



SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

(An Autonomous Institution)

(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)
(Accredited by NBA-AICTE, New Delhi, ISO 9001:2000 Certified Institution &
Accredited by NAAC with "A" Grade)



Madagadipet, Puducherry - 605 107

Department of Applied Chemistry

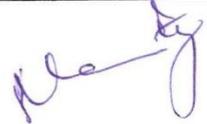
Minutes of Board of Studies

The first Board of Studies meeting of Department of Applied Chemistry was held on 27 August 2020 at 3:00 P.M in the Computer Centre - I in Administrative Block, Sri Manakula Vinayagar Engineering College with the Head of the Department in the Chair.

The following members were present for the BoS meeting

Sl.No	Name of the Member with Designation and official Address	Responsibility in the BoS	Signature
1	Dr. S. Deepa, M.Sc., M.Phil., Ph.D, Professor & Head Department of Applied Chemistry, SMVEC	Chairman	
External Members			
2	Dr. Velavan Kathirvelu, Associate Professor NIT, Goa	Pondicherry University Nominee	
3	Dr. V. Nandhakumar, M.SC., M.Phil., Ph.D, Associate Professor, Department of Chemistry, AVVM Sri Pushpam College, Poondi, Thanjavur.	External Subject Expert	
4	Dr. K. Ramesh, M.SC., M.Phil., Ph.D, Assistant Professor, Department of Chemistry, Poompuhar College, Melaiyur, Nagapattinam,	External Subject Expert	
5	Mr. R. Sevel, Associate Director, Par Active Technologies Private Limited.	Industrial Expert	
Internal Members			
6	Dr. A. Rajappa, M.Sc., M.Phil., Ph.D, Associate Professor	Member	
7	Dr. K. Karthikeyan, M.Sc., M.Phil., Ph.D. Associate Professor	Member	
8	Mrs. S. Savithri, M.Sc., M.Phil., (Ph.D) Associate Professor,	Member	
9	Mrs. M. Rajeswari M.Sc., M.Phil., (Ph.D) Assistant Professor	Member	

Department of Applied Chemistry-- First BOS Meeting (27.8.2020)

Co-opted Members			
10	Mr. K Ganesan, M.SC., M.Phil., Assistant Professor, Department of Mathematics	Member	
11	Dr. T. Jayavarthanam, M.SC., M.Phil., Ph.D, Associate Professor, Department of Physics	Member	
12	Mrs. G. Namitha, M.A., M.Phil., Assistant Professor, Department of English	Member	

Agenda of the Meeting

- 1) Discuss about the curriculum Structure of B.Sc., Applied Chemistry
- 2) To discuss and approve the B.Sc., Degree Regulations 2020 (R-2020), Curriculum from I to VI Semesters and Syllabi from I to II semesters for the B.Sc., Applied Chemistry and the students admitted in the Academic Year 2020-21. (First Year)
- 3) To discuss about the uniqueness of the Curriculum (R-2020)
- 4) To discuss and approve Evaluation Systems
- 5) To discuss about the Innovative Teaching / Practices Methodology adopted to handle the emerging. / Advanced Technological concept courses
- 6) To discuss Ph.D Programme / Research Centre in Chemistry
- 7) Any other item with the permission of chair

Minutes of the Meeting

Dr. S. Deepa, Chairman, BoS opened the meeting by welcoming and introducing the external members, to the internal and co-opted members and thanked them for accepting to become the member of the Board of Studies and the meeting thereafter deliberated on agenda items that had been approved by the Chairman.

Item:1 Curriculum structure

Recommended and forwarded to academic council

Item:2 Suggestions given for curriculum 2020

1. Suggested to interchange first and second years laboratory
2. Suggested to distribute credits equally in all semesters
3. Suggested to change project name instead of core project to group project
4. Suggested to change some of the subject title
5. Suggested to include hours for NSS/NCC/NSO/Yoga classes
6. Suggested to give 2 credit for Environmental studies
7. Suggested to avoid the repetition of the subject title

These suggestions were incorporated in the curriculum 2020 and approved by the expert members and recommended to academic council.

Item:3 Regulation 2020

Approved and forwarded to Academic Council

Item:4 Curriculum (R-2020)

Accepted and forwarded to Academic Council

Item:5 Innovative Teaching / Practices Methodology

Discussed and forwarded to Academic Council

Item:6 Ph.D Programme / Research Centre

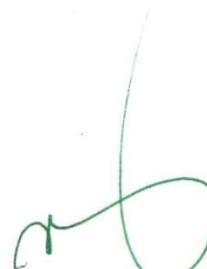
Discussed and forwarded to Academic Council

Item:7 Both B.Sc., Applied Chemistry and B.Sc., Chemistry (General) are similar courses in respective of curriculum and syllabus. However it is advised to get the necessary equivalent certificate.

The meeting was concluded at 4:30 PM with vote of thanks by **Dr. S. Deepa**, Head of the Department, Applied Chemistry.



Dr. S. Deepa
Chairman/ BOS



Dr. V.S.K. Venkatachalapathy
Director cum Principal
Chairman/Academic Council
Director cum Principal
SRI KRISHNA VARADACHARI ENGINEERING COLLEGE
Madhavpet, Puducherry - 605 107.



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BACHELOR OF SCIENCE

IN

APPLIED CHEMISTRY

CURRICULUM AND SYLLABUS

**(For students admitted from academic year 2020-2021
onwards)**

B.Sc., CURRICULUM (2020-2021 onwards)**SEMESTER I**

Part	Subject code	Course Title	Course Category	C	L	T	P	CAM	ESM	Total Marks
I	A20TAT101	Language - I	MIL	3	3	1	0	25	75	100
II	A20ENT101	English - I	English	3	3	1	0	25	75	100
III	A20CHT101	General Chemistry - I (Inorganic, Organic & Physical Chemistry)	DSC	5	4	1	0	25	75	100
III	A20CHT102	Polymer Chemistry	DSC	4	4	1	0	25	75	100
III	A20CHP103	Volumetric analysis practical	DSC	2	0	0	4	50	50	100
III	A20MAT131	Mathematics- I	IDC	4	4	1	0	25	75	100
IV	A20EEP101	Certification Course – I	EEC	2	2	0	2	50	-	50
V	A20AET101	Value Education	AECC	0	2	0	0	50	-	50
First Semester Total				23	22	05	6	275	425	700

SEMESTER II

Part	Subject code	Course Title	Course Category	C	L	T	P	CAM	ESM	Total Marks
I	A20TAT202	Language - II	MIL	3	3	1	0	25	75	100
II	A20ENT202	English - II	English	3	3	1	0	25	75	100
III	A20CHT204	General Chemistry - II (Inorganic, Organic & Physical Chemistry)	DSC	4	4	1	0	25	75	100
III	A20CHP205	Organic qualitative analysis practical	DSC	3	0	0	6	50	50	100
III	A20CHP206	Applied Chemistry Lab	DSC	2	0	0	4	50	50	100
III	A20MAT232	Mathematics- II	IDC	4	4	1	0	25	75	100
IV	A20SEP202	Quantitative Aptitude and Logical Reasoning – I	SEC	2	2	0	0	50	-	50
IV	A20EEP202	Certification Course – I	EEC	2	2	0	2	50	-	50
V	A20AET202	Environmental Science	AECC	0	2	0	0	50	-	50
V		NSS/ NCC/ NSO/ Yoga	EAC	1	0	0	2	-	-	-
Second Semester Total				24	20	4	14	350	400	750

SEMESTER III

Part	Subject code	Course Title	Course Category	C	L	T	P	CAM	ESM	Total Marks
III	A20CHT307	General Chemistry - III (Inorganic, Organic & Physical Chemistry)	DSC	5	4	1	0	25	75	100
III	A20CHT308	Bioorganic Chemistry	DSC	5	4	1	0	25	75	100
III	A20CHP309	Inorganic Qualitative Analysis –I and preparation of inorganic compounds	DSC	3	0	0	4	50	50	100
III	A20PHT331	Physics –I	IDC	3	3	1	0	25	75	100
III	A20PHP332	Physics Laboratory –I	IDC	2	0	0	4	50	50	100
III	A20CHE301	Water Analysis (Practical)	DSE	2	0	1	4	50	50	100
	A20CHE302	Food Analysis (Practical)								
	A20CHE303	Molecules of Life (Practical)								
IV	A20SEP303	Quantitative Aptitude and Logical Reasoning – II	SEC	2	2	1	0	50	-	50
V	A20EEP303	Certification course – III	EEC	2	2	0	2	50	-	50
Third Semester Total				24	15	5	14	325	375	700

SEMESTER IV

Part	Subject code	Course Title	Course Category	C	L	T	P	CAM	ESM	Total Marks
III	A20CHT410	General Chemistry - IV (Inorganic, Organic & Physical Chemistry)	DSC	4	4	1	0	25	75	100
III	A20CHT411	Physical Chemistry – I	DSC	4	4	1	0	25	75	100
III	A20CHP412	Inorganic Qualitative Analysis – II practical	DSC	2	0	0	4	50	50	100
III	A20PHT433	Physics –II	IDC	3	3	1	0	25	75	100
III	A20PHP434	Physics Laboratory –II	IDC	2	0	0	4	50	50	100
III	A20CHE404	Industrial Chemistry	DSE	3	3	1	0	25	75	100
	A20CHE405	Pharmaceutical Chemistry								
	A20CHE406	Chemistry of Consumer Products								
IV	A20SEP404	C++ Programming and Its Application to Chemistry	SEC	2	0	1	3	50	-	50
	A20SEP405	Instrumental Methods of Analysis								
	A20SEP406	Computational Chemistry Practical								
V	A20EET404	Verbal Ability and Reasoning	EEC	2	2	0	2	50	-	50
	A20EEP405	Certification course – IV		2	2	0	2	50	-	50
Fourth Semester Total				24	18	5	15	350	400	750

SEMESTER V

Part	Subject code	Course Title	Course Category	C	L	T	P	CAM	ESM	Total Marks
III	A20CHT513	Spectroscopy	DSC	4	4	1	0	25	75	100
III	A20CHT514	Inorganic Chemistry	DSC	4	4	1	0	25	75	100
III	A20CHT515	Organic Reaction Mechanism	DSC	4	4	1	0	25	75	100
III	A20CHP516	Gravimetric Analysis and Preparation of Organic Compounds (Practical)	DSC	3	0	0	6	50	50	100
III	A20CHP517	Physical Chemistry Practical –I (Non-electrical)	DSC	3	0	0	6	50	50	100
III	A20CHE507	Energy and Fuel Cells	DSE	3	3	0	0	25	75	100
	A20CHE508	Nano and green Chemistry								
	A20CHE509	Pharmaceutical Chemistry								
IV	A20EEP506	Certification course – V	EEC	2	2	0	2	50	--	50
	A20SEP101	Personality, Aptitude and Career Enhancement	SEC	2	0	0	4	50	-	50
Five Semester Total				25	17	3	18	300	400	700

SEMESTER VI

Part	Subject code	Course Title	Course Category	C	L	T	P	CAM	ESM	Total Marks
III	A20CHT618	Solid state and Coordination chemistry	DSC	4	4	1	0	25	75	100
III	A20CHT619	Chemistry of Natural Products	DSC	4	4	1	0	25	75	100
III	A20CHT620	Physical Chemistry-II	DSC	4	4	1	0	25	75	100
III	A20CHP621	Physical Chemistry Practical –II (Electrical)	DSC	3	0	0	6	50	50	100
III	A20CHR622	Core Based Project	DSC	6	0	0	6	40	60	100
III	A20CHE610	Agricultural Chemistry	DSE	3	3	0	0	25	75	100
	A20CHE611	Dairy Chemistry								
	A20CHE612	Leather Chemistry								
Six Semester Total				24	15	3	12	190	410	600

Legend:

L- Number of lecture hours per week,

P - Number of practical hours per week,

DSC –Discipline Specific Core Course,

MIL – Modern Indian Language,

SEC – Skill Enhancement Course,

EEC – Employability Enhancement Course,

T - Number of tutorial hours per week

C - Number of credits for the course

DSE - Discipline Specific Elective Course,

IDC – Interdisciplinary Course,

AECC – Ability Enhancement Compulsory Course,

EA – Extension Activity

SUMMARY							
CAREER STREAM TITLE	NO. OF COURSES (CREDITS IN BRACKET) SEMESTER WISE						
	I	II	III	IV	V	VI	TOTAL
LANGUAGE- I (Tamil)	1(3)	1(3)	-	-	-	-	2(6)
LANGUAGE- II (English)	1(3)	1(3)	-	-	-	-	2(6)
DSC	1(5), 1(4)	1(4)	2(5)	2(4)	3(4)	3(4)	13(55)
DSC (Lab)	1(2)	1(3), 1(2)	1(3)	1(2)	2(3)	1(3)	8(21)
IDC	1(4)	1(4)	1(3)	1(3)	-		4(14)
IDC (Lab)	-	-	1(2)	1(2)	-	-	2(4)
DSE	-	-	1(2)	1(3)	1(3)	1(3)	4(11)
SEC	-	1(2)	1(2)	1(2)	1(2)	-	4(8)
AECC *	1(0)	1(0)	-	-	-	-	2(0)
PROJECT WORK	-	-	-	-	-	1(6)	1(6)
EEC	1(2)	1(2)	1(2)	2(2)	1(2)	-	6(12)
EXTENSION ACTIVITY *	-	1(1)	-	-	-	-	1(1)
NUMBER OF PAPERS AND CREDITS (SEMESTER WISE)	8(23)	10(24)	8(24)	9(24)	8(25)	6(24)	50(144)
TOTAL NUMBER OF CREDITS	144						

YEAR – I	LANGUAGE – I TAMIL - I	HRS/WK -
SEMESTER - I		CREDIT -3
A20TAT101		

பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகாலத் தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- காலந்தோறும் தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றை காலந்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதாகவும், மொழியின் கட்டமைப்பைப் புரிந்து கொள்வதாகவும் பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.
- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.

அலகு - 1

இக்காலக் கவிதைகள் - 1

1. பாரதியார் - கண்ணன் என் சேவகன்
2. பாரதிதாசன் - தமிழ்ப்பேறு
3. அப்துல் ரகுமான் - அவதாரம்
4. மீரா - கனவுகள் + கற்பனைகள் = காகிதங்கள்
5. து. நரசிம்மன் - மன்னித்துவிடு மகனே

அலகு - 2

இக்காலக் கவிதைகள் - 2

1. ராஜா சந்திரசேகர் - கைவிடப்பட்ட குழந்தை
2. அனார் - மேலும் சில இரத்தக் குறிப்புகள்
3. சுகிர்தராணி - அம்மா
4. நா.முத்துக்குமார் - தூர்

அலகு - 3

சிற்றிலக்கியம்

1. கலிங்கத்துப் பரணி - பொருடடக்கை வாள் எங்கே... (பாடல் - 485)
2. அழகர்கிள்ளை விடு தூது - இதமாய் மனிதருடனே... (கண்ணி - 45)
3. நந்திக் கலம்பகம் - அம்பொன்று வில்லொடிதல்... (பாடல் - 77)
4. முக்கூடற் பள்ளு - பாயும் மருதஞ் செழிக்கவே... (பாடல் - 47)
5. குற்றாலக் குறவஞ்சி - ஓடக் காண்பதுமே... (பாடல் - 9)

காப்பியங்கள்

மணிமேகலை - உலகவறவி புக்க காதை - "மாசுஇல் வால்ஒளி! - இந்நாள் போலும் இளங்கொடி கெடுத்தனை" .
(28 அடிகள்)

அலகு - 4 - தமிழ் இலக்கிய வரலாறு

- 1) சிற்றிலக்கியம் - தோற்றமும் வளர்ச்சியும், 2) புதுக்கவிதை - தோற்றமும் வளர்ச்சியும், 3) சிறுகதை - தோற்றமும் வளர்ச்சியும், 4) புதினம் - தோற்றமும் வளர்ச்சியும், 5) உரைநடை - தோற்றமும் வளர்ச்சியும்

அலகு - 5

மொழிப்பயிற்சி :

1. கலைச்சொல்லாக்கம், 2. அகரவரிசைப்படுத்துதல், 3. மரபுத்தொடர் / பழமொழி, 4. கலை விமர்சனம், 5. நேர்காணல்

உரைநடைப் பகுதி :

1. உ.வே.சாமிநாதையர் - சிவதருமோத்திரச் சுவடி பெற்ற வரலாறு,
2. தஞ்சாவூர்க் கவிராயர் -கூஜாவின் கோபம்,
3. இரா.பச்சியப்பன் - மாடல்ல மற்றையவை

பார்வை நூல்கள்

1. கைலாபதி, க., தமிழ் நாவல் இலக்கியம், குமரன் பதிப்பகம், வடபழனி, 1968.
2. சுந்தரராஜன், பெ. கோ., சிவபாதசுந்தரம், சோ., தமிழில் சிறுகதை வரலாறும் வளர்ச்சியும், க்ரியா, சென்னை, 1989.
3. பரந்தாமனார், அ.கி., நல்ல தமிழ் எழுத வேண்டுமா, பாரி நிலையம், சென்னை, 1998,
4. பாக்யமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.பி. எச். பதிப்பகம், சென்னை, 2011
வல்லிக்கண்ணன், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், அன்னம், சிவகங்கை, 1992.

YEAR – I	LANGUAGE – II ENGLISH- I	
SEMESTER - I		HRS/WK -
A20ENT101		CREDIT -3

**LANGUAGE-II
ENGLISH –I**

COURSE OBJECTIVES:

- To recognize the rhythms, metrics and other musical aspects of poetry
- To read a variety of texts critically and proficiently
- To enable the students to enjoy the flair of literature through the work of great writer
- To make the students to know the functions of basic grammar and frame sentences without grammatical error.
- To enable them understanding the intrinsic nuances of writing in English language

COURSE OUTCOMES:

After the completion of this course, the students will be able to:

- Comprehend and discuss the various facets of selected poems
- Analyze and interpret texts written in English
- Read drama with graduate-level interpretive and analytical proficiency
- Improve the fluency and formation of grammatically correct sentences
- Enhance the writing skills for specific purposes

UNIT I: POETRY

1. John Milton: On His Blindness
2. William Wordsworth: Daffodils
3. Percy Byshe Shelley: Ozymandias
4. Emily Dickinson: Because I could not stop for Death
5. Sarojini Naidu: The Queen’s Rival

UNIT II: PROSE

1. Francis Bacon: Of Love
2. Charles Lamb: A Dissertation upon Roast Pig
3. Katherine Mansfield: A Doll’s House
4. R. K. Narayan: An Astrologer’s Day
5. Abdul Kalam: The Power of Prayer

UNIT III: DRAMA

1. Oscar Wilde: *Lady Windermere’s Fan*

UNIT IV: GRAMMAR

1. Parts of Speech
2. Tenses
3. Subject-Verb Agreement

UNIT V: COMPOSITION

1. Essay Writing
2. Email

TEXT BOOKS:

1. Brookside Musings: A Selection of Poems and Short Stories: Board of Editors, Orient Longman Limited, 2009
2. Wilde, Oscar. Lady Windermere's Fan. published in The Importance of Being Earnest and Other Plays. London: Penguin, 1940. ISBN 0-14-048209-1.
3. Wilde, Oscar. Lady Windermere's Fan. London: Nick Hern Books, 2005. ISBN 978-1-85459-771-7
4. Lamb, Charles, A Dissertation Upon Roast Pig & Other Essays, Penguin; UK ed. edition (7 April 2011)
5. Gale, Emily Dickinson's Because I could not stop for Death, Cengage Learning, 2015

REFERENCE BOOKS:

1. Lalitha Natarajan & Sasikala Natesan English for Excellence: Poetry Anuradha Publications
2. Literary Pursuits: Board of Editors, Orient Longman Limited, 2015
3. Literary Pinnacles: An Anthology of Prose and Poetry. Board of Editors, Orient Longman Limited, 2015
4. The Approach to Life: A Selection of English Prose: Orient Longman Limited, 2009
5. Jeet Thayil, 60 Indian Poets, Penguin Books, 2008

WEB RESOURCES:

1. <https://poets.org/poem/because-i-could-not-stop-death-479>
2. <https://www.enotes.com/topics/an-astrologers-day>
3. <https://www.poetryfoundation.org/poems/46565/ozymandias>
4. <https://www.dltk-holidays.com/spring/poem/daffodils.htm>
5. <https://www.bartleby.com/4/313.html>

**A20CHT101-GENERAL CHEMISTRY – I
(INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY)**

Course Objectives

1. To know the concept of qualitative inorganic analysis.
2. To acquaint knowledge about electron displacement effects, hybridization and conformations.
3. To know about the structure of an atom.

Course Outcomes (CO)

1. Explain the basic analytical knowledge and group separation of elements.
2. Understand and apply the nomenclature of inorganic and organic compounds.
3. Explain the isomerism of alkanes and cycloalkanes.
4. Acquire the knowledge about the structure of atoms. Understand characteristics of gases.

UNIT – I

Qualitative analysis (18 hours)

Introduction - Dry reactions – heating, flame tests; Wet reactions – test tubes, centrifuge tubes, stirring rods, droppers, reagent bottles and reagents, the centrifuge, washing the precipitates, wash bottles, transferring of precipitates, 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), scheme of classification of anions.

UNIT-II

Nomenclature of inorganic and organic compounds (18 hours)

Writing symbols of elements and formulae of inorganic species- inorganic nomenclature- names of compounds in general-names of ions – names of radicals –names of isopolyanions-names of hetero polyanions –names of acids – names of salts and salt like compounds –names of addition compounds –names of neutral hydrides –names of boron hydrides. Nomenclature of cations, anions, radicals, binary acids, oxy acids, peroxy acids salts, binary compounds, hydrates, double salts.

Nomenclature of organic compounds – Introduction, systems of naming organic compounds – Rules of IUPAC system of nomenclature for cyclic compounds , complex organic compounds – substituted alkanes, alkenes and alkynes, compounds having functional groups, polyfunctional compounds.

UNIT-III

Chemistry of alkanes and Cycloalkanes (18hours)

Inductive effect, electromeric effect, mesomeric effect and hyperconjugative effect. Homolytic and heterolytic fission, Reaction Intermediates-carbocations, carbanions, carbon free radicals and carbenes. Classification of reagents: Electrophiles and nucleophiles. Types of organic reactions- Substitution, addition, elimination and rearrangement reactions (Basic ideas only).

Structure – Nomenclature - Isomerism in alkanes – Natural source of alkanes – Methods of preparation – physical properties - chemical properties – Conformation study of ethane and n-butane.

Nomenclature – methods of preparation – physical and chemical properties. Stability of cycloalkanes Bayer strain theory.

UNIT-IV

Structure of atom – Classical Mechanics and Wave mechanical approach (18 hours)

Introduction of classical mechanics approach - Quantum Theory and Bohr Atom. Wave mechanical concept of atom – de Broglie's equation. Heisenberg's Uncertainty principle. Schrodinger's Wave equation. Charge cloud concept and orbitals. Quantum Numbers-Principal, Azimuthal, Magnetic and Spin Quantum Numbers and their significance. Pauli's Exclusion principle. Energy distribution and orbitals. Distribution of electrons in orbitals. Representation of ground state electronic configuration of elements – Aufbau principle, n+l rule and Hund's rule. Pauling's exclusion principle.

UNIT-V

Gaseous state (18 hours)

Characteristics of gases- parameters of a gas. Gas laws-Boyle's law, Charles's Law, Gay lussac's law and Avogadro's law. The ideal gas equation- kinetics of molecular theory of gases. Derivation of kinetic gas equation. Distribution of molecular velocities- calculation of molecular velocities. Collision properties. vander-waals equation – Liquefaction of gases – Law of corresponding states- Methods of liquefaction of gases.

TEXT BOOKS

1. G. Svehla, (1997) **Vogel's Text book of Macro and Semimicro Qualitative Analysis**, Longman Inc., Newyork.
2. R. D. Madan, (2004) **Modern Inorganic Chemistry**, S. Chand & Co., New Delhi.
3. M.K. Jain. S.C. Sharma, (2004) **Modern Organic Chemistry**, Vishal publishing Co., New Delhi .
4. B. R. Puri, L. R. Sharma, K. K. Kalia, (2014) **Principles of Inorganic Chemistry**, Milestone Publishers and Distributors, New Delhi.
5. Arun Bahl , B.S.Bahl, (2012) **Advanced Organic Chemistry**, S. Chand & Co., New Delhi, Revised multicolor edition.
6. Arun Bahl and B.S.Bahl, G.D.Tuli, (2012) **Essentials of Physical Chemistry**, S. Chand & Co., New Delhi, Revised multicolor edition.

REFERENCE BOOKS

1. Sathya Praksash, G.D. Tuli, S. K. Basu, R.D. Madan, (2012) **Advanced Inorganic Chemistry**, Vol. 1, S. Chand & Co., New Delhi.
2. J. D. Lee, (2006) **Concise Inorganic Chemistry**, Black Well Science, UK.
3. M. K. Jain, S. C. Sharma, (2011) **Modern Organic Chemistry**, Vishal Publishing Co., New Delhi,.
4. S. Glasstone, D. Lewis, (2004) **Elements of Physical Chemistry**, Macmillan Ltd, London.

A20CHT102 - POLYMER CHEMISTRY

Course Objectives

1. To know about basics of polymers, polymerization and plastic materials
2. To learn about polymer processing and synthesis of some commercially important polymers and to know about various polymer processes techniques.
3. To know different type of plastics, advancements, disposal, applications

Course Outcomes (CO)

1. Know about the types of polymers, chemical and physical properties, its industrial applications and uses.
2. Understand the various polymerization techniques, processing and different types of individual polymer products.
3. Acquiring knowledge of commercially important polymer products and its applications.
4. know about the recent advances in polymer products and their applications.

UNIT-I

(9 hours)

Introduction to polymers: Genesis of polymers: *Basic concept – monomers and polymers – definition. Classification of polymers – natural and synthetic polymers – organic and inorganic Polymers – Thermoplastic and thermosetting plastics – plastic materials, elastomers, few applications.

Chemistry of Polymerization: Types – Chain polymerization – Free radical polymerization, Ionic polymerization, coordination polymerization. Step Polymerization – polycondensation, poly addition, ring opening. Miscellaneous polymerization reactions – electrochemical. Group transfer polymerization.

UNIT-II

Polymer properties and Reactions

(9 hours)

Molecular weight and Size: Average molecular weight - number average - weight average molecular weights – concepts. Sedimentation and viscosity Average molecular weights - Molecular weight and degree of polymerization.

Glass Transition Temperature (T_g): Definition, application of T_g in processing, Transition and Associated properties, Factors influencing the glass transition temperature. Photo oxidative degradation of polymers.

UNIT-III Polymerization Processing Techniques

(9 hours)

Polymer Processing Technology: Introduction to polymer processing-basic concept and applications-Injection Moulding - compression moulding, extrusion process, Blow moulding, Blown film, Rotational Moulding, FRP.

UNIT-IV Chemistry of Commercial Polymers

(9 hours)

Chemistry of polymers: Types-engineering and commodity plastics, General methods and preparation Properties of PE, PP, PS, PMMA, polyacetal, PC, polyamides, PVC, PF, UF, epoxy, Teflon.

UNIT-V Recent Advances in Polymers

(9 hours)

Polymer and environmental effect-introduction-disposal of polymer waste-recycling system-importance of biopolymers –basis of conducting polymers, introduction to blends and alloys. Application of plastics in various fields-plastic industries in India.

Text Books

1. S. Durai pandian and Laxmi Durai pandian (1984) *Trigonometry*. Emerald Publishers, Chennai.
2. N.P.Bali- TRIGONOMETRY- Year of Publication 1994.Krishna Prakasan Mandhir, 9, Shivaji Road, Meerut (UP)
3. Shanti Narayan, “Integral Calculus”, S Chand & Co. New Delhi, 2001.

Reference Books

1. A.Singaravelu (2003) Algebra and Trigonometry, Vol.-I Meenakshi Agency, Chennai.
2. P.R.Vittal. (2004) Trigonometry, Margham Publications, Chennai.
3. P. Kandasamy, K. Thilagavathy, “Mathematics of B.SC”, Vol I & II, S. Chand Company Ltd, New Delhi – 2004.

Web References

1. <https://nptel.ac.in/courses/111/105/111105122/>
2. <https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:trig/x9e81a4f98389efdf:inverse-trig/v/inverse-trig-functions-arcsin>
3. <https://www.khanacademy.org/math/statistics-probability>

A20CHP103 - VOLUMETRIC ANALYSIS PRACTICAL

Course Objectives

1. To demonstrate the concept of quantitative volumetric analysis.
2. To understand the various types of titrimetric analysis.

Course Outcomes (CO)

1. Gain the knowledge in principles of volumetric analysis.
2. Estimating the amount of substances present in solutions.
3. Learn to approach a problem systematically and to interpret the result Logically

Titrimetric Quantitative Analysis

a. Acidimetry and Alkalimetry:

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.

b. Permanganometry:

1. Estimation of Oxalic acid by KMnO_4 using a standard Oxalic acid solution
2. Estimation Iron (II) Sulphate by KMnO_4 using a standard Mohr's Salt solution
3. Estimation of calcium (ii) by KMnO_4 using standard oxalic acid solution

c. Dichrometry:

1. Estimation of Iron (II) by potassium dichromate using standard Mohr's salt solution

d. Iodometry:

1. Estimation of KMnO_4 by Thio using a standard Potassium dichromate Solution
2. Estimation of Copper (II) Sulphate by $\text{K}_2\text{Cr}_2\text{O}_7$ solution.

BOOKS FOR REFERENCE

1. Venkateswaran. V, Veeraswamy. R, Kulandaivelu. A.R., (1997) **Basic Principles of Practical Chemistry**, New Delhi, Sultan Chand and Sons.
2. Mendham. J, Denney. R.C, Barnes. J.D, and Thomas, M. (1989) **Vogel's Text book of Quantitative Analysis**, Pearson Education.
3. Gopalan. R, Subramaniam. P.S, and Rengarajan. K, (2004) **Elements of Analytical Chemistry**, Sultan Chand and Sons.

A20MAT131 – MATHEMATICS – I

Course Objectives

1. To understand the concept of types of Integration.
2. To introduce Double and Triple Integration.
3. To explore the expansion of $\sin\theta$, $\cos\theta$, $\tan\theta$
4. To learn the concept of inverse trigonometry functions.
5. To introduce the concept of correlation and regression.

Course Outcomes

After completion of the course, the students will be able to

CO1 – understand the different types of integration.

CO2 - Solve double and Triple integral problems.

CO3 – Find expansion of trigonometric values and solution of trigonometric solutions.

CO4 - Identify the different types of Inverse trigonometry.

CO5 – learns different methods in solve statistics.

UNIT I DEFINITE INTEGRALS

(9 Hrs)

Revision of all Integral models - Definite integrals – Integration by parts & Reduction formula.

UNIT II MULTIPLE INTEGRALS

(9 Hrs)

Multiple Integrals, change of order of integration and change of variables in double integrals (Cartesian to polar). Applications: Areas by double integration and volumes by triple integration (Cartesian and polar).

UNIT III TRIGONOMETRY

(9 Hrs)

Expansions of $\cos n\theta$, $\sin n\theta$ - Expansion of $\tan n\theta$ in terms of $\tan \theta$ - Expansion of $\tan(A+B+C+\dots)$ - Formation of Equations. Powers of sines and cosines of θ in terms of functions of multiples of θ - expansions of $\sin \theta$ and $\cos \theta$ in a series of ascending powers of θ

UNIT IV INVERSE TRIGONOMETRY

(9 Hrs)

Expansion of Inverse Circular Functions. Definition – Relation between Hyperbolic Functions - Inverse Hyperbolic Functions. Resolution into Factors - simple problems only - DeMoivre's Property on the Circle and Cote's Property on the Circle. Logarithm of complex quantities.

UNIT V STATISTICS

(9 Hrs)

Measures of central tendency – Arithmetic Mean, Median and Mode – Measures of dispersion and Standard deviation – Skewness and Measures of Skewness – Pearson's coefficient of Skewness – Moments – Correlation – Rank correlation and regression.

Text Books

1. S. Duraipandian and LaxmiDuraipandian (1984) *Trigonometry*. Emerald Publishers, Chennai.
2. N.P.Bali- TRIGONOMETRY- Year of Publication 1994. Krishna Prakasan Mandhir, 9, Shivaji Road, Meerut (UP)
3. Shanti Narayan, "Integral Calculus", S Chand & Co. New Delhi, 2001.

Reference Books

1. A.Singaravelu (2003) Algebra and Trigonometry, Vol.-I Meenakshi Agency, Chennai.
2. P.R.Vittal. (2004) Trigonometry, Margham Publications, Chennai.
3. P. Kandasamy, K. Thilagavathy, "Mathematics of B.SC", Vol I & II, S. Chand Company Ltd, New Delhi – 2004.

Web References

1. <https://nptel.ac.in/courses/111/105/111105122/>
2. <https://www.khanacademy.org/math/precalculus/x9e81a4f98389efdf:trig/x9e81a4f98389efdf:inverse-trig/v/inverse-trig-functions-arcsin>
3. <https://www.khanacademy.org/math/statistics-probability>

A20CHT101 - VALUE EDUCATION

COURSE OBJECTIVES

1. To orient about the society, social life, integrity in personal and public life.
- 3 To learn the concepts of human values and respect for others.
- 4 To provide in-depth understanding about moral awareness.
- 5 To inculcate a sense of socially responsible citizens.

COURSE OUTCOMES

- 1 Develop a sense of self respect and respect for others.
- 2 Able to occupy one's own social space and help others live peacefully.
- 3 Develop scientific temper and logical reasoning and to apply in day to day life.

UNIT - I VALUE EDUCATION & HUMAN EDUCATION

Value Education - Definition - relevance to present day - Concept of Human Values - Self Introspection - Self Esteem

UNIT – II SOCIETY & FAMILY VALUES 3

Structure and components of Society - Marriage and Family Values – Anger Neutralization , Adjustability - Threats to family life.

UNIT - III ETHICS & LEADERSHIP QUALITIES 3

Ethical values: Ethics, Social Ethics, Public Policy - Leadership qualities: Integrity, Character, Courage - Personality development – Inter-culture Tolerance.

UNIT - IV SOCIAL VALUES 3

Social Values, Faith, Service, Commitment and Decency - Fundamental Rights and Responsibilities of citizens.

UNIT–V SOCIAL PROBLEMS AND ROLE OF STUDENTS 3

Social Problems: Definition - Poverty, Illiteracy, Unemployment, Exploitation, Obscenity, Immorality - Crimes and Online Crimes - Student unrest, Ragging and Peaceful Campus - Role of Students in tackling social problems

REFERENCE BOOKS

1. Mani Jacob (Ed). „Resource Book for Value Education“, Institute for Value Education, New Delhi. 2002.
2. NCERT. “Value Education”. Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.
2. Daniel and Selvamony. “Value Education Today “- Madras Christian College, Tambaram and ALACHE, New Delhi, 1990.
4. Ignacimuthu S. “Values for Life”. Better Yourself Books, Mumbai, 1991.
5. M.M.M.Mascaronhas. Centre for Research Education Science and Training for Family Life Promotion - Family Life Education, Bangalore, 1993.

YEAR – I	LANGUAGE – I TAMIL - II	
SEMESTER - II		HRS/WK -
A20TAT202		CREDIT -3

பாடத்திட்டத்தின் நோக்கம்

- இரண்டாயிரம் ஆண்டுகாலத் தமிழின் தொன்மையையும் வரலாற்றையும் அதன் விழுமியங்களையும் பண்பாட்டையும் எடுத்துரைப்பதாக இப்பாடத்திட்டம் அமைக்கப்பட்டுள்ளது.
- காலந்தோறும் தமிழ் இலக்கியம் உள்ளடக்கத்திலும், வடிவத்திலும் பெற்ற மாற்றங்கள், அதன் சிந்தனைகள், அடையாளங்கள் ஆகியவற்றை காலந்தோறும் எழுதப்பட்ட இலக்கியங்களின் வழியாகக் கூறுவதாகவும், மொழியின் கட்டமைப்பைப் புரிந்து கொள்வதாகவும் பாடத்திட்டம் வடிவமைக்கப்பட்டுள்ளது.
- வாழ்வியல் சிந்தனைகள், ஒழுக்கவியல் கோட்பாடுகள், சமத்துவம், சூழலியல் எனப் பல கூறுகளை மாணவர்களுக்கு எடுத்துரைக்கும் விதத்தில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது.

அலகு - 1

1. எட்டுத்தொகை : 1. குறுந்தொகை (பாடல் - 130), 2. நற்றிணை (பாடல் - 27), 3. அகநானூறு (பாடல் - 86)
2. பத்துப்பாட்டு - சிறுபாணாற்றுப்படை (அடிகள் - 126-143)
3. பதினெண் கீழ்க்கணக்கு : திருக்குறள் - வெகுளாமை (அதிகாரம் 31), காதல் சிறப்புரைத்தல் (அதிகாரம் 113)

அலகு - 2

1. எட்டுத்தொகை : 1. ஐங்குறுநூறு (பாடல் - 203), 2. கலித்தொகை - பாலைத்திணை (பாடல் - 9), 3. புறநானூறு (பாடல் - 235)
2. பத்துப்பாட்டு - முல்லைப்பாட்டு (அடிகள் - 6 - 21)
3. பதினெண் கீழ்க்கணக்கு - 1. நாலடியார் - நல்லார் எனத்தான் (221), 2. திரிகடுகம் - கோலஞ்சி வாழும் குடியும் (33), இனியவை நாற்பது - குழவி தளர்நடை (14), கார் நாற்பது - நலமிகு கார்த்திகை (26), 5. களவழி நாற்பது - கவளங்கொள் யானை (14)

அலகு - 3

சைவம் - பன்னிரு திருமுறைகள்

1. திருஞானசம்பந்தர் - வேயுறு தோளிபங்கள் (இரண்டாம் திருமுறை)
2. திருநாவுக்கரசர் - மனமெனும் தோணி (நான்காம் திருமுறை)
3. சுந்தரர் - ஏழிசையாய் இசைப்பயனாய் (ஏழாம் திருமுறை)
4. மாணிக்கவாசகர் - ஆதியும் அந்தமும் இல்லா (திருவெம்பாவை)
5. திருமூலர் - அன்பு சிவம் இரண்டு (திருமந்திரம்)

வைணவம் - நாலாயிரத் திவ்யப் பிரபந்தம்

1. பேயாழ்வார் - திருக்கண்டேன் பொன்மேனி ...
2. பெரியாழ்வார் - கருக்கண் தோகை மயிற் பீலி...
3. தொண்டரடிப்பொடி ஆழ்வார் - பச்சைமாமலை போல்...
4. ஆண்டாள் - கருப்பூரம் நாறுமோ? கமலப்பூ ...
5. திருமங்கையாழ்வார் - வாடினேன் வாடி வருந்தினேன்

இஸ்லாமியம்

சீறாப்புராணம் - படலம் நின்ற பிணை மானுக்குப் -- 5 பாடல்கள் (பாடல் எண்கள் : 61 - 65)
கிறித்துவம்

இரட்சனய யாத்ரீகம் - கடைதிறப்புப் படலம் - 5 பாடல்கள் (பாடல் எண்கள் : 3,9,10,15,16)

அலகு - 4

தமிழ் இலக்கிய வரலாறு

1. சங்க இலக்கியங்கள், 2. நீதி இலக்கியங்கள், 3. பக்தி இலக்கியங்கள், 4. காப்பியங்கள்

அலகு - 5

சிறுகதைகள்

1. புதுமைப்பித்தன் - அகலிகை
2. ந.பிச்சமூர்த்தி - வேப்பமரம்
3. அகிலன் - ஒரு வேளைச் சோறு
4. ஜி. நாகராஜன் - பச்சக் குதிரை
5. கி.ராஜநாராயணன் - கதவு
6. சா.கந்தசாமி - தக்கையின் மீது நான்கு கண்கள்
7. ஆண்டாள் பிரியதர்ஷினி - மாத்திரை
8. வண்ணதாசன் - ஒரு உல்லாசப் பயணம்
9. சு. தமிழ்ச்செல்வன் - வெயிலோடு போய்
10. பாரததேவி - மாப்பிள்ளை விருந்து

பார்வை நூல்கள்

1. அரசு, வீ., இருபதாம் நூற்றாண்டுச் சிறுகதைகள் நூறு, அடையாளம் பதிப்பகம், திருச்சி, 2013
2. அருணாசலம், ப., பக்தி இலக்கியங்கள், பாரி நிலையம், சென்னை, 2010
3. தமிழண்ணல், புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 2000
4. பாக்யமேரி, வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, என்.சி.பி. எச். பதிப்பகம், சென்னை, 2011

பசுபதி, ம.வே. செம்மொழித்தமிழ் இலக்கண இலக்கியங்கள், த□□□ப் பல்கலைக்கழகம், தஞ்சாவூர், 2010.

YEAR – I	LANGUAGE – II ENGLISH- II	
SEMESTER - II		HRS/WK -
A20ENT202		CREDIT -3

COURSE OBJECTIVES:

- To recognize poetry from a variety of cultures, languages and historic periods
- To develop the intensive study of language by critical reading
- To identify the various genres and analyze the works of writers in English
- To expand the basic understanding of targeted grammatical structures
- To understand the conventions of writing in English

COURSE OUTCOMES:

After the completion of this course, the students will be able to

- Understand and appreciate poetry as a literary art form
- Comprehend and recognize relationship between ideas , events and facts
- Learn to explore characters and their conflicts , dilemmas and extend their response to stories
- Apply grammatical structures meaningfully and appropriately in oral and written form
- Write effectively and coherently

UNIT I: POETRY

1. John Donne: The Flea
2. Lord Byron: She Walks in Beauty
3. Robert Frost: Stopping by Woods on a Snowy Evening
4. Rabindranath Tagore: Where the Mind is Without Fear
5. Nissim Ezekiel: Night of the Scorpion

UNIT II: PROSE

1. A.G. Gardiner: All about a Dog
2. Ernest Hemingway: A Day's Wait
3. Anton Chekhov: The Lottery Ticket
4. Swami Vivekananda: Chicago Address 1893
5. Ruskin Bond: The Thief

UNIT III: FICTION

1. Jane Austen: *Pride and Prejudice*

UNIT IV: GRAMMAR

1. Voice
2. Conditionals

3. Intensifiers
4. Coherence

UNIT V: COMPOSITION

1. Letter Writing
2. Report Writing

TEXT BOOKS:

1. Wisdom and Experience: An Anthology for Degree Classes. Board of Editors, Orient Longman Limited, 2007
2. The Approach to Life: A Selection of English Prose: Orient Longman Limited, 2009
3. Brookside Musings: A Selection of Poems and Short Stories: Board of Editors, Orient, Longman Limited, 2009

REFERENCE BOOKS:

1. Lalitha Natarajan & Sasikala Natesan English for Excellence: Poetry Anuradha Publications
Literary Pursuits: Board of Editors, Orient Longman Limited, 2015
2. Literary Pinnacles: An Anthology of Prose and Poetry. Board of Editors, Orient Longman, Limited, 2015
3. Raymond Murphy and Surai Pongtongcharoen, English Grammar in Use, Cambridge University, 1985

WEB RESOURCES:

1. <https://poets.org/poem/she-walks-beauty>
2. <https://www.poetryfoundation.org/poems/46467/the-flea>
3. <https://www.classicshorts.com/stories/lottery.html>
4. <http://short-storylovers.blogspot.com/2012/07/thief-by-ruskin-bond.html>
5. <http://www.gutenberg.org/files/1342/1342-h/1342-h.htm>

**A20CHT204-GENERAL CHEMISTRY – II
(INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY)**

Course Objectives

1. To learn the basic principles and concepts of metallurgy and their applications
2. Know about metallurgy, importance of periodic table and atomic properties.
3. To learn about alcohols and aromatic compounds.
4. To study the fundamentals of thermodynamics and thermochemistry.

Course Outcomes (CO)

1. Obtain problem solving skills in order to modify industrial processes in extraction metallurgy.
2. Gain knowledge about periodic properties and understand the basic aspects of alcohols and aromatic compounds.
3. Learn about concepts of thermodynamics.
4. Acquire the knowledge in thermochemistry.

UNIT-I : Metallurgy (18 hours)

Introduction-Minerals, ores - occurrence of metals-classification of ores-various steps involved in the metallurgical processes- concentration of ores, working of concentrated ore- calcination – roasting - smelting - Ellingham Diagram-Thermodynamic Principles-reduction by carbon-alumino thermic process-reduction by heating air-electrolytic reduction- - purification of metals-liquation-distillation-oxidation-cupellation- electro refining - zone refining-van Arkel process-Amalgamation process-Mond's process, Extraction of Iron, Extraction of Copper, extraction of aluminium, extraction of Silver, extraction of Zinc

UNIT-II: Periodic table and atomic properties (18 hours)

Mendeleev Periodic Table, Modern Periodic table-Long form periodic table, Description of groups-Alkali metals-Alkali earth metals-Boron Family-Carbon Family-Nitrogen family/Pnicogens-Oxygen family/Chalcogens-Halogen family-Inert gases/Noble gases – IUPAC nomenclature for the super heavy elements, Merits and Demerits of long form of periodic table.

Classification of Elements-Bohr classification-Basis of Sub Shell in which last electron enters(s, p, d, f), Periodicity-Causes of periodicity, Calculation of effective nuclear charge, Periodic Properties, Atomic Size-Covalent radius--Ionic Radius-Metallic radius-Vander Waal's radius, Factors affecting atomic size, Ionization energy – factors affecting ionization energy-applications of ionization energy, Electron affinity-Factors affecting electron affinity, Electronegativity-Factors Affecting electronegativity-applications of electronegativity.

UNIT-III (18 hours)

Benzene and Aromaticity Nomenclature

Naming of monosubstituted Benzene, disubstituted benzene and polysubstituted benzene. Benzenoid and non benzenoid aromatic electrophillic substitution reaction. Arenium ion mechanism. Reactions – Nitration, sulphonation, halogenation, Fridel Crafts alkylation and acylation, orientation and reactivity of monosubstituted benzene.

Aromaticity The concept of Aromaticity, Aromatic, anti aromatic, and non aromatic compounds, Huckel's rule. Toluene, cumene and styrene – Preparation, Physical and Chemical propertie

UNIT-IV**(18 hours)****Thermodynamics - I**

Basic concepts - scope and limitations - Thermodynamic terms - intensive and extensive properties- state, equilibrium - processes-nature of heat and work – pressure – volume work - isothermal reversible and irreversible expansion works of an ideal gas - maximum work - Zeroth law of thermodynamics - Internal Energy and First law of thermodynamics - Enthalpy of a system-Relation between ΔE and ΔH -Relation between C_p and C_v – Joule Thomson effect -comparison between adiabatic and isothermal expansions - Adiabatic expansion of an ideal gas -work done in adiabatic reversible expansion.

UNIT-V**(18 hours)****Thermochemistry**

Introduction - exothermic and endothermic reactions - Thermo chemical equations - Kirchoff's equation - types of heat of reaction - heat of formation - standard heat of formation - standard heat of reaction - heat of combustion-heat of solution - heat of neutralization-heat of fusion - heat of vaporization - heat of sublimation and heat of transition – definition - simple problems. Hess's law of constant heat summation – applications - bond energy and strength of bond - experimental determination of heat of combustion - bomb calorimeter.

TEXT BOOKS

1. Puri B.R, Sharma L.R, Kalia K.C., (2014) Principles of Inorganic Chemistry, MILESTONE publishers and Distributors, New Delhi.
2. Sathya praksash, G.D. Tuli, S. K. Basu, R.D. Madhan, (2012) Advanced Inorganic Chemistry, Volume 1, S. Chand & Company, New Delhi.
3. M.K. Jain, S.C. Sharma, (2011) Modern Organic Chemistry, Vishal Publishing Co., Delhi.
4. B.S. Bahl, and Arun Bahl, (2012) Advanced Organic Chemistry, S.Chand and Co, New Delhi, Revised multicolor edition.
5. B.S. Bahl and G. D. Tuli, and Arun Bahl, (2012) Essentials of Physical Chemistry, S. Chand publishing, Revised multicolor edition.

REFERENCE BOOKS

1. R. D. Madan, (2011) Modern Inorganic Chemistry, S.Chand and Co., Third Revised Edition.
2. R. Gopalan, (2009) Inorganic Chemistry For Undergraduate, Universities Press (India) Private Limited, Hyderabad.
3. Puri B. R. Sharma L. R., M. S. Pathania, (2013) Principles of Physical Chemistry,
4. Vishal Publishing Co., New Delhi.

A20CHP205 - ORGANIC QUALITATIVE ANALYSIS PRACTICAL

Course Objectives

1. To identify the functional groups of unknown organic compounds.

Course Outcomes (CO)

1. Learn to approach a problem systematically and to interpret the result Logically
2. Detect various functional groups present in an organic compound.

Organic analysis

Analysis of organic compounds

- Preliminary tests
- Detection of elements present
- Aromatic or Aliphatic
- Saturated or Unsaturated
- Nature of the functional group
- Confirmatory tests and Preparation of derivatives for the functional groups.

The following functional group compounds may be given:

Aldehydes, Ketones, Amines, Amides, Diamide, Carbohydrates, Phenols, Acids, Esters and Nitro compounds.

BOOKS FOR REFERENCE

1. Venkateswaran. V, Veeraswamy. R, Kulandaivelu. A.R., (1997) Basic Principles of Practical Chemistry, New Delhi, Sultan Chand and Sons.
2. Mendham. J, Denney. R.C, Barnes. J.D, and Thomas, M. (1989) Vogel's Text book of Quantitative Analysis, Pearson Education.
3. Gopalan. R, Subramaniam. P.S and Rengarajan. K, (2004) Elements of Analytical Chemistry, Sultan Chand and Sons.

A20CH9206 - APPLIED CHEMISTRY LAB

Course Objectives

1. To understand the importance of chemicals in day to day life
2. To learn various methods of preparation of consumer products
3. To learn the application of software that is easily available in the market and apply it
4. To estimate the amount of chemical substance present in consumer products.

List of Experiments

Small scale preparation of following consumer products.

Hard Soap Soft Soap

Pain Balm Chalk piece

Tooth paste Shampoo

Detergent powder Ink

Phenoyl (Toilet Cleaner) Soda

Bleaching powder Hand sanitizer

Natural mosquito repellent Perfumes

Shoe polish Nail polish

TEXT BOOKS

1. R. Norris Shreve, and A. Joseph Brink, Chemical process industries, 4th edn., McGraw – Hill Kogakusha Ltd, 1977.
2. George T. Austin. Shreve's Chemical Process Industries, 5th edn., McGraw – Hill: 1984.
3. N. S. Subbarao, Biofertilizers in agriculture, Oxford and IBH publishing Co.: New Delhi, 1982.
4. K.V. Raman, Computers in Chemistry, Tata McGraw-Hill Ltd., New Delhi, 1993.
5. N. S. Gnanapragasam and G. Ramamurthy, Organic Chemistry Lab Manual, S. Viswanathan printers and publishers Ltd, 2002.

REFERENCES

1. P. Kamaraj, R. Jeyalakshmi, V. Narayanan, Chemistry in engineering and technology; Sudhandhira publications: Chennai, 2001.
2. J.C. Kuriakose, J. Rajaram, Chemistry in engineering and technology. Vol. 2, Tata McGraw hill: New Delhi,

A20MAT232 - ALLIED MATHEMATICS – II

Course Objectives

1. To familiarize the concept of matrices.
2. To introduce mathematical tools to solve first order differential equations.
3. To learn linear differential equations of higher order with constant coefficients.
4. To understand the concept of partial differentiation.
5. To introduce the concepts of curl, divergence and integration of vectors in vector calculus.

Course Outcomes

After completion of the course, the students will be able to

CO 1 - Find eigen values and eigen vectors, diagonalization of a matrix.

CO 2 - Solve differential equations.

CO 3 - Solve higher order differential equations.

CO 4 - Solve different types of partial differential equation.

CO 5 - Understand the use of vector calculus.

UNIT I MATRICES

(9 Hrs)

Rank of a Matrix- Consistency of system of equations. Eigen values and Eigen vectors of a real matrix - Characteristic equation - Properties of Eigen values and Eigen vectors. Cayley-Hamilton Theorem.

UNIT II DIFFERENTIAL EQUATION

(9 Hrs)

Exact equations, First order linear equations, Bernoulli's equation, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT III HIGHER ORDER DIFFERENTIAL EQUATION

(9 Hrs)

Linear differential equations of higher order with constant coefficients, the operator D, Euler's linear equation of higher order with variable coefficients, Solution by variation of parameter method.

UNIT IV PARTIAL DIFFERENTIAL EQUATION

(9 Hrs)

Partial derivatives, Total derivatives, Differentiation of implicit functions, Maxima and Minima of two variables. Partial differential equations of higher order with constant coefficients.

UNIT V VECTOR CALCULUS

(9 Hrs)

Gradient, divergence and curl - Directional derivative- Irrotational and Solenoidal vector fields - Gauss Divergence Theorem and Stoke's Theorem.

Text Books

1. Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley, Tenth edition, 2019
2. B.V.Ramana, "Higher Engineering Mathematics", Tata McGraw-Hill, New Delhi, Sixth edition 2018.
3. N.P. Bali and Manish Goyal, "A Text Book of Engineering Mathematics", Lakshmi Publications, New Delhi, Ninth Edition, 2018

Reference Books

1. C W. Evans, "Engineering Mathematics", A Programmed Approach, 3th Edition, 2019
2. Singaravelu. A., "Engineering Mathematics - I", Meenakshi publications, Tamil Nadu, 2019
3. M.K. Venkataraman, "Engineering Mathematics (Third Year-Part A)", The National Publishing Company, Madras, 2016.

Web References

1. [http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra –slides-systemsofquation-handout.pdf](http://www.yorku.ca/yaoguo/math1025/slides/chapter/kuttler-linearalgebra-slides-systemsofquation-handout.pdf)
2. <https://nptel.ac.in/courses/111/105/111105122/>
3. <https://nptel.ac.in/courses/122/104/122104017/>
4. <https://nptel.ac.in/courses/111/106/111106051/>
5. <https://nptel.ac.in/courses/111/108/111108081/>

A20SEP202 - QUANTITATIVE APTITUDE AND LOGICAL REASONING – I

COURSE OBJECTIVE

- ❖ To enhance holistic development of students and improve their employability skills

UNIT – I (6 Hours)

Numbers: Classification of numbers – Test of divisibility – Unit digit – HCF and LCM – Remainder theorem – Progression – Simplification – Averages – Combined mean (simple problems)

UNIT – II (6 Hours)

Simple interest and compound interest – Word problems

UNIT – III (6 Hours)

Problems related to permutation and combination – Probability (simple problems)

UNIT – IV (6 Hours)

Reasoning (Analytical and logical): Odd man out – Word series – Number series – Direction test – Blood relationship – Coding and decoding – Seating arrangements

UNIT – V

Problems related to clocks and calendar

REFERENCES

1. Dinesh Khattar-The Pearson guide to quantitative aptitude for competitive examinations.
2. Dr. R.S. Agarwal.– Quantitative Aptitude for Competitive Examinations, S.Chand and Company Limited
3. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mcgraw Hill, 3rd Edition
4. Edgar Thrope, Test Of Reasoning for Competitive Examinations, Tata Mcgraw Hill, 4th Edition
5. <http://fw.freshersworld.com/placementweek/papers.asp>

A20AET202 – ENVIRONMENTAL STUDIES

Course Objectives

1. To gain knowledge on the importance of natural resources and energy
2. To understand the structure and function of an ecosystem
3. To imbibe an aesthetic value with respect to biodiversity, understand the threats and its conservation and appreciate the concept of interdependence
4. To understand the causes of types of pollution and disaster management
5. To observe and discover the surrounding environment through field work

UNIT – I Introduction to Natural Resources/Energy (9 Hours)

Natural Resources – Definition – Scope and Importance – Need for Public Awareness

Renewable and Non-renewable Resources: Natural resources and associated problems. Forest resources and over-exploitation – Water resources and over- utilization – Mineral resource extraction and its effects - Food resources - food problems and Modern agriculture - Energy resources and its future.

UNIT – II Ecosystems (9 Hours)

Concept of an ecosystem-structure and function of an ecosystem-producers, consumers and decomposers-ecological succession- food chains(any 2 Examples)- food webs(any 2 Examples)-ecological pyramids.

UNIT – III Environmental Pollution /Disaster Management (9 Hours)

Definition-causes, effects and control measures of : Air, Water and Soil pollution- e- waste management- Disaster management: Natural and manmade- food/earthquake/cyclone, tsunami and landslides.

UNIT – IV Social Issues and The Environment (9 Hours)

Sustainable development- Climate change: global warming, acid rain, ozone layer depletion and nuclear radiation- Environment Protection Act (any 2) air, water, wildlife and forest.

UNIT – V Human Population and The Environment (9 Hours)

Population growth, variation among nations - Population explosion—Family Welfare Programme - Environment and human health - Human rights - Value education - HIV/AIDS - Women and Child Welfare Role of Information Technology in environment and human health

TEXT BOOKS RECOMMENDED:

- K. De, “Environmental chemistry” 9th Ed; New age international (P) Ltd, New Delhi, 2010.
- K. RaghavanNambiar, “Text Book of Environmental Studies” 2ndEd, Scitech Publications (India) Pvt Ltd, India, 2010.
- G. S. Sodhi, Fundamental concepts of environmental chemistry, I Ed, Alpha Science International Ltd, India, 2000.

REFERENCE BOOKS

- 1. B.K. Sharma, “Environmental chemistry” 11th Ed, KRISHNA Prakashan Media (P) Ltd, Meerut, 2009.
- 2. S.S.Dara, and D.D. Mishra “A text book of environmental chemistry and pollution control, 5th Ed, S.Chandand Company Ltd, New Delhi, 2012.
- 3. Richard T. Wright, Environmental Science: Toward a Sustainable Future, 10thedition, Prentice Hall, 2008

USEFUL WEB SITE

- www.ifpri.org/topic/environment-and-natural-resources
- <https://www.iucn.org/content/biodiversity>
- <http://www.world.org/weo/pollution>
- www.water-pollution.org.uk/
- <https://www.tceq.texas.gov/airquality/monops/sites>