of Van der Waal's equation. Various methods for expressing concentrations of solutions – Vapour pressure of liquids – ideal and non-ideal solutions – Raoult's law – Vapour pressure of non-ideal solutions – Vapour pressure composition and boiling point composition curves

Unit IV Thermodynamics 12 h

System-Isolated system - Open system - Closed system. Surroundings - Extensive and intensive properties - Types of process. First law of thermodynamics - Internal energy. State function and path function - Exact and inexact differentials - Enthalpy of system, enthalpy of vaporization, enthalpy of fusion - Heat capacity of a system Relation between Cp and Cv in gaseous system. Joule Thomson effect, Joule Thomson coefficient and inversion temperature. Heat of neutralization - Heat of solution, heat of combustion, Kirchoff's equation - Flame and explosion temperature - Bomb calorimeter - Measuring enthalpy of combustion, Hess's law- Bond energy - Calculations of bond energy

Unit V Basic Organic Chemistry 12 h

Electronic displacements: Inductive effect, electromeric effect, resonance hyperconjugation and steric effect. Strength of organic acids and bases - Factors affecting pK values. Cleavage of bonds: homolysis and heterolysis. Reactive intermediates: Structure and stability of carbocations, carbanions and free radicals

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 Glasstone. S and Lewis. D, 2014, "Elements of Physical Chemistry", 2nd Edition, Macmillan Ltd, London

5 https://www.lamar.edu/arts-sciences/_files/documents/chemistry-biochemistry/dorris/chapter8.pdf

6 http://www.cnm.manchester.ac.uk/people/jonathan/CH0001081100.pdf

232CE1A1CP	VOLUMETRIC ANALYSIS AND PREPARATION	SEMESTER I

Total Credits: 3
Total Instructions Hours: 72 h

S.No	Contents
1	Estimation of HCl by NaOH using a standard oxalic acid solution
2	Estimation of Na_2CO_3 by HCl using a standard Na_2CO_3 Solution.
3	Estimation of oxlaic acid by $KMnO_4$ using a standard oxalic acid solution
4	Estimation iron(II) sulphate by $KMnO_4$ using a standard Mohr's salt solution.
5	Estimation of calcium(II) by $KMnO_4$ using standard oxalic acid solution
6	Estimation of iron(II) by potassium dichromate using standard Mohr's salt solution
7	Estimation of $KMnO_4$ by thiosulphate using a standard potassium dichromate solution
8	Estimation of copper(II) sulphate by $K_2Cr_2O_7$solution
9	Preparation of Tetraammminecopper(II)sulphate
10	Preparation of Hexamminecobalt(II) chloride
11	Preparation of Prussian blue
12	Preparation of Hexathiourealead(II) nitrate
13	Separation of dyes using Paper Chromatography (Under DBT Star College Scheme)
14	Separation of dyes using Thinlayer Chromatography (Under DBT Star College Scheme)

Note: Any 10 Experiments

References

1. Venkateswaran. V, Veeraswamy. R and Kulandaivelu. A.R, 2017, "Principles of Practical Chemistry", 1st Edition, Sultan Chand & Sons & New Delhi
2. Mendham. J, Denney. R.C, Bames. J.D and Thomas. M, 1989. "Vogel's Text book of Quantitative Analysis", 6th Edition, Pearson Education & UK
3. Gopalan. R, Subramanian. P.S and Rengarajan. K, 2004, "Elements of Analytical Chemistry", 1st Edition, S. Chand and Sons & New Delhi
4. Giri. S, Bajpai. D.N and Panday. O.P, 2013, "Practical Chemistry Vol. I & II", 30th Edition, S. Chand & Company, New Delhi

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Course Code	Course Name	Category	L	T	P	Credit
232PY1A1IP	PHYSICS - I	IDC	3	-	4	5

PREAMBLE

This course has been designed for students to learn and understand

- The properties of electricity, crystals, and electronics
- The thermal, and optical properties of the materials.
- The basics of digital electronics

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the applications of electrical circuits	K2
CO2	Classify different types of bonds, bond theory and energy gaps	K2
CO3	Develop the different kinds of spectral formation	K3
CO4	Demonstrate the working of diodes and rectifiers	K3
CO5	Experiment with the logic gates	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

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232PY1A1IP	PHYSICS - I	SEMESTER I

Total Credits: 5

Total Instruction Hours: 72 h

Syllabus

Unit I Electricity 16 h

Capacitors – Types of capacitors - Spherical capacitor - Cylindrical capacitor - Carey-Foster's bridge – Working of potentiometer - Calibration of voltmeter - Calibration of ammeter

1.Calibration of low range voltmeter using potentiometer

2. Determination of unknown resistance using Carey Foster's bridge

3. Calibration of low range ammeter using potentiometer

Unit II Crystals 13 h

Ionic crystals - Covalent crystals - Metallic bond - Band theory of solids - Tunnel diodes - Energy bands - Superconductivity - Bound electron pairs - Hall effect - Experimental determination of hall coefficient.

4.Determination of band gap of semiconductors using four probe method

5.Determination of band gap of semiconductor by thermal method

Unit III Optics 17 h

Interference in the thin film - Air wedge – Thickness of a thin wire – Newton's rings – Determination of wavelength using Newton's rings - Theory of transmission grating – Normal incidence

6.Determination of wavelength of mercury lines by grating minimum deviation method

7.Determination of the radius of curvature in Newton's rings

Unit IV Analog Electronics 13 h

Bridge rectifiers – Band gap determination using post office box – Transistor characteristics in common base and common emitter mode - Transistor single stage amplifier- Expression for input impedance - Output impedance and current gain

8.Characterization of junction diode

9.To determine band gap using Post office box method

Unit V Digital Electronics 13 h

1's and 2's complement of a binary number and binary arithmetic - Steps in the fabrication of Monolithic IC's – General applications of IC's - Registers - Flip flops - JK flip flops - Half adder - Full adder

10.Verification of logic gate truth table.

11.Verification of De Morgan's law.

12.Construction and working of IC regulated power supply

Text Books

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

2 E-book]Arthur B, 2003, "Concepts of Modern Physics", 6th Edition, McGraw-Hill, New York.

References

1 Sedha R.S., 2004, "A text book of Digital Electronics", 1st Edition. S. Chand & Co, New Delhi.

2 David H, Robert R, Jearl W, 2014, "Fundamentals of Physics", 10th Edition. John Willy Company Hoboken, New Jersey, United States.

3 [E-book] Serway A.R., Jewett W.J.,2014, "Physics for Scientists and Engineers with Modern Physics",9th Edition,Brooks/Cole, USA.

4 Gupta Kumar, 2011, Solid State Physics, K Nath and co Meerut.

5 Brijal N and Subramanian, "Text book of optics" ,S.Chand& Company, New Delhi

6 Weblink: https://www.askiitians.com/revision-notes/physics/solid-and-electronic-device/

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.

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Dr.NGPASC
COIMBATORE | INDIA

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 प्रकाशनं 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
231TL1A2MA	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
232CE1A2CA	GENERAL CHEMISTRY - II	CORE	3	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The fundamentals of organic chemistry and preparation, reaction of alkenes and alkynes
- The concept and reactivity of s-block elements
- The need for second law of thermodynamics and entropy changes

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the fundamental concept of alkanes	K2
CO2	Illustrate the preparation and properties of alkenes and alkynes	K2
CO3	Summarize the position and properties of s-block elements	K2
CO4	Outline the basics of crystals and their characteristics	K2
CO5	Interpret the facts and limitations of second law of thermodynamics	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

232CE1A2CA	GENERAL CHEMISTRY - II	SEMESTER II

Total Credits: 3

Total Instruction Hours: 36 h

Syllabus

Unit I Alkanes — 7 h

Nomenclature of alkanes, preparation, physical and chemical properties. Conformation of ethane - Butane - Cyclohexane - Baeyer's strain - Equatorial and axial bonds - 1,3-diaxial strain - Conformation and reactivity – Conformation of mono and dimethyl cyclohexane.

Unit II Alkenes and Alkynes — 8 h

Preparation of alkenes - Dehydrohalogenation - Dehydration - Dehalogenation and reduction of alkynes. Reactions of alkenes - Addition of halogens - HX (Markovnikov's rule, peroxide effect) - H_2O - HOCl - Hydroxylation with H_2O_2 - Alkaline $KMnO_4$ - Hydroboration - Oxidation - Ozonolysis.

Alkynes – Preparations and reactions – Reduction - Addition of H_2O and HOCl - Ozonolysis - Polymerization - Acidity of alkynes

Unit III s - Block Elements — 7 h

General characteristics of alkali and alkaline earth metals - Anomalous behavior of lithium and beryllium - Diagonal relationships of lithium with magnesium and beryllium with aluminum - Preparation, properties and uses of lithium hydride, sodium peroxide, potassium iodide, calcium-carbide, plaster of paris and lithopone

Unit IV Solid State — 7 h

Difference between crystalline and amorphous solids - Symmetry in crystal systems - Law of interfacial angles - Law of rational indices - Miller indices - Space lattice and unit cell - Bravis lattices - Bragg's equation - Radius ratio rule - Packing in crystals - Types of crystals - Structure of sodium chloride and CsCl - Concept of conductor - Semiconductor - Superconductor - Band theory - Types of semiconductor

Unit V Thermodynamics — 7 h

Second law of thermodynamics - Need for second law - Entropy - Entropy changes in isothermal expansion of an ideal gas - Entropy changes in reversible and irreversible processes - Entropy as a function of T and V - Entropy as a function of T

and P- Entropy of mixing of ideal gases - Physical significance of entropy. General conditions of equilibrium and spontaneity - Definition of A and G - Physical significance of A and G - Temperature and pressure dependence of G

Text Books

1 Madhan R.D, 2019, "Modern Inorganic Chemistry", 10th Edition, Mc Graw Hill Company & USA

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

References

1 Lee J.D, 2016, "A New Concise Inorganic Chemistry", 5th Edition, ELBS & UK

2 Morrison R.T, 2016, "Organic Chemistry", 7th Edition, Prentice Hall of India Pvt. Ltd., & New Delhi

3 Puri B.R, Sharma L.R and Kalia K.C, 2016, 33rd Edition, "Principles of Inorganic Chemistry", Vishal Publishing & Co & New Delhi

4 Glasstone S and Lewis D, 2014, "Elements of Physical Chemistry", 2nd Edition, Macmillan Ltd, & UK

5 https://chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_Principles_of_Modern_Chemistry_(Oxtoby_et_al.)/Unit_4%3A_Equilibrium_in_Chemical_Reactions/13%3A_Spontaneous_Processes_and_Thermodynamic_Equilibrium/13.4%3A_Entropy_Changes_in_Reversible_Processes

6 https://www.sjctni.edu/Department/ch/eLecture/Solid%20State.pdf

Course Code	Course Name	Category	L	T	P	Credit
232CE1A2CB	GENERAL CHEMISTRY - III	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concept of chemical metallurgy and the chemistry of group 13 and 14 elements
- About the aromaticity and electrophilic substitution reaction of benzene
- The Importance of chemical equilibrium, zeroth and third law of thermodynamics

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Choose the different types of metals extraction process and its importance in chemical metallurgy	K2
CO2	Identify the periodic behavior and their properties of groups 13 and 14 elements	K2
CO3	Outline the properties of aromatic compounds and their reactions	K2
CO4	Compare the preparation and properties alkyl and aryl halides	K2
CO5	Apply the chemical equilibrium and laws of thermodynamics in different states	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

232CE1A2CB	GENERAL CHEMISTRY - III	SEMESTER II

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Process of Metallurgy 10 h

Metallurgy - Minerals and ores - Ore dressing – Gravity separation - Froth flotation magnetic separation - Chemical separation - Calcination and roasting. Extraction of metal - Chemical reduction - Auto reduction - Electrolytic reduction - Metal displacement. Thermodynamic principles of metallurgy - Ellingham diagram, observations and its applications. Refining methods - Fractional crystallization - Van Arkel method - Electrolytic refining - Vapour phase refining - Ion exchange method. Occurrence, extraction, properties and uses of Germanium and Titanium - Properties and uses of $GeCl_4$ and TiO_2

Unit II Chemistry of Groups 13 & 14 Elements 10 h

Boron family – Physical properties – Anomalous properties of Boron - Diagonal relationship of boron with silicon. Preparation, properties, structure and uses of orthoboric acid, borax, borazine, boron nitride, diborane and bonding in diboranes. Relative strengths of boron trihalides as Lewis acids. Aluminium – Extraction of aluminium from bauxite – Preparation, properties and uses aluminium chloride – Alum (Potash alum). Carbon family – Physical properties – Catenation - Classification of carbides - Preparation, structure and uses of silicones - Classification and structure of silicates

Unit III Arenes and Aromaticity 8 h

Aromaticity - Huckel's rule (aromatic, non-aromatic and anti-aromatic molecules) – Structure of benzene – Kekule structure - Molecular orbital structure - Resonance energy and stability of benzene - Benzenoid and non-benzenoid compounds – Cyclic ions - Electrophilic substitution reactions – Energy profile diagram - Mechanism of halogenation, sulphonation and nitration - Friedel-Crafts alkylation and acylation

Unit IV Alkyl and Aryl Halides 10 h

Alkyl halides, preparation, chemical reactions - Mechanisms of nucleophilic aliphatic substitution reactions (S_N1 and S_N2) – Elimination reactions (E1 and E2). Substitution vs elimination. – Preparation, properties and uses of Aryl halides (Cl and Br substitution). Electrophilic and nucleophilic aromatic substitution reaction

mechanisms. Comparison of alkyl and aryl halides towards nucleophilic substitution reactions

Unit V **Chemical Equilibrium, Zeroth and Third Law of Thermodynamics** **10 h**

Law of mass action - Thermodynamic treatment of the law of mass action - Van't Hoff reaction isotherm, Temperature dependence of the equilibrium constant – Van't Hoff equation, integrated form of Van't Hoff equation.

Homogeneous and heterogeneous systems (NH_3, PCl_5 and $CaCO_3$) - Relationship between Kp and Kc - Factors affecting chemical equilibrium – Le Chatlier principle (Haber's and Contact processes) - Zeroth law of thermodynamics - Absolute temperature scale. Statement of third law - Nernst heat theorem

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", 5th Vishal publishing Co & New Delhi

3 Puri B.R, Sharma L.R and Kalia K.C, 2016, "Principles of Inorganic Chemistry", 31st Vishal Publishing & Co & New Delhi

4 Glasstone S and Lewis D, 2014, "Elements of Physical Chemistry", 2nd Edition, Macmillan Ltd & London

5 https://en.wikipedia.org/wiki/Laws_of_thermodynamics

6 https://chem.libretexts.org/Courses/Brevard_College/CHE_201%3A_Organic_Chemistry_I/04%3A_Aromatic_Compounds_(Arenes)

232CE1A2CP	ORGANIC CHEMISTRY	SEMESTER II

Total Credits: 2
Total Instructions Hours: 48 h

S.No	List of Experiments
	Organic Analysis
1	Systematic analysis of organic compounds containing carbohydrate
2	Systematic analysis of organic compounds containing mono & di carboxylic acids
3	Systematic analysis of organic compounds containing amines
4	Systematic analysis of organic compounds containing amides
5	Systematic analysis of organic compounds containing phenol
6	Systematic analysis of organic compounds containing aldehydes
7	Systematic analysis of organic compounds containing ketones
8	Systematic analysis of organic compounds containing esters
9	Systematic analysis of organic compounds containing diamides
	Single stage preparation
10	Preparation of Methyl salicylate from Salicylic acid (Esterification) (Under DBT Star College Scheme)
11	Preparation of Aspirin from Salicylic acid (Acetylation) (Under DBT Star College Scheme)
12	Preparation of *p*-Bromo acetanilide from aniline (Bromination) (Under DBT Star College Scheme)

Note: Any 10 Experiments

References

1. Venkateswaran V, Veeraswamy R and Kulandaivelu A.R, 2017, "Principles of Practical Chemistry", 1st Edition, Sultan Chand & Sons & New Delhi.
2. Gnanapragasam N.S and Ramamurthy G, 2009, "Organic Chemistry Lab Manual", S. Viswanathan and Co. Pvt. Ltd & New Delhi..
3. Gopalan R, Subramanian P.S and Rengarajan K, 2004, "Elements of Analytical Chemistry", 1st Edition, S. Chand and Sons & New Delhi.
4. Mendham J, Denney R.C, Bames J.D and Thomas M, 1989. "Vogel's Text book of Quantitative Analysis", 6th Edition, Pearson Education & UK.

Course Code	Course Name	Category	L	T	P	Credit
232PY1A2EP	PHYSICS - II	IDC	3	-	4	5

PREAMBLE

This course has been designed for students to learn and understand

- The basic principles, theory and concepts of properties of matter
- The concepts of viscosity and surface tension
- The basic programming in microprocessor

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 young's modulus	K2
CO2	Demonstrate the viscosity for a given liquid	K2
CO3	Explain the basic of surface tension and vibration of wave	K3
CO4	Illustrate the gravitational field and applications	K3
CO5	Write the assembly language programs	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

232PY1A2EP	PHYSICS - II	SEMESTER II

Total Credits: 5

Total Instruction Hours: 72 h

Syllabus
(Embedded)

Unit I Properties of Matter 14 h

Young's Modulus – Rigidity Modulus – Poisson's Ratio – Bending of Beams – Expression for Bending Moment – Measurement of Young's Modulus – Uniform and Non-Uniform Bending.

Practical

1. Determine the Young's modulus of a given bar – Uniform bending (Microscopic method).
2. Determine the Young's modulus of given bar – Non-Uniform bending (Microscopic method).
3. Determination of rigidity modulus of a string by using static method.

Unit II Viscosity 13 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.

Practical

4. Determine the coefficient of viscosity of water by Poiseuille's Method.
5. Determine the coefficient of viscosity of water by Stoke's Method.

Unit III Surface Tension and Vibration 15 h

Explanation of surface tension on kinetic theory – Work done in increasing area of a surface – Pressure difference across a liquid surface - Jaegar's method - Transverse and longitudinal modes of vibration - A.C. frequency measurement using sonometer.

Practical

6. Determine the surface tension of water by drop weight method.
7. Study the frequency of a tuning fork by sonometer.

Unit IV Gravitation **14 h**

Newton's law of gravitation - Kepler's laws of planetary motion - Determination of 'G' Boy's experiment - Variation of 'g' with altitude and depth - Determination of 'g' with compound pendulum.

Practical

8 Compound Pendulum - Determination of 'g'.

9 Torsional pendulum - Determination of moment of inertia of given disc.

Unit V Microprocessors 8085 instruction set **16 h**

8085 Machine language - 8085 assembly language - ASCII codes - Writing and executing an assembly language program - High level language - Operating system.

Practical

10. Write the assembly language program for 8-bit subtraction.
11. Write the assembly language program for 8-bit addition.
12. Write the assembly language program for 8-bit Multiplication.

Text Books

1. Murugesan R., 2016, "Modern Physics", 18th Edition, S. Chand and Co, New Delhi.
2. Ramesh S. Gaonkar, 2013, Microprocessor architecture, Programming and application with 8085, 6th edition, New age international.

References

1. Brij Lal and Subrahmanyam N, 2017,"Properties of Matter", 7th Edition, S. Chand and Co, New Delhi.
2. Subramanyam N, 2019,"Text book of Sound", 3rd Edition, Vikas publications, New Delhi.
3. Nagoor Kani A, 2012, "Microprocessors and Microcontrollers", 2nd Edition, Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. E-book: Godse A.P, Godse D.A, 2008, "Microprocessors and Microcontroller System" Technical Publications, Pune.
5. Weblink: https://https://archive.nptel.ac.in/courses/108/105/108105102/

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.

12.10.23
BoS Chairman/HoD
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Dr. N. G. P. Arts and Science College
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Dr.N.G.P. Arts and Science College
APPROVED
BoS- 14th 17.10.23 | AC- 16th 13.12.23 | GB- 21st 05.01.24

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

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
232CE1A3CA	APPLIED CHEMISTRY	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of pesticides and fertilizer
- The basic knowledge in the oils, waxes and petroleum products
- The concept of cement and its processing

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Explain the method of preparation of insecticides, fungicides and their applications	K2
CO2	Classify the chemical fertilizers utility in agriculture	K2
CO3	Acquire the knowledge on oils, fats and waxes	K3
CO4	Outline the classification and analysis of fuels and their combustion	K2
CO5	Summarize the processes and characteristics of cement	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

232CE1A3CA	APPLIED CHEMISTRY	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Pesticides **10 h**

Insecticides: Classification – Organic and inorganic insecticides –Structure and mode of action – Dichloro-Diphenyl-Trichloroethane (DDT) – Methoxychlor - Benzene Hexachloride (BHC) – Gammaxane – Malathion - Parathion – Benefits of pesticides – Adverse environmental effects of pesticides

Fungicides: Classification – Structure and mode of action – Bordeaux mixture, mercury compounds, baygon, dithiocarbamates

Unit II Fertilizers **10 h**

Definition - Chemical fertilizers - Classification of chemical fertilizers – Manufacture of urea, superphosphate, triple super phosphate and potassium nitrate. Mixed fertilizer, Organic and Bio fertilizer (Manures, compost and sawdust). Advantages and disadvantages of fertilizers

Unit III Oils, Fats and Waxes **8 h**

Oils and Fats - Difference between oils and fats - Properties of oils and fats - Essential oil - Mineral oil - Difference between drying, semi-drying and non-drying oils - Hydrogenation of oils - Saponification value - Iodine value

Waxes: Properties and Classification, common waxes - Spermaceti, bayberry, bees, chinese insect, candelilla, carnauba wax, montan, ozocerite, paraffin and synthetic wax - Properties and uses

Unit IV Fuels **10 h**

Petroleum - Cracking of petroleum - Synthetic petrol -Refining of gasoline-Reforming and knocking. Octane Rating of fuels, cetane rating, diesel engine fuel, kerosene as a fuel, LPG and CNG as a fuel

Fuels and Combustion: Classification, calorific value, Dulong's formula, analysis of coal, proximate and ultimate analysis, significance, carbonization of coal, manufacture of metallurgical coke by Otto-Hoffmann's process. Flue gas analysis by ORSAT method

Unit V Construction materials **10 h**

Introduction – Composition of white cement and waterproof cement. Portland cement – Types – Cementing materials – Raw materials – Manufacture – Reactions in kiln – Mixing of additives – Setting of cement – Properties of cement – Testing of cement. Rotary kiln for wet and dry processes – Gypsum–Plaster of Paris – Setting and hardening of lime-Waterproof chemicals (hydrophobic and hydrophilic)

Text Books

1 Jayashree Ghosh, 2016, "Fundamental Concepts of Applied Chemistry", 1st edition, S. Chand & Company Pvt Ltd & NewDelhi

2 Sharma B.K, 2014, "Industrial Chemistry", 18th edition, Krishna Prakash and Media pvt ltd & Meerut

References

1 Jain D.C, 2014, "Engineering Chemistry", 16th edition: Dhanpatrai publishing Company pvt Ltd & New Delhi

2 Bagavathi Sundari K, 2004, "Applied Chemistry", 1st edition, MJP Publishers, & Chennai

3 Thankamma Jacob A, 1979, "A Text Book of Applied Chemistry", 1st edition, Mc Millan India Ltd & New Delhi

4 Vermani O.P, 2017, "Applied Chemistry- Theory and Practice", 2nd edition, New Age International Private Limited & Chennai.

5 https://cosmeticsbusiness.com/news/article_page/Lipid_lore_Oils_fats_and_waxes/153554

6 https://www.accessengineeringlibrary.com/content/book/9780071410373/chapter/chapter4

Course Code	Course Name	Category	L	T	P	Credit
232CE1A3CB	ANALYTICAL CHEMISTRY	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The laboratory practices in performing practical
- The principles of gravimetric and volumetric analysis
- The methods and concepts of crystal growth techniques

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Examine the laboratory practices	K3
CO2	Identify the various terms used to express concentration and role of indicators in titration.	K2
CO3	Relate concentration, precipitation and solubility products	K2
CO4	Examine the errors, significant figures and precision of the experimental result	K2
CO5	Outline the principles of crystal growth	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

232CE1A3CB	ANALYTICAL CHEMISTRY	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Laboratory Practices — 10 h

Storage and handling of corrosive, toxic and poisonous chemicals - Simple first aid procedure for acid and alkali in eye, acid and alkali burns, heat burns and cut by glasses. Principle of titrimetric methods - Acidimetry - Alkalimetry - Permanganometry - Dichrometry - Iodometry - Argentometry - Complexometric titrations

Unit II Qualitative analysis — 10 h

Introduction - Dry reactions – Heating and flame tests - Wet reactions – Test tubes - Centrifuge tubes - Stirring rods - Droppers - Reagent bottles - Centrifugation - Transferring of precipitates - Washing the precipitates through Buchner funnel - Sintered crucible - Wash bottles - Heating of solutions - Evaporation - Dissolving of precipitates - Precipitation with hydrogen sulphide - Cleaning of apparatus - Interfering anions and its elimination - Classification of cations into analytical groups (group separation only)

Unit III Quantitative Analysis — 8 h

The mole concept – Atomic, molecular and molar masses – Equivalent mass of an acid, base, oxidizing and reducing agents. Concentration terms – Normality - Molarity - Molality- Mole fraction - Mole Percentage - Percentage solution – Weight composition - Volume composition. Principles of volumetric analysis – Standard solution (primary and secondary standards) - Titration – Types (acid, base, oxidation and reduction) - Equivalent point - End point - Choice of indicators – Internal and external indicators - Theory of indicators – Precautions to avoid errors in titrimetric analysis

Unit IV Gravimetric Analysis — 10 h

Precipitation methods - Super saturation and precipitate formation – Post precipitation - Co-precipitation - Conditions of precipitation - Precipitation from homogeneous solution - Ignition of the precipitate - Quantitative separations based on precipitation methods - Fractional precipitation - Organic precipitants - Types- Advantages and disadvantages - Sequestering agents - Solubility products and precipitation

Unit V Crystal Growth **10 h**

Introduction to crystal growth - Nucleation – Gibbs - Thomson equation - Kinetic theory of nucleation – Limitations of classical nucleation theory - Homogeneous and heterogeneous nucleation – Different shapes of nuclei – Spherical, cylindrical and orthorhombic – Temkins model – Physical modeling of Burton-Cabrera-Frank theory (BCF) - Crystal Growth Techniques - Bridgman technique - Czochralski method - Verneuil technique - Zone melting – Gel growth and solution growth methods

Text Books

1 Svehla. G, Sivasankar. B, 2012, "Vogel's Qualitative Inorganic Analysis", 7th edition, Pearson education & New Delhi

2 Venkateswaran. V, Veeraswamy. R, Kulandaivelu. A. R, 1997, "Basic Principles of Practical Chemistry", 2nd edition, Sultan Chand and Sons & New Delhi

References

1 Gopalan. R, Subramaniam. P.S and Rengarajan. K, 2004, "Elements of Analytical Chemistry", Sultan Chand and Sons & New Delhi

2 Lee. J. D, 2006, "Concise Inorganic Chemistry", 2nd edition, Black Well Science & UK.

3 Mendham. J, Denney. R.C, Bames. J.D, and Thomas, M, 1989, "Vogel's Text book of Quantitative Analysis, 6th edition, Pearson Education& UK

4 Bhat H.L, 2014, "Introduction to Crystal Growth: Principles and Practices" 1st edition, CRC Press Taylor and francis group & USA

5 http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000831ME/P001617/M019047/ET/148456031720_kotru.pdf

6 http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/s000831me/p001617/m019386/et/148704959026_1.pdf

232CE1A3CP	INORGANIC CHEMISTRY	SEMESTER III

Total Credits: 3
Total Instructions Hours: 72 h

S.No **INORGANIC ANALYSIS**

Semi micro qualitative analysis of inorganic mixture containing two cations and two anions of which one will be interfering acid radicals.

Cations: Lead, copper, bismuth, cadmium, iron, aluminum, zinc, manganese, cobalt, nickel, barium, calcium, strontium, magnesium and ammonium.

Anions: Carbonate, sulphate, nitrate, chloride, bromide, chromate, iodide, fluoride, borate, oxalate, and phosphate

1	Semi-micro qualitative analysis of inorganic mixture - I
2	Semi-micro qualitative analysis of inorganic mixture - II
3	Semi-micro qualitative analysis of inorganic mixture - III
4	Semi-micro qualitative analysis of inorganic mixture - IV
5	Semi-micro qualitative analysis of inorganic mixture - V
6	Semi-micro qualitative analysis of inorganic mixture - VI
7	Semi-micro qualitative analysis of inorganic mixture - VII
8	Semi-micro qualitative analysis of inorganic mixture - VIII
9	Semi-micro qualitative analysis of inorganic mixture - IX
10	Semi-micro qualitative analysis of inorganic mixture - X
11	Analysis of water quality parameters COD and BOD (Under DBT Star College Scheme)
12	Analysis of water quality parameters pH, Turbidity and Dissolved solids (Under DBT Star College Scheme)

Note: Any 10 Experiments

References

1 Ramanujam. V.V, 1988, "Inorganic Semimicro Qualitative Analysis" 3rd edition, National Pubs & London

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

3 Giri. S, Bajpai. D.N and Panday. O.P, 2013, "Practical Chemistry Vol. I & II", 30th edition, S. Chand & Company & New Delhi

4 Bassart. J, Dennay. R.C, Jeffery. G.H and Mendham, 1989, "Vogels text book of qualitative Inorganic analysis", 5th edition, The ELBS & Longman & UK

232CE1A3SP	COMPUTER APPLICATIONS FOR CHEMISTRY	SEMESTER III

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Create a short document using word and saving it
2	Document a letter using mail merge concepts
3	Create a work sheet with data and find the sum and average of the data
4	Prepare a work sheet for a company quarterly report using special formatting
5	Creation of power point presentation to illustrate climate change
6	Creation of power point presentation to illustrate air and water pollution
7	Calculation of a work sheet data by applying formulae
8	Preparation of a pie chart to represent the hardness of water
9	Preparation of a bar diagram to represent the Melting point
10	Preparation of a flowchart to represent the thermal stability of the compounds
11	To draw the chemical structure using Chem Draw
12	Plot the UV and IR Graph using ORIGIN software

Note: Any 10 Experiments

References

1. Peter Norton. 2022, "Introduction to computers",2nd edition, Megrew Hill & New Delhi
2. D.P. Nagpal., 2000, "Matering Microsoft office 2000", 3rd edition, A.H. Wheeler Publishing and Co Ltd & New Delhi
3. V. Rajaraman and Neeharika Adabala, 2015, "Fundamentals of computers", 2nd edition & New Delhi
4. Foundations of Computing: 2000 Essential for Computing Studies, Profession and Entrance Examinations, 5th edition & New Delhi

Course Code	Course Name	Category	L	T	P	Credit
232MT1A3EP	MATHEMATICS WITH MATLAB	IDC Practical III	2	-	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 concepts 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 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

232MT1A3EP	MATHEMATICS WITH MATLAB	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 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 10 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 10 h

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 Pfaffian differential equation

13 Solve the homogeneous differential equation

14 Solve the exact differential equation.

Unit V Integral Calculus 10 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 Rudra Pratap, 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 Mc Graw-Hill Companies, Inc., New York.

232CE1ASSA	CHEMISTRY IN THE SERVICE OF MANKIND	SEMESTER III

Total Credit: 1

Syllabus

Unit I Fuels and Energy Resources

Types of fuels - Liquid fuels - Petroleum products – Gaseous fuel - Coal gas, producer gas and bio gas - Rocket fuels - Solid and liquid propellants - Nuclear fuels- Difference between nuclear and chemical fuels. Renewable sources of energy -Solar energy, wind energy and tidal energy

Unit II Polymers and Fertilizers

Chemistry of some important polymers - Synthetic fibres – Nylon 6, Nylon 66, polyester – Synthetic rubber - Polyurethane rubber – Reclaimed rubber - Sponge, foam rubber, thermocol - Polymerization techniques - Bulk, solution, suspension, emulsion polymerization. Plant nutrients - Need and requirements - Natural and artificial fertilizer - Urea, triple super phosphate, muriate of potash – Complex fertilizers

Unit III Vitamins and Drugs

Vitamins - Water soluble vitamins - Vitamin B and C - Fat soluble vitamins - A, D, E & K -Sources - Physiological functions and deficiency symptoms. Drugs - Some important drugs - Antibacterials – Sulphonamide - Antipyretics - Aspirin - Antimalarials - Paludrine - Antibiotics - Penicillin

Unit IV Surface Coatings

Pretreatment of the surface metallic coating - Galvanizing - Tinning - Inorganic coatings - Organic coatings - Oil paints - Water paints - Special paints - Enamels and lacquers

Unit V Industrial Processes

Small scale units - Manufacture of candles - Safety matches - Soap and naphthalene balls - Shoe polish- Gum paste - Fountain pen ink - Chalk crayons - Plaster of paris and silicon carbide crucibles. Large scale units - Manufacture of paper - Sugar-Glass - Ceramics and cement.

Text Books

1. Sharma. B.K, 2001," Industrial Chemistry", 12th edition, Goel Publishing House & NewDelhi
2. Jain P.C and Monica Jain, 2006,"Engineering Chemistry", 15th edition, Dhanpat Rai and Sons & NewDelhi.

References

1. Williams. R.J.P and Fraústo da Silva J.J.R, 2005, "The Chemistry of Evolution" Elsevier Science & UK.
2. George and T. Austin, 1984, " Shreve's Chemical Process Industries", McGraw Hill Book Co & NewDelhi.
3. Alexander Findlay , 2007, " Chemistry in the Service of Man", Longmans, Green & London.
4. Sharma. B.K, 2003, "Industrial Chemistry", Reprint, Goel Publishing House & Meerut
5. https://www.studocu.com/in/document/university-of calcutta/chemistry/surface-coatings/35681435
6. https://biochem.zsmu.zp.ua/wp-content/uploads/2017/04/biochemistry-of-vitamins.pdf

232CE1ASSB	COSMETIC CHEMISTRY	SEMESTER III

Total Credit: 1

Syllabus

Unit I Hair Care Products

Shampoos – Principal constituents – Thickeners and foam stabilizers– Perfumes – Preservatives – Conditioning agents – Antidandruff shampoos. Hair cream – Composition – Hair dyes – Types – Constituents – Dye removals

Unit II Skin Care Product

Skin cleansers – Classifications – Cold cream – Cleansy milk – Moisturizers – Hand and body lotions – Sun screen lotions – Constituents

Unit III Colour Cosmetics

Lipstick – Constituents – Manufacturing method – Lip glosses – Nail polish – Formulation – Manufacture – Face powder – Constituents

Unit IV Dental Product

Oral care product – Product categories – Toothpaste – Toothpowder – Oral rinses – Mouth washes

Unit V Bath Powder Preparation

Bath powders – Soap and detergents – Constituents – Manufacture

Text Books

1. Niir Board, 2004, "Modern Technology of Cosmetics", Asia Pacific Business Press Inc. & New Delhi.
2. Romanowski. P. Schueller. R. 2009, "Beginning Cosmetic Chemistry: Practical Knowledge for the Cosmetic Industry" 3rd edition Allured books publisher & New Delhi

References

1. Chattopadhyay. P. K., 2013, "Herbal Cosmetics & Ayurvedic Medicines". 3rd revised edition, Niir Project Consultancy Services & New Delhi.
2. Panda. H, 2015, "Herbal Cosmetics Handbook", 3rd revised edition, Asia Pacific Business Press Inc. & New Delhi
3. Dar A. M, 2018, "Cosmetic Chemistry", Educreation Publishing & Chhattisgarh
4. Perry Romanowski, Randy Schueller, 2009, "Beginning Cosmetic Chemistry", 3rd edition, Allured Business Media & New Delhi
5. https://pharmacy.hebmu.edu.cn/trywhx/resources/43/2019624163611.pdf
6. https://atrium.lib.uoguelph.ca/xmlui/bitstream/handle/10214/3091/Cosmetic_Chemistry_Complete_Activity_Guide.pdf

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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. ° Décrirequelqu'un	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
232CE1A4CA	INORGANIC CHEMISTRY - I	CORE	4	1	-	5

PREAMBLE

This course has been designed for students to learn and understand

- The structure, preparation, properties and uses of transition elements
- The basic knowledge about metal carbonyl compounds
- The acid and base concepts and non-aqueous solvent reactions

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Illustrate the occurrence, extraction, properties and uses of transition elements	K2
CO2	Classify the structure, preparation, properties and uses of d-block elements	K3
CO3	Demonstrate the methods of preparation, structure and bonding of metal carbonyls	K3
CO4	Utilize different approaches of Arrhenius, Bronsted, Lowry concepts and their application and limitations	K3
CO5	Summarize the classification, neutralization and their behavior of non-aqueous solvents	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

232CE1A4CA	INORGANIC CHEMISTRY - I	SEMESTER IV

Total Credits: 5

Total Instruction Hours: 60 h

Syllabus

Unit I Transition Elements **12 h**

Transition Elements – Position in the Periodic Table, occurrence, extraction, properties and uses of zirconium, vanadium, molybdenum and tungsten. Preparation and properties of vanadium pentaoxide (V_2O_5), Zirconium oxychloride ($ZrOCl_2$), ammonium molybdate, molybdenum blue, tungesten dioxide (WO_2) and tungsten bronzes

Unit II d-Block Elements **12 h**

General characteristics - Electronic configuration - Metallic character - Ionization energy - Variable valency - Reducing property - Colour - Magnetic property - Non-stoichiometric compounds - Catalytic properties and tendency to form complexes. Preparation, properties and uses of potassium dichromate, potassium permanganate and manganese dioxide

Unit III Metal Carbonyl Compounds **12 h**

Classification - General methods of preparation - Effective atomic number rule - Structure and bonding of mononuclear carbonyls of nickel, iron and chromium, binuclear carbonyls of iron, cobalt and manganese and trinuclear carbonyls of iron and osmium, tetra nuclear carbonyls of iridium

Unit IV Acid and Base Theory **12 h**

Arrhenius, Bronsted, Lowry, Lux flood, Lewis theory. Relative strength of acids and bases - Acidity and basicity of solvolytic reaction. Hard and Soft (Lewis) Acids and Bases (HSAB) - Principle - Application - Limitations. Theories of hardness and softness. Electronegativity, hardness and softness. Bonding contributions

Unit V Non-aqueous Solvents **12 h**

Classification, neutralization reaction and solvolysis in liquid ammonia, metal - ammonia solutions and cavity model. Neutralization, amphoteric behavior, solvolysis and redox reactions in liquid sulphur dioxide and liquid hydrogen fluorides

Text Books

1. Soni P.L. 2000, "Text book of Inorganic Chemistry", 20th Edition, S. Chand & Co. Ltd & New Delhi
2. Malik W. U, Tuli G. D and Madan R. D, 2012, "Selected Topics in Inorganic Chemistry", 3rd Edition, S. Chand & Co. Ltd. & New Delhi

References

1. Lee J. D. 2014, "A New Concise Inorganic Chemistry", 5th Edition, Oxford Publishers & UK
2. Madhan R. D, 2016, "Modern Inorganic Chemistry", 10th Edition, Mc Graw Hill Company & USA
3. Soni P. L, 2000, "Text book of Inorganic Chemistry", 20th Edition, S. Chand & Co. Ltd. & New Delhi
4. Cotton F.A, Wilkinson G, Bochmann M and Murilla C, 2007, "Advanced Inorganic Chemistry", 6th Edition, Wiley India Pvt. Ltd. & India
5. https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Supplemental_Modules_(Physical_and_Theoretical_Chemistry)/Equilibria/Acid-Base_Equilibria/1._Theories_of_Acids_and_Bases
6. https://archive.nptel.ac.in/content/storage2/courses/104106064/lectures.pdf

Course Code	Course Name	Category	L	T	P	Credit
232CE1A4CB	SPECTROSCOPY AND CHROMATOGRAPHY	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic principles involved in different spectroscopic techniques
- The basic knowledge and applications of spectroscopy
- The importance of chromatographic techniques in organic mixture separation

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic principles, instrumentation of UV-Visible spectroscopy and applications	K3
CO2	Gain the knowledge in principles, instrumentation, functions and simple applications of IR spectroscopy	K3
CO3	Study the basic principles and instrumentation of NMR spectroscopy	K3
CO4	Know about basic principles and instrumentation of mass spectroscopy technique	K3
CO5	Exploring the various chromatography techniques and their applications in separation of organic mixtures	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

232CE1A4CB	SPECTROSCOPY AND CHROMATOGRAPHY	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I UV - Visible Spectroscopy 10 h

Electromagnetic radiation - Principle – Instrumentation - Selection rules - Types of electronic transitions in organic molecules - Woodward Fieser rules for calculation of λ_{max} of conjugated dienes and unsaturated carbonyl compounds. Chromophore concept - Auxochromes – Bathochromic – Hypsochromic – Hyperchromic - Hypochromic shifts. Types of absorption bands - Solvent effects - Franck - Condon principle - Applications

Unit II Infrared Spectroscopy 8 h

Principle - Instrumentation - Types of vibrational modes - Types of bands - Finger print region. Applications of IR spectra to identify – Functional groups - Hydrogen bonding – Keto-enol tautomers

Unit III Nuclear Magnetic Resonance Spectroscopy 10 h

Principle - Instrumentation - Solvents used - Number of signals - Equivalent and non-equivalent protons - Position of signals - Chemical shift - Factors influencing chemical shifts - Peak area and proton coupling - Coupling constant - Splitting of signals. NMR spectra of simple molecules (ethanol, ethyl acetate, ethylamine, ethyl bromide, isopropyl ketone, acetone, anisole, benzaldehyde and toluene)

Unit IV Mass Spectrometry 10 h

Principle – Instrumentation - Mass spectrum - Molecular ion peak. Metastable ion peak – Isotopic ion peak. Nitrogen rule - General fragmentation modes of simple molecules (pentane, ethyl benzene, acetone, ethanol and cyclohexene). Retro -Diels Alder reaction, McLafferty rearrangement

Unit V Chromatography 10 h

Introduction - Paper chromatography - Principle - Solvents used - Development of chromatogram - Ascending, descending and radial paper chromatography - Applications

Thin layer chromatography – Principle – Choice of adsorbents and solvents, preparation of TLC plates - Rf values

Column chromatography - Principle - Types of adsorbents, preparation of the column, elution, column efficiency, number of theoritical plates recovery of substances and applications

Text Books

1 Sharma Y.R, 2013, "Elementary Organic Spectroscopy", 5th Edition, S. Chand & Co. Ltd & New Delhi

2 Jag Mohan, 2020, "Organic Spectroscopy - Principles and Applications", 2nd Edition (Reprint), Narosa publishing house & New Delhi

References

1 Kalsi P. S, 2009, "Spectroscopy of Organic Compounds", 6th Edition, New Age International Publishers & New Delhi

2 Silverstein R. M and Webster F.X, 2014, "Spectrometric Identification of Organic compounds", 8th Edition, John Wiley and Sons & USA

3 William Kemp, 2008, "Organic Spectroscopy", 3rd Edition, Palgrave publications & New York

4 Banwell C. N and McCash E. M, "Fundamentals of Molecular spectroscopy", 4th Edition, Tata Mcgraw Hill Education Ltd & USA

5 Srivastava VK, Srivastava (KK), "Introduction To Chromatography Theory & Practice", S Chand & Company Pvt Ltd - Se

6 https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SCY1612.pdf

232CE1A4CP	GRAVIMETRIC ANALYSIS	SEMESTER IV

Total Credits: 3
Total Instructions Hours: 72 h

S.No	List of Experiments
	GRAVIMETRIC ANALYSIS
1	Estimation of lead as lead chromate
2	Estimation of aluminium as aluminium oxinate
3	Estimation of calcium as calcium oxalate
4	Estimation of barium as barium sulphate
5	Estimation of copper as CuSCN
6	Estimation of iron as Fe_2O_3 by precipitating iron as $Fe(OH)_3$
7	Estimation of nickel as Ni-(DMG) (Under DBT Star College Scheme)
8	Estimation of Zinc as Zinc oxide
9	Estimation of Chromium as Chromium oxide
10	Estimation of lead as lead Sulphate (Under DBT Star College Scheme)
11	Estimation of aluminium as aluminium oxide
12	Estimation of Copper as Copper oxide
13	Estimation of Sulphate as Barium sulphate
14	Estimation of Silver as Silver chloride

Note: Any 10 Experiments

References

1. Venkateswaran V, Veeraswamy R and Kulandaivelu A. R, 2017,"Principles of Practical Chemistry", 1st Edition, Sultan Chand & Sons & New Delhi
2. Giri S, Bajpai. D. N and Panday O.P, 2013, "Practical Chemistry Vol. I & II", 30th Edition, S. Chand & Company & New Delhi
3. Mendham J, Denney.R. C, Bames. J. D and Thomas M. 1989, "Vogel's Text book of Quantitative Analysis", 6th Edition, Pearson Education & New Delhi
4. Ahluwalia V. K, 2008, "College Practical Chemistry", 2nd Edition, Universities Press (India Private Limited) & Hyderabad

Course Code	Course Name	Category	L	T	P	Credit
232CE1A4SA	GREEN CHEMISTRY	SEC	3	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- The basics of green chemistry
- An idea about green chemistry and its limitations
- The reactions and applications of green chemistry

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1	Gain knowledge on green chemistry principles	K3
CO2	Understand the few methods of green synthesis	K2
CO3	Develop the basic knowledge of the various green reactions	K3
CO4	Compare Aqueous phase, Solid state and PTC reactions	K3
CO5	Analyze the Photochemical, Microwave, Sonication and Ionic liquid reactions	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

232CE1A4SA	GREEN CHEMISTRY	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 36 h

Syllabus

Unit I **Introduction to Green Chemistry** **7 h**

Twelve principles of green chemistry - Explanation. Planning a green synthesis - Percentage atom utilization - Evaluating type of reaction involved - Selection of appropriate solvent - Reagent - Protecting groups - Use of catalyst - Energy requirement

Unit II **Green Synthesis** **7 h**

Adipic acid, catechol, disodiumiminodiacetate, Hoffmann elimination, Benzoic acid from methyl benzoate and toluene, Diels-Alder reaction, Decarboxylation

Unit III **Green Reactions** **7 h**

Introduction - Mechanism and application of Acyloin condensation - Aldol condensation - Arndt-Eistert synthesis - Baeyer-Villiger oxidation - Baker-Venkatraman Rearrangement - Barbier reaction - Barton reaction- Baylis-Hillman Reaction - Beckmann rearrangement- Benzil - Benzilic rearrangement - Biginelli reaction

Unit IV **Aqueous phase, Solid state and PTC reactions** **8 h**

Aqueous phase reaction - Hydrolysis of methyl salicylate - Chalcone - Para ethoxy acetanilide - Para acetamido phenol - Vanillidene acetone. SFE - Liquid CO_2 in green synthesis. Solid state synthesis - Diphenyl carbinol - Phenyl benzoate - Azomethines. PTC reaction - Phenylisocyanide - Diphenyl-7-hydroxy-coumarin

Unit V **Photochemical, Microwave, Sonication and Ionic liquid Reactions** **7 h**

Photochemical reactions - Benzopinacol, trans Azobenzene to cis-azobenzene and trans stilbene to cis-stilbene. Microwave reactions - 3-methyl-1-phenyl-5-pyrazolone and copper phthalocyanine. Sonication reaction - Butyraldehyde, 2-chloro-N-Aryl anthranilic acid. Ionic liquid reactions - 1-Acetyl naphthalene, Ethyl-4-methyl-3-cyclohexene carboxylate

Text Books

1. Ahluwalia V. K, 2011, "Green Chemistry-Greener Alternatives to synthetic alternatives to synthetic organic transformations", 1st Edition, Narora Publishing House & New Delhi.
2. Ahluwalia V. K, 2019, "Green Chemistry", 3rd Edition, Ane Books India & New Delhi

References

1. Asim K. Das and Madhua Das, 2012, "Environmental Chemistry with Green Chemistry", Books and Allied Pvt. Ltd & New Delhi
2. Rashmi S, Srivastava M. M, 2009, "Green Chemistry", 4th Edition Reprint, Narosa Publishing House & New Delhi.
3. lndu Tucker Sidhwani, Rakesh K. Sharma, 2020, "An Introductory Text on Green Chemistry: For Undergraduate Students ", 1st Edition, Wiley & Sons & Germany
4. Kumar V, 2010, "An Introduction to Green Chemistry", Vishal Publishing Co & New Delhi
5. https://www.mlsu.ac.in/econtents/441_green_chemistry_-ramesh_-_gec_clt.pdf
6. https://macmillan.princeton.edu/wp-content/uploads/AM_phase-transfer-catalysis.pdf

Course Code	Course Name	Category	L	T	P	Credit
232MT1A4EP	STATISTICAL ANALYSIS AND TOOLS	IDC	2	-	2	3

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

232MT1A4EP	STATISTICAL ANALYSIS AND TOOLS	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus
(Embedded)

Unit I Measures of Central Tendency 9 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 9 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 10 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 10 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 10 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.

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