

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY AND SCIENCES (A)
(UGC Autonomous)

Approved by AICTE, Affiliated to Andhra University, Accredited by
(Estd : 2001)



2023-24
R23-CSE Curriculum & Syllabi

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

I Year Course structure – CSE

Semester –I

CODE	SUBJECT NAME	Category	Periods				Sessional Marks	Semester end Exam marks	Total Marks	Credits
			L	T	P	Total				
23MA1101	Linear Algebra and Multivariable Calculus	BS	2	1	0	3	40	60	100	3
23EN2101	Communicative English	HS	3	0	0	3	40	60	100	3
23CY1102	Applied Chemistry	BS	2	1	0	3	40	60	100	3
23EC3102	Basics of Electrical and Electronics Engineering	ES	2	1	0	3	40	60	100	3
23CS3101	Problem Solving and Programming using C	ES	3	0	0	3	40	60	100	3
23CY1202	Applied Chemistry Lab	BS	0	0	3	3	50	50	100	1.5
23EN2201	Communicative English Language Lab	HS	0	0	3	3	50	50	100	1.5
23CS3201	Problem Solving and Programming using C – Lab.	ES	0	0	3	3	50	50	100	1.5
23CS9201	Information Technology Fundamentals	SC	0	0	3	3	50	50	100	0
23MC0101	Universal Human Values & Professional Ethics	MC	2	0	0	2	0	0	0	0
Total			14	3	12	29	400	500	900	19.5

Linear Algebra and Multivariable Calculus	
Code: 23MA1101	Credits : 03
Instruction : 2 Periods & 1 Tutorial/Week	Sessional Marks : 40
End Exam : 3 Hours	End Exam Marks : 60

Course Objectives:

To provide the students with sufficient knowledge in calculus and matrix algebra, this can be used in their respective fields.

Course Outcomes

After course completion, the students will be able to:

1	Apply elementary transformations to reduce the matrix into the echelon form and normal form to determine its rank and interpret the various solutions of system of linear equations.
2	Identify the special properties of a matrix such as the eigen value, eigen vector, employ orthogonal transformations to express the matrix into diagonal form, quadratic form and canonical form.
3	Equip themselves familiar with the functions of several variables.
4	Evaluate double and triple integrals techniques over a region in two dimensional and three dimensional geometry.
5	Express the given function in terms of sine and cosine.

CO-PO –PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	1	1							1	2		2	
CO2	3	2	1	1							1	2		2	
CO3	3	2	1	1							1	2		2	
CO4	3	2	1	1							1	2		2	
CO5	3	2	1	1							1	2		2	

Correlation levels 1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SYLLABUS

UNIT-1: **10 Periods**

Linear Equations: Rank of matrix - Normal form of a matrix - PAQ form - Gauss Jordan method of finding the inverse - Consistency of linear system of equations.

Sections: 2.7 and 2.10.

UNIT-2: **10 Periods**

Linear transformations and Quadratic forms : Eigen values - Eigen vectors - Properties of eigen values (without proofs) - Cayley Hamilton theorem (without proof) - Reduction of quadratic form to canonical form - Nature of the Quadratic form.

Sections: 2.13, 2.14, 2.15, 2.17 and 2.18.

UNIT-3: **10 Periods**

Multivariable Calculus: Total derivatives - Chain rule - Change of variables - Jacobians - Taylor's series expansion of two variable function - Maxima and minima of functions of two variables - Method of Lagrange's multipliers.

Sections: 5.5, 5.6, 5.7, 5.9, 5.11 and 5.12.

UNIT-4: **10 Periods**

Multiple Integrals : Double integrals - Change of order of integration - Double integration in polar coordinates - Areas enclosed by plane curves - Triple integrals - Volumes of solids (by using double and triple integrals).

Sections: 7.1, 7.2, 7.3, 7.4, 7.5 and 7.6.

UNIT-5: **10 Periods**

Fourier Series : Introduction - Euler's formulae (without proof) - Conditions for a Fourier expansion - Functions having points of discontinuity - Change of interval - Even and odd functions - Half range series.

Sections: 10.1, 10.2, 10.3, 10.4, 10.5, 10.6 and 10.7.

Text Books:

1. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

Reference Books:

1. **Erwin Kreyszig**, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. **N. P. Bali**, Engineering Mathematics, Lakshmi Publications.
3. **George B. Thomas, Maurice D. Weir and Joel Hass**, Thomas, Calculus, 13/e, Pearson Publishers, 2013.
4. **H. K. Dass**, Advanced Engineering Mathematics, S. Chand and company Pvt. Ltd.
5. **Michael Greenberg**, Advanced Engineering Mathematics, Pearson, Second Edition.

Communicative English	
Code: 23EN2101	Credits : 03
Instruction : 3 periods/Week	Sessional Marks : 40
End Exam : 3 Hours	End Exam Marks : 60

Course Objectives:

1. To develop awareness about the importance of LSRW skills
2. To implement verbal and nonverbal cues properly in their career and personal life
3. To prepare the students impress everyone with their effective communication skills
4. To familiarize the students with latest terminology and jargon.
5. To train them to attempt various vocabulary tests to get employment.

Course Outcomes

After course completion, the students will be able to:

1	Comprehend LSRW skills and various linguistic aspects of multicultural milieu.
2	Acquire verbal and nonverbal Communication skills through varied individual and team activities.
3	Apply proper vocabulary and appropriate grammar to draft different types of writings collectively and separately for effective professional and personal communication.
4	Analyze and relate advanced terminology in conceptual conversations, writings and in pronunciation.
5	Distinguish and practice several kinds of vocabulary tests for better employability with competence.

CO-PO –PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1									2	2			2		2
CO2									2	2			2		2
CO3									2	2			2		2
CO4									2	2			2		2
CO5									2	2			2		2

Correlation levels 1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SYLLABUS

UNIT-1: **10 Periods**

Listening: Motivational Speech (Martin Luther King, Jr. Dr. Abdul Kalam, Sundar Pitchai)

Speaking: Self Introduction – Introducing others

Reading: Motivational Speech or Essays (H G Wells, Stephen Hawking)

Writing: Paragraph Writing - Letter Writing – Profile Building

Grammar: Types of Sentences – Assertive, Interrogative, Imperative and Exclamatory - Phrases & Clauses - Verb Forms

Vocabulary: Root words – Foreign words and Phrases

UNIT-2: **10 Periods**

Listening: TED Talks - Can global food companies make the shift to regenerative agriculture?

Speaking: Basics of Communication - Verbal, Nonverbal - Oral talk on selected topics (Women empowerment and gender issues) – Extempore

Reading: Newspaper reading

Writing: Written Communication – Essay Writing – Assertive essays

Grammar: Tenses - Agreement: Subject-verb, Noun-pronoun – Articles – Prepositions

Vocabulary: One-word Substitutes – Word Associations – Portmanteau Words

UNIT-3: **10 Periods**

Listening: Poems – Sonnets and Haikus

Speaking: Presenting point of view on current affairs

Reading: Editorials reading

Writing: Writing structured, analytical and argumentative essays on general topics.

Grammar: Active & Passive Voice, Use of Passive Verbs in Academic Writing - Discourse Markers or Transition Words

Vocabulary: Modifiers and Misplaced Modifiers–Academic words– Synonyms–Antonyms

UNIT-4: **10 Periods**

Listening: Role-plays

Speaking: Debate

Reading: Skimming and Scanning - Failure to Success Stories (KFC, J K Rowling, Walt Disney)

Writing: Summary

Grammar: Direct and Indirect Speech – Degrees of Comparison

Vocabulary: Homonyms & Homophones – Collocations – Etymology

UNIT-5: **10 Periods**

Listening: News Bulletins- Recycle for Life: Karaikal's success in battling waste

Speaking: Mock Press, Floor Crossing

Reading: The role of Social Media analytics in new-age Digital Market

Writing: Resume Writing – Dialogue Writing

Grammar: Quantifiers, Prescribed Phrases – Correction of Sentences

Vocabulary: Affixation – Paronyms – Acronyms – Word Building

***Note-** Additional topics that can be introduced during the course but are out of the prescribed syllabus.

Text Books:

Text book prepared by the faculty of English, ANITS

Reference Books:

1. Bailey, Stephen. *Academic writing: A handbook for international students*, Routledge, 2014.
2. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
3. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012 (Student Book, Teacher Resource Book, CD & DVD).
4. Varma, Shalini. *Mantra*. Amazon: India, 2005
5. Body Language: Your Success

E-Resources

1-language.com;<http://www.5minuteenglish.com/><https://www.englishpractice.com/>
Grammar/Vocabulary English Language Learning Online;
<http://www.bbc.co.uk/learningenglish/>
<http://www.better-english.com/>;
<http://www.nonstopenglish.com/>
<https://www.vocabulary.com/>;
BBC Vocabulary Games
Free Rice Vocabulary Game
Reading
<https://www.usingenglish.com/comprehension/>; <https://www.englishclub.com/reading/short-stories.htm>; <https://www.english-online.at/>
All Skills
<https://www.englishclub.com/>; <http://www.world-english.org/><http://learnenglish.britishcouncil.org/>
Online Dictionaries
Cambridge dictionary online; MacMillan dictionary; Oxford learner's dictionaries

Listening:

Unit-I-

https://www.ted.com/talks/steve_presley_can_global_food_companies_make_the_shift_to_regenerative_agriculture

Unit-V- https://www.youtube.com/watch?v=_YINmkbsL74&t=2s

https://www.ourbetterworld.org/series/environment/story/working-hand-in-hand-for-change?utm_source=taboola&utm_medium=indianexpress-indianexpress&utm_content=Watch+Hand+In+Hand+India+Make+Waste+Work&utm_campaign=OBW_ENV_SERIES_2022#tblciGiBX-q8Y7DpgDIPImvjD7pcLI4ECqb3eMNOy27aIpILTMiCPuj0ogbbDp9K5kf2cAQ

Reading:

Unit-V-The role of Social Media-

<https://timesofindia.indiatimes.com/education/upskill/the-role-of-social-media-analytics-in-new-age-digital-marketing/articleshow/101944496.cms>

Applied Chemistry	
Code: 23CY1102	Credits : 03
Instruction : 2 Periods & 1 Tutorial/Week	Sessional Marks : 40
End Exam : 3 Hours	End Exam Marks : 60

Course Objectives:

- To create an understanding on the analytical terms and implement methodologies for water analysis.
- To induce knowledge on various alternate energy sources, materials in computer aided equipment's.
- To enlighten them with the principles, technological aspects of green chemistry and Biomolecules.

Course Outcomes

After course completion, the students will be able to:

- 1 Apply methodologies to determine the water quality parameters.
- 2 Understand the meaning of the term's accuracy, precision and errors and apply them for various Chemical analytical data.
- 3 Select anodic and cathodic materials for functioning of batteries/ cells based on the concepts of electrode potentials
- 4 Predict the electrical conductivity of solids based on band theory and also able to identify the applications of nanomaterial for various engineering applications.
- 5 Identify various Green solvents, apply principles of Green chemistry and differentiate RNA & DNA.

CO-PO –PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2		1		1	1	1					1		2
CO2	3	1				1	1	2					1		2
CO3	3	1				1	1	2					1		2
CO4	3					1	1	1					1		2
CO5	3					1	1	2					1		2

Correlation levels

- 1: Slight (Low)
- 2: Moderate (Medium)
- 3: Substantial (High)

SYLLABUS

Unit -1:Water chemistry and treatment technology 10 Periods

Impurities in water - Specifications of water for domestic use (ICMR and WHO) - Hardness-Types, units of hardness, Numerical problems on hardness, Disadvantages in using hard water; Alkalinity, determination of alkalinity, disadvantages of alkalinity with a case study of caustic embrittlement in boilers.

Water softening method - Ion exchange resin process, advantages & disadvantages; Desalination methods - Reverse Osmosis & Electrodialysis. Municipal water treatment - Sedimentation with coagulation, Sterilization - Chlorination (break point chlorination), UV treatment.

Unit-2: Errors in chemical analysis & Spectrophotometric Techniques 10 Periods

Errors in chemical analysis- Mean, Median, Accuracy, Precision; types of errors, source of errors, minimize errors; statistical terms- mode, variance, standard deviation; Significant figures; statistical Analysis of chemical, health and environmental data.

Spectrophotometric techniques: Interaction of radiation and matter, Absorbance & Transmittance, absorption spectra & emission spectra, Beers-Lamberts law; Principle, instrumentation and medical applications of UV-Vis double beam spectrophotometer, flame photometer.

Unit-3: Energy Storage Systems 10 Periods

Introduction to Electrode potentials, Electro Chemical Series; Batteries - Primary battery - Dry Cell, Secondary battery - Lead Acid battery, Lithium-ion batteries; Fuel cells - Hydrogen -Oxygen fuel cells, Applications.

Advanced batteries for Electrical vehicles - Lithium iron phosphate, Solid state battery - advantages & applications; Solar cells – Types - Polycrystalline and Thin film Solar cells, Principle, Working and Applications.

Unit-4: Chemistry of materials 10 Periods

Introduction to solids, Band theory of solids, Role of dopants on band structures, organic semiconductors, Engineering Applications, Compound semiconductors; fabrication methods of semiconducting materials, wafer manufacturing, oxidation diffusion and ion implantation; Liquid crystals- Types of liquid crystals- working of LCD, LED, OLED, Applications of liquid crystals.

Nanomaterials, Synthesis by Sol-Gel Process; Characterization of Nanomaterials - Instrumentation-working of Scanning electron microscope and Transmission electron microscope; Applications of nanomaterials.

Unit -5: Green Chemistry & Biomolecules 10 Periods

Principles of Green chemistry, Alternative solvents, Renewable feed stock-biodiesel production, Design Synthesis for Energy Efficiency-Microwave radiation, sonochemistry.

Biomolecules: Amino acids, classification; Nucleic Acids, Chemical composition of nucleic acids, structure of Nucleic acids, biological functions of nucleic acids.

Text Books:

1. Engineering chemistry -Pc jai nans M.Jain-Dhanpath Rai & Sons , New Delhi.
2. Engineering Chemistry by O.G.Pallanna, MecGrawhil, Chennai
3. Hand book of Green Chemistry and Technology; by James Clarke and Duncan Macquarrie; Blakwell publishing
4. Vogel's text book of Quantitative analysis,
5thedition,G.H.Jeffery,J.Bassett,J.Mendham,R.S.Denney.

Reference Books:

1. A text book of Engineering Chemistry-S.S.Dara- S.Chand & Co.New Delhi.
2. Dell,Ronald M Rand, David A J. Understanding Batteries, Royal society of Chemistry, (2001)
3. Anastas;P.T, Warner,J.C.Green Chemistry; Theory and Practice, Oxford University and Press Inc., Newyork, 1998.
4. Chemistry of Biomolecules, 2nd Edition, Dr.S.P.Bhutani, Routledge, Taylor & Francis Group.

Basics of Electrical & Electronics Engineering (Common for CSE, CSE (AI & ML, DS), IT, Mechanical and Chemical)	
Course Code: 23EC3102	Credits : 03
Instruction : 2 Periods & 1 Tutorial/Week	Sessional Marks : 40
End Exam : 3 Hours	End Exam Marks : 60

Prerequisites: Basic Knowledge of electric current concepts from Intermediate

Course Objectives:

1. To analyze using basic network theorems and reduction techniques for DC circuits.
2. To understand behavior of magnetic circuits and operation of electrical machines.
3. To understand operation and phasor diagrams of various basic electronic components.

Course Outcomes: At the end of the course the student will be able to:

CO1	Apply network theorems and calculate various parameters of DC circuits.
CO2	Analyze the behavior of magnetic circuits and calculate the parameters of magnetic circuits
CO3	Analyze the construction and working of DC and AC machines
CO4	Illustrate the construction & working of PN Diode, Half wave and Full wave rectifiers.
CO5	Explain the construction & operation of Transistor and FET

CO-PO –PSO Mapping:

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	2	-	-	-	-	-	-	-	3	-	-	
CO2	3	3	2	2	-	-	-	-	-	-	-	3			-
CO3	3	3	3	3	3	-	-	3	-	-	-	3	-	-	
CO4	3	-	-	3	3	-	-	3	-	-	-	3	-	3	
CO5	3	-	-	3	3	-	-	3	-	-	-	3	-	3	

Correlation levels

- 1: Slight (Low)
- 2: Moderate (Medium)
- 3: Substantial (High)

SYLLABUS

UNIT-I **10 Periods**

DC Circuits

Circuit Elements, Basic Laws, KCL, KVL, Linearity principle (Superposition), Mesh and Nodal analysis, Thevenin's and Norton's theorems.

UNIT-II **10 Periods**

Magnetic Circuits

Definition of Magnetic circuit, Reluctance, Magneto-motive force, Magnetic flux, Simple problems on series magnetic circuits, Faraday's Law of Electromagnetic induction, statically and dynamically induced EMF.

UNIT-III **14 Periods**

DC Machines

DC Generator construction, Working of DC generator, DC Motor working principle, significance of back EMF, Applications

AC Machines

Transformer construction, working principle, Three-phase induction motor construction, Three-phase induction motor working principle.

UNIT-IV **12 Periods**

Semiconductor Diode and Rectifiers

Intrinsic and Extrinsic Semiconductors, PN Junction Diode-Forward and Reverse biases, Avalanche break down, Construction, Operation and Characteristics of Half wave rectifier, Full wave center tapped and bridge rectifiers.

UNIT-V **14 Periods**

Transistor, FET/MOSFET Characteristics

The common base configuration, Input and Output characteristics, Construction of FET, Transfer and Drain characteristics, Construction of MOSFET, and Characteristics of enhancement and depletion modes.

TEXTBOOKS:

1. V.K. MEHTA & ROHIT MEHTA, "Principles of Electrical Engineering and Electronics", 2nd edition, S. Chand Publications

REFERENCE BOOKS:

1. J. B. Gupta, "A textbook of electrical Engineering", S.K Katari & Sons Publication.

Problem Solving and Programming Using C (Common to CSE, IT, Civil, EEE, ECE, Mechanical and Chemical)	
Code: 23CS3101	Credits : 03
Instruction : 3 Periods/Week	Sessional Marks : 40
End Exam : 3 Hours	End Exam Marks : 60

Course Objectives:

1. To learn how to solve a given problem.
2. To illustrate the basic concepts of C programming language.
3. To discuss the concepts of Functions, Arrays, Pointers and Structures.
4. To familiar with Dynamic memory allocation concepts.
5. To apply concepts of structures and files to solve real word problems.

Course Outcomes

After course completion, the students will be able to:

1	Demonstrate the ability to analyze complex problems and apply appropriate problem-solving techniques to devise effective solutions.
2	Apply control structures to solve programming problems effectively
3	Design efficient algorithms involving arrays, demonstrating a clear understanding of array data structures.
4	Solve programming problems that require the use of pointers, including pointer arithmetic and manipulation.
5	Demonstrate the ability to declare structure variables and define their member data types.

CO-PO –PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	2				2					2	
CO2	3	3	3	3	2				2	2				2	
CO3	3	3	3	3	2	1	1	1	2		1	1		2	
CO4	3	3	3	3	2	1	1	1	2	1	2	1		2	
CO5	3	3	3	3	2	1	1	1	2	1	2	1		2	

Correlation levels
1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SYLLABUS

UNIT-1: **10 Periods**

Introduction to Problem Solving: Problem Solving Aspect, Problem Identification, Problem Understanding, Algorithm Development, Solution Planning, Flowcharts, flowgorithm.

Overview of C: History of C, C Language Elements, Basic Structure of C Program, C Tokens-Variables and Data Types, Operators, Expressions and Type Conversions.

UNIT-2: **10 Periods**

Control Statements: Selection Statements- if and switch statements.

Iterative Statements: for, while and do-while statements.

Jump Statements: break and continue statements.

UNIT-3: **10 Periods**

Arrays: Declaration, accessing array elements, Storing values, Operations on arrays, Multi-dimensional arrays.

Functions: Introduction, Using Functions, Function declaration, Function definition and Functioncall, Parameter passing, Passing arrays to functions, Recursion, Storage classes.

UNIT-4: **10 Periods**

Pointers: Declaration and Initialization of pointer variables, Pointer arithmetic, Pointers and arrays, Pointer to pointer, Array of pointers, Pointers and functions, Dynamic Memory Allocation.

Strings: Introduction to Strings, String handling functions, Preprocessor Directives.

UNIT-5: **10 Periods**

Structures: Introduction, Nested Structures, Array of Structures, Structures and Functions,

Unions.**Command-Line Arguments:** Command-line Arguments

Files: Introduction, File Operations

Text Books:

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
2. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.
3. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.

Reference Books:

1. Jeri R. Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson
2. Brian W Kernighan and Dennis M Ritchie, The C Programming Language, Second Edition, Prentice Hall Publication.
3. Paul Deitel, Harvey Deitel -C How to Program with an introduction to C++, Eighth Edition

Applied Chemistry Lab (Common for CSE ,CSE (AL & ML) ,CSE(Data Science))	
Code: 23CY1202	Credits : 1.5
Instruction : 3 Periods Practical/Week	Sessional Marks : 50
End Exam : 3 Hours	End Exam Marks : 50

Course Objectives:

1. In make them understand on various methods of analyzing samples (Soil, food, water)
2. To create knowledge on handling advanced instrumentation

Course Outcomes

After course completion, the students will be able to:

1	Apply volumetric analysis and titration principles to prepare standard solutions, standardize acids with strong bases, and assess water quality, food, and soil samples.
2	Proficiently employ diverse analytical methods (spectrophotometric, pH metric, conductometric, and potentiometric) to estimate chemical properties of substances and accurately interpret data results.
3	Cultivate problem-solving and critical thinking skills through practical application of analytical methods and instrumentation in engineering design and decision-making.

CO-PO –PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1	1	1		1		1	1	1		1		2	
CO2	3	1	2	1		1		1	1	1		1		2	
CO3	3	1	2	1		1		1	1	1		1		2	

Correlation levels 1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SYLLABUS

- 1.Preparation of Standard solutions and Standardisation of acid by using Strong base.
2. Determination of Hardness, pH, TDS in ground water sample.
3. Estimation of Zinc in food samples by Complexometric method.
4. Estimation of copper content in industrial wastewaters.
5. Estimation of available chlorine content in potable water using Iodometric method.
6. Estimation of Iron in biological samples using potassium thiocyanate by Spectrophotometric method.
7. Determination of electrolytic Strength of Lead acid battery by pH metric method
8. Estimate the strength of acids in an acid mixture by using Conductometric method.
9. Estimation of Chromium in Dichromate by using Potentiometric method.
10. Determination of Viscosity of various liquid fuels using Ostwald's Viscometer.

Demonstration Experiments

11. Determination of Dissolved Oxygen in a water sample using Iodometric method.
12. Microwave assisted organic synthesis.

Text Books:

1. Vogel's text book of Quantitative analysis, 5th edition,
H.Jeffery,J.Bassett,J.Mendham,R.S.Denney.
2. Vogel's A text book of Macro and semi micro Inorganic analysis, revised by
G.Svehla

Reference Books:

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
2. Pradip Dey, Manas Ghosh, Programming in C, Oxford University Press, AICTE Edition,
3. B. Gottfried, Programming with C, 3/e, Schaum's outlines, McGraw Hill (India), 2017.
4. Jeri R. Hanly, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson.

Communicative English Language Lab (Common for CSE ,CSE (AL & ML) ,CSE(Data Science))	
Code: 23EN2201	Credits : 1.5
Instruction : 3 Periods Practical/Week	Sessional Marks : 50
End Exam : 3 Hours	End Exam Marks : 50

Course Objectives:

1. To give idea about phonetics, linguistics and LSRW skills
2. To develop conversational skills among the students
3. To introduce different accents of English language through presentations
4. To train the students to do various exercises on vocabulary and grammar

Course Outcomes

After course completion, the students will be able to:

1	Understand various linguistic, phonetic and communicative aspects
2	Apply general conversational activities in different socio-cultural contexts with logical thinking.
3	Analyze cultural diversity of several nations' languages through presentations.
4	Appraise and reframe various exercises for getting better employability

CO-PO –PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1									2	2		2		2	
CO2									2	2		2		2	
CO3									2	2		2		2	
CO4									2	2		2		2	

Correlation levels 1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SYLLABUS

UNIT I

Introduction to Phonetics – IPA – RP – Phonetic Transcription – Word stress or accent

UNIT II

Functional English – JAM – Debate – Situational Dialogues or Role Plays

UNIT III

Presentations on various topics from academic contexts and on international issues

UNIT IV

Discussing specific topics and practising exercises and short structural talks

Reference Books:

1. Everyday dialogues in English----- Robert J.Dixon.
2. Speak well----- orient black swan.
3. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
4. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
5. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012

e- Resources & other digital material:

Grammar/Listening/Writing 1-language.com <http://www.5minuteenglish.com/>
<https://www.englishpractice.com/> Listening <https://learningenglish.voanews.com/z/3613>;
<http://www.englishmedialab.com/listening.html> Speaking <https://www.talkenglish.com/BBC>;
Learning English – Pronunciation tips Merriam-Webster – Perfect pronunciation Exercises
All Skills <https://www.englishclub.com/>; <http://www.world-english.org/>
<http://learnenglish.britishcouncil.org/> Online Dictionaries Cambridge dictionary online;
MacMillan dictionary; Oxford learner's dictionaries

Problem Solving and Programming Using C Lab (Common to CSE, IT, Civil, EEE, ECE, Mechanical and Chemical)	
Code: 23CS3201	Credits : 1.5
Instruction : 3 Periods Practical/Week	Sessional Marks : 50
End Exam : 3 Hours	End Exam Marks : 50

Course Objectives:

1. To learn how to solve a given problem.
2. To illustrate the basic concepts of C programming language.
3. To discuss the concepts of Functions, Arrays, Pointers and Dynamic Memory Allocation.
4. To understand and implement Structures and Unions.

Course Outcomes

After course completion, the students will be able to:

1	Develop an algorithm and flowchart by applying various control structures to solve real world problems
2	Apply iterative statements, arrays and modular programming to solve the complex problems
3	Implement Programs using pointers and String handling Functions.
4	Develop code for complex applications using structures, unions and file handling features

CO-PO –PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	3	3	3								2	
CO2	3	3	3	3	3	3								2	
CO3	3	3	3	3	3	3								2	
CO4	3	3	3	3	3	3								2	

Correlation levels 1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SYLLABUS

Sr. No	Module Name	Name of Program
1.	Familiarization with programming environment Introduction to Programming, Writing of Algorithms, Introduction to Drawing flow Charts /Preparation of Flowchart/ Steps for Writing Code in C/ Turbo C.	1. First Basic Program-Writing a Single Statement. 2. Writing a Program to print your Basic details Multi statements.
2	Variable types and type conversions	1. WAP to perform simple Input-Output Operations in C. 2. WAP to add two numbers. 3. WAP to perform simple arithmetic operations in C (Addition, Subtraction, Multiplication, Division, Modulus). 4. Write a simple program that print the result of all the operators available in c (including pre/post increment, bitwise and logical). 5. WAP to find area and perimeter of circle. 6. WAP to find area and perimeter of rectangle. 7. Given the values of three variable entered by user, write a program to compute and display the value of x, where $x=a/(b-c)$. 8. Write a program to convert one data type to another using auto conversion and casting. Take the value from user input.

3	<p>Branching and logical expressions:</p> <p>Use of If, if- else, Else if, nested if statements and operators with them and switch case statement</p>	<ol style="list-style-type: none"> 1. WAP to find whether a given number is positive or not. 2. WAP to find greatest of two numbers. 3. WAP to find greatest of three numbers using nested if/else if statements only. 4. WAP to find greatest of three numbers using & operator. 5. WAP to find whether a given number is even or odd. 6. Given the marks of a student studying five different subjects. Calculate average marks of students and assign him/her Grade based on following: Marks is equal or greater than 90 – Grade A Marks equal or more than 75 and less than 90 –Grade B Marks equal or more than 60 and less than 75 –Grade C Marks equal or more than 50 and less than 60 –Grade D Marks less than 50 –Grade F 7. WAP to find roots of a quadratic equation: $ax^2+bx+c=0$ 8. WAP to print day of a week using switch case statement 9. WAP to design a simple calculator using switch-case statements
4.	<p>Loops: do, while and for loops:</p> <p>Use of while loop, do while, and for loop: their Syntax</p>	<ol style="list-style-type: none"> 1. WAP to print counting 1 to 10 using all loop 2. WAP to print table of any number. 3. WAP to print the factorial of given number. 4. WAP to print the sum of digits of a given number.
	<p>Using Loops:</p>	<ol style="list-style-type: none"> 1. WAP to print the Fibonacci series up to 10 level. 2. WAP to find whether the given number is Armstrong or Not. 3. WAP to find whether the given number is Palindrome or Not. 4. WAP to find whether the given number is prime or not. 5. WAP to reverse the digits of a given number.
5.	<p>1D Arrays, 2D array Declaration of arrays, syntax, semantics, Operations on Arrays.</p>	<ol style="list-style-type: none"> 1. Program to insert 5 elements into array and print elements of array. 2. WAP to merge two sorted array in one sorted array. 3. WAP to add two matrices in 2-D array 4. WAP to multiply two matrices in 2-D array. 5. WAP to find transpose of a Matrix. 6. WAP to find average of 10 numbers using array. 7. WAP to print the following numbers in reverse order using array.

6.	Functions Simple function declaration, definition, functions with return type, call by value.	1. WAP to create function display a simple message. 2. WAP to create function to add two numbers. 3. WAP to create a function to swap two numbers using call by value. 4. WAP to generate Fibonacci series using recursive function. 5. WAP to swap two integers using call by value and call by reference method of passing arguments to a function.
7.	Pointers Pointer declaration, use of pointers in array, functions, call by reference, recursive functions	1. WAP to understand basic use of pointers. 2. WAP to implement call by reference for swapping of two numbers. 3. WAP to calculate factorial of a number using recursion. 4. WAP to Fibonacci series up to 20 using recursive functions
8.	Structures and Unions Basics of Structure Union and accessing data of structure.	1. WAP for user defined data type namely Student and implement it using Structure 2. WAP for user defined data type namely Book and implement it using Structures 3. WAP to create an array of structure. 4. WAP to Create an Union and perform operations.
9	File Operations: File opening modes, creation of files, reading and writing data files.	1. WAP to read a simple file using file handling. 2. WAP to write data in file. 3. WAP to append data in existing file.
10.	Searching and sorting: Various searching and sorting algorithms.	1. WAP to implement linear search 2. WAP to implement binary search 3. WAP to implement selection sort. 4. WAP to implement insertion sort. 5. WAP to implement quick sort. 6. WAP to implement merge sort. 7. WAP to implement bubble sort.

Text Books:

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
2. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.
3. R.G. Dromey, How to Solve it by Computer, 1/e, Pearson Education, 2006.

Reference Books:

1. Pradip Dey, Manas Ghosh, Programming in C, Oxford University Press, AICTE Edition,
2. B. Gottfried, Programming with C, 3/e, Schaum's outlines, McGraw Hill (India), 2017.
3. Jeri R. Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson.

Information Technology Fundamentals (ITF) (Common to all Branches)	
Code: 23CS9201	Credits : 00
Instruction : 3 Periods Practical/Week	Sessional Marks : 50
End Exam : 3 Hours	End Exam Marks : 50

Course Objectives:

1. To make the students to know about the internal parts of computer, Generation of Computers
2. To make the students to know how to assemble and disassemble a computer from its parts
3. To make the students to install Operating system for a computer.
4. To provide technical training to the students on productivity tool like Word Processor, Spread Sheets, Presentations and LaTeX
5. To learn about networking of computers and use Internet facility for browsing and searching

Course Outcomes

After course completion, the students will be able to:

- 1 Identify the Internal parts of computers to assemble and disassemble a computer from its parts.
- 2 Understand the installation process of different types Operating system for a computer by their own.
- 3 Apply the procedure to interconnect two or more computers for information sharing.
- 4 Create the documents, building the resume using LaTeX.
- 5 Create the slide presentation using Beamer (LaTeX).

CO-PO –PSO Mapping

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3				2					3	3	2		2	
CO2	3				2					3	3	2		2	
CO3	3				2				3	3	3	2		2	
CO4	3				2				2	3	3	2		2	
CO5	3				2				2	3	3	2		2	

Correlation levels 1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

Laboratory Experiments

Task 1:

Learn about Computer Hardware -1: Identifying the internal parts of computer with its peripherals, Block diagram of Computer, Generations of Computers. Write specifications for each part of a computer including peripherals and specifications of a system. Submit it in the form of report.

Task 2:

Learn about Computer Hardware-2: Assemble and disassemble the Personal Computer, Internal and external connections of the computer, Troubleshoot the computer by identifying working and non-working parts. Submit a report about the working and non- working parts in a computer.

Task 3:

Installation of Operating System: Linux, Windows 7/8/10 Installation, install both the operating system in a computer and make the system as Dual boot. Student should record the entire installation process.

Task 4:

Installation of Device drivers: Install supported device drivers for the system- printer drivers, audio and video drivers, Graphic card drivers, USB drivers, install new application software and record the process of installations.

Task 5:

Networking: Connecting computers directly using a cable or wireless connectivity and share information, connecting computers using switch/hub or Local Area Network connection and share information, Wide Area Network Connection, crimping activity, logical configuration. The entire process has to be documented.

Task 6:

Introduction to Web Design: Introduction to Web Design, Introduction to HTML tags, Cascading Style sheets and Applications using HTML and CSS.

Task 7:

Introduction to Virus and Antivirus: Types of Virus, virus engine, Antivirus- download freely available Anti-virus software, install it and use it to check for the threats to the computer being used. Student should submit information about the features of the installation process and antivirus used.

Task 8:

Introduction to LaTeX: LaTeX and its installation and different IDEs, Creating the document using Latex, content into sections using article and book class of Latex.

Styling Pages: Reviewing and customizing different paper sizes and formats. Formatting text, creating basic table, adding simple and dashed border, merging rows and columns, referencing and indexing. Student should submit a user manual of the LaTeX.

Task 9:

Resume/ CV Preparation using LaTeX: Create a new document with resume tag, adding sections of resume with different styles, apply Lists / Bullet Points, Adding Positions, finding styles and apply other CV styles, generating PDF.

Task 10:

Diagrams, Mathematics and Documentation : Images, Colors, Figures, Graphs, Tables, Lists, Block Structures, Smart Diagrams, Math Symbols, Mathematical Equations, Fractions, Matrices, Integrals, Partial Derivatives, Aligning Equations, Changing margins, Page Numbers, Headers and Footers, Paragraph, Pages and Page Breaking.

Task 11:

Make a Presentation using LaTeX: Introduction about Beamer Document, Use Themes, Apply Colors, Fonts, Styles, Add Symbols, Alignments, Lists, Math Equations, Figures, Graphs, Headers and Footers, Logos, Slide Partitions and sections and subsections.

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. PC Hardware, Maintenance & Troubleshooting In-Depth, Reddy N.S.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI
5. Lamport L. LaTeX: a document preparation system: user's guide and reference Manual. Addison-Wesley: 1994

Universal Human Values & Professional Ethics	
Code: 23MC0101	Credits : 00
Instruction : 2 Periods/Week	Sessional Marks : 00
End Exam : --	End Exam Marks : 00

Course Objectives:

1. Development of a holistic perspective based on self-exploration about him/her (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Course Outcomes

After course completion, the students will be able to:

1	Articulate Basic human aspirations and requirements for their fulfilment and identify the Role and process of Value education
2	Articulate the needs and activities of the self and body and frame program for self-regulation and health for harmony of the self and body
3	Recognize the value of Relationship and the nine feelings in Relationship for fulfilment of relationship for harmony in the family
4	Identify human goals and articulate systems for their fulfilment leading to harmony in the society; Also identify the characteristics of four orders of nature and mutually fulfilling interaction for harmony in nature.
5	Identify the nature of existence and the role of human being for harmony in existence; Also articulate ethical human conduct, humanistic constitution and holistic Criteria for Technologies, production systems and management models for Universal human order.

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CO1						2	2	3					2	2	2
CO2								3					2		
CO3								3					2		
CO4						2	3	3	2				2	2	2
CO5							2	3					2	2	

Correlation levels 1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

SYLLABUS

UNIT – I **12 Periods**

Introduction – Fulfillment of Basic Human Aspirations: Need for value education – Process of Value Education – Self-Exploration – Its content and process – Natural Acceptance and Experiential Validation – Basic Human Aspirations – Basic requirements for fulfillment of aspirations – Right understanding, Relationship and Physical Facility- Priority – Human Consciousness – Role of Education-Sanskars – Understanding Happiness and Prosperity – Programme for perpetual happiness and prosperity.

UNIT – II **12 Periods**

Harmony in the Self: Human being as co-existence of Self and Body - Needs of Self and Body – Distinguishing Self and Body – Imaginations and its sources – Self-organized /Enslaved behavior - Harmony of the Self and body – Programme for self-regulation and health – Prosperity – Identification of physical facilities.

UNIT – III **12 Periods**

Harmony in the Family: Human relationship – Feelings in Relationship – Trust – Intention and competence – Respect as right evaluation– Other feelings in Relationship – Love.

Harmony in the Society: Human Goals – Systems for fulfillment of human goals - Education-Sanskars - Health-Self regulation - Production-Work - Justice-Preservation - Exchange-Storage - Undivided Society, Universal Human Order.

UNIT – IV **10 Periods**

Harmony in the Nature: Four Orders of Nature – Characteristics of the four orders – Mutually fulfilling interaction - Understanding the harmony in the Nature

Harmony in the Existence: Existence as Units in Space – Submergence of Units in Space – Existence as Co-existence - Development in the Existential Sense – Role of Human being in Existence

UNIT – V **10 Periods**

Universal Human Values and Ethical Human Conduct: Natural acceptance of human values - Definitiveness of Ethical Human Conduct - Humanistic Constitution and Humanistic Universal Order - Holistic Criteria for Technologies, production systems and management models - Holistic Community Model - Journey towards Universal Human Order.

Text Books:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010.

References:

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – Pandit Sunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abul Kalam Azad
12. Vivekananda - Romain Rolland (English)
- 13. Gandhi - Romain Rolland (English)**