

E.G.S. PILLAY ENGINEERING COLLEGE

(Autonomous)

Approved by AICTE, New Delhi | Affiliated to Anna University, Chennai Accredited by

NAAC with 'A' Grade |

Accredited by NBA(CSE, EEE, MECH, IT, CIVIL, ECE)

NAGAPATTINAM – 611002



B.Tech-Artificial Intelligence & Data Science

R-2019

SEMESTER-1

S.No.	Course Code	Course Title	L	T	P	C
1	1901MA107	Engineering Mathematics-I	3	2	0	4
2	1901CH105	Chemistry for Artificial Intelligence & Data Science	3	0	0	3
3	1901GE104	Programming for Problem Solving	2	0	4	4
4	1901EN102	Professional English	3	0	0	3
5	1901GE151	Engineering Intelligence I	0	0	2	1
6	1901CHX51	Engineering Chemistry Lab	0	0	2	1
7	1901HSX51	Communication Skills Lab	0	0	2	1
		Total Credits				17

ENGINEERING MATHEMATICS - I
(LINEAR ALGEBRA AND CALCULUS)

L	T	P	C
3	1	0	4

1901MA107

Course Objectives:

- To explain the main concepts of linear algebra those are used in data analysis and machine learning.
- To learn the fundamentals of working with data in vector and matrix form, acquire skills for solving systems of linear algebraic equations and finding the basic matrix decompositions and general understanding of their applicability.
- To provide an understanding of double and triple integrals

Module-1 : MATRICES

9 +3=12 HOURS

Rank of a matrix – Consistency of a system of linear equations - Solution of a system of linear equations - Linearly dependent and independent vectors–Eigenvalues and Eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors – Cayley Hamilton theorem (excluding proof) - Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation.

Module-2 : VECTOR SPACES

9 +3=12 HOURS

Vector spaces and subspaces – Linear independence and dependence – Basis and Dimension - Null spaces, column spaces and Linear transformations - LU decomposition method - Singular Value Decomposition method

Module-3 : DIFFERENTIAL CALCULUS

9 +3=12 HOURS

Partial differentiation – Homogeneous functions and Euler’s theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor’s series for functions of two variables – Maxima and minima of functions of two variables – Lagrange’s method of undetermined multipliers

Module-4 : HIGHER ORDER ORDINARY DIFFERENTIAL EQUATION

9 +3=12 HOURS

Linear, homogeneous and non- homogeneous differential equations of second and higher order with constant coefficients - Non-homogeneous term of the type e^{ax} , $\sin ax$, $\cos ax$, and x^n , $e^{ax} V(x)$

Module-5 : MULTIPLE INTEGRALS

9 +3=12 HOURS

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

Theory: 45 Hrs

Tutorial: 15

Total Hours: 60 Hrs

Textbooks:

1. Grewal B.S., , 41st Edition, 2011, “Higher Engineering Mathematics”, Khanna Publishers, New Delhi.
2. Ramana B.V., 11th Reprint, 2010, “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi
3. David C. Lay, “Linear Algebra and its Applications”, Pearson Education Asia, New Delhi, 5 th Edition, 2016.

Reference Materials:

1. Kreyzig E., “Advanced Engineering Mathematics”, 10th Edition, John Wiley and sons, 2011
2. Venkataraman M.K., “Engineering Mathematics”, The National Publishing Co., Chennai, 2003
3. Weir, MD, Hass J, Giordano FR, 12th Edition, 2015, Thomas’ Calculus, Pearson education.
4. Thomas G.B. and Finney R.L., “Calculus and Analytic Geometry”, 11th Edition, Pearson Education, 2006.
5. Seymour Lipschutz , Marc Lipson, “Schaum Outline of Linear Algebra”, McGraw Hill Trade; New Delhi, 6th Edition, 2017

Course Outcomes (COs):

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

	Competency	Cognitive level
CO1	Calculate the inverse and rank of a square matrix and Make use of matrix Operations to solve the systems of linear equations	Apply
CO2	Determine Vector spaces and subspaces using linear independence and span of a set of vectors, basis and dimension.	Apply
CO3	Solve the problems of differentiation of functions of two variables and know about the maximization and minimization of functions of several variables.	Apply
CO4	Use and Solve Higher Order Ordinary Differential Equations	Apply
CO5	Solve the area and volume of a curve using double and triple integration.	Apply

Course Outcome(CO)s Vs Performance Indicator(PI)s Matrix

(Support provided by COs to PIs: L = Slightly (1); M = Moderately (2); S = Substantially (3))

Comp.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	-	-	-	-	-	-	-	-	1		
CO2	3	2	1	-	-	-	-	-	-	-	-	-	1		
CO3	3	2	1	-	-	-	-	-	-	-	-	-	1		
CO4	3	2	1	-	-	-	-	-	-	-	-	-	1		
CO5	3	2	1	-	-	-	-	-	-	-	-	-	1		

UNIT I ELECTROCHEMISTRY:**9 HOURS**

Cell terminology – Electro chemical cells- Electrolytic cells- Cell reactions- Daniel cell-Difference between electrolytic cells and electrochemical cells. Reversible cells and irreversible cells -types- EMF and its applications - Nernst equation (derivation and problems).Single electrode potential - Hydrogen electrode - Calomel electrode - Glass electrode - pH measurement using glass electrode.

UNIT II CORROSION AND PROTECTIVE COATING:**9 HOURS**

Corrosion – types-chemical, electrochemical corrosion (galvanic, differential aeration) - Factors influencing corrosion -corrosion control – material selection and design aspects - electrochemical protection – sacrificial anode method and impressed current cathodic method. Protective coatings: Thermal Spray, Electroplating of gold and electroless plating of nickel. Paints - Constituents and Functions.

UNIT III WATER TECHNOLOGY:**9 HOURS**

Sources and impurities, Water quality parameters: Definition and significance Desalination of brackish water: Reverse Osmosis. Boiler troubles: Scale and sludge, Boiler corrosion, Caustic embrittlement, Priming & foaming. Treatment of boiler feed water: Internal treatment (phosphate, colloidal and calgon conditioning) and External treatment – Ion exchange demineralization and zeolite process.

UNIT IV ENERGY SOURCES AND STORAGE DEVICES**9 HOURS**

Nuclear energy: light water nuclear power plant, breeder reactor. Solar energy conversion: Principle, working and applications of solar cells; Recent developments in solar cell materials. Batteries: Types of batteries, Primary battery - dry cell, Secondary battery - lead acid battery and lithium-ion battery; Fuel cells: H₂-O₂ fuel cell.

UNIT V NANOCHEMISTRY**9 HOURS**

Basics: Distinction between molecules, nanomaterials and bulk materials; Size-dependent properties (optical, electrical, mechanical and magnetic); Types of nanomaterials: Definition, properties and uses of – nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: precipitation, hydrothermal, solvothermal, laser ablation, chemical vapour deposition methods. Applications of nanomaterials in medicine, agriculture, energy, electronics and catalysis.

TOTAL: 45 PERIODS**TEXT BOOKS:**

1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008.
3. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018

REFERENCES:

1. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath and James Murday, "Text book of nanoscience and nanotechnology", Universities Press-IIM Series in Metallurgy and Materials Science, 2018.
2. O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017.
3. Friedrich Emich, "Engineering Chemistry", Scientific International PVT, LTD, New Delhi, 2014.

4. Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, Second Edition, 2019.
5. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.

Course Outcomes (COs):

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

	Competency	Cognitive level
CO1	Describe electrode potential concepts using electro chemical principles	Understand
CO2	Explain the solution for various corrosion problems.	Understand
CO3	Explain suitable water treatment methods.	Understand
CO4	Describe the various conventional and non-conventional energy systems	Understand
CO5	Classify the nano materials used for different purposes	Understand

COs Vs POs Matrix

Comp.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	P
CO1	2	2	-	-	-	-	-	-	-	-	-	
CO2	2	2	-	-	-	-	-	-	-	-	-	
CO3	2	2	-	-	-	-	-	-	-	-	-	
CO4	2	2	-	-	-	-	-	-	-	-	-	
CO5	2	2	-	-	-	-	-	-	-	-	-	

1901GE104

Programming for Problem Solving

L T P C
2 0 4 4

PREREQUISITE:

The course assumes no prior skill or background in design, art or engineering. It is open to all undergraduates and graduate students with an interest in programming.

COURSE OBJECTIVES:

1. To learn the fundamentals of computers.
2. To understand the various steps in program development.
3. To learn the syntax and semantics of C programming language.
4. To learn the usage of structured programming approach in solving problems.
5. To understand and formulate algorithm for programming script
6. To analyse the output based on the given input variables

Module I Introduction to Programming

7 Hours

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.) Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples, From algorithms to programs; source

code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Module II Expressions & Control Statements

5 Hours

Arithmetic expressions and precedence, Conditional Branching and Loops. Writing and evaluation of conditionals and consequent branching. Iteration and loops.

Module III Arrays & Strings

6 Hours

Arrays, Arrays (1-D, 2-D), Character arrays and Strings, Basic Algorithms, Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

Module IV Functions

6 Hours

Function, Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference, Recursion, Recursion as a different way of solving problems. Example programs, such as Finding Factorial, Fibonacci series, Ackerman function etc. Quick sort or Merge sort.

Module V Structures, Pointers & File Handling

6 Hours

Structures, Defining structures and Array of Structures, Pointers, Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation), File handling

TOTAL: 30 HOURS

Mode of Assessment: CAT/Assignment/Quiz/Seminar/Presentation/ESE

Course Outcomes:

1. Summarize the important computer components including various types of disks and processors
2. Implement algorithms, flowchart, pseudo-code for arithmetic, numerical and logical problems & translate to programs
3. Implement conditional branching, iteration techniques for solving mathematical & logical problems
4. Implement arrays, searching & sorting techniques for problem solving including matrix operations
5. Decompose a problem into functions and synthesize a complete program using divide and conquer approach
6. Apply structures, pointers and file handling to formulate algorithms and programs

FURTHER READING:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. R.S. Salaria, Programming for Problem Solving, Khanna Publishing House.
3. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill.
4. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

REFERENCES:

1. NPTEL Course – INTRODUCTION TO PROGRAMMING IN C, Prof. SATYADEV NANDAKUMAR, IITL
2. NPTEL Course – PROBLEM SOLVING THROUGH PROGRAMMING IN C, Prof. ANUPAM BASU, IIT KGP

LIST OF EXPERIMENTS [SUGGESTED]

1. Familiarization with programming environment
2. Simple computational problems using arithmetic expressions
3. Problems involving if-then-else structures
4. Iterative problems e.g., sum of series
5. 1D Array manipulation
6. Matrix problems, String operations
7. Simple functions
8. Programming for solving Numerical methods problems
9. Recursive functions
10. Pointers and structures
11. Project

The student will learn following through Practicals:

- To formulate the algorithms for simple problems.
- To translate given algorithms to a working and correct program.
- To be able to correct syntax errors as reported by the compilers.
- To be able to identify and correct logical errors encountered at run time.
- To be able to write iterative as well as recursive programs.
- To be able to represent data in arrays, strings and structures and manipulate them through a program.
- To be able to declare pointers of different types and use them in defining self-referential structures.
- To be able to create, read and write to and from simple text files.

Total Hours:60

Mode of Assessment: PAT/Presentation

CO-PO/PSO Mapping:-

*	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	2	-	-	-	-	-	-	-	-	-	2	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	2	-	2	-
CO3	3	2	-	-	-	-	-	-	2	2	-	2	-	2	-
CO4	3	3	2	-	2	-	-	-	-	-	-	2	-	2	-
CO5	3	3	3	2	2	-	-	-	2	2	-	2	-	2	-
CO6	3	2	2	-	-	-	-	-	-	-	-	2	-	2	-
Overall I	3	2.5	2.2 5	2	2	-	-	-	2	2	-	2	-	2	-

1901EN102

PROFESSIONAL ENGLISH
(B.Tech., Artificial Intelligence & Data Science)

L T P C
3 0 0 3

COURSE OBJECTIVES:

- To improve the communicative competence of learners
- To help learners use language effectively in academic/work contexts
- To build on students' English language skills by engaging them in listening, speaking and grammar learning activities that are relevant to authentic contexts.
- To develop learners' ability to read and write complex texts, summaries, articles, blogs, definitions, essays and user manuals.
- To use language efficiently in expressing their opinions via various media.

MODULE I INTRODUCTION TO FUNDAMENTALS OF COMMUNICATION 9 Hours

Listening – for general information-specific details-conversation: Audio / video (formal & informal); Telephone conversation; Listening to voicemail & messages

Speaking - Self Introduction; Introducing a friend; Conversation - politeness strategies; Telephone conversation; Leave a voicemail; Leave a message with another person; asking for information to fill details in a form.

Reading - Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails.

Writing- Writing emails/letters introducing oneself

Grammar - Present Tense (simple and progressive); Question types: Wh / Yes or No

Vocabulary – One word substitution; Abbreviations & Acronyms (as used in technical contexts).

MODULE II NARRATION AND SUMMATION 9 Hours

Listening- Listening to podcasts, anecdotes/stories/event narration; documentaries and interviews with celebrities.

Speaking- Narrating personal experiences/events; Interviewing a celebrity; Reporting and summarizing documentaries / podcasts/interviews.

Reading- Reading biographies, newspaper reports

Writing - Guided writing- Paragraph writing, Short Report on an event (field trip etc.) Grammar –

Past tense (simple); Subject-Verb Agreement; and Prepositions

Vocabulary - Word forms (prefixes & suffixes); Phrasal verb

MODULE III DESCRIPTION OF A PROCESS / PRODUCT 9 Hours

Listening- Listen to a product and process descriptions; a classroom lecture; and advertisements about products.

Speaking – Picture description; giving instruction on use of the product; presenting a product; and Summarizing a lecture.

Reading –

Reading advertisements, gadget reviews; user manuals. Writing Writing definitions; instructions; and Product/Process description.

Grammar- Imperatives; Adjectives; Degrees of comparison; Present & Past Perfect Tenses.

Vocabulary - Compound Nouns, Homonyms; and Homophones, discourse markers (connectives & sequence words)

MODULE IV CLASSIFICATION AND RECOMMENDATIONS 9 Hours

Listening – Listening to TED Talks; Scientific lectures; and educational videos.

Speaking – Small Talk; Mini presentations and making recommendations.

Reading – Newspaper articles; Journal reports – and Non Verbal Communication (tables, pie chart etc.)

Writing – Writing recommendations; Transferring information from non-verbal (chart, graph etc, to verbal mode)

Grammar–Articles;Pronouns-Possessive & Relativepronouns.
Vocabulary-Collocations;Fixed/Semifixedexpressions.

MODULE V EXPRESSION

9 Hours

Listening–Listeningtodebates/discussions;differentviewpointsonanissue;andpaneldiscussions.
Speaking –group discussions, Debates, andExpressing opinions through Simulations & Role play.
Reading–Reading editorials;andOpinionBlogs;
Writing –EssayWriting(Descriptiveornarrative).
Grammar–FutureTenses,Punctuation;Negation(Statements&Questions
Vocabulary-Cause&EffectExpressions–Content vs Functionwords.

TOTAL: 45 HOURS

Course Outcomes (COs):

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

- CO1: Listenandcomprehendcomplexacademic texts.
- CO2: Readandinferthedenotativeandconnotativemeanings oftechnicaltexts.
- CO3: Writedefinitions,descriptions,narrationsandessays onvarioustopics.
- CO4: Speak fluentlyandaccuratelyinformalandinformalcommunicativecontexts.
- CO5: Expresstheir opinions effectivelyinbothoralandwrittenmediumofcommunication.
- CO6: Understand technical theories and write technical articles of their own.

REFERENCES:

1. TechnicalCommunication–PrinciplesAndPracticesByMeenakshiRaman&SangeetaSharma,Oxford Univ.Press,2016,NewDelhi.
2. ACourseBookonTechnicalEnglishByLakshmiNarayanan,ScitechPublications(India)Pvt.Ltd.
3. EnglishForTechnicalCommunication(WithCD)ByAyshaViswamohan,McgrawHillEducation,ISBN :0070264244.
4. EffectiveCommunicationSkill, KulbhusanKumar,RSSalaria,KhannaPublishing House.
5. LearningtoCommunicate–Dr.V.Chellammal,AlliedPublishingHouse,NewDelhi,2003.

Course Outcomes (COs):

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

COS	Competency	Cognitive level
CO1	Listenandcomprehendcomplexacademic texts.	Understand (K2)
CO2	Readandinferthedenotativeandconnotativemeanings oftechnicaltexts.	Understand (K2)
CO3	Writedefinitions,descriptions,narrationsandessays onvarioustopics	Understand (K2)
CO4	Speak fluentlyandaccuratelyinformalandinformalcommunicativecontexts.	Understand (K2)
CO5	Expresstheir opinions effectivelyinbothoralandwrittenmediumofcommunication.	Understand (K2)
CO6	Understand technical theories and write technical articles of their own.	Understand (K2)

V. COs Vs POs/PSOs Matrix

Support provided by COs to Pos/PSOs:- L = lightly(1); M = Moderately(2); S = substantially(3)

Comp.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-

Comp.	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-

1901GE151 ENGINEERING INTELLIGENCE I L T P C
(Common for all B.E./B.Tech. Programme) 0 0 2 1

MODULE I BEHAVIORAL CHANGES – TRANSITION OF SCHOOL TO COLLEGE 6 Hours

Vocabulary -The Concept of Word Formation - prefixes- suffixes- Synonyms – Antonyms - Grammar - Articles-Preposition-Adjective-Adverb-connectives-Tenses(present, past &future)-Sentence pattern- types of sentences- Active voice – passive voice and Impersonal passive voice-Wh-Questions.

MODULE II EXPOSURE TO INDIVIDUAL COMPETANCE 6 Hours

Listening- listening intently-arousing and sustaining interest-listening to short or longer texts- formal and informal conversations- telephonic etiquettes- narratives from different sources. -listening and Note taking-correlative verbal and nonverbal communication-listening to TOEFL & IELTS programs- listening to Project presentation-listening to technical seminar and conferences.

MODULE III CAREER PLANNING 6 Hours

Speaking - stress and intonation – persuasive speaking -Describing person, place and thing - sharing personal information – greetings – taking leave -Individual and Group Presentation- impromptu Presentation- public speaking-Group Discussion-project planning- facing viva voce and delivering project.

MODULE IV INTRODUCTION TO COMMUNICATIONS SKILLS 6 Hours

Reading – comprehending general and technical articles-cloze reading-inductive reading-short narrative and descriptions from newspapers – Skimming and scanning-reading and interpretation-critical reading interpreting and transferring graphical information-sequencing of sentences-analytical reading on various Projects.

MODULE V COMMUNICATION EXERCISE-1 6 Hours

Writing- Precise writing – Summarizing- interpreting visual texts (pie chart, bar chart, picture - advertisement setc., - Proposal writing (launching new units or department in a institution or industry & to get loan from bank) -report writing (accident, progress, project, survey, Industrial visit)- job application-e-mail drafting- letter writing(permission, accepting and decaling)-instructions – recommendations – checklist

TOTAL: 30 HOURS

Course Outcomes:

- At the end of the course, students will be able to
- CO1: Apply their knowledge and skill to engineering field
 CO2: Understand the value of individual competence
 CO3: Apply their skill to career planning and team work
 CO4: Illustrate verbal and non verbal skills
 CO5: Use various communication skill exercise to write and interpret the contents

REFERENCES:

1. Dr. P. Prasad (2012)—The Functional Aspects of COMMUNICATIONS SKILLS I; fifth Edition; S. K. Kataria & Sons Publication
2. Kalyana; (2015)—Soft Skill for Managers I; First Edition; Wiley Publishing Ltd.
3. Aruna Koneru (2008)—Professional Communication I; Second edition; Tata McGraw-Hill Publishing Ltd.

		L	T	P	C
1901CHX51	ENGINEERING CHEMISTRY LAB	0	0	2	1

Aim of the course: Engineering Chemistry laboratory course is designed to provide basic chemistry and its application to the first year engineering students. The course includes the study of applications of water quality chemistry, identification of acidic and alkaline nature of water, molecular weight determination and explaining the principles behind each experiment.

List of Practical Experiments

1. Determination of total, temporary & permanent hardness of water by EDTA method
2. Determination of strength of given hydrochloric acid using pH meter
3. Estimation of iron content of the given solution using potentiometer
4. Estimation of sodium present in water using flame photometer
5. Corrosion experiment – weight loss method
6. Determination of molecular weight of a polymer by viscometry method
7. Conductometric titration of strong acid Vs strong Base
8. Estimation of dissolved oxygen in a water sample/sewage by Winkler's method.
9. Comparison of alkalinity of the given water samples
10. Determination of concentration of unknown colored solution using spectrophotometer
11. Determination of percentage of copper in alloy
12. Determination of ferrous iron in cement by Spectrophotometry method
13. Adsorption of acetic acid on charcoal
14. Determination of the flash point and fire point of a given oil using Pensky Martine closed cup apparatus
15. Determination of the calorific value of solid fuels
16. Determination of the structure of the compound using chem software.

COURSE OUTCOMES

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

CO1: Measure the hardness and alkalinity of given water sample

CO2: Find the amount and percentage of iron in unknown sample using EMF and photometric methods

CO3: Determine the amount of strong acid present in the given sample using PH metric and conductometric methods

CO4: Determine the amount of dissolved oxygen and heavy metal present in the given sample

CO5: Determine the molecular weight of the given polymer

TEXTBOOKS:

1. Experimental organic chemistry, Daniel R. Palleros, John Wiley & Sons, Inc., New York (2001)
2. -Engineering Chemistry II, Jain & Jain, 15th edition, Dhanpat Rai Publishing company, New Delhi.
3. Vogel's Textbook of practical organic chemistry, Furniss B.S. Hannaford A.J, Smith P.W. Gand Tatchel A.R. LBS Singapore (1994).
4. LBS Singapore (1994). Kolthoff I.M., Sandell E.B. et al. Mcmillan, Madras 1980.

List of Experiments:

- 1. Activities on Fundamentals of Listening and Inter-personal Communication (6)**
Listening to conversation, listening to technical presentation- listening to online videoconferencing, interviews and webinars- starting a conversation- responding appropriately and relevantly- using appropriate body language- Role Play in different situations & Discourse Skills- using visuals.
- 2. Activities on Reading Comprehension (6)**
General Vs Local comprehension- reading for facts- guessing meanings from context- Scanning- skimming and inferring meaning- critical reading & effective googling- TOFEL, IELTS- reading online journals.
- 3. Activities on Writing Skills (6)**
Structure and presentation of different types of writing - letter writing - Resumewriting- e-correspondence- Proposal writing- Technical report writing- Portfolio writing- planning for writing- improving one's writing.
- 4. Activities on Presentation Skills (6)**
Oral presentations (individual and group) through JAM sessions – presentation on online platform (webinars, online meeting) - seminars -PPTs and written presentation through posters- projects- report- e-mails- assignments etc.- creative and critical thinking.
- 5. Activities on Soft Skills (6)**
Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre- interview planning, opening strategies, answering strategies, interview through tele-conference & video-conferencing and Mock Interviews- Time management- stress management- paralinguistic features- Multiple intelligences- emotional intelligence- spiritual quotient (ethics)- intercultural communication- creative and critical.

References Total : 30 Hours

1. Raman, Meenakshi and Sangeetha Sharma, — Technical Communication: Principles and Practice, Oxford University Press, New Delhi, 2011.
2. Sudha Rani, D, — Advanced Communication Skills Laboratory Manual, Pearson Education 2011.
3. Paul V. Anderson, — Technical Communication, Cengage Learning Pvt. Ltd. New Delhi, 2007.
4. — English Vocabulary in Use series, Cambridge University Press 2008.
5. — Management Shapers Series, Universities Press (India) Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. Rizvi and Ashraf M., -Effective Technical Communication, Tata McGraw Hill, New Delhi, 2005.
7. Jones, D, -The Pronunciation of English, CUP, Cambridge, 2002

