NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF Mechanical Engineering

Theory Course Plan - Even Semester - 2022-23

Date: 04/01/2023

Course Code and Title	:	19ME05E-Gas Dynamics and Jet Propulsion
Programme	:	B.E-Mechanical Engineering
Semester	:	VI
Course Instructors	:	Mr. R. VIGNESH KUMAR, AP(SG)/MECH
Module Coordinator	:	Dr. S. IYAHRAJA, Professor/MECH

Course Outcomes (COs):

COs	CO Statements After the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Calculate the adiabatic and isentropic properties in various regions of flow.	K2	PO1, PO2 & PO3	PSO2	75
CO2	Evaluate the adiabatic and isentropic properties in various conditions of flows during friction, heat transfer and mass addition.	K2	PO1, PO2 & PO3	PSO2	75
CO3	Derive the conditions for the change in pressure, density and temperature for flow through a normal, oblique and expansion shock waves.	K2	PO1, PO2 & PO3	PSO2	75
CO4	Explain how thrust and shaft powers are interrelated in various types of propulsion engines.	K2	PO1, PO2 & PO3	PSO2	75
CO5	Apply the gas dynamics principles in the space propulsion.	K2	PO1, PO2 & PO3	PSO2	75

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note: Correlation 3 – Strong 2 – Medium 1 – Weak ☐- No

Course Content Delivery Method:

Topic	Cos	Level of Content	Content Delivery	No. of Hours to be Handled
Content-I				
Energy and momentum equations of compressible fluid flows.	CO1	Concept understanding via known problems	C&T	1
Stagnation states, Mach waves and Mach cone	CO1		C&T	1
Effect of Mach number on compressibility	CO1		C&T	1
Isentropic flow through variable ducts - Nozzle	CO1		C&T, AV	1
Isentropic flow through variable ducts - Diffusers	CO1		C&T, AV	1
Numerical Problems	CO1		Tutorial	4
Content-II				
Rayleigh flow	CO2	Concept understanding via known problems	C&T	1
Fanno flow	CO2		C&T	1
variation of flow properties	CO2		C&T	1
Simple flow with mass addition	CO2		C&T	1
Numerical Problems	CO2		Tutorial	5
Content-III				
Governing equations	CO3	Concept understanding via known problems	C&T	1
Variation of flow parameters across the normal shock	CO3		C&T	1
Oblique shock	CO3		C&T	1
Prandtl-Meyer relations	CO3		C&T	1
Wind Tunnel - Applications	CO3		AV & S	1
Numerical Problems	CO3		Tutorial	4
Content-IV				
Theory of jet propulsion and Thrust equation	CO4	Concept understanding via known problems	C&T	1
Thrust power and propulsive efficiency	CO4		C&T	1
Operating principle, cycle analysis and use of stagnation state performance of ram jet engine	CO4		AV & S	1
turbojet engine	CO4		AV & S	1
turbofan engine	CO4		AV & S	1
turbo prop engine	CO4		AV & S	1
Numerical Problems	CO4		Tutorial	3
Content-V				
Types of rocket engines and Propellants	CO5	Concept understanding via known problems	C&T, AV	1
Feeding systems, Ignition and combustion	CO5		C&T, AV	1
Theory of rocket propulsion	CO5		AV	1
Performance study	CO5		C&T	1
Staging, Terminal and characteristic velocity	CO5		C&T	1
Applications and space flights	CO5		AV & S	1
Numerical Problems	CO5		Tutorial	3

1. Chalk and Talk (C&T)
2. Animation videos(AV)
3. Seminar (S)

Text Books:

1. S.M. Yahya, Fundamentals of Compressible Flow with Aircraft and Rocket Propulsion, New Age International Publishers, Sixth Edition, 2018.
2. EthirajanRathakrishnan, Gas dynamics, PHI Learning, sixth Edition 2017.

REFERENCES

1. V Ganesan, Gas Turbines, McGraw Hill Education, third Edition, 2017.
2. Hill, Mechanics and Thermodynamics of Propulsion, pearson publishers, second Edition, 2009.
3. John Anderson, Modern Compressible Flow: with Historical Perspective, McGraw Hill Education, third Edition, 2017.
4. Patrick H. Oosthuizen, Introduction to Compressible Fluid Flow (Heat Transfer), CRC Press, second Edition, 2013.
5. Balachandran P, Gas Dynamics for Engineers, PHI Learning, 2010.

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT	Other Assessment Tools			
	Weightage -0.6	Cognitive Domain Tool	Affective Domain Tool	Course End Survey	
		Weightage – 0.15	Weightage – 0.15	Weightage – 0.1	
CO1	IAT 1	Tutorial	Viva voce	CES-1	0.2
CO2	IAT 1	Tutorial	Viva voce	CES-2	0.2
CO3	IAT 1 & 2	Tutorial	Viva voce	CES-3	0.2
CO4	IAT 2	MCQ	Seminar	CES-4	0.2
CO5	IAT 2	MCQ	Seminar	CES-5	0.2

Rubrics for Evaluation of Cognitive domain Tools:

Assignment – Tutorial problems

Criteria	Level 5 Excellent (9-10 Marks)	Level 4 Good (7-8 Marks)	Level 3 Satisfactory (5-6 Marks)	Level 2 Not up to expectation (3-4 Marks)	Level 1 Poor (1-2 Marks)
Problem solving ability	Provided an accurate solution withlabels to illustrate the procedure or the process being studied.	Provided an easy-to-follow solution with labels to illustrate the process.	Provided an easy-to-follow solution with labels to illustrate theprocess, but one key step was left out.	Provided an easy-to-follow solution with labels to illustrate the process.	The solution was quite incomplete.

Documentation	Document is neatly written and uses headings and subheadings to visually organize the material.	Document is neatly written but formatting does not help visually organize the material.	Document is written without visually organize the material.	Document is written with cross-outs, multiple erasures and/or tears and creases	Document looks sloppy with cross-outs, multiple erasures
Time management	Finishes and Submits within Specified Date	Finishes and Submits within a day from Specified Date	Finishes and Submits within two days from Specified Date	Finishes and Submits within three days from Specified Date	Finishes and Submits within four days from Specified Date

Viva-voce / Seminar Presentation (Affective Domain):

	15 Marks	12 Marks	9 Marks	6 Marks	3 Mark	0 Mark
Viva-voce	In depth knowledge and a thorough understanding of all aspects which allows questions to be answered accurately and fluently and the discussion to be extended with confidence into difficult areas.	Outcome at excellent level. In depth knowledge and a thorough understanding of most aspects, with some ability to extend the discussion into difficult areas.	Outcome at focal level. Knowledge and understanding of most aspects in some depth, with the ability to extend the discussion into difficult areas.	Outcome at threshold level. Explains a relatively superficial knowledge and understanding of most aspects, with the ability to make relatively simple links between theory and real time practice.	Little knowledge or understanding shown. Unable to make relevant links between theory and real time practice.	No knowledge or understanding concept

4/11/23 — Course Instructors

4/11/23 — Module Coordinator

4/11/23 — HOD/MECH

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF MECHANICAL ENGINEERING
Theory Course Plan - Even Semester - 2022-23

Course Code and Title	:	19ME30E COMPOSITE MATERIALS
Programme	:	B.E –MECH
Semester	:	VI
Course Instructors	:	Dr.K.Manisekar, HOD/MECH
Course Coordinator	:	Dr.K.Manisekar, HOD/MECH

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	Related PO	Related PSO	Threshold
CO1	Explain the fundamentals of composite materials and its classification	1	1, 3	70
CO2	Describe the knowledge in polymer matrix composites and its processing methods	2	3	70
CO3	Identify the metal matrix composites and its manufacturing processes	2	3	70
CO4	Comprehend the ceramic matrix composite and its processing routes	3	3	70
CO5	Discuss Mathematical techniques to predict the macroscopic properties of different Laminates	4	1	70

Course Content Delivery Method:

Course Content	COs	Content Delivery	No. of Hours to be Handled
UNIT I INTRODUCTION TO COMPOSITE MATERIALS			
Definition, need & Classification of composite materials	CO1	Chalk and Talk, Powerpoint Presentation	1
General characteristics and Applications of composite materials	CO1	Chalk and Talk, Powerpoint Presentation	1
Matrices - Polymer, Graphite, Ceramic and Metal Matrices	CO1	Chalk and Talk, Powerpoint Presentation	1
Fibers – Glass, Carbon, Ceramic and Aramid fibers	CO1	Chalk and Talk, Powerpoint Presentation	1
Characteristics of fibers and matrices	CO1	Chalk and Talk, Powerpoint Presentation	1
Lamina Constitutive Equations: Lamina Assumptions and Macroscopic Viewpoint	CO1	Chalk and Talk	2
Generalized Hooke"s Law	CO1	Chalk and Talk	1
Reduction to Homogeneous Orthotropic Lamina - Rule of mixtures.	CO1	Chalk and Talk	1
UNIT II METAL MATRIX COMPOSITES			
Characteristics, advantages, limitations and various types of metal matrix composites (MMC)	CO2	Chalk and Talk, Powerpoint Presentation	2
Alloy vs MMC	CO2	Chalk and Talk, Powerpoint Presentation	1
Reinforcements – particles and fibres	CO2	Chalk and Talk, Powerpoint Presentation	1

Course Content	COs	Content Delivery	No. of Hours to be Handled
Effect of reinforcement – volume fraction – rule of mixtures	CO2	Chalk and Talk, Powerpoint Presentation	1
Manufacturing methods of MMC – powder metallurgy process	CO2	Chalk and Talk, Powerpoint Presentation	1
Manufacturing methods of MMC – diffusion bonding	CO2	Chalk and Talk, Powerpoint Presentation	1
Manufacturing methods of MMC – stir casting	CO2	Chalk and Talk, Powerpoint Presentation	1
Applications of MMC in aerospace, automotive industries.	CO2	Chalk and Talk, Powerpoint Presentation	1
UNIT III POLYMER MATRIX COMPOSITES			
Polymer resins – thermosetting resins & thermoplastic resins	CO3	Chalk and Talk, Powerpoint Presentation	1
Reinforcement fibres – rovings – woven fabrics – non woven random mats – various types of fibres	CO3	Chalk and Talk, Powerpoint Presentation	1
PMC Manufacturing methods - hand lay-up processes and compression moulding	CO3	Chalk and Talk, Powerpoint Presentation	2
PMC Manufacturing methods - injection moulding and resin transfer moulding	CO3	Chalk and Talk, Powerpoint Presentation	2
PMC Manufacturing methods – Pultrusion and Filament winding	CO3	Chalk and Talk, Powerpoint Presentation	1
Laminates - Balanced Laminates, Symmetric Laminates, Angle Ply Laminates, Cross Ply Laminates.	CO3	Chalk and Talk, Powerpoint Presentation	1
Applications of PMC in aerospace, automotive industries	CO3	Chalk and Talk, Powerpoint Presentation	1
UNIT IV CERAMIC MATRIX COMPOSITES			
Engineering ceramic materials – properties, advantages, limitations and monolithic ceramics	CO4	Chalk and Talk, Powerpoint Presentation	1
Need for CMC – ceramic matrix and various types of ceramic matrix composites	CO4	Chalk and Talk, Powerpoint Presentation	1
Oxide ceramics and non-oxide ceramics – aluminium oxide and silicon nitride	CO4	Chalk and Talk, Powerpoint Presentation	1
Reinforcements – particles, fibres and whiskers	CO4	Chalk and Talk, Powerpoint Presentation	1
Sintering - Hot pressing	CO4	Chalk and Talk, Powerpoint Presentation	1
Cold isostatic pressing (CIPing) – Hot isostatic pressing (HIPing).	CO4	Chalk and Talk, Powerpoint Presentation	1
Applications of CMC in aerospace, automotive industries.	CO4	Chalk and Talk, Powerpoint Presentation	3
UNIT V MECHANICS OF COMPOSITES			
Orthotropic Stiffness matrix (Qij), Definition of stress and Moment Resultants.	CO5	Chalk and Talk, Powerpoint Presentation	1
Strain Displacement relations.	CO5	Chalk and Talk, Powerpoint Presentation	1
Basic Assumptions of Laminated anisotropic plates.	CO5	Chalk and Talk, Powerpoint Presentation	1
Laminate Constitutive Equations	CO5	Chalk and Talk, Powerpoint Presentation	1
Coupling Interactions, Balanced Laminates, Symmetric Laminates, Angle Ply Laminates, Cross Ply Laminates.	CO5	Chalk and Talk, Powerpoint Presentation	1

Course Content	COs	Content Delivery	No. of Hours to be Handled
Laminate Structural Moduli.	CO5	Chalk and Talk, Powerpoint Presentation	1
Evaluation of Lamina Properties from Laminate Tests.	CO5	Chalk and Talk, Powerpoint Presentation	1
Quasi-Isotropic Laminates.	CO5	Chalk and Talk, Powerpoint Presentation	1
Determination of Lamina stresses within Laminates.	CO5	Chalk and Talk, Powerpoint Presentation	1

TEXT BOOKS

1. Krishan K. Chawla, "Composite Materials: Engineering and Science", 3rd Edition, Springer, 2013.

2. Mallick, P K, "Fiber-reinforced composites: Materials, manufacturing and Design", Third Edition, CRC press, 2007.

REFERENCES

1. John Cuppoleeti, "Metal, ceramic and polymeric composites for various uses", In tech, 2011.

2. Ronald F. Gibson, "Principles of Composite Material Mechanics", CRC Press; 4th Edition, 2016.

3. Ning Hu, "Composites and their properties", Intech, 2012.

4. Adel zakiel-sonbati, "Thermoplastic-composite materials", 2012.

5. T. H. G. Megson "Aircraft Structures for engineering students", Fourth Edition Butterworth-Heinemann, 2007

E-sources:

1. https://nptel.ac.in/courses/112104168/
2. https://nptel.ac.in/courses/101104010/
3. https://nptel.ac.in/content/storage2/courses/101104010/downloads/Lecture7.pdf
4. https://nptel.ac.in/content/storage2/courses/101106038/mod01lec01.pdf
5. https://nptel.ac.in/courses/112104249/

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT	Other Assessment Tools			
	(Weightage – 0.6)	Cognitive Domain Tool	Affective Domain Tool	Course End Survey	
		(Weightage – 0.15)	(Weightage – 0.15)	(Weightage – 0.1)	
CO1	IAT1	MCQ	Viva	Course End Survey	20%
CO2	IAT1	MCQ	Viva	Course End Survey	20%
CO3	IAT2	MCQ	Viva	Course End Survey	20%
CO4	IAT2	MCQ	Presentation	Course End Survey	20%
CO5	IAT2	Class Assignment	Viva	Course End Survey	20%

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Indicator 1 [Class Assignment]	Document is neatly written and uses headings and subheadings to visually organize the material.	Document is neatly written but formatting does not help visually organize the material.	Document is written without visually organize the material.	Document is written with cross-outs, multiple erasures and/or tears and creases	Document looks sloppy with cross-outs, multiple erasures
	Finishes and Submits within Specified Date	Finishes and Submits within a day from Specified Date	Finishes and Submits within two days from Specified Date	Finishes and Submits within three days from Specified Date	Finishes and Submits within four days from Specified Date
Indicator 2 [Viva]	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Indicator 3 [Presentation]	Addresses all aspects of the topic	Addresses most aspects of the topic	Addresses many aspects of the topic	Addresses some aspects of the topic	Minimally addresses some aspects of the topic
	Relaxed, easy presentation with minimal hesitation	Generally comfortable appearance, occasional hesitation	Somewhat comfortable appearance, some hesitation	Generally uncomfortable, difficulty with flow of presentation	Completely uncomfortable, lack of flow to presentation, frequent hesitation

3/01/23
Course Coordinator

3/01/23
HOD

Rubrics for Evaluation of Viva Voce:

CRITERIA	LEVEL 5 EXCELLENT (9-10 MARKS)	LEVEL 4 GOOD (6-8 MARKS)	LEVEL 3 SATISFACTORY (4-5 MARKS)	LEVEL 2 NOT UPTO EXPECTATION (1-3 MARKS)	LEVEL 1 POOR (0 MARKS)
Comprehension	Student is able to accurately answer almost all questions posed by examiner about the topic	Student is able to accurately answer most questions posed by examiner about the topic	Student is able to accurately answer a few questions posed by examiner about the topic	Student is unable to accurately answer questions posed by examiner about the topic	Unable to answer
Vocabulary	Uses Vocabulary appropriate for the audience. Extends audience vocabulary by defining words that might be new to most of the audience	Uses vocabulary appropriate for the audience. Includes 1-2 words that might be new to most of the audience, but does not define them	Uses vocabulary appropriate for the audience. Does not include any vocabulary that might be new to the audience	Uses several (5 or more) words or phrases that are not understood by the audience	Unable to answer
Content	Shows a full understanding of the topic	Shows a good understanding of the topic	Shows a good understanding of parts of the topic	Does not seem to understand the topic very well	Unable to answer
Use Complete Sentences	Always (99-100% of time) speaks in complete sentences	Mostly (80-98%) speaks in complete sentences	Sometimes (70-80%) speaks in complete sentences	Rarely speaks in complete sentences	Unable to answer
Speaks Clearly	Speaks clearly and distinctly all (100-95%) the time and mispronounces no words	Speaks clearly and distinctly all (100-95%) the time, but mispronounces one word	Speaks clearly and distinctly most (94-85%) the time, but mispronounces no more than one word	Often mumbles or cannot be understand or mispronounces more than one word	Unable to answer

03/01/23 3/1/23

Course Instructors

3/1/23

Module Coordinator

3/1/23

HOD/MECH

Dr. K. MANISEKAR, M.E.,Ph.D.,
Professor & Head
Department of Mechanical Engineering
National Engineering College
K.R. Nagar, Kovilpatti - 628 503.

COURSE COMMITTEE MEETING (ACADEMIC YEAR: 2022 - 23 ODD SEMESTER)

Course Code and Title	:	**19ME53C DESIGN OF MACHINE ELEMENTS**
Semester	:	2022 – 2023 Odd Semester (Vth Sem)
Degree and Branch	:	BE MECHANICAL ENGINEERING
Course Instructors	:	Dr. S. Iyahraja, Prof / Mech Mr. A. Andrews, AP / Mech Mr. K. Pradeepraj, AP / Mech
Course Coordinator	:	Dr. S. Iyahraja, Prof / Mech

Course committee meeting has been convened for discussing the course plan, content delivery method, fixing the assessment methods and weightage for CO calculations on 25.07.2022.

Minutes of Meeting

1. CO Attainment Threshold and Target fixed for the academic year 2021-2022 are given below.

19ME53C -DESIGN OF MACHINE ELEMENTS (2021-2022)					
	CO1	**CO2**	**CO3**	**CO4**	**CO5**
Target	80	80	80	80	80
Threshold	60	60	60	60	60

2. CO Average and Threshold attainment for the same course in previous academic year 2021 - 2022 with 144 Nos. of students as follows.

COs	**Target %**	**Threshold %**	**CO Average attainment**	**No. of student crossed Threshold**	**Percentage of student crossed Threshold**	**Over all CO Attainment**
CO1	80	60	72.39	115	81.56	75.38%
CO2	80	60	70.55	108	76.72	
CO3	80	60	73.52	113	80.22	
CO4	80	60	64.95	89	61.25	
CO5	80	60	70.03	110	77.14	

Note: Considering the previous year attainment (Internal assessment) and accordingly the target and threshold fixed for the current semester. The Attainment of CO4 is very low. Only 61.25% has been attained against the target of 80% for the threshold of 60 marks.

So, for academic year 2022 - 2023 the target and threshold are

COs	**Target**	**Threshold**
CO1	80	60
CO2	80	60
CO3	80	60
CO4	80	55
CO5	80	60

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3												3		
CO2	3	3											3		
CO3	3	3	3										3		
CO4	3	3		3									3		
CO5	3	3											3		

3. Pre course assessment test to be conducted in the first day class itself.
4. The other assessment methods for the attainment of the COs were discussed and finalized.
5. Weightage of each COs in Internal marks was finalized.
6. The teaching methodology to be followed for each CO was discussed during the meeting.
7. The attendance and difficulties in online teaching methodology were discussed.
8. Remedial and extra coaching classes will be conducted with appropriate topics in which the students are found to be slow learners.
9. It was decided to maintain uniformity in covering the course contents for all the batches.

The weightage for the assessments in course outcome evaluation has been decided as follows.

COs	Tool 1	Weightage	Tool 2	Weightage	Tool 3	Weightage	Tool 4	Weightage
CO1	IAT - 1	60%	MCQ	15%	Viva – Voce	15%	CES	10%
CO2	IAT - 1	60%	Design and prepare a Component	15%	Presentation on the Design carried out	15%	CES	10%
CO3	IAT – 1 & 2	60%	Design and simulate a Component using software	15%	Presentation on the Design carried	15%	CES	10%
CO4	IAT – 2	60%	Design Coding using any programming tool	15%	Viva – Voce	15%	CES	10%
CO5	IAT - 2	60%	Tutorial	15%	Viva – Voce	15%	CES	10%

orics for various assessment tools:

1. Design of Component (Cognitive Domain):

Assessment	15 Marks	12 Marks	9 Marks	6 Marks	3 Mark	0 Mark
Time management	Finishes and Submits within Specified Date	Finishes and Submits within a day from Specified Date	Finishes and submits within two days from Specified Date	Finishes and submits within three days from Specified Date	Finishes and submits within four days from Specified Date	Finishes and submits after four days from Specified Date
Critical Thinking and Originality	Identifies and evaluates the significant points	Identifies and evaluates some points	Identifies and evaluates some points of view but is minimal in examining	Identifies some points of view but is minimal in examining	Tried to identify other points of view but struggles	No identification of relevant concept.

2. Tutorial (Cognitive Domain):

Assessment	15 Marks	12 Marks	9 Marks	6 Marks	3 Mark	0 Mark
Time management	Finishes and Submits within Specified Date	Finishes and Submits within a day from Specified Date	Finishes and submits within two days from Specified Date	Finishes and submits within three days from Specified Date	Finishes and submits within four days from Specified Date	Finishes and submits after four days from Specified Date
Documentation	Document is neatly written and uses headings and subheadings to visually organize the material.	Document is neatly written but formatting does not help visually organize the material.	Document is written without visually organize the material.	Document is written with cross-outs, multiple erasures and/or tears and creases	Document looks sloppy with cross-outs, multiple erasures	Document is poorly highlighted, organized and presented
Critical Thinking and Originality	Identifies and evaluates the significant points	Identifies and evaluates some points	Identifies and evaluates some points of view but is minimal in examining	Identifies some points of view but is minimal in examining	Tried to identify other points of view but struggles	No identification of relevant concept.

3. Viva-voce / Presentation (Affective Domain):

	15 Marks	12 Marks	9 Marks	6 Marks	3 Mark	0 Mark
Viva-voce	In depth knowledge and a thorough understanding of all aspects which allows questions to be answered accurately and fluently and the discussion to be extended with confidence into difficult areas.	Outcome at excellent level. In depth knowledge and a thorough understanding of most aspects, with some ability to extend the discussion into difficult areas.	Outcome at focal level. Knowledge and understanding of most aspects in some depth, with the ability to extend the discussion into difficult areas.	Outcome at threshold level. Explains a relatively superficial knowledge and understanding of most aspects, with the ability to make relatively simple links between theory and real time practice.	Little knowledge or understanding shown. Unable to make relevant links between theory and real time practice.	No knowledge or understanding concept

3/8/22 3/8/22

Course Instructors

3/8/22

Course Coordinator

3/8/22

Module Coordinator

3/8/22

HOD/MECH

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF MECHANICAL ENGINEERING

Theory Course Plan - ODD Semester - 2022-23

NEC/AC / 02 (a)
06/08/2022

Course Code and Title	:	19ME34C– MANUFACTURING TECHNOLOGY - I
Programme	:	MECHANICAL ENGINEERING
Semester	:	III
Course Instructors	:	C. Veera Ajay AP/Mech

Course Outcomes (COs):

COs	CO Statements	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Elucidate and select appropriate casting method for a product and design the Gating and riser systems (K3)	K3	PO2	PSO3	50	70
CO2	Identify and select suitable metal joining process for fabrication and prepare Weld joints in laboratory (K3)	K3	PO1	PSO3	50	70
CO3	Discuss and practice the metal forming processes and calculate the load Requirement in forming processes (K3)	K3	PO3	PSO3	50	70
CO4	Explain the various stages in component preparation through powder metallurgy Technique (K2)	K2	PO4	PSO3	50	70
CO5	Discuss various polymer processing methods and applications (K2)	K2	PO4	PSO3	50	70

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak □- *No*

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I - METAL CASTING PROCESSES				
Introduction to metal casting processes	CO1	K3	Lecture with discussion and Animation	1
Moulding sand: types, properties and testing methods	CO1	K3	Lecture with discussion and Animation	1
Patterns: materials and allowances – Core making process	CO1	K3	Lecture with discussion and Animation	1
Heat transfer and solidification in casting-Riser and gating design	CO1	K3	Lecture with discussion and Animation	2
Working principle of Special casting processes	CO1	K3	Lecture with discussion and Animation	2
Recent developments in casting– Casting defects	CO1	K3	Lecture with discussion and Animation	2
Preparation of mould using green sand and split pattern in laboratory.	CO1	K3	Demonstration (foundry laboratory)	3
UNIT II - METAL JOINING PROCESSES				
Introduction about metal joining processes	CO2	K3	Lecture with discussion and Animation	1
Fusion welding processes	CO2	K3	Lecture with discussion and Animation	2
solid state welding processes	CO2	K3	Lecture with discussion and Animation	2
Brazing, soldering and adhesive bonding Processes	CO2	K3	Lecture with discussion and Animation	2
Recent developments in welding-Weld defects	CO2	K3	Lecture with discussion and Animation	2
Practicing with TIG welding for making simple weld joints in laboratory.	CO2	K3	Demonstration (welding laboratory)	3
UNIT III - METAL FORMING PROCESSES				
Hot working and cold working of metals	CO3	K3	Lecture with discussion and Animation	1
forging and rolling, Processes-principles and applications	CO3	K3	Lecture with discussion and Animation	2
drawing and extrusion Processes-principles and applications	CO3	K3	Lecture with discussion and Animation	2
Sheet metal forming processes-principles and applications	CO3	K3	Lecture with discussion and Animation	1
Load estimation for bulk (forging, rolling, extrusion, and drawing) and sheet (shearing, deep drawing, and bending)	CO3	K3	Lecture with discussion and Animation	2
Recent developments in forming	CO3	K3	Lecture with discussion and Animation	1
Preparation of simple objects through hot forging and simple sheet metal parts in laboratory.	CO3	K3	Demonstration (smithy laboratory)	3

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT IV - POWDER METALLURGY				
Metallic Powder preparation: Mechanical, Physical and chemical methods	CO4	K2	Lecture with discussion and Animation	3
Powder Treatment and handling, Powder compaction: Pressure and Pressure less compaction methods.	CO4	K2	Lecture with discussion and Animation	2
Sintering: Solid state, Liquid state and activated sintering processes.	CO4	K2	Lecture with discussion and Animation	3
Secondary operations on part prepared through powder metallurgy	CO4	K2	Lecture with discussion and Animation	2
Recent developments and Industrial pplications.	CO4	K2	Lecture with discussion and Animation	2
UNIT V - PROCESSESING OF PLASTICS				
Introduction -types of plastics	CO5	K2	Lecture with discussion and Animation	2
Blow moulding, Injection moulding (screw and plunger type machines)	CO5	K2	Lecture with discussion and Animation	3
Rotational moulding, Transfer moulding and compression moulding	CO5	K2	Lecture with discussion and Animation	3
Recycling and Eco-friendly Processing	CO5	K2	Lecture with discussion and Animation	2
Recent developments and Industrial applications.	CO5	K2	Lecture with discussion and Animation	2

Text Books:

1. HajraChoudhury, "Elements of Workshop Technology, Vol.I Manufacturing Processes", Media Promotors Private Limited, Mumbai, 15th Reprint, 2016.
2. S.Gowri, P.Hariharan and A.SureshBabu, "Manufacturing Technology 1", Pearson Education, 2017.

Reference Books:

1. B.S. Magendran Parashar & R.K.Mittal, "Elements of Manufacturing Processes", Prentice Hall of India, 2003.
2. P.N.Rao, "Manufacturing Technology", 2nd Edition, Tata McGraw-Hill Publishing Limited, 2015.
3. P.C. Sharma, "A Text book of Production Technology", 11th Edition, S.Chand and Company, 2013.
4. Begman, "Manufacturing Process", 8th Edition, John Wiley & Sons, 2018.
5. Serope Kalpajian, Steven R.Schmid, "Manufacturing Engineering and Technology", Pearson Education, Inc. 2018 (2nd Indian Reprint).
6. Beddoes.J and Bibby M.J, "Principles of Metal Manufacturing Processes", Elsevier, 2016.
7. Rajput R.K, "A text book of Manufacturing Technology", Lakshmi Publications, 2016.
8. Larry Jeffus, "Welding and Metal Fabrication", Cengage Learning, 2012.

E-sources:

CO1	https://www.youtube.com/watch?v=Tx1k2xYFWQU https://www.youtube.com/watch?time_continue=1&v=TBzKT7_fY2c&feature=emb_logo https://www.youtube.com/watch?v=vnZI9TSlGUo https://www.youtube.com/watch?v=H78qWl4sf54 https://www.youtube.com/watch?v=few7fUuF0pE
CO2	https://www.youtube.com/watch?v=ZLIwfXSXEVc&feature=emb_logo https://www.youtube.com/watch?v=A5U2W9wBOCw https://www.youtube.com/watch?time_continue=9&v=AvXoEp53zAY&feature=emb_logo https://www.youtube.com/watch?v=KvSY8XC9C6I https://www.youtube.com/watch?v=RURl6qqAWOM
CO3	https://www.youtube.com/watch?v=R1ifDegeq-g https://www.youtube.com/watch?v=XNG3ewS39Lw youtube.com/watch?v=yGKym19qxiM&feature=emb_logo https://www.youtube.com/watch?v=JgNaSll8Obo https://www.youtube.com/watch?v=dNbVsmVgOnM
CO4	https://www.youtube.com/watch?v=22ytR__l22g https://www.youtube.com/watch?v=oDA3aIDmkv8 https://www.youtube.com/watch?v=22ytR__l22g&t=46s https://www.youtube.com/watch?v=9Sf278j1GTU&list=PLbMVogVj5nJSkVfiNz6f9HeghkYD5u3c0
CO5	https://www.youtube.com/watch?v=tvk2yWh0cco https://www.youtube.com/watch?v=FATc12opDCA https://www.youtube.com/watch?v=PY94sQlJqwk&list=PLwdnzlV3ogoUH_9gN_6royr0u04Eq_z-T https://www.youtube.com/watch?v=iUH_EdNNtDU https://www.youtube.com/watch?v=PYTiD0S-ixU

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial/…..)	Affective Domain Tool (Viva /Seminar/Presentation/……)	Course End Survey	
		(Weightage – 0.15)	(Weightage – 0.15)	(Weightage – 0.1)	
CO1	IAT 1	MCQ	Viva	Course End Survey	0.2
CO2	IAT 1	MCQ	Viva		0.2
CO3	IAT 2	MCQ	Viva		0.2
CO4	IAT 2	MCQ	Viva		0.2
CO5	IAT 2	MCQ	Presentation		0.2

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Viva	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Presentation	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Ajay 06.08.22
Course Instructor

6/8/22
HOD/Mech

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE PLAN

(Academic Year: 2022-2023 Odd Semester)

Course Code and Title	:	**19ME06E POWER PLANT ENGINEERING**
Semester	:	2022 – 2023 Odd Semester (VIIth Sem)
Degree and Branch	:	BE MECHANICAL ENGINEERING
Course Instructors	:	Dr. S. Iyahraja, Prof / Mech Mr. R.Vijayakumar, AP(S.G) / Mech Mr. R.Vignesh Kumar, AP(S.G) / Mech
Course Coordinator	:	Dr. S. Iyahraja, Prof / Mech
Pre-requisite for the course		Thermal Engineering

COs	**CO Statements** Upon the completion of the course the students will be able to	**CO Level**	**Related PO**	**Related PSO**	**Threshold**	**Target**
CO1	Explain the construction, operation of various components of thermal power plant and performance of steam boilers.	K2	1,2,6,7,8	2	65	80
CO2	Describe the functions of different components of nuclear and hydel power plants.	K2	1,2,6,7,8	2	65	80
CO3	Summarize the functions of different components of diesel and gas turbine power plants	K3	1,2,6,7,8	2	65	80
CO4	Explain the basic concept and working of Solar, Wind and Bio-Energy power plants	K2	1,2,6,7,8	2	65	80
CO5	Recognize the environmental and regulatory issues related to various power plants and estimate the economy of power plants.	K3	1,2,6,7,8	2	65	80

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3				2	3	2						3	
CO2	2	2				2	3	2						3	
CO3	2	1				2	3	2						3	
CO4	2	2				2	3	2						3	
CO5	3	3				2	3	2						3	

Content Delivery Methods:

UNIT I - THERMAL POWER PLANT

CO 1: Explain the construction, operation of various components of thermal power plant and performance of steam boilers. (K2)

Sl. No.	Course Content	Content delivery methods	No. of Hours Required (9)
1	Layout	Chalk and Board	1
2	Fuel and ash handling	Power Point Presentation	1
3	Combustion Equipment for burning coal, Mechanical Stokers	Power Point Presentation	1
4	Pulveriser, Electrostatic Precipitator	Power Point Presentation	1
5	Draught	Chalk and Board/Power Point Presentation	1
6	Condenser	Chalk and Board/Power Point Presentation	1
7	Cooling Towers	Power Point Presentation	1
8	Steam Boilers	Power Point Presentation	1
9	Environmental effects	Power Point Presentation	1

UNIT II - NUCLEAR AND HYDEL POWER PLANTS

CO 2: Describe the functions of different components of nuclear and hydel power plants. (K2)

Sl. No.	Course Content	Content delivery methods	No. of Hours Required (9)
1	Nuclear Energy - Fission, Fusion Reaction	Chalk and Board/Power Point Presentation	1
2	Types of Reactors	Chalk and Board/Power Point Presentation	3
3	Waste disposal and safety nuclear waste transportation norms	Chalk and Board/Power Point Presentation	1
4	Hydel Power plant - Layout - Essential Elements	Chalk and Board/Power Point Presentation	1
5	Selection of turbines	Chalk and Board/Power Point Presentation	1
6	Governing of Turbines	Chalk and Board/Power Point Presentation	1
7	Micro-Hydel developments.	Chalk and Board/Power Point Presentation	1

Unit III - DIESEL AND GAS TURBINE POWER PLANT

CO 3: Summarize the functions of different components of diesel and gas turbine power plants. (K2)

Sl. No.	Course Content	Content delivery methods	No. of Hours Required (9)
1	Layout - Types of diesel plants, components	PowerPoint Presentation	2
2	Selection of Engine type, applications	PowerPoint Presentation	1
3	Gas turbine Power plant - Layout	Chalk and Board/ PowerPoint Presentation	1
4	Gas turbine material	PowerPoint Presentation	1
5	Open and closed cycles	Chalk and Board	2
6	Reheating - Regeneration and inter cooling - combined cycle	Chalk and Board	2

Unit IV - SOLAR, WIND AND BIO ENERGY POWER PLANT

CO 4: Explain the basic concept and working of Solar, Wind and Bio-Energy power plants. (K2)

Sl. No.	Course Content	Content delivery methods	No. Of Hours Required (9)
1	Radiation	PowerPoint Presentation	1
2	Solar Collectors	Chalk and Board	2
3	Application of solar thermal systems	PowerPoint Presentation	1
4	Direct Electricity Conversion	Chalk and Board	1
5	Wind energy potential, Principle of wind energy conversion; Basic components, types and their constructional features	Chalk and Board	2
6	Biomass: sources, characterization, principles of energy transfer technologies	Chalk and Board	2

Unit V - ECONOMICS AND ENVIRONMENTAL EFFECT OF POWER PLANTS

CO 5: Recognize the environmental and regulatory issues related to various power plants and estimate the economy of power plants. (K3)

Sl. No.	Course Content	Content delivery methods	No. of Hours Required (9)
1	Cost of Electric Energy - Fixed and operating costs	Chalk and Board & PowerPoint Presentation	1
2	Energy rates - Types tariffs	PowerPoint Presentation	1
3	Economics of Load sharing	Chalk and Board & PowerPoint Presentation	2
4	Comparison of various power plants	PowerPoint Presentation	1
5	Emission from various power plants	PowerPoint Presentation	1
6	Environmental affects and its remedies	PowerPoint Presentation	2
7	Environmental regulatory and norms for power plant	PowerPoint Presentation	1

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	Internal Assessment Test (Weightage – 60%)	Cognitive Domain Tool (Weightage – 15%)	Affective Domain Tool (Weightage –15%)	Course End Survey (Weightage – 10%)	
CO1	IAT 1	MCQ	Viva – Voce	CES 1	20
CO2	IAT 1	Field Visit Report	Presentation	CES 2	20
CO3	IAT 1 & 2	MCQ	Viva – Voce	CES 3	20
CO4	IAT 2	Field Visit Report	Presentation	CES 4	20
CO5	IAT 2	Tutorial	Viva – Voce	CES 5	20

Note: (Use of PSG Design Data Book is permitted in the End Semester Examination)

TEXT BOOKS

1. Nag PK, "Power Plant Engineering", Tata McGraw- Hill, 4th Edition, 2017.
2. Arora SC and Domkundwar S, "A Course in Power Plant Engineering", Dhanpat Rai, Eighth Edition 2016.
3. EI-Wakil MM," Power Plant Technology", Tata McGraw-Hill, 2010.

REFERENCES

1. Sharma SC and Nagpal, "A Text Book of Power Plant Engineering", Jain publication, 16th Edition, 2015.
2. Ramalingam KK, "Power Plant Engineering", Scitech Publications, 2015.
3. Rai GD, "Introduction to Power Plant technology", Khanna Publishers, 11th Reprint Edition, 2013.
4. Indian boiler regulations (IBR) Act, 2005

CO Attainment:

CO	Level of CO	Target %	Threshold %	Weightage of CO for Internal Mark %
CO1	K2	80	65	20
CO2	K3	80	65	20
CO3	K3	80	65	20
CO4	K3	80	65	20
CO5	K3	80	65	20

Course Instructors **Course Coordinator** **Module Coordinator** **HOD/MECH**

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Theory Course Plan - Odd Semester - 2022-23

05/08/2022

Course Code and Title	:	**19CS03E – Data Science**
Programme	:	B.E. CSE
Semester	:	VII
Course Instructor	:	G R Hemalakshmi
Course Coordinator	:	G R Hemalakshmi

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Understand fundamentals of data analysis.	K2	PO1	PSO1	80% of class average	85
CO2	Explore the data analysis techniques.	K2	PO1, PO2,PO3	PSO1		85
CO3	Analyze the key concepts in predictive data analysis	K3	PO1,PO2, PO3	PSO1		80
CO4	Apply data science in data visualization techniques	K3	PO1,PO2,	PSO1		80
CO5	Apply the concepts in real-world applications using python	K3	PO1,PO2, PO9	PSO1		80

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

PSO1: To promote an innovation ecosystem for implementing products and services.
PSO2: To develop entrepreneurial skills for supporting modern and challenging community needs

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak ☐- No

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I DATA SCIENCE FUNDAMENTALS				
Linear Algebra, Graph theory	CO1	K2	Chalk and Talk PowerPoint Presentation	2
Probability, Measures of central tendency: mean, median and mode				3
Measuring asymmetry: skewness				3
Measures of location of dispersions.				1
UNIT II STATISTICAL TECHNIQUES				
Basic analysis techniques	CO2	K2	Chalk and Talk PowerPoint Presentation Hands-On (Case Study)	2
Statistical hypothesis generation and testing				2
Chi-Square test , t-Test				2
Analysis of variance				1
Correlation analysis, Maximum likelihood test				2
UNIT III PREDICTIVE DATA ANALYSIS				
Predictive models : Regression	CO3	K3	Chalk and Talk PowerPoint Presentation Hands-On (Case Study)	2
classification, time series forecasting, clustering, association rule mining				2
				2
text mining : Sentimental Analysis				2
UNIT IV DATA VISUALISATION				
Introduction Data visualization methods: Mapping	CO4	K3	Chalk and Talk PowerPoint Presentation Hands-On (Case Study)	2
Time series . Connections and correlations Scatter plot maps - Trees, Hierarchies and Recursion				2
				3
Data visualization using Tableau				2
UNIT V DATA SCIENCE TOOLS				
Python Programming: Working with data set, data manipulation	CO5	K3	Chalk and Talk PowerPoint Presentation Hands-On (Case Study)	2
Data analysis models using python: Pre-processing, predictive models				2
Application development with Jupyter				2
Data Science Experience (IBM - DSX)				3

TEXT BOOKS

1. Vijay Kotu, Bala Deshpande. "Data Science: Concepts and Practice", Morgan Kaufmann Publishers, 2nd Edition ,2019..

2. Cathy O'Neil and Rachel Schutt, "Doing Data Science, Straight Talk From The Frontline", O'Reilly, 1st Edition, 2014.

REFERENCES

1. Lillian Pierson, "Data Science For Dummies", John Wiley & Sons, 2nd Edition, 2017.

2. Hadley Wickham, Garrett Grolemund." R for Data Science: Import, Tidy, Transform, Visualize, and Model Data", O'Reilly Media Inc, 1st Edition, 2017.

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial/……) (Weightage – 0.15)	Affective Domain Tool (Viva /Seminar/Presentation/……) (Weightage 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT I	MCQ	Viva	CIS 1	20
CO2	IAT I			CIS 2	20
CO3	IAT I & II	MCQ Assignment	Viva ~~Presentation~~	CIS 3	20
CO4	IAT II			CIS 4	20
CO5	IAT II	~~MCQ~~	~~presentation~~	CIS 5	20

Rubrics for Evaluation of Cognitive Domain Tools:

1) ASSIGNMENT

Level of Content or Problem Understanding	18-10)Content should match with the marks assigned for the question	(5-7)Content level relevant with the marks assigned for the question	(<5)Very meager content
Submission time	2(in exact time)	1(within two days)	0(within end of the week)
Portion of Completion	3(All the given questions are solved)	2(Few questions with incompletion or not following procedure)	1 (Missing of answering some questions)

Rubrics for Evaluation of Affective Domain Tools:

1) VIVA

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Content	Shows a full understanding of the topic.	Shows a Very good understanding of the topic.	Shows a good understanding of parts of the topic	Shows a average understanding of parts of the topic.	Does not seem to understand the topic very well.
Communication	Speaks clearly and distinctly all the time	Speaks clearly and distinctly all the time, but mispronounces one word.	Speaks clearly and distinctly most (94-85%) of the time. Mispronounces no more than one word.	Speaks clearly and distinctly most (40-50%) of the time. Mispronounces no more than one word.	Often mumbles or cannot be understood OR mispronounces more than one word.

2) PRESENTATION

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Presentation	Presented in logical sequence; introduction and background give proper context; key points and conclusions are clear and well developed.	Most information presented in logical sequence; clear introduction; adequate background; some irrelevant information	Some problems with sequencing, lacks clear transitions; incomplete or overly detailed introduction; emphasis given to less important information.	Need Improvement	Not up to the mark
Knowledge	Demonstrates deep knowledge; answer the questions with explanations and elaboration.	Adequate knowledge of most topics; answer the questions, but fails to elaborate.	Superficial knowledge of topic; only able to answer basic questions.	Try to give related responses, but it is not well defined	Answers with "yes" or "no" and fails to elaborate or explain.

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Clarity	Everything was expressed very clearly	All but the most difficult concepts were clearly explained.	Several points were not clearly explained.	Much of the presentation was difficult to understand.	The presentation was extremely garbled.

Course Instructor
G.R.Hemalakshmi
AP(SG)/CSE

Module Coordinator
Dr S.Kalaiselvi
Asso. Prof./CSE

HOD / CSE
Dr. V.Gomathi
Professor & Head /CSE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

19CS03E – Data Science

05/08/2022

Course Instructor: G.R.Hemalakshmi AP(SG)/ CSE

Regulation: 2019

Academic Year: 2022-2023 & Odd Semester

Year and Semester: IV & VII

Degree & Branch: B.E & CSE

L	T	P	C
3	0	0	3

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Understand fundamentals of data analysis.	K2	PO1	PSO1	80% of class average	85
CO2	Explore the data analysis techniques.	K2	PO1, PO2,PO3	PSO1		85
CO3	Analyze the key concepts in predictive data analysis	K3	PO1,PO2,PO 3	PSO1		80
CO4	Apply data science in data visualization techniques	K3	PO1,PO2,	PSO1		80
CO5	Apply the concepts in real-world applications using python	K3	PO1,PO2	PSO1		80

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak – No

Assessment Procedure:

CO	Assessment Tools: IAT (Weightage – 0.6)	Other Assessment Tools: Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial/.....) (Weightage – 0.15)	Affective Domain Tool (Viva /Seminar/Presentation/ .....) (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	Weightage of CO for internal mark

CO1	IA I I	MCQ	Viva	Course End Survey	20
CO2	IA I I			Course End Survey	20
CO3	IAT II	MCQ	Viva	Course End Survey	20
CO4	IAT II	Assignment	Presentation	Course End Survey	20
CO5	IA I II	~~MCQ~~	~~Viva~~	Course End Survey	20

Content delivery is planned through chalk and talk, PowerPoint presentation. Hands on demo. General concepts delivery will be taken through lecture with discussion and also they will be demonstrated through implementation wherever necessary.

CO1-CO3 is provided with Hands-On delivery method for the respective case studies enclosed in syllabus for the better understanding of students.

Experiential assignment is given for CO3 – predictive modeling to implement various clustering and association algorithms that will help them to enrich their skills and apply that in any real-time applications and useful for their projects.

After Completion all 5 CO's, they are provided with an assessment called presentation (for CO5- Apply the concepts in real-world applications using python) to analysis and find out the problem statement related to their core where they can apply this data Science knowledge attained through all previous CO's.

They will be assessed by both Cognitive domains through MCQ to check their level of understanding and Affective domain to analysis how they listen for and remember through Viva.

Course end survey will be done for every CO's to get feedback from students on the teaching learning methods. Based on the survey, further refined will be done if necessary.

The objective of this course plan (2019 Regulation) is to achieve 100% attainment in all CO's and to make every student to attain the minimum threshold with good knowledge in Data Science.

Course Instructor

Module Coordinator 5/8/22

HOD/CSE 5/8/22

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Theory Course Plan - Odd Semester - 2022-23

02/08/2022

Course Code and Title	:	**19CS04E – DATA MINING**
Programme	:	B.E. – COMPUTER SCIENCE & ENGINEERING
Semester	:	IV Year & VII SEM
Course Instruetor and Coordinator	:	P Abitha AP/CSE

Course Outcomes (COs):

CO	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Identify the issues in data mining applications and apply preprocessing methods	K3	1,2	1	70	85
CO2	Comprehend features of classification techniques	K2	1,2,3	1	70	85
CO3	Identify appropriate clustering technique to analyse the data	K3	1,2,3	1	70	80
CO4	Use association rule mining to generate rules	K3	1,2,3	1	70	80
CO5	Use recent trends of Data mining in Business applications	K3	1,2,5,9	1	70	85

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 - Strong 2 - Medium 1 - Weak □- No

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I DATA MINING AND DATA PREPROCESSING				
Introduction to KDD process – Knowledge discovery from databases	CO1	K3	Lecture interspersed with discussion and demonstration	1
Need for data pre-processing – Data cleaning				2
Data integration and transformation – Data reduction				1
Data discretization and concept hierarchy generation				1
UNIT II CLASSIFICATION				
Basic Concepts	CO2	K2	Lecture interspersed with discussion , PPT presentation	2
Decision tree induction				1
Bayes classification methods				1
Rule based classification				1
Model evaluation and selection				1
Techniques to improve classification accuracy				1
Classification: advanced concepts - Bayesian belief networks				2
Support Vector Machine				1
Classification using frequent patterns				2
UNIT II CLUSTER ANALYSIS				
Cluster Analysis: Basic concepts and Methods	CO3	K3	Lecture interspersed with discussion , PPT presentation, Think Pair and Share	2
Cluster Analysis				2
Partitioning methods – Hierarchial methods				1
Density based methods				1
Grid based methods Evaluation of clustering				1
Advance cluster analysis: Probabilistic model based clustering				2
Clustering high dimensional data				1
UNIT IV ASSOCIATION RULE MINING				
Association Rule Mining: Market Basket Analysis				2
Frequent pattern mining				1
Apriori algorithm				1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Generating association rules from frequent items	CO4	K3	Lecture interspersed with discussion , PPT presentation	1
Improving the efficiency of Apriori algorithm				1
Mining Multilevel association rules				1
Multidimensional association rules				1
Constraint based association Mining				1
Applications of Data Mining – Temporal and Sequence Mining				2
Web and Text Mining				2
UNIT V APPLICATION AND RECENT TRENDS				
Dataset Collection - Disease Prediction Weather Prediction	CO5	K3	Lecture interspersed with discussion and demonstration, PPT	1
Student's future learning behavior prediction				1
Anamoly detection				1
Stock Market Analysis				1
Commercial applications				1
				Total hours: 45

TEXT BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pei "Data Mining: Concepts and Techniques", Elsevier, 3rd Edition, 2012
2. Charu C. Aggarwal, "Data Mining : The Textbook", Springer International Publisher, 2015
3. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining & OLAP", Tata McGraw Hill Edition, 10th Reprint, 2007

REFERENCES

1. Pawel Cichosz, "Data Mining Algorithms: Explained Using R", John Wiley & Sons, 2015.
2. Pang –Ning Tan, Vipin Kumar, Michael Steinbach, "Introduction to Data Mining", Pearson Education India, 2012.
3. Daniel T. Larose, "Data Mining and Predictive Analytics", John Wiley & Sons, 2015.
4. https://elearningdom.com/

ASSESSMENT PROCEDURE:

CO	Assessment Tools: IAT (Weightage - 0.6)	Other Assessment Tools: Cognitive Domain Tool (Multiple Choice Quesring /Assignment / Tutorial/.....) (Weightage - 0.15)	Affective Domain Tool (Viva /Seminar/Presentation/.....) (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	Weightage of CO for Internal mark
CO1	IAT I	MCQ	Viva	Course Interim Survey	1.0
CO2	IAT I	Assignment		Course Interim Survey	1.0
CO3	IAT I&II	MCQ	Viva	Course Interim Survey	1.0
CO4	IAT II	MCQ		Course Interim Survey	1.0
CO5	IAT II	Case study assignment	Presentation	Course End Survey	1.0

Rubrics for Evaluation of Affective domain Tools: VIVA

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Content	Shows a full understanding of the topic	Shows a very good understanding of the topic	Shows a good understanding of the topic	Shows a average understanding of the topic	Does not seem to understand the topic very well
Communication	Speaks clearly and distinctly all the time	Speaks clearly and distinctly all the time but mispronounces one word	Speaks clearly and distinctly most (94 – 85%) of the time. Mispronounces more than one word.	Speaks clearly and distinctly most (40 – 50%) of the time. Mispronounces more than one word.	Often mumbles or cannot be understood OR Mispronounces more than one word

Evaluation of Affective domain Tools: PRESENTATION

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Presentation	Presented in logical sequence; introduction and background give proper context; key points and conclusions are clear and well developed.	Most information presented in logical sequence; clear introduction; adequate background; some irrelevant information	Some problems with sequencing, lacks clear transitions; incomplete or overly detailed introduction; emphasis given to less important information	Need improvement	Not up to the mark
Knowledge	Demonstrates deep knowledge; answer the questions with explanations and elaboration.	Adequate knowledge of most of the topics; answer the questions but fails to elaborate	Superficial knowledge of topic; only able to answer basic questions	Try to give related responses but it is not well defined.	Answers with "yes" or "no" and fails to elaborate or explain
Clarity	Everything was expressed very clearly	All but most difficult concepts were clearly explained	Several points were not clearly explained	Much of the presentation was difficult to understand	The presentation was extremely garbled

Rubrics for Evaluation of Cognitive domain: CASE STUDY ASSIGNMENT

Performance Indicators	15 point	12 point	<=10 point
Problem understanding and analysis	Exact understanding and proper analysis of the problem	Appropriate understanding of problem and analysis	Relevant understanding of problem and analysis
Presentation and semantics	Optimal	Most likely	Relevant
Relevant content and time management	Relevant content (in time)	Relevant content (within two days)	Relevant content (within end of the week)

Course Instructor
(ABITHA P)

Course Coordinator
(ABITHA P)

Module Coordinator
(S Kalaiselvi)

HOD/CSE
3/8/22

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGIEERING

One Credit Practical Course Plan - Even Semester - 2021-22

Date : 22/01/2021

Course Code and Title	:	19CS04L &PYTHON FOR DATA SCIENCE
Programme	:	COMPUTER SCIENCE AND ENGIEERING
Semester	:	IV
Course Instructors	:	Dr.V.Kalaivani , Dr.G.Sivagama Sundari

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Understand the basic concepts Python Programming	K2	PO1 PO2, PO3 PO4	PSO1	60% of class Avg	80%
CO2	Apply the Data mining algorithms using python packages	K3	PO1 PO2	PSO1	60% of class Avg	80%

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak - No

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
LIST OF EXERCISES				
Implementation of data manipulation with pandas	CO1	K2	Online lecture with Discussion and practical implementation using python	4
Mathematical Computations with NumPy			Online lecture with Discussion and practical implementation using python	3
Implementation of Pre-processing Techniques.			Online lecture with Discussion and practical implementation using python	1
Implementation of Classification Algorithms	CO2	K3	Video lecture	6
Implementation of Clustering Algorithms			Online lecture with Discussion	6
Implementation of data visualization using matplotlib				4
Analysis of Time Series data				3

Total hours:30

Reference Books:

Samir Madhavan. "Mastering python for data science". Packt Publishers. 1st Edition 2015.

E-sources:

https://nptel.ac.in/courses/106/106/106106212/
https://onlinecourses.nptel.ac.in/noc21_cs33/preview
https://www.programiz.com/python-programming
https://jakevdp.github.io/PythonDataScienceHandbook/

Assessment Procedure:

CO	Laboratory Practice	Model Exam1	Model Exam2	Weightage of CO for internal mark
CO1	0.6	0.4	-	20%
CO2	0.6	0.4	-	20%

Rubrics for Evaluation:

Laboratory Practice

- Problem Understanding (10)
- Implementation (20)
- Viva Voce (10)
- Completion of exercises. (10)
  - Within a day (10)
  - Within 2 days (5)
  - More than 2 days (0)
- Punctuality(5)
- Interaction during lab hours (5)

Course Instructors Course Coordinator Module Coordinator HOD/CSE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Theory Course Plan - Odd Semester - 2022-23

L	T	P	C	QP
2	0	2	3	A

Course Code and Title	:	**19CS05N – Fundamentals of Java Programming**
Programme	:	B.E. EEE
Semester	:	VII sem/Final year
Course Instructors	:	R.Vazhan Arul Santhiya AP/CSE
Course Coordinator	:	D.Vijaya kumar AP(Sr)/CSE
Course Credit	:	3

COURSE OUTCOMES

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Apply the object oriented concepts to solve real world problems	K3	PO1,PO2, PO3,	PSO1	60% of class average	80
CO2	Explain the principles of packages and strings in Java	K2	PO1,PO2	PSO1		80
CO3	Develop multi thread applications with exception handling	K3	PO1,PO2, PO3	PSO1		80
CO4	Create user interfaces for java applications and applets using GUI	K3	PO1,PO2, PO3,PO5	PSO1		80
CO5	Build real time applications with JDBC and collections	K3	PO1,PO2, PO3,PO5	PSO1		80

Mapping of course outcome(CO) with the Programme Outcome(PO) and Programme Specific Objectives(PSO)

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

Content Delivery Method

UNIT- I JAVA BASICS

Course content	COs	Level of Content	Content Delivery	Number of hours to be handled
Basic oops concepts Introduction of Java Programming	CO1	K3	1.Brain storming 2.Chalk and Talk	1
Objects and Classes,Methods	CO1	K3		2
Constructors and Access Specifiers	CO1	K3	3.Multimedia Presentation	2
Data types,Variables-Declaration and initialization of variables	CO1	K3	4.Demonstration	1
Java operators and control statements	CO1	K3	5.Hands on practice	1
Arrays and its types	CO1	K3		1
Inheritance and Methodoverriding	CO1	K3		2
Abstract class and Interfaces	CO1	K3		2

UNIT-II PACKAGES AND STRING

Course content	COs	Level of Content	Content Delivery	Number of hours to be handled
Introduction of packages	CO2	K2	1.Discussion	1
Importing packages in the programme	CO2	K2		2
Access protection	CO2	K2	2.Multimedia Presentation	1
Wrapper classes	CO2	K2		2
Java Strings and String handling	CO2	K2	3..Demonstration	2
Character Extraction and string comparison	CO2	K2	4.Hands on practice	2
Methods for modifying and searching strings	CO2	K2		2

UNIT-III EXCEPTION HANDLING AND THREADS

Course content	COs	Level of Content	Content Delivery	Number of hours to be handled
Exception handling:Try,catch,Finally blocks	CO3	K3	1.Discussion	2
Throw throws and its differences in exception handling	CO3	K3	2.Multimedia Presentation	2
Class throwable	CO3	K3	3..Demonstration	1
Introduction to multi threaded programming	CO3	K3	4.Brain storming	1
Creating thread and multiple	CO3	K3	5.Hands on	2

threads			practice	
Thread priorities and synchronization	CO3	K3		2
Inter thread Communication-suspending,resuming and stopping the threads	CO3	K3		2

UNIT IV APPLETS AND EVENT HANDLING

Course content	COs	Level of Content	Content Delivery	Number of hours to be handled
The basics of Applets	CO4	K3	1.Multimedia presentations 2.chalk and talk 3.Demonstration 4.Hands on Practice	1
Throw –throws and its differences in exception handling	CO4	K3		2
Class throwable	CO4	K3		1
Introduction to multi threaded programming	CO4	K3		2
Creating thread and multiple threads	CO4	K3		2
Thread priorities and synchronization	CO4	K3		2
Inter thread Communication-suspending,resuming and stopping the threads	CO4	K3		2

UNIT V JDBC AND COLLECTION

Course content	COs	Level of Content	Content Delivery	Number of hours to be handled
Introduction to JDBC and its design	CO5	K3	1.Multimedia presentations 2.Discussion 3.Demonstration 5.Hands on Practice	2
The structured query language	CO5	K3		2
JDBC configuration used in Java	CO5	K3		2
Execution of Structured Query Language	CO5	K3		2
Collection- wrapper class	CO5	K3		2
Framework of collection	CO5	K3		2

Text Books:

1. Hortsmann & cornell, "CORE JAVA 2 Advanced Features- VOL-II",Pearson Education,10th Edition,2017.
2. Deitel H M and Deitel P J-Java How to program. Pearson Education, New Delhi,11th Edition,2018.
3. Herbert Schildt, Java : The complete Reference,11th Edition,2018.

Reference Books:

1. Anita Seth,B.L.Juneja, "JAVA one step ahead", Oxford University Press Publication,2nd edition ,2018.
2. Sachin Malhotra and saurabh Choudhary.Programming in Java Oxford university. New delhi ,2018.
3. Herbert Schildt."Java:A Beginner's Guide", Tata McGraw Hill,2007.

E-sources:

1. www.studytonight.com/cpp/cpp-and-oops-concepts.php
2. https://www.w3schools.com/java/
3. https://www.geeksforgeeks.org/java-programming
4. https://www.tutorialspoint.com/java/
5. https://onlinecourses.nptel.ac.in/
6. https://www.javatpoint.com/java

Assessment procedure:

CO	IAT (Weightage 0.6)	Assessment Tools – Other Assessment Tools: Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial/.....) (Weightage 0.15)	Affective Domain Tool (Viva /Seminar/Presentation/.....) (Weightage 0.15)	Course End Survey (Weightage 0.1)	Weightage of CO for internal mark
CO1	IAT1	MCQ	viva	CIS1	20
CO2	IAT1	Programming Assignment	vivo	CIS2	20
CO3	IAT I & II	MCQ	viva	CIS3	20
CO4	IAT II	Programming assignment(GUI)	viva	CIS4	20
CO5	IAT II	Group assignment	Presentation	CES	20

Rubrics for Evaluation of Affective domain Tools :VIVA

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Content	Shows a full understanding of the topic.	Shows a Very good understanding of the topic.	Shows a good understanding of parts of the topic.	Shows a average understanding of parts of the topic.	Does not seem to understand the topic very well.
Communication	Speaks clearly and distinctly all the time	Speaks clearly and distinctly all the time, but mispronounces one word.	Speaks clearly and distinctly most (91-84%) of the time. Mispronounces no more than one word.	Speaks clearly and distinctly most (40-50%) of the time. Mispronounces no more than one word.	Often mumbles or cannot be understood OR mispronounces more than one word.

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Rubrics for evaluation of Affective domain Tools :presentation					
Presentation	Presented in logical sequence; introduction and background give proper context; key points and conclusions are clear and well developed.	Most information presented in logical sequence; clear introduction, adequate background; some irrelevant information	Some problems with sequencing, lacks clear transitions; incomplete or overly detailed introduction; emphasis given to less important information.	Need Improvement	Not up to the mark
Knowledge	Demonstrates deep knowledge; answer the questions with explanations and elaboration.	Adequate knowledge of most topics; answer the questions, but fails to elaborate.	Superficial knowledge of topic; only able to answer basic questions.	Try to give related responses, but it is not well defined	Answers with "yes" or "no" and fails to elaborate or explain
Clarity	Everything was expressed very clearly	All but the most difficult concepts were clearly explained.	Several points were not clearly explained.	Much of the presentation was difficult to understand.	The presentation was extremely garbled.

Course Instructor

[R. VAZHEN ARUL SANTHIYA AP/CSE]

Course Coordinator

D. VIJAYAKUMAR AP(SG)/CSE

Module Coordinator

[Dr V KALAIVANI Prof ICSE]

Programme coordinator & HOD/CSE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI - 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

One Credit Theory Course Plan - Even Semester - 2022-23

12.01.2023

Course Code and Title	:	**19CS24L APPLICATION DEVELOPMENT USING FIRBASE**
Programme	:	B.E. CSE
Semester	:	IV sem and VI sem
Course Credit	:	1
Course Instructor/ Course Coordinator	:	Abitha P AP/CSE

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Understand how to simplify a database by using Firebase data modelling	K2	PO1, PO2, PO3	PSO1	70%
CO2	Build interactive web applications using firebase	K3	PO1, PO2, PO3	PSO1	

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Setup a new project using the Firebase console • Install and use the Firebase SDK	CO1	K2	Lecture interspersed with discussion and demonstration / Hands on Practice	5
Configuring Firebase in a website				5
Adding firebase functionalities in a website				
CRUD your data in Real-time • Adding and Retrieving data in the Firestore database	CO2	K3		4
CRUD your data in Real-time • Updating and deleting data in the Firestore database				4
Build and implement user authentication methods using crashlytics				4
Controlling the Firebase • Sorting and limiting the data				4
Create a Real-time web application using Firebase				4

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
			TOTAL HOURS	30

SOFTWARE REQUIREMENTS

- Operating System: Windows / Linux
- Software: Sublime Text and Firebase CLI

REFERENCES

1. Houssem Yahiaoui, "Firebase Cookbook: Over 70 recipes to help you create real-time web and mobile applications with Firebase", Packt publishing, 2017.
2. Andrew Grant, "The Definitive Guide to Firebase: Build Android Apps on Google's Mobile Platform", Apress, 1st Edition, 2017.

E-material

- https://www.udemy.com/course/learning-firebase/

Assessment Procedure:

Weightage for CO	Laboratory Practice	Model Exam 1	Model Exam 2	VIVA	CES
CO1	0.4	0.3		0.2	0.1
CO2	0.4	-	0.3	0.2	0.1

Rubrics for Laboratory Practice (Continuous Assessment)

Laboratory Practice (40)			
Problem Analysis (10)	8-10 (Exact Understanding and proper analysis of problem)	5-7 (Appropriate Understanding of problem and analysis)	<5 (Relevant Understanding and analysis)
Coding & Implementation (20)	15-2 (Exact Understanding and implementation)	7-15 (Most likely)	<5 (Relevent)
Report Submission (10)	10 (within 2 days)	7 (within one week)	<=5 (within end of the week)

Rubrics for Evaluation of Viva: Viva 15 points to be converted to 20 points

Performance Indicators	5 Point	4 Point	3 Point	2 Point	1 Point
Responses to Questions (5)	Answered all questions, explained practical example	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only few questions
Technical knowledge (5)	Very good understanding	Only know the core concepts	Relevant understanding	Needs improvement	Not up to the level

Communicatinon (5)	Excellent flow with good grammar	Good flow with few shortfalls	Average flow with medium grammar	Poor flow	Very poor

Rubrics for Model Exam

Model Exam 1 (30)			
Algorithm & Problem Understanding (5)	Implementation (10)	Debugging (10)	Viva (5)

Course Instructors
Ms. Abitha P, AP/CSE

Course Coordinator
Ms. Abitha P, AP/CSE

Module Coordinator
Dr. K. Mohaideenpitchai Prof/CSE

Programme Coordinator
Dr. V. Gomathi, Professor & Head

HOD/CSE
Dr. V. Gomathi, Professor & Head

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
Theory Course Plan - Even Semester - 2022-23

NEC/AC / C2 (a)
24/03/2023

Course Code and Title	:	19CS/IT/EC/EE/CR25C PROBLEM SOLVING TECHNIQUES
Programme	:	B.E / B.Tech – CSE/ECE/EEE/CR/IT
Semester	:	02
Course Coordinator	:	Dr.G.Sivakamasundari, AP(SG)/CSE
Course Instructors	:	Dr.K.G.Srinivasagan, Professor & Head / IT Dr.G.Sivakamasundari, AP(SG)/CSE Mr.K.Rajkumar, AP /CSE Ms.D.Abisha, AP/ CSE Ms.V.Veera Anusuya, AP/ CSE Ms.P.Priyadharshini, AP / CSE Ms.K.B.Mirra, AP / CSE Ms.M.K.Kowsalya, AP / CSE Mr.P.G.Siva Sharma Karthick, AP/IT Ms.R.Madhu, AP /IT Ms.R.Suguna, AP / IT

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Develop algorithmic solutions to simple computational problems.	(K3)	1,2	1	70
CO2	Make appropriate decisions and solve problems using looping techniques.	(K2)	1,2	1	70
CO3	Solve problems using array and functions.	(K3)	1,2	1	70
CO4	Implement various sorting techniques.	(K3)	1,2	1	70
CO5	Implement various searching techniques.	(K3)	1,2	1	70

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak □- No

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I BASICS OF PROBLEM SOLVING				
Overview of programming: Problem Solving – Everyday	CO1	K3	Lecture with Discussion	2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Life,Types of Problem				
Computer-based problem solving, Difficulties in problem solving			Lecture with Discussion	1
Program design			Lecture with Discussion	1
Implementation issues, programming environment			Lecture with Discussion	1
Data Storage and Communication with Computer			Lecture with Discussion	1
Organizing the Problem, Divide and conquer strategy			Lecture with Discussion	2
Algorithms for problem solving Algorithms and flow charts, flowchart symbols, Design of algorithms for simple and scientific problems			Flipped class room	2
UNIT II BASIC TECHNIQUES				
Sequential Logic Structure	CO2	K2	Lecture with Discussion	3
Decision Making			Lecture Interspersed with Demonstration	2
Looping Techniques			Lecture Interspersed with Demonstration	3
Multi-Way decision Making			Lecture Interspersed with Demonstration	1
Solving with Modules			Lecture Interspersed with Demonstration	1
UNIT III ARRAYS AND FUNCTIONS				
Arrays: one dimensional array	CO3	K3	Lecture Interspersed with Demonstration	1
Two dimensional arrays. Multi-dimensional arrays			Lecture Interspersed with Demonstration	2
Character arrays and Strings: Declaring and initializing String Variables			Power point presentation	1
String handling functions. Comparison of two strings			Power point presentation	2
User defined Functions: Definition - Declaration Function calls, Category of Functions			Lecture Interspersed with Demonstration	2
Recursion - Storage Classes			Lecture Interspersed with Demonstration	2
UNIT IV SORTING TECHNIQUES				
Sorting: Bubble Sort	CO4	K3	Lecture Interspersed with Demonstration & Role play	1
Selection Sort			Lecture Interspersed with Demonstration & Role play	1
Insertion Sort			Lecture Interspersed with Demonstration & Role play	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Postman Sort			Lecture Interspersed with Demonstration	1
Quick Sort			Lecture Interspersed with Demonstration	2
Merge Sort			Lecture Interspersed with Demonstration & Role play	2
Radix Sort			Lecture Interspersed with Demonstration	1
Applications			Lecture Interspersed with Demonstration & Placement Question Discussion	1
UNIT V SEARCHING TECHNIQUES				
Searching algorithms Linear search	CO5	K3	Lecture Interspersed with Demonstration & Role play	1
Binary search			Lecture Interspersed with Demonstration & Role play	2
Fibonacci search			Lecture Interspersed with Demonstration	2
Golden ratio selection			Lecture Interspersed with Demonstration	2
Golden section search method			Lecture Interspersed with Demonstration	2
Applications			Lecture Interspersed with Demonstration & Placement Question Discussion	1

Text Books:

1. Maureen Sprankle and Jim Hubbard, "Problem Solving and Programming Concepts", Prentice Hall 9 th Edition, 2012.
2. Harsha Priya, R. Ranjeet, – "Programming and Problem Solving Through C Language", Firewall/Laxmi Publications (P) Ltd., New Delhi, 2015

Reference Books:

1. Pradip Dey, Manas Ghosh, Fundamentals of Computing and Programming in C, Oxford University Press, 2nd Edition, 2013.
2. M.G.Venkateshmurthy, Programming Techniques through C: A Beginners Companion, Pearson Education, Canada 2009.
3. Ashok.N Kamthane, Computer Programming, Pearson Education, India, 2011.

E-sources:

1. https://swayam.gov.in/nd1_noc20_cs02/preview
2. https://www.sololearn.com/Course/C/
3. https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
4. https://www.studytonight.com/c/programs/
5. https://accessracker.com/c/programs/c-programming-examples.htm
6. https://skillrack.com/
7. https://www.hackerrank.com/

Assessment Procedure:

CO	Assessment Tools				
		Other Assessment Tools			
	IAT (Weightage – 0.6)	Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial/ . . .) (Weightage – 0.15)	Affective Domain Tool (Viva /Seminar/Presentation/ . . . .) (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	Weightage of CO for internal mark
CO1	IAT I	Assignment/ MCQ	Presentation/ Viva	CIS 1	20%
CO2	IAT I	Skillrack Programming Assignment topic wise	Viva	CIS 2	20%
CO3	IAT I & II			CIS 3	20%
CO4	IAT II	Problematic Assignment	Role Play / Viva	CIS 4	20%
CO5	IAT II			CIS 5	20%

Rubrics for Evaluation of Affective domain Tools:

Viva

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Technical Proficiency	Very good understanding and good ability in relating with real time applications and current state of the art in that particular domain	good understanding and good ability in relating with real time applications	Only know the core concepts of the course	Need improvement	Not up to the mark
Responses to Questions	Gives well-constructed, confident responses that are genuine.	Gives well-constructed responses, does not sound rehearsed, student somewhat hesitant or unsure	Gives well-constructed responses but sounds rehearsed or unsure.	Try to give related responses, but it is not well defined	Answers with "yes" or "no" and fails to elaborate or explain.
Communication	Speaks clearly and distinctly with no lapse in sentence structure and grammar usage; speaks concisely with correct pronunciation	Speaking is clear with minimal mistakes in sentence structure and grammar.	Speaking is unclear - lapses in sentence structure and grammar.	Speaking is messy - very difficult to understand message of what is being said.	Try to speak in english

Presentation

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Background content	Material sufficient for clear understanding AND exceptionally presented	Material sufficient for clear understanding AND effectively presented	Material sufficient for clear understanding but not clearly presented	Material clearly but not sufficient	Material not clearly related to topic OR background dominated seminar
Organization of presentation	Information presented as interesting story in logical, easy to follow sequence	Information presented in logical sequence; easy to follow	Most of information presented in sequence	Hard to follow; sequence of information jumpy	Very minimal work is done in preparing the presentation

Role Play

Performance Indicators	5 point	4 point	3 point	1 point
Content	Great job! You offered creative new insights on the topic!	Your role-play is on-topic, but it is missing some creativity and insight.	The role-play is somewhat off-topic. Pay more attention to the directions next time!	The role-play is completely off-topic, as if your group did not even read the directions.
Roles	Excellent work! Every member of your group stayed in character, and it was clear you took your roles seriously	Everyone in your group stayed in character, but some members didn't seem to really be "into" what they were doing.	For the most part, your group stayed in character. Next time, spend more time preparing for how the characters might think or act	Your group failed to stay in character, and it looked like you had not prepared for how the characters might think or act.
Preparation	Your group did an excellent job preparing and rehearsing your role-play, and it shows - everything went very smoothly.	Your group obviously spent some time preparing for the role-play, but some rehearsal might have helped things run more smoothly.	Your group needs to spend more time preparing for the role-play. Reading lines from a script is a sure sign you're not prepared	It seems that your group used the preparation time for something else.
Overall Impression	Excellent! Your presentation was entertaining and informative!	Good! Your presentation, while it was fun to watch, could have been more informative.	Keep working! Don't forget that, though the proCESs is entertaining, you're also supposed to learn something from it	Argh! I expect much better work from you next time.

Rubrics for Evaluation of Cognitive Domain

Problematic Assignment

Performance Indicators	5 point	3-4 point	1-2 point
Problem Understanding and Analysis	Exact understanding and proper analysis of problem	Appropriate Understanding of Problem and analysis	Relevant Understanding and analysis
Presentation and Semantics	Optimal	Most likely	Relevant
Relevant content & Time Management	Relevant content (in exact time)	Relevant content (within two days)	Relevant content (within end of the week)

Course Instructor | Course Coordinator | Module Coordinator | HOD/CSE | HOD/IT

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Laboratory Course Plan - Even Semester - 2022-23

NEC/AC / 02 (b)
24/03/2023

Course Code and Title	:	19CS/IT /EC/CE27C & 19E/E28C Problem Solving Techniques Laboratory
Programme	:	B.E / B.TECH CSE/ECE/EEE/CE/IT
Semester	:	02
Course Coordinator	:	Dr.G.Sivakamasundari, AP(SG)/CSE
Course Instructors	:	Dr.K.G.Srinivasagan, Professor & Head / IT Dr.G.Sivakamasundari, AP(SG)/CSE Mr.K.Rajkumar, AP /CSE Ms.D.Abisha, AP/ CSE Ms. V.Veera Anusuya, AP/ CSE Ms. P.Priyadharshini, AP / CSE Ms. K.B.Mitra, AP / CSE Ms.M.K.Kowsalya, AP / CSE Mr.P.G.Siva Sharma Karthick, AP/IT Ms.R.Madha, AP /IT Ms.R. Sugnna, AP / IT

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Target
CO1	Solve simple and Complex problems.	K3	1,2	1	70%
CO2	Solve sorting and searching problems	K3	1,2	1	70%

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 Strong 2 – Medium 1 – Weak – No

Course Content Delivery Method:

Experiment Title	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Solve problems such as temperature conversion, student grading, interest calculation.	CO1	K3	Lecture Interspersed with Demonstration & Skill Rank Programming Track	12
Find the roots of a quadratic equation			Lecture Interspersed with Demonstration & Skill Rank Programming Track	

Experiment Title	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Design a simple arithmetic calculator. (Use switch statement)			Lecture Interspersed with Demonstration & Skill Rack Programming Track	
Design a traffic light controller (Use switch statement			Lecture Interspersed with Demonstration & Skill Rack Programming Track	
Perform the following operations: a. Generate Pascal,s triangle. b. Construct a Pyramid of numbers.			Lecture Interspersed with Demonstration & Skill Rack Programming Track	
Generate of the first n terms of the Fibonacci sequence and prime sequence.			Lecture Interspersed with Demonstration & Skill Rack Programming Track	
Compute Sine series and Cosine series.			Lecture Interspersed with Demonstration & Skill Rack Programming Track	
Find the 2's complement of a binary number.			Lecture Interspersed with Demonstration & Skill Rack Programming Track	
Perform the following operations: a. Matrix addition. b. Transpose of a matrix. c. Matrix multiplication by checking compatibility			Lecture Interspersed with Demonstration & Skill Rack Programming Track	3
Perform the following operations on a string: a. Insert a sub-string into main string at a given position. b. Delete n characters from a given position in a string. c. Check whether the given string is palindrome or not. d. Replace a character of string either from beginning or ending or at a specified location.			Lecture Interspersed with Demonstration & Skill Rack Programming Track	6
Perform the following operations: (Use recursive functions) a. Find the factorial of a given integer. b. Find the GCD (Greatest Common Divisor) of two given integers. c. Solve the Towers of Hanoi problem.			Lecture Interspersed with Demonstration & Skill Rack Programming Track	3
Implement Insertion Sort, Merge Sort	CO2	K3	Lecture Interspersed with Demonstration & Skill Rack Programming Track	3
Implement Linear search, Binary search			Lecture Interspersed with Demonstration & Skill Rack Programming Track	3

Resources:

1. http://www.homeandlearn.co.uk/csharp/csharp.html
2. http://www.w3schools.com/aspnet/aspnet_examples.asp
3. https://www.sololearn.com/Course/C/
4. https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
5. https://www.studytonight.com/c/programs/
6. https://codescracker.com/c/program/c-programming-examples.htm
7. https://skillrack.com/

Assessment Procedure:

CO	Programming Tracks	In-lab Tracks	Skill Rack Assessment	VIVA	CES
Weightage for CO1	0.2	0.3	0.2	0.2	0.1
Weightage for CO2	0.2	0.3	0.2	0.2	0.1

Rubrics for Evaluation of Viva:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Technical Proficiency	Very good understanding and good ability in relating with real time applications and current state of the art in that particular domain	good understanding and good ability in relating with real time applications	Only know the core concepts of the course	Need Improvement	Not up to the mark
Responses to Questions	Gives well-constructed, confident responses that are genuine.	Gives well-constructed responses, does not sound rehearsed, student somewhat hesitent or unsure.	Gives well-constructed responses, but sounds rehearsed or unsure.	Try to give related responses, but it is not well defined	Answers with "yes" or "no" and fails to elaborate or explain.
Communication	Speaks clearly and distinctly with no lapse in sentence structure and grammar usage; speaks concisely with correct pronunciation	Speaking is clear with minimal mistakes in sentence structure and grammar.	Speaking is unclear - lapses in sentence structure and grammar.	Speaking is messy - very difficult to understand message of what is being said.	Try to speak in english

Rubrics for Evaluation of In lab Tracks:

Rubrics	*Marks*				
	5	*4*	*3*	*2*	*1*
Problem Understanding(5)	Excellent Problem Analysis	Good Problem Analysis	Average Problem Analysis	Poor Problem Analysis	Unsatisfactory
Implementation and Output (5)	Excellent performance	Good performance	Moderate performance	Poor program and debugging	Unsatisfactory
Time Management (5)	Within 2 days from the lab date	3 to 4 days from the lab date	After 5 days from the lab date	After a week from the lab date	Unsatisfactory
Viva (5)	Excellent	Very good	Good	Poor	No answer

1. K. Srinivasa Reddy
2. K. Phani
3. P. Praveen
4. [signature]
5. [signature]
6. [signature]
7. [signature]
8. M. K. Kowsalya
9. [signature]
10. [signature]

Course Instructor | Course Coordinator | Module Coordinator | HOD/CSE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
Course Committee Meeting (Academic Year: 2022- 2023 EVEN semester)

03.01.2023

Course Code and Title	:	19CS28E- Cloud Security
Programme	:	BE CSE
Semester	:	VI
Regulations	:	2019
No. of Credits		3
Course Instructors	:	Mrs.D.Abisha, AP/CSE Mrs. P. Abitha, AP/CSE
Course Coordinator		Mrs.D.Abisha. AP/CSE

Course committee meeting has been conducted for discussing the course plan, content delivery method, fixing the assessment methods and weightage for CO calculations on **03-01-2023** from 11.30am to 12.30 pm at CSE Department Library.

Minutes of Meeting

The following points were discussed in course committee meeting.

1. Formulation of Course Plan
2. Setting of Threshold
   Based on the course content, the blooms level, course outcome and threshold has been confirmed as follows.

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Understand the fundamentals of cloud security.	K2	1,2,6	1	70%
CO2	Explore the cloud security architecture.	K2	1,2,6	1	70%
CO3	Apply the key concepts of cloud platforms and provide storage services for load balancing in cloud architecture.	K3	1,2,5,6	1	70%
CO4	Assess the security of virtual systems and Analyse attacks on the VM.	K3	1,2,5,6	1	70%
CO5	Examine the risks involved in cloud security.	K2	1,2,6	1	70%

In R2019. this course is introduced to ensure your data and applications are readily available to authorized users and a secure way to immediately access your data. This provides flexibility and complete understanding of course content and gives way to achieve CO attainment toward the attainment of relevant POs and PSOs.

- CO1 to CO5 strongly maps to PO1 with respect to the knowledge of engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- CO3 and CO4 strongly mapped with PO5 for Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- CO1 to CO5 moderately mapped with PO2 to Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- CO1 to CO5 moderately maps to PO6 to apply the reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note: Correlation 3 – Strong 2 – Medium 1 – Weak - No

Programme Specific Objectives:

PSO1: To promote an innovation ecosystem for implementing products and services.

PSO2: To develop entrepreneurial skills for supporting modern and challenging community needs.

3. Different Assessment Tools

   The weightage for the assessments in course outcome evaluation has been decided as follows.

CO	Assessment Tools					Weightage of CO for internal mark
	Preparatory Test (Weightage – 0.1)	IAT (Weightage - 0.5)	Other Assessment Tools			
			Cognitive Domain Tool (Weightage – 0.15)	Affective Domain Tool (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	PT 1	IAT 1	MCQ	Viva	CIS 1	20
CO2	PT 2	IAT 1	Notes Taking	Seminar	CIS 2	20
CO3	PT 3	IAT 1 & 2	Assignment	Presentation	CIS 3	20
CO4	PT 4	IAT 2			CIS 4	20
CO5	PT 5	IAT 2	MCQ	Viva	CIS 5	20

4. Different Content Delivery Methods and the teaching methodology to be followed for each CO was discussed
5. Rubrics
6. To maintain uniformity in covering the course contents for both the batches.
7. Internal Assessment Test Preparatory Test – IAT Prep 1 will cover CO1, CO2 and half of the unit of CO3 IAT Prep 2 will cover remaining syllabus of CO3, CO4 and CO5.
8. Internal Assessment Test - For IAT questions, it is proposed to follow the mark distribution CO wise given below. IAT 1 will cover CO1, CO2 and half of the unit of CO3. IAT 2 will cover remaining syllabus of CO3, CO4 and CO5.

Percentage of Knowledge level in IAT has been decided as follows;

COs	% wise contribution of questions in two internal assessment tests			% of Weightage of CO for Internal Mark
	K1	K2	K3	
CO1	10	20	10	50
CO2	10	20	10	50
CO3	10	10	20	50
CO4	10	10	20	50
CO5	10	20	10	50

Course Instructors

Course Coordinator

Module Coordinator

Programme Coordinator

HOD/CSE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Theory Course Plan - Even Semester – 2022-2023

NEC/AC/2022-2023 / 02 (a)

03/01/2023

Course Code and Title	:	**19CS28E CLOUD SECURITY**
Programme	:	B.E COMPUTER SCIENCE AND ENGINEERING
Semester	:	VI (Elective) QP Pattern: A Credit : 3
Course Instructors	:	Mrs. D. ABISHA, Asst.Prof/CSE Mrs. P. ADITHA, Asst.Prof/CSE
Course Coordinator	:	Mrs. D. ABISHA, Asst.Prof/CSE

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Understand the fundamentals of cloud security.	K2	1,2,6	1	70%
CO2	Explore the cloud security architecture.	K2	1,2,6	1	70%
CO3	Apply the key concepts of cloud platforms and provide storage services for load balancing in cloud architecture.	K3	1,2,5,6	1	70%
CO4	Assess the security of virtual systems and Analyse attacks on the VM.	K3	1,2,5,6	1	70%
CO5	Examine the risks involved in cloud security.	K2	1,2,6	1	70%

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Unit I INTRODUCTION TO CLOUD SECURITY				
Cloud Security objectives - *Confidentiality, Integrity, and Availability*	CO1	K2	Lecture with discussion	1
Cloud security services - *Authentication, Authorization, Auditing, And Accountability*			Lecture with discussion	1

Cloud security design principles - *Least privilege, Separation of duties, Defense in depth, Fail safe, Economy of mechanism, Complete mediation, Open design, Least common mechanism, Psychological acceptability, Weakest link, Leveraging existing components*			Lecture with discussion	1
Secure cloud software requirements - *Secure Development Practices*			Lecture with discussion	1
Approaches to Cloud Software Requirements Engineering			Lecture with discussion	1
Cloud Security Policy Implementation and Decomposition – *Implementation Issues : Access controls, Data protection, Confidentiality, Integrity, Identification and authentication, Communication security, Accountability* *Decomposition issues : confidentiality, integrity, availability, identification, authentication, authorization, and auditing;*			Lecture with discussion and Multimedia Presentation	2
Secure Cloud Software Testing - *Testing for Security Quality Assurance: Conformance Testing, Functional Testing, Performance Testing, Security Testing,* *Cloud Penetration Testing: Legal and Ethical Implications, The Three Pre-Test Phases, Penetration Testing Tools and Techniques.* *Regression Testing*			Lecture with discussion and Multimedia Presentation	2
Unit II CLOUD SECURITY ARCHITECTURE				
Cloud Computing Security Architecture	CO2	K2	Lecture with discussion	1
Architectural considerations - *General Issues, Trusted Cloud Computing, Secure Execution Environments and Communications, Microarchitectures*			Lecture with discussion and Multimedia Presentation	3
Identity Management – *Passwords, Tokens, Memory Cards, Smart Cards, Biometrics, Implementing Identity Management* Access Control - *Controls, Models for Controlling Access, Single Sign-On (SSO)*			Lecture with discussion and Multimedia Presentation	3
Autonomic Security – *Systems, Protection, Self-Healing*			Lecture with discussion	2
Unit III CLOUD PLATFORMS				
Structure & security	CO3	K3	Lecture with discussion	1

Storage services			Lecture with discussion	1
Networking and databases service			Lecture with discussion and Multimedia Presentation	2
App services and web apps			Lecture with discussion and Multimedia Presentation	2
Virtual machine			Lecture with discussion	1
Case studies using open stack			Lecture with Hands-on Session	2
Unit IV VIRTUALIZATION BASED SECURITY ENHANCEMENT				
Guest Hopping	CO4	K3	Lecture with discussion	1
Attacks On The VM - VM Migration Attack			Lecture with discussion	1
Hyper Jacking			Lecture with discussion	1
IBM Security			Lecture with discussion and Multimedia Presentation	1
Virtual Server Protection			Lecture with discussion	1
Virtualization Based Sandboxing			Lecture with discussion	1
Storage Security			Lecture with discussion	1
HIDPS			Lecture with discussion and Multimedia Presentation	1
Log Management - Data Loss Prevention			Lecture with discussion	1
Unit V CLOUD RISK MANAGEMENT				
Cloud Computing Risk Issues	CO5	K2	Lecture with discussion	1
The CIA Triad – *Confidentiality, Integrity, Availability*			Lecture with discussion	1
Threats to Infrastructure, Data and Access Control - *Common Threats and Vulnerabilities: Logon Abuse, Inappropriate System Use, Eavesdropping, Network Intrusion, Denial-of-Service (DoS) Attacks, Session Hijacking Attacks, Fragmentation Attacks Cloud Access Control Issues : Database Integrity Issues*			Lecture with discussion and Multimedia Presentation	3
Cloud Service Provider Risks - *Back-Door, Spoofing, Man-in-the-Middle, Replay, TCP Hijacking, Social Engineering, Dumpster Diving, Password Guessing, Trojan Horses and Malware*			Lecture with discussion and Multimedia Presentation	2
Cloud Computing Security Challenges			Lecture with discussion	1

Security Policy Implementation - *Policy Types: Senior Management Statement of Policy. Regulatory Policies, Advisory Policies. Informative Policies. Computer Security Incident Response Team (CSIRT)*			Lecture with discussion	1
				Total: 45 Hours

TEXT BOOKS

1. Michael Collier, Robin Shahan, "Fundamentals of Azure", Microsoft press, 1st Edition, 2016.
2. Dr.Imrnad M Abbadi, "Cloud Management and Security" Wiley-Blackwell publication, 2 nd Edition, 2015.
3. Ronald L.Krutz and Russell Dean Vines," Cloud Security: A Comprehensive Guide to Secure", Wiley-India, 2nd Edition, 2013. **(CO 1, 2, 5)**

REFERENCES

1. Bernard Golden, "Amazon webservices", John Wiley & Sons, Inc, 1st Edition, 2015.
2. Maddiestigler, "Beginning Serverless Computing-Developing with Amazon Web Services, Microsoft Azure, and Google Cloud", APress, 2nd Edition, 2018.
3. Barrie Sosinsky, "Cloud Computing Bible", Wiley-India, 1st Edition, 2014.

Assessment Procedure

CO	Assessment Tools					Weightage of CO for internal mark
			Other Assessment Tools			
	Preparatory Test (Weightage – 0.1)	IAT (Weightage – 0.5)	Cognitive Domain Tool (Weightage – 0.15)	Affective Domain Tool (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	PT 1	IAT 1	MCQ	Viva	CIS 1	20
CO2	PT 2	IAT 1	Notes Taking	Seminar	CIS 2	20
CO3	PT 3	IAT 1 & 2	Assignment	Presentation	CIS 3	20
CO4	PT 4	IAT 2			CIS 4	20
CO5	PT 5	IAT 2	MCQ	Viva	CIS 5	20

Rubrics for Evaluation of Affective domain Tools : Viva

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Responses to Questions	Gives well-constructed, confident responses that are genuine.	Gives confident responses	Gives well-constructed responses, does not sound rehearsed, student somewhat hesitant or unsure.	Gives well-constructed responses, but sounds rehearsed or unsure.	Answers with "yes" or "no" and fails to elaborate or explain.
Communication	Speaks clearly and distinctly with no lapse in sentence structure and grammar usage; speaks concisely with correct pronunciation.	speaks concisely with correct pronunciation	Speaking is clear with minimal mistakes in sentence structure and grammar	Speaking is unclear - lapses in sentence structure and grammar	Speaking is messy - very difficult to understand message of what is being said

Rubrics for Evaluation of Cognitive domain Tools: Notes Taking

CATEGORY	Distinguished 3 pts.	Proficient 2 pts.	Emerging 1 pt.	Below Proficient 0 pts
Keywords vs. copying	Notes are recorded as keywords and phrases in student's words.	Notes are primarily recorded as keywords and phrases in mostly student's words	Notes are primarily copied from the source. Some evidence of keywords and phrases in own words.	Notes are copied directly from the source.
Relevance	Notes relate to the topic and show the main ideas enough example	Notes primarily relate to the topic, some main ideas, some example	Some notes relate to the topic, but many don't, few main ideas, little example	Notes are not related to the topic, little main ideas, no examples
Organization	All notes are organized logically and effectively.	Most notes are organized with some logic, orderly and legible	Some evidence that notes are organized, with little order, somewhat legible.	No evidence of notes that are organized, orderly or legible.

Quantity	Enough notes to get all relevant, key data, but not excessive to create an effective product.	A sufficient number of notes are taken to create the product.	Nearly enough notes are taken to create the product.	Not enough notes are taken to create a product, or excessive notes are taken

Rubrics for Evaluation of Affective domain Tools : Seminar Presentation

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Preparedness	Student is completely prepared and has obviously rehearsed.	Student seems pretty prepared but might have needed a couple more rehearsals.	The student is somewhat prepared, but it is clear that rehearsal was lacking.	The student is somewhat prepared, but it is clear that rehearsal was totally lacking.	Student does not seem at all prepared to present.
Comprehension	Student is able to accurately answer almost all questions posed by classmates about the topic.	Student is able to accurately answer most questions posed by classmates about the topic.	Student is able to accurately answer a few questions posed by classmates about the topic.	Student is able to answer very few questions posed by classmates about the topic.	Student is unable to accurately answer questions posed by classmates about the topic.
Evaluates Peers	Fills out peer evaluation completely and always gives scores based on the presentation.	Fills out almost all of the peer evaluation and always gives scores based on the presentation.	Fills out most of the peer evaluation and always gives scores based on the presentation.	Fills out some of the peer evaluation and always gives scores based on the presentation.	Fills out most of the peer evaluation but scoring appears to be biased.

Rubrics for Evaluation of Affective domain Tools : Assignment

CATEGORY	5	4	3	1
Neatness	Assignment is in an orderly packet and is incredibly neat, with no smudges or tears	Assignment is in an orderly packet and is neat, with a few smudges or tears	Assignment is in a packet with several smudges or tears	Assignment is disorderly with many smudges or tears
Completion	All of the assigned work is complete	Most of the assigned work is complete	Some of the assigned work is complete	Student didn't turn in assignment
Timeliness	Assignment was received on due date	Assignment was 1 day late	Assignment was 2 days late	Assignment was 3 or more days late
Accuracy	All of the answers are correct	Most of the answers are correct	Some of the answers are correct	Little to none of the answers are correct
Work shown	All work is meticulously shown	Most work is meticulously shown	Some steps for problem solving are missing	Students didn't show any work

3/11/23 — Course Instructors

3/11/23 — Course Coordinator

3/11/2023 — Module Coordinator

3/11/23 — Programme Coordinator

3/11/23 — HOD/CSE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Theory Course Plan - Odd Semester - 2022-2023

NEC/AC / 02 (a)
Date: 01.08.2022

Course Code and Title	**:**	19EC53C – Linear Integrated Circuits
Programme	**:**	B.E.-Electronics and Communication Engineering
Semester	**:**	V
Course Instructors	**:**	Mr.N.Arumugam, Asso.Prof/ECE Dr.T.S.Arun Samuel, Prof/ECE Mr.I.Vivek Anand, AP(SG)/ECE

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Describe the fabrication of IC and also DC, AC characteristics of OP- AMP. (K2)	K2	PO1, PO2,PO3, PO12	PSO1	60	80
CO2	Discuss the various applications of OP-AMP. (K2)	K3	PO1, PO2, PO3, PO6 PO12	PSO1	70	80
CO3	Discuss analog multipliers, PLL and its application. (K2)	K3	PO1, PO3, PO5, PO7, PO12	PSO1	60	80
CO4	Infer the different types of digital to analog converter and Analog to Digital converter. (K3)	K2	PO1, PO2, PO3, PO6 PO12	PSO2	70	80
CO5	Describe the various operating modes of timer IC & Different types of voltage regulator. (K2)	K3	PO1, PO2, PO3, PO6 PO12	PSO2	65	80

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	3	2	2									2		
CO2	2	3	2			2						2		
CO3	2		2		1		2					2		
CO4	2	2	2			2						1	2	
CO5	3	3	2			2								

Note : Correlation 3 – Strong 2 – Medium 1 – Weak ☐*- No*

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I IC FABRICATION AND CIRCUIT CONFIGURATION FOR LINEAR ICS				
Advantages of IC over discrete components	CO1	K2	Chalk and Talk, Presentation, Videos	1
Manufacturing process of monolithic IC	CO1	K2	Lecture with Discussion, Presentation, Videos	1
Construction of Monolithic Bipolar transistor, Monolithic diodes, Integrated Resistors	CO1	K2	Lecture with Discussion, Presentation, Videos	1
Monolithic Capacitors, Inductors	CO1	K2	Chalk and Talk, Presentation, Videos	1
General operational amplifier stages, Current mirror and current sources, Current sources as active loads	CO1	K2	Lecture with Discussion, Presentation, Videos	1
BJT Differential amplifier with active Loads	CO1	K2	Chalk and Talk, Presentation, Videos	2
DC and AC performance characteristics, slew rate, Open and closed loop Configurations.	CO1	K2	Chalk and Talk, Presentation, Videos	2
UNIT II APPLICATIONS OF OPERATIONAL AMPLIFIERS				
Sign Changer, Scale Changer, Phase Shift Circuits	CO2	K3	Lecture with Discussion, Presentation, Videos	1
Voltage Follower, V-to-I and I-to-V converters, Adder, Subtractor	CO2	K3	Chalk and Talk, Presentation, Videos	1
Instrumentation amplifier, Integrator, Differentiator	CO2	K3	Chalk and Talk, Demonstrations	1
Logarithmic amplifier, Antilogarithmic amplifier	CO2	K3	Chalk and Talk, Presentation, Videos	1
Comparators, Schmitt trigger, Precision rectifier, Peak detector	CO2	K3	Chalk and Talk, Presentation, Videos	1
Clipper and Clamper	CO2	K3	Group Assignment with presentation	1
Low-pass, High-pass and Band-pass Butterworth filters	CO2	K3	Chalk and Talk, Demonstrations	1
Sine-wave generators, Triangular wave generator, Saw-tooth wave Generator	CO2	K3	Chalk and Talk, Presentation, Videos	1
Astable and Monostable Multivibrators	CO2	K3	Chalk and Talk, Demonstrations	1
UNIT III ANALOG MULTIPLIER AND PHASE LOCKED LOOP				
Analog Multiplier using Emitter Coupled Transistor Pair	CO3	K3	Chalk and Talk, Presentation, Videos	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Gilbert Multiplier cell, Variable transconductance technique	CO3	K3	Chalk and Talk, Presentation, Videos	1
Analog multiplier ICs and their applications	CO3	K3	Lecture with Discussion, Presentation, Videos	2
Operation of the basic PLL, Closed loop analysis	CO3	K3	Chalk and Talk, Presentation, Videos	1
Voltage controlled oscillator, Monolithic PLL IC 565	CO3	K3	Group Assignment with presentation	1
Application of PLL for AM detection.	CO3	K3	Lecture with Discussion, Presentation, Videos	1
FM detection, FSK modulation and demodulation	CO3	K3	Chalk and Talk, Presentation, Videos	2
UNIT IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS				
Analog and Digital Data Conversions, D/A converter, specifications	CO4	K2	Chalk and Talk, Presentation, Videos	2
Weighted resistor type, R-2R Ladder type	CO4	K2	Group Assignment with presentation	2
Voltage Mode and Current Mode R-2R Ladder types	CO4	K2	Chalk and Talk, Presentation, Videos	2
Switches for D/A converters, High speed sample and hold circuits	CO4	K2	Lecture with Discussion, Presentation, Videos	1
A/D Converters, specifications, Flash type, Counter type, Servo tracking type	CO4	K2	Chalk and Talk, Presentation, Videos	1
Successive Approximation type, Dual Slope type, A/D converter, Figure of merit, Static Parameters: DNL, INL.	CO4	K2	Chalk and Talk, Presentation, Videos	1
UNIT V TIMER, VOLTAGE REGULATORS AND FUNCTION GENERATOR ICs				
Timer IC 555, IC Voltage regulators	CO5	K3	Chalk and Talk, Demonstrations	1
Three terminal fixed and adjustable voltage regulators	CO5	K3	Lecture with Discussion, Presentation, Videos	2
Description and Functional Diagram, Monostable operation, Astable operation	CO5	K3	Chalk and Talk, Presentation, Videos	1
IC 723 general purpose regulator	CO5	K3	Chalk and Talk, Presentation, Videos	1
IC Voltage regulators	CO5	K3	Group Assignment with presentation	1
IC L8038 function generator	CO5	K3	Chalk and Talk, Presentation, Videos	2
Description and Functional Diagram, SMPS	CO5	K3	Lecture with Discussion, Presentation, Videos	1

TEXT BOOKS:

1. Sergio Franco, "Design with operational amplifiers and analog integrated circuits", 3rd Edition, Tata McGraw Hill, 2007
2. D.Roy Choudhry, Shail Jain, "Linear Integrated Circuits", New Age International Private Limited, 4th Edition, 2010.

REFERENCES:

1. Johan H. Huijsing, "Operational Amplifiers: Theory and Design", Kluwer Academic Publishers, 2nd Edition, 2011.
2. Paul R. Gray, Paul J. Hurst, Stephen H. Lewis and Robert G. Meyer, "Analysis and Design of Analog Integrated Circuits", John Wiley & Sons Inc, 5th Edition, 2009.
3. S.Salivahanan & V.S.Kanchana Bhaskaran, "Linear Integrated Circuits", TMH, 1st Edition, 2008.

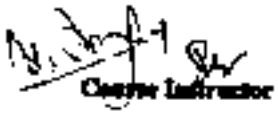
Assessment Procedure:

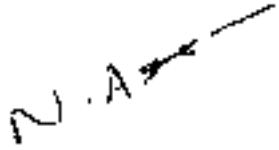
CO	Assessment Tools			Weightage of CO for internal mark
	(Weightage – 0.60)	(Weightage – 0.30)	(Weightage – 0.1)	
CO1	Internal Assessment Test	Viva, Assignment, MCQ	Course End Survey-1	0.2
CO2	Internal Assessment Test	Class Test, Assignment, MCQ	Course End Survey -2	0.2
CO3	Internal Assessment Test	MCQ, Assignment	Course End Survey -3	0.2
CO4	Internal Assessment Test	Viva, Assignment	Course End Survey -4	0.2
CO5	Internal Assessment Test	Viva, Assignment	Course End Survey -5	0.2

Rubrics for Evaluation of Assignment:

CATEGORY	4 point	3 point	2 point	1 point
Content: FOCUS 1	Topic is clear, it is explicitly stated	Topic is generally clear though it may not be explicitly stated	Topic may be vague	Topic is unclear or confusing
Content: SUPPORT	Support information is related to and supportive of the topic	Support information has minor weakness in relatedness to and/or support of the topic	Support information has major weakness in relatedness to and /or support of the topic	An attempt has been made to add support information, but it was unrelated or confusing
Content: ELABORATION	Elaboration consists of specific developed details	Elaboration consists of some specific details	Elaboration consists of general and/or undeveloped details, which may be presented in a list like fashion.	Elaboration is sparse; almost no details

Content: ORGANIZATION	Organizational structure establishes relationship between among ideas/events	Organizational structure establishes relationship between among ideas/events, although minor lapses may be present	Organizational structure establishes relationship between among ideas/events. The structure is minimally complete.	Structure establishes relationship between among ideas/events. The overall structure is incomplete or confusing.





NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University - Chennai)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Theory Course Plan - Even Semester - 2022-23

NEC/AC/02.18J

02/01/2022

Course Code and Title	:	19EC41E EMBEDDED SYSTEM ARCHITECTURE
Programme	:	ECE
Semester	:	VI
Course Instructors	:	Dr. K.J Prasanna Venkatesan -AP(SG)/ECE, Mr.I Vivek Anand -AP(SG)/ECE
Course Coordinator	:	Dr. K.J Prasanna Venkatesan -AP(SG)/ECE, Mr.I Vivek Anand -AP(SG)/ECE

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Explain the Hardware architecture of embedded product.	K2	1,2,3,5,9, 10,11,12,	1	75	80
CO2	Understand the software layered architecture of embedded product	K2	1,2,3,5,9, 10,11,12,	1	75	80
CO3	Distinguish the internal components of FPGA specific design.	K2	1,2,3,5,9, 10,11,12,	1	75	80
CO4	Describe the printed circuit board design principles.	K2	1,2,3,5,9, 10,11,12,	1	75	80
CO5	Understand the concept of final product assembly sequence.	K2	1,2,3,5,9, 10,11,12,	1	75	80

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak -No

Course Content Delivery Method:

Course Content	Cos	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I HARDWARE ARCHITECTURE				
Understanding embedded system Product specifications with Examples	CO1	K2	Chalk and Board Lecture/Online Lecture with discussion	3
Component selection - Component package types	CO1	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Embedded system design flow types-Preparation of Block diagram to Final Product Architecture arrival	CO1	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	4
UNIT II SOFTWARE ARCHITECTURE				
System software – Embedded system software layered architecture-	CO2	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	2
Understanding of different Operating System (Linux, Windows, VxWorks, RTOS etc) features and architectures	CO2	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	3
Basics of Boot loader functionalities	CO2	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	2
significance of Kernel and Device drivers - File system types.	CO2	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	2
UNIT III FPGA ARCHITECTURE				
Basic concepts of CPLD architecture - Difference of CPLD & FPGA	CO3	K2	Chalk and Board Lecture/Online Lecture with discussion	1
Basic interface protocol study – I2C, GPIO, SPI & UART	CO3	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Packaging options – concept of on chip logic blocks design-FPGA Design flow	CO3	K2	Chalk and Board Lecture/Online Lecture with discussion	3

Course Content	Cos	Level of Content	Content Delivery	No. of Hours to be Handled
Preparation of Block diagram to Final FPGA Architecture arrival	CO3	K2	Chalk and Board Lecture/Online Lecture with discussion, Hands on training	2
UNIT IV PCB ARCHITECTURE				
Understanding of PCB design principles -	CO4	K2	Chalk and Board Lecture/Online Lecture with discussion	1
Different PCB options	CO4	K2	Chalk and Board Lecture/Online Lecture with discussion	2
PCB component placement guidelines - PCB layout routing	CO4	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Gerber generation	CO4	K2	Chalk and Board Lecture/Online Lecture with discussion, Hands on training	4
UNIT V DESIGN FOR MANUFACTURING				
Understanding of basic Component assembly process - Different ways of assembly – machine assembly/manual assembly -	CO5	K2	Chalk and Board Lecture/Online Lecture with discussion	3
Component storage options - Assembly flow	CO5	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Understanding of basic mechanical ID design	CO5	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Different mechanical enclosure options - Advantages & Disadvantages of different mechanical enclosure	CO5	K2	Chalk and Board Lecture/Online Lecture with discussion	3

Text Books:

1Vilas S bagad, "Electronics product design", Technical publications, Pune 2009.

2. Rajkamal, "Embedded sysytem- Architecture, programming and design", Mcgraw Hill, 2017.

Reference Books:

1. Shibu K.V, "Introduction to Embedded systems", Mcgraw Hill, 2017

2. Kiyofumi Tanaka, "Embedded systems –Theory and Methodology", Intech publication, Croatia, 2012.

3. Jack Ganssle, "The art of designing embedded system", 2nd Edition, Newness publication, 2008.

Course Instructor

HOD/ECE 2/3/2022

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Theory Course Plan - Even Semester - 2022-2023

Date: 04.01.2023

Course Code and Title	:	19EC42E-Embedded System Analysis and Risk Management
Programme	:	B.E.-Electronics and Communication Engineering
Semester	:	VI
Course Instructor	:	Mr.T.Devakumar, AP-SG/ECE

Prerequisite Course: 19EC41E Embedded System Architecture

Course Outcomes and its Mapping with Program Outcomes:

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Explain embedded product design specific feasibility analysis	K2	PO3, PO6	PSO1	65
CO2	Explain embedded product component specific feasibility analysis.	K2	PO3, PO5	PSO1	65
CO3	Understand the concept of embedded product validation	K2	PO3, PO12	PSO1	65
CO4	Distinguish different certification standards.	K2	PO3, PO7	PSO1	65
CO5	Understand the concept of Risk management.	K2	PO3, PO7	PSO1	65

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I FEASIBILITY ANALYSIS: DESIGN SPECIFIC				
CO1 Explain embedded product design specific feasibility analysis				
Conceptual design arrival to Final Product(MISTRAL/TATA ELAXI)	CO1	K2	Lecture with Discussion , PPT and Videos	3
Use Case Analysis	CO1	K2		2
Product Feature Analysis	CO1	K2		2
End application Analysis	CO1	K2		2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT II FEASIBILITY ANALYSIS: COMPONENT SPECIFIC				
CO2 Explain embedded product component specific feasibility analysis				
EMI/EMC Analysis need and types	CO2	K2	Lecture with Discussion and PPT	2
MTBF Analysis-Reliability Analysis Thermal Analysis	CO2	K2		3
Signal Integrity testing methods	CO2	K2		1
Power Analysis-DC Analysis types-AC Analysis types	CO2	K2		3

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT III VALIDATION				
CO3 Understand the concept of embedded product validation				
Validation concepts and methods	CO3	K2	Lecture with Discussion and PPT	2
Validation through Environmental Concern	CO3	K2		2
Design for manufacturing (DFM)	CO3	K2		2
Design for testability	CO3	K2		3

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT IV VALIDATION				
CO4 Understand the concept of embedded product validation				
Types of Certifications for embedded system product	CO4	K2	Lecture with Discussion and PPT	2
FCC/CE and UL standards	CO4	K2		2
DO254 standards and its components	CO4	K2		2
DO178 Standards and its components	CO4	K2		3

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT V MARKET RESEARCH & RISK MANAGEMENT				
CO5 Understand the concept of risk management				
Different schemes for existing products analysis and gap analysis	CO5	K2	Lecture with Discussion and PPT	2
Product competitor analysis for existing products arrival of Product cost	CO5	K2		2
Product feature enhancement analysis	CO5	K2		2
Methods of Market research for products	CO5	K2		3

TEXT BOOKS

1. Vilas S Bagad, "Electronics product design", Technical publications, Pune 2009.
2. John P.Uyemura, "Introduction to VLSI circuits and Systems", Wiley student Edition, 2006.

REFERENCES

1. Gunarschirner, "Embedded system: Design, Analysis and verification", Springer, 2013.
2. Edward Ashford Lee, "Introduction to Embedded Systems – a cyber-physical system approach", 2nd Edition, MIT press, 2017.
3. Shibu K.V, "Introduction to Embedded systems", Mcgraw Hill, 2017.
4. Kiyofumi Tanaka, "Embedded systems –Theory and Methodology", Intech publication, Croatia, 2012. 5. Arnold Berger, "Embedded system Design –An Introduction to process, Tolls and Techniques", CMP Books, 2002.
6. Jack Ganssle, "The art of designing embedded system", 2nd edition, Newness publication, 2008.
7. Kim H Pries, "Testing complex and embedded systems", CRC Press, 2010.

ONLINE REFERENCES

1. https://users.ece.utexas.edu/~valvano/Volume1/E-Book/C7_DesignDevelopment.htm
2. https://awrcorp.com/download/faq/english/docs/simulation/dc_analysis.html
3. https://www.alberta.ca/how-demand-and-supply-determine-market-price.aspx
4. https://www.aha.io/roadmapping/guide/requirements-management/what-are-product-features

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT	Cognitive Domain Tool	Affective Domain Tool	Course End survey	
	(Weightage 0.5)	(Weightage 0.2)	(Weightage 0.2)	(Weightage 0.2)	
CO1	IAT	MCQ/Assignment	Viva	CO end survey	0.2
CO2	IAT	MCQ/Tutorial	Viva	CO end survey	0.2
CO3	IAT	MCQ /Assignment	Viva	CO end survey	0.2
CO4	IAT	MCQ/Tutorial	Viva	CO end survey	0.2
CO5	IAT	MCQ	Viva	CO end survey	0.2

Rubrics for Evaluation of Cognitive domain tools:

CATEGORY	4 point	3 point	2 point	1 point
Content: FOCUS	Topic is clear, it is explicitly	Topic is generally clear though it	Topic may be vague	Topic is unclear or confusing
	stated	may not be explicitly stated		
Content: SUPPORT	Support information is supportive of the topic	Support information has minor weakness	Support information has major weakness	Support information was unrelated
Content: ELABORATION	Elaboration consists of specific developed details	Elaboration consists of some specific details	Elaboration consists of general and/or undeveloped details.	Elaboration is sparse; almost no details
Content: ORGANIZATION	Organizational structure establishes in perfect	Organizational structure with minor lapses may be present	Organizational structure is minimally complete.	Structure is incomplete or confusing.

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Viva-Voce (Knowledge of Subject)	Demonstrated with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructor
(T. Devakumar)

Module Coordinator
(T. Devakumar)

N. A

Programme Coordinator

HOD/ECE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF ELECTRONIC AND COMMUNICATION

Theory Course Plan –19EC64E-INTRODUCTION TO INTERNET OF THINGS Semester – IV (2022-23)

Course Code and Title	:	19EC64E-INTRODUCTION TO INTERNET OF THINGS
Programme	:	B.E.-Electronics and Communication Engineering
Semester	:	IV
Course Instructor	:	Ms.P.Arishenbagam, AP/ECE
Course Coordinator	:	Ms.P.Arishenbagam, AP/ECE

Prerequisite:

Basic knowledge on Computer, Internet, Sensors, microcontrollers and Programming languages.

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Understand basic building blocks of Internet of Things.	K2	1,5 9,10,12	-	65
CO2	Choose suitable sensors and actuators used for specific IoT applications based on the performance.	K2	1,5 9,10,12	-	65
CO3	Discuss web technologies suitable for IoT client device.	K2	1,5 9,10,12	-	65
CO4	Understand fundamentals of technologies such as Node JS, REST protocol and JSON which are used at IoT servers.	K2	1,5 9,10,12	-	65
CO5	Understand the architecture of Raspberry pi and methodology to configure it as a IoT device	K2	1,5 9,10,12	-	65

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I - FUNDAMENTALS OF IOT				
IoT& Web Technology: The Internet of Things Today	CO1	K2	Chalk and Talk/ Presentation	1
Time for Convergence, Towards the IoT Universe, Internet of Things Vision,	CO1	K2	Chalk and Talk/ Presentation	1
IoT Strategic Research and Innovation Directions, IoT Applications	CO1	K2	Chalk and Talk/ Presentation	1
Future Internet Technologies, Infrastructure, Networks and Communication.	CO1	K2	Chalk and Talk/ Presentation	2
Processes, Data Management, Security, Privacy & Trust	CO1	K2	Chalk and Talk/ Presentation	1
Device Level, Energy Issues	CO1	K2	Chalk and Talk/ Presentation	2
IoT Related Standardization, Recommendations on Research Topics	CO1	K2	Chalk and Talk/ Presentation	1
UNIT II – SENSORS AND ACTUATORS				
Classification of Sensors and Actuators	CO2	K2	Chalk and Talk/ Presentation	1
General Requirements for Interfacing - Units and Measures	CO2	K2	Chalk and Talk/ Presentation	2
Transfer function - Impedance and Impedance matching	CO2	K2	Chalk and Talk/ Presentation	2
Range, Span, Resolution, Accuracy, Errors, Repeatability, Sensitivity and Sensitivity analysis, frequency response & bandwidth,	CO2	K2	Chalk and Talk/ Presentation	2
Temperature sensor, pressure sensor, optical sensors and actuators, DC motor, STEP motor.	CO2	K2	Chalk and Talk/ Presentation	2
UNIT III – FRONT END WEBTECHNOLOGIES FOR IOT				
Client Server Communication	CO3	K2	Chalk and Talk/ Presentation	2
World wide web, URL, HTTP request & response.	CO3	K2	Chalk and Talk/ Presentation	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Web Clients, Web Servers.	CO3	K2	Chalk and Talk/ Presentation	2
HTML - Elements, Forms with post and get methods.	CO3	K2	Chalk and Talk/ Presentation	2
Cascade style sheet, JavaScript - functions and objects.	CO3	K2	Chalk and Talk/ Presentation	2
UNIT IV – BACK END WEB TECHNOLOGIES FOR IOT				
Introduction to Node.JS, Node package manager	CO4	K2	Chalk and Talk/ Presentation	1
Callback concept, event loop	CO4	K2	Chalk and Talk/ Presentation	2
buffers, streams, file system, Global object.	CO4	K2	Chalk and Talk/ Presentation	2
Utility module, web modules.	CO4	K2	Chalk and Talk/ Presentation	2
Express framework, RESTful API. JSON.	CO4	K2	Chalk and Talk/ Presentation	2
UNIT V – SINGLEBOARD COMPUTER & WEB PROGRAMMING				
Introduction to Raspberry Pi, Architecture, Compatible Peripherals, Add-Ons, andAccessories,	CO5	K2	Chalk and Talk/ Presentation	3
Operating System for Raspberry Pi, Setting up Raspberry Pi,	CO5	K2	Chalk and Talk/ Presentation	3
Node.JS aswebserver, returning sensor data as JSON.	CO5	K2	Chalk and Talk/ Presentation	3

Text Books:

1. Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram, "Internet of Things", Wiley, 2016.
2. Nathan Ida, "Sensors, Actuators and their Interfaces", Scitech publishing, 2013.
3. Dominique D. Guinard, Vlad M. Trifa, "Building the Web of Things with Examplesin Node.JS AND RASPBERRY PI", Manning Publications Co., 2016

Reference Books:

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things, A Hands-on-Approach", 1stEdition, Universities press Pvt. Ltd., India, 2015.
2. Rajkumar Buyya, Amir Vahid Dastjerdi, "Internet of Things: Principles and Paradigms", 1st Edition, Elsevier, USA, 2016.
3. Charles Bell, "Beginning Sensor Networks with Arduino and Raspberry Pi", 1st Edition, Apress Publishers, USA, 2013.
4. Patranabis D, "Sensor and Actuators", Prentice Hall of India (Pvt) Ltd. 2005.

E-sources:

1. https://www.raspberrypi.org/
2. https://www.w3schools.com/nodejs/

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT	Other Assessment Tools			
		Cognitive Domain Tool	Affective Domain Tool	Course End Survey	
	(Weightage – 0.5)	(Weightage – 0.2)	(Weightage – 0.2)	(Weightage – 0.1)	
CO1	IAT-1	MCQ/Assignment	Viva	CES-1	0.2
CO2	IAT-1	Tutorial/Assignment	Viva	CES-2	0.2
CO3	IAT-1 & IAT-2	MCQ/Tutorial/Assignment	Viva	CES-3	0.2
CO4	IAT-2	MCQ/Tutorial/Assignment	Viva	CES-4	0.2
CO5	IAT-2	MCQ/Assignment	Viva	CES-5	0.2

RubricsforAssignment (Cognitive domain Tool):

Content	Timeliness	Presentation
80%	10%	10%

Rubrics for Evaluation of Affective domain Tools:

For Viva-Voce/Presentation:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Indicator 1 (Knowledge of Subject)	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Indicator 2 (Answering Queries)	Answers all parts of the question correctly and thoroughly	Answers all parts of the question correctly	Answers part of the question or is partially correct	Attempts to answer the question but is incorrect	Does not answer appropriately
Indicator 3 (Communication skill)	Spoke clearly with volume and expression and emphasized key messages	Presented with confidence and displayed enthusiasm	Presenter exemplified proper body language	Made eye contact throughout the duration	Engaged the person

Course Instructor (P.PARISHENBAGAM)

Course Coordinator (P.PARISHENBAGAM)

Module Coordinator

Programme Coordinator

HOD/ECE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI - 628 503
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Estd : 1984

Course Committee Meeting (Academic Year: 2022- 2023 Even semester)

Course Code and Title	:	19EC43C-Microprocessor and Microcontrollers
Programme	:	Electronics and Communication Engineering
Semester	:	IV
Regulations	:	R-2019
No. of Credits	:	3
Course Instructors	:	1. Dr.K.J.Prasanna Venkatesan, Asso.Prof/ECE 2. Mrs.C.Kalleswari, AP/ECE 3. Ms.A.Apsara, AP/ECE
Course Coordinator	:	Dr.K.J.Prasanna Venkatesan, Asso.Prof/ECE

Course committee meeting has been conducted for discussing the course plan, content delivery method, fixing the assessment methods and weightage for CO calculations on 30.12.2022 at 2:30 p.m.

Minutes of Meeting

1. Based on the course content, the blooms level and course outcome, target and threshold has been confirmed as follows.

COs	CO Statements: Upon the completion of the course, the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Explain the internal architecture and organization of 8085 Microprocessor	K2	PO1,PO3	-	65
CO2	Develop assembly language programming using microprocessor	K2	PO1, PO2, PO3,PO12	PSO1	65
CO3	Describe the internal architecture and organization of 8051 Microcontroller	K2	PO1, PO3, PO12	-	65
CO4	Design microcontroller-based system	K3	PO1, PO3, PO4,PO12	PSO1	65
CO5	Explain the basics of RISC processor	K2	PO1,PO5	-	65

2. The weightage for the assessments in course outcome evaluation has been decided as follows.

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.5)	Other Assessment Tools			
		Cognitive Domain Tool (Weightage – 0.2)	Affective Domain Tool (Weightage – 0.2)	Course End Survey (Weightage – 0.1)	
CO1	IAT	MCQ/Assignment	Viva	CO end survey	0.2

CO2	IAT	MCQ/Tutorial	Viva	CO end survey	0.2
CO3	IAT	MCQ/Assignment	Viva	CO end survey	0.2
CO4	IAT	MCQ/Tutorial	Viva	CO end survey	0.2
CO5	IAT	MCQ	Viva	CO end survey	0.2

3. Percentage of Knowledge level in IAT has been decided as follows.

COs	% wise contribution of questions in three internal assessment tests			% of Weightage of CO for Internal Mark
	K1	K2	K3	
CO1	2%	18%		20%
CO2	2%	18%		20%
CO3	2%	8%		20%
CO4		8%	12%	20%
CO5	2%	8%		20%

4. It is proposed to conduct minimum of three meeting with concerned faculties in order to plan the course delivery planning and review of the progress.
5. Separate Moodle Classroom for the course should be opened before reopening day.
6. It is proposed to conduct two tests for the evaluation of all 5 COs.
7. The question paper meeting for internal assessment test must be based on Blooms level.

30/12/22 30/12/22 30/12/22
Course Instructors

30/12/22
Course Co-ordinator

04/01/2023
Module Co-ordinator
(T. Deva Kumar)

N. A...
Programme Co-ordinator

HoD/ECE

Dr.A.SHENBAGAVALLI M.E., Ph.D
PROFESSOR & HEAD
Department of Electronics and Communication Engg
National Engineering College
K.R. Nagar, KOVILPATTI 628 503

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Theory Course Plan - Odd Semester - 2021-2022

Date: 01.08.2022

Course Code and Title	**:**	19EC32C – Digital System Design
Programme	**:**	B.E.-Electronics and Communication Engineering
Semester	**:**	III
Course Instructors	**:**	Dr.A.Shenbagavalli, Prof & Head/ECE Mrs.R.Manjula Devi, AP(SG)/ECE Mr.I.Vivek Anand, AP(SG)/ECE

Course Outcomes (COs):

COs	**CO Statements** Upon the completion of the course the students will be able to	**CO Level**	**Related PO**	**Related PSO**	**Threshold**	**Target**
CO1	Understand and represent Logic function and simplify it	K2	PO1, PO2,PO3, PO12	PSO1	65	80
CO2	Design and analyze combinational circuits	K3	PO1, PO2, PO3, PO6 PO12	PSO1	65	80
CO3	Design and analyze sequential circuits	K3	PO1, PO3, PO5, PO7, PO12	PSO1	65	80
CO4	Understand Logic families, working of Memory elements and Programmable Logic devices	K2	PO1, PO2, PO3, PO6 PO12	PSO2	65	80
CO5	Write simulation codes for digital circuits using Verilog HDL	K3	PO1, PO2, PO3, PO6 PO12	PSO2	65	80

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak ☐*- No*

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I DIGITAL LOGIC AND ITS SIMPLIFICATION				
Boolean algebra, Number systems	CO1	K2	Lecture with discussion, Presentation, Videos	1
De Morgan's theorem, Binary arithmetic	CO1	K2	Lecture with discussion, Presentation, Videos	1
SOP, POS, Universal gates	CO1	K2	Lecture with discussion, Presentation, Videos	1
Canonical forms, Duality	CO1	K2	Lecture with discussion, Presentation, Videos	1
Binary codes, Code conversions	CO1	K2	Lecture with discussion, Presentation, Videos	2
Boolean expression simplification using Karnaugh Maps	CO1	K2	Lecture with discussion, Presentation, Videos	2
UNIT II COMBINATIONAL LOGIC				
Adder, Subtractor	CO2	K3	Lecture with discussion, Presentation, Videos	2
BCD Adder, Decoder	CO2	K3	Lecture with discussion, Presentation, Videos	1
Encoder, Multiplexer	CO2	K3	Lecture with discussion, Presentation, Videos	1
Function realization using Multiplexer & Decoder	CO2	K3	Lecture with discussion, Presentation, Videos	1
Comparator, Parity generator & checker	CO2	K3	Lecture with discussion, Presentation, Videos	2
Barrel shifter, ALU, Driver and Multiplexed display, Parallel adder	CO2	K3	Group Assignment with presentation	2
UNIT III SEQUENTIAL LOGIC				
SR, JK, Master-slave	CO3	K3	Lecture with discussion, Presentation, Videos	2
Edge triggered FFs, Ripple & Synchronous counter	CO3	K3	Lecture with discussion, Presentation, Videos	2
Shift register, Design of synchronous sequential circuits	CO3	K3	Lecture with discussion, Presentation, Videos	2
Moore, Mealy, Serial Adder Design	CO3	K3	Lecture with discussion, Presentation, Videos	1
Generation of Pulse train, Pseudo random sequence and clock signals	CO3	K3	Lecture with discussion, Presentation, Videos	1
Asynchronous sequential design-Hazards, Races	CO3	K3	Group Assignment with presentation	1
UNIT IV LOGIC FAMILIES, MEMORY ELEMENTS AND PLDs				
TTL specifications, TTL	CO4	K2	Lecture with discussion, Presentation, Videos	2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
ECL, CMOS Logic Family and its Interfacing	CO4	K2	Lecture with discussion, Presentation, Videos	2
Characteristics, Memory Elements	CO4	K2	Lecture with discussion, Presentation, Videos	2
Static RAM, dynamic RAM	CO4	K2	Lecture with discussion, Presentation, Videos	1
ROM, EPROM, FPGA	CO4	K2	Lecture with discussion, Presentation, Videos	1
Programmable Logic devices – PLA, PAL, PLD	CO4	K2	Lecture with discussion, Presentation, Videos	1
UNIT V HDL PROGRAMMING				
HDL, Verilog data types and objects	CO5	K3	Lecture with discussion, Presentation, Videos	2
Modeling – Gate level	CO5	K3	Lecture with discussion, Presentation, Videos	2
Data flow and behavioral	CO5	K3	Lecture with discussion, Presentation, Videos	1
Programming for Adder	CO5	K3	Lecture with discussion, Presentation, Videos	1
Multiplexer, Flip flops	CO5	K3	Group Assignment with presentation	1
Registers and Counters.	CO5	K3	Lecture with discussion, Presentation, Videos	2

TEXT BOOKS

1. M. Morris Mano, Michael D. Ciletti, "Digital Design with an introduction to Verilog HDL", PHI, 6th Edition, 2018

2. Charles Roth, L.K.John, B.K.Lee, "Digital System Design using Verilog", Cengage, 1st Edition, 2016.

REFERENCES

1. R.P. Jain, "Modern digital Electronics", Tata Mc-Graw Hill, 4th Edition, 2010.

2. Donald P.Leach, A.P.Malvino, Goutam Saha, "Digital Principles and Applications", Tata Mc-Graw Hill, 8th Edition, 2014

3. James E. Palmer, David E. Perlman,``Schuams Outlines-Introduction to Digital Systems", Tata McGraw Hill, 2nd Edition 2003

4.Thomas L.Floyd,"Digital Fundamentals", PHI, 11th Edition, 2017.

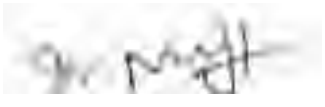
Assessment Procedure:

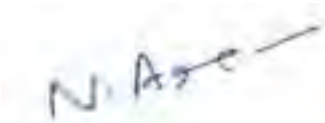
CO	Assessment Tools			Weightage of CO for internal mark
	(Weightage – 0.60)	**(Weightage – 0.30)**	**(Weightage – 0.1)**	
CO1	Internal Assessment Test	Viva, Assignment	Course End Survey-1	**0.2**

CO	Assessment Tools			Weightage of CO for internal mark (Weightage – 0.30)
	(Weightage – 0.60)	(Weightage – 0.30)	(Weightage – 0.1)	
CO2	Internal Assessment Test	Class Test, Assignment	Course End Survey -2	0.2
CO3	Internal Assessment Test	Multiple Choice Question, Assignment	Course End Survey -3	0.2
CO4	Internal Assessment Test	Open Book Test, Assignment	Course End Survey -4	0.2
CO5	Internal Assessment Test	Viva, Assignment	Course End Survey -5	0.2

Rubrics for Evaluation of Open Book Test:

CATEGORY	4 point	3 point	2 point	1 point
Content: FOCUS 1	Topic is clear, it is explicitly stated	Topic is generally clear though it may not be explicitly stated	Topic may be vague	Topic is unclear or confusing
Content: SUPPORT	Support information is related to and supportive of the topic	Support information has minor weakness in relatedness to and/or support of the topic	Support information has major weakness in relatedness to and /or support of the topic	An attempt has been made to add support information, but it was unrelated or confusing
Content: ELABORATION	Elaboration consists of specific developed details	Elaboration consists of some specific details	Elaboration consists of general and/or undeveloped details, which may be presented in a list like fashion.	Elaboration is sparse; almost no details
Content: ORGANIZATION	Organizational structure establishes relationship between among ideas/events	Organizational structure establishes relationship between among ideas/events, although minor lapses may be present	Organizational structure establishes relationship between among ideas/events. The structure is minimally complete.	Structure establishes relationship between among ideas/events. The overall structure is incomplete or confusing.






Course Instructors **Course Coordinator** **Module Coordinator**

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Theory Course Plan - Odd Semester - 2023-2024

Date: 05.07.2023

Course Code and Title	:	**19EC34C NETWORK THEORY**
Programme	:	B.E.-Electronics and Communication Engineering
Semester	:	III
Course Instructors	:	Dr.A.Shenbagavalli Prof/ECE, Dr.R.Manjula Devi AP(SG)/ECE, Mrs.S.Malathi AP/ECE & Mrs.C.Kalieswari AP/ECE

Prerequisite Courses:

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Analyze dc and steady state ac networks using various techniques and network theorems.	K3	PO1, PO2, PO3, PO4, PO10	PSO1	75
CO2	Apply and determine the time domain response of series RL,RC and RLC circuits for DC and AC excitation.	K3	PO1, PO2, PO3, PO4, PO10	PSO1	70
CO3	Apply and determine the frequency domain response of resonant circuits and to design passive filters.	K3	PO1, PO3, PO2, PO4, PO10	PSO1	70
CO4	Apply Laplace transform for analysis and synthesis of two port networks.	K3	PO1, PO2, PO3, PO4, PO10	PSO1	75
CO5	Synthesis two port networks and derive its parameters.	K3	PO1, PO2, PO4, PO10	PSO1	75

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I STEADY STATE DC AND AC CIRCUIT ANALYSIS				
CO1- Analyze dc and steady state ac networks using various techniques and network theorems.				
Introduction to Electric circuits	CO1	K3	Lecture with Discussion	1
Mesh current method	CO1	K3	Lecture with Discussion	2
Node voltage method	CO1	K3	Lecture with Discussion	2
Superposition theorem, source transformation	CO1	K3	Lecture with Discussion	2
Thevenin's theorem	CO1	K3	Lecture with Discussion	2
Norton's theorem	CO1	K3	Lecture with Discussion	1
Maximum power-transfer theorem	CO1	K3	Lecture with Discussion	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT II - TRANSIENT RESPONSE ANALYSIS				
CO2- Apply and determine the time domain response of series RL,RC and RLC circuits for DC and AC excitation				
Step response of first order series RL,RC circuits	CO2	K3	Lecture with Discussion	2
Step response of second order RLC circuit	CO2	K3	Lecture with Discussion	2
Sinusoidal response of first order series RL,RC circuits	CO2	K3	Lecture with Discussion	2
Sinusoidal response of second order RLC circuit	CO2	K3	Lecture with Discussion	2
sinusoidal steady state analysis	CO2	K3	Lecture with Discussion	2
UNIT III – RESONANCE CIRCUITS				
CO3- Apply and determine the frequency domain response of resonant circuits and to design passive filters				
Series resonance	CO3	K3	Lecture with Discussion	1
Parallel resonance	CO3	K3	Lecture with Discussion	1
Bandwidth calculation	CO3	K3	Lecture with Discussion	2
Quality factor calculation	CO3	K3	Lecture with Discussion	1
Selectivity calculation	CO3	K3	Lecture with Discussion	1
Passive filters design	CO3	K3	Lecture with Discussion & Animation Videos	2
UNIT IV – CIRCUIT ANALYSIS & SYNTHESIS USING S-DOMAIN				
CO4- Apply Laplace transform for analysis and synthesis of two port networks.				
Circuit element models in s-domain	CO4	K3	Lecture with Discussion	1
Circuit analysis	CO4	K3	Lecture with Discussion	2
Transfer function calculation	CO4	K3	Lecture with Discussion	1
State-variable based approach	CO4	K3	Lecture with Discussion	2
Conversion from state-variable to transfer function	CO4	K3	Lecture with Discussion	2
Network stability	CO4	K3	Lecture with presentation	1
Network synthesis	CO4	K3	Lecture with Discussion	2
UNIT V - LINEAR TWO PORT NETWORKS				
CO5- Synthesis two port networks and derive its parameters.				
Impedance parameters	CO5	K3	Lecture with Discussion	2
Admittance parameters	CO5	K3	Lecture with Discussion	2

Hybrid parameters	CO5	K3	Lecture with Discussion	1
Transmission parameters	CO5	K3	Lecture with Discussion	1
Relation between parameters	CO5	K3	Lecture with Presentation	2
T and Pi networks	CO5	K3	Lecture with Discussion	1
Interconnection of two-port networks	CO5	K3	Lecture with Discussion	1

REFERENCES:

1. Robert L. Boylestad, "Introductory circuit analysis", 13th Edition, Pearson, 2016.
2. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", 5thEdition, McGraw Hill, 2012.
3. John Bird, "Electrical Circuit Theory and Technology", 5th Edition, Newness Publication, 2014.Zainal abedin Navabi, "Verilog Digital System Design", 2nd Edition, Tata Mc Graw Hill, 2008.
4. William H. Hayt, Jack, E.Kemmerly and Steven M. Durbin, "Engineering Circuit Analysis", 8th Edition, Tata Mc-Graw Hill, 2012.
5. Joseph A. Edminister, Mahmood, Nahvi, "Electric Circuits", Schaum's Series, 5th Edition, Tata Mc-Graw Hill, 2010.

E-SOURCES:

1. https://archive.nptel.ac.in/courses/108/105/108105159/
2. https://archive.nptel.ac.in/courses/108/104/108104139/

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT	Cognitive Domain Tool	Affective Domain Tool	Course End survey	
	(Weightage – 0.5)	(Weightage – 0.2)	(Weightage – 0.2)	(CO end Survey -0.1)	
CO1	IAT	Assignment	Viva	CO end survey	0.2
CO2	IAT	Tutorial	Viva	CO end survey	0.2
CO3	IAT	MCQ /Assignment	Viva	CO end survey	0.2
CO4	IAT	Assignment	Viva	CO end survey	0.2
CO5	IAT	Tutorial	Viva	CO end survey	0.2

Rubrics for Evaluation of Cognitive domain tools:

Criteria	4 Proficient	3 Basic	2 Developing	1 Inadequate
Problem identification	Student thoroughly identifies the problem and defines it with accuracy.	Student identifies the problemand defines with accuracy.	Student identifies the problem and defines it, but with some errors.	Student fails to attempt to identify and define the problem.
Strategies/Apply Skills	Student selects efficient problem-solving strategies to find a solution.	Student selects and applies problem solving strategies to find a solution	Student selects and applies inaccurate problem-solving strategies to find a solution.	Student selects and applies inappropriate problem-solving strategies to find a solution.

Accuracy of answer	Student correctly solves theproblem with a logical and sequential written response which integrates substantialand pertinent information, important details, and concepts.	Student correctly solves the problem with a logical and sequential written response that integrates pertinent information, important details, and concepts.	Student incorrectly solves the problem. There are errors in the process used to solve the problem. Written response lacks information, important details, and concepts.	Student incorrectly solves the problem. There are major errors in the process used to solve the problem, with steps either missing or wrong steps employed. Written response is minimal, lacking information, detail, and concepts.
Work presentation	Student presents all work ina clear, neat, organized, andcourse specific manner using technology and/or a variety of resources to communicate information. All aspects of the problem are addressed and correctly labeled. No errors are present.	Student presents work in a clear, organized, and course specific manner. All aspectsof the problem are addressedand correctly labeled. No errors are present.	Student presents work in a somewhat clear, organized, andcourse specific manner. Most aspects of the problem are addressed and labeled. Minor errors are present.	Student presents some work in anunclear, disorganized, non-course specific manner. Most aspects of the problem are not addressed and labeled. There is at least one major error inpresentation of work.

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Viva-Voce (Knowledge of Subject)	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructors **Course Coordinator** **Module Coordinator**

Programme Coordinator

HOD/ECE 6/9/23.

Dr. S. Tamil Selvi
Professor/ECE & Dean (Academic)
National College
K.R. Nagar, - 628 503.
Kovilpatti, Thoothukudi District, India

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University - Chennai)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Theory Course Plan - Odd Semester - 2022-23

22.07.2022

Course Code and Title	:	19EC60E- PRINCIPLES OF OPERATING SYSTEM
Programme	:	B.E.-Electronics and Communication Engineering
Semester	:	V
Course Instructors	:	Mr.T.Devakumar,AP(SG)/ECE Ms.Arulselvagana Selvammal.P, AP/ECE

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Conceptualize the components involved in designing a contemporary OS and determine the various ways of structuring an operating system.	K2	PO1, PO2, PO6, PO9, PO10, PO11, PO12	-	65	80
CO2	Discuss Handle processes, threads, and their communication and solve some of the common operating systems problems such as deadlock and synchronization.	K2	PO1, PO2, PO3, PO5, PO6, PO9, PO10 PO11, PO12	-	65	80
CO3	Explore various techniques of allocating memory to processes and realize the role of virtual memory.	K2	PO1, PO3, PO5, PO6, PO9, PO10 PO11, PO12	-	65	80
CO4	Evaluate disk scheduling algorithms and interpret the mechanisms adopted for file accessing in distributed applications.	K2	PO1, PO3, PO4, PO6, PO9, PO10 PO11, PO12	-	65	80
CO5	Express the methods used to implement virtualization and general structure of distributed operating systems.	K3	PO2, PO3, PO5, PO6, PO7, PO9, PO10 PO11, PO12	-	65	80

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 - Strong 2 - Medium 1 – Weak 0- No

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I OPERATION SYSTEM AND STRUCTURES				
Introduction - Computer-System Organization, Computer System Architecture	CO1	K2	Lecture with discussion, Video Presentation	2
Operating-System Structure, Operating System Operations, Protection and Security	CO1	K2	Lecture with discussion, Presentation	2
Kernel Data Structures - Computing Environments- Open-Source Operating Systems	CO1	K2	Lecture with discussion, Presentation	2
Operating-System Structures - Operating-System Services, System Calls,System Programs	CO1	K2	Lecture with discussion, Video Presentation	2
Operating-System Design and Implementation	CO1	K2	Lecture with discussion, Presentation	1
UNIT II PROCESS MANAGEMENT				
Processes – Process Scheduling, Operations on Processes, Inter-process Communication	CO2	K2	Lecture with discussion, Presentation, Live demonstration, Project based Learning	2
Communication in Client– Server Systems	CO2	K2	Lecture with discussion, Presentation	1
Threads - Multithreading Models, Process Synchronization - The Critical-Section Problem	CO2	K2	Lecture with discussion, Presentation, Live demonstration	2
Peterson's Solution, Semaphores, Classic Problems of Synchronization	CO2	K2	Lecture with discussion, Presentation	1
CPU Scheduling - Scheduling Algorithms, Thread Scheduling	CO2	K2	Lecture with discussion, Presentation	1
Deadlocks – Methods for Handling Deadlocks, Deadlock Prevention,	CO2	K2	Lecture with discussion, Presentation	1
Avoidance and Detection, Recovery from Deadlock	CO2	K2	Lecture with discussion, Presentation	1
UNIT III MEMORY MANAGEMENT				
Main Memory - Swapping, Contiguous Memory Allocation,	CO3	K2	Lecture with discussion, Video Presentation	2
Segmentation, Paging	CO3	K2	Lecture with discussion, Presentation	1
Segmentation with paging, Structure of the Page Table	CO3	K2	Lecture with discussion, Presentation	2
Virtual Memory - Demand Paging, Page Replacement	CO3	K2	Lecture with discussion, Presentation	2
Allocation of Frames, Thrashing	CO3	K2	Lecture with discussion, Presentation	1
Memory-Mapped Files, Allocating Kernel Memory.	CO3	K2	Lecture with discussion, Presentation	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT IV STORAGE MANAGEMENT				
Mass-Storage Structure - Disk Structure, Disk Attachment	CO4	K2	Lecture with discussion, Presentation, Questioning & answering	2
Disk Scheduling, Disk Management	CO4	K2	Lecture with discussion, Presentation, Live demonstration	1
File-System Interface - Access Methods, Directory and Disk Structure	CO4	K2	Lecture with discussion, Presentation, Questioning & answering	2
File-System Mounting, File Sharing	CO4	K2	Lecture with discussion, Presentation, Questioning & answering	1
File-System Implementation - File-System Structure and Implementation	CO4	K2	Lecture with discussion, Presentation, Questioning & answering	1
Directory Implementation, Allocation Methods, Free-Space Management	CO4	K2	Lecture with discussion, Video Presentation	2
UNIT V ADVANCED OPERATING SYSTEM				
Virtual Machines – Building Blocks	CO5	K3	Lecture with discussion, Video Presentation	1
Types of Virtual Machines and Their Implementations	CO5	K3	Lecture with discussion, Presentation, Project based Learning	2
Virtualization and Operating System Components	CO5	K3	Lecture with discussion, Live demonstration	2
Distributed Systems - Types of Network-based Operating Systems	CO5	K3	Lecture with discussion, Presentation	2
Network Structure, Communication Structure and Protocols	CO5	K3	Lecture with discussion, Presentation	2

TEXT BOOKS

1. G. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne Operating System Concepts, 9th Edition, John Wiley & Sons Private Limited, 2013.

2. Operating Systems: Internals and Design Principles, 8thEdition, William Stallings, Pearson Education Limited, 2015.

REFERENCES

1. Andrew S. Tanenbaum, Modern Operating System, 4th Edition, Pearson Education Limited, 2014.

2. Operating System: A Design-oriented Approach, 2nd Edition, Charles Crowley, Irwin Publishing, 2011.

3. Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India, 2006

4 Understanding the Linux Kernel, 3rd Edition, Daniel P. Bover, Marco Cesati, O'Reilly and Associates, 2008.

Assessment Procedure:

CO	Assessment Tools				
	IAT (Weightage – 0.6)	Other Assessment Tools			Weightage of CO for internal mark
		Cognitive Domain Tool (Weightage – 0.2)	Affective Domain Tool (Weightage – 0.2)	Course End Survey (Weightage – 0.1)	
CO1	IAT-1	MCQ	Viva	CES-1	0.2
CO2	IAT-1	Tutorial	Project based Assessment	CES-2	0.2
CO3	IAT-1&IAT-2	MCQ Tutorial	Viva	CES-3	0.2
CO4	IAT-2	MCQ Tutorial	Viva	CES-4	0.2
CO5	IAT-2	MCQ	Project Based Assessment Case Study Presentation	CES-5	0.2

Rubrics for Evaluation of Affective domain Tool:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Indicator 1 (Knowledge of Subject)	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Indicator 2 (Organization and Presentation)	Information is presented in a interesting way in easy logical sequence to follow	Information presented in sequence and easy to follow	Most of the information presented in sequence	Some of the information presented in sequence	Hard to follow the information
Indicator 3 (Communication skill)	Spoke clearly with volume and expression and emphasized key messages	Presented with confidence and displayed enthusiasm	Presenter exemplified proper body language	Made eye contact throughout the duration	Engaged the person

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Viva-Voce (Knowledge of Subject)	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructor

Course Coordinator

Module Coordinator

HOD/ECE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI - 628 503
(An Autonomous Institution, Affiliated to Anna University - Chennai)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Theory Course Plan - Even Semester - 2022-23

NEC/AC / 02 (a)

02/03/2022

Course Code and Title	:	19EC41E EMBEDDED SYSTEM ARCHITECTURE
Programme	:	ECE
Semester	:	VI
Course Instructors	:	Dr. K J Prasanna Venkatesan -AP(SG)/ECE, Mr.I Vivek Anand -AP(SO)/ECE
Course Coordinator	:	Dr. K J Prasanna Venkatesan -AP(SG)/ECE, Mr.I Vivek Anand -AP(SO)/ECE

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Explain the Hardware architecture of embedded product.	K2	1,2,3,5,9, 10,11,12,	1	75	80
CO2	Understand the software layered architecture of embedded product	K2	1,2,3,5,9, 10,11,12,	1	75	80
CO3	Distinguish the internal components of FPGA specific design.	K2	1,2,3,5,9, 10,11,12,	1	75	80
CO4	Describe the printed circuit board design principles.	K2	1,2,3,5,9, 10,11,12,	1	75	80
CO5	Understand the concept of final product assembly sequence.	K2	1,2,3,5,9, 10,11,12,	1	75	80

Mapping of Course Outcomes (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak - No

Course Content Delivery Method:

Course Content	Cos	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I HARDWARE ARCHITECTURE				
Understanding embedded system Product specifications with Examples	CO1	K2	Chalk and Board Lecture/Online Lecture with discussion	3
Component selection - Component package types	CO1	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Embedded system design flow types- Preparation of Block diagram to Final Product Architecture arrival	CO1	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	4
UNIT II SOFTWARE ARCHITECTURE				
System software – Embedded system software layered architecture.	CO2	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	2
Understanding of different Operating System (Linux, Windows, VxWorks, RTOS etc) features and architectures	CO2	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	3
Basics of Boot loader functionalities	CO2	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	2
significance of Kernel and Device drivers - File system types.	CO2	K2	Chalk and Board Lecture/Online Lecture with discussion Case Study Analysis	2
UNIT III FPGA ARCHITECTURE				
Basic concepts of CPLD architecture - Difference of CPLD & FPGA	CO3	K2	Chalk and Board Lecture/Online Lecture with discussion	1
Basic interface protocol study – I2C, GPIO, SPI & UART	CO3	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Packaging options – concept of on chip logic blocks design-FPGA Design flow	CO3	K2	Chalk and Board Lecture/Online Lecture with discussion	3

Course Content	Cos	Level of Content	Content Delivery	No. of Hours to be Handled
Preparation of Block diagram to Final FPGA Architecture arrival	CO3	K2	Chalk and Board Lecture/Online Lecture with discussion, Hands on training	2
UNIT IV PCB ARCHITECTURE				
Understanding of PCB design principles -	CO4	K2	Chalk and Board Lecture/Online Lecture with discussion	1
Different PCB options	CO4	K2	Chalk and Board Lecture/Online Lecture with discussion	2
PCB component placement guidelines - PCB layout routing	CO4	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Gerber generation	CO4	K2	Chalk and Board Lecture/Online Lecture with discussion, Hands on training	4
UNIT V DESIGN FOR MANUFACTURING				
Understanding of basic Component assembly process - Different ways of assembly – machine assembly/manual assembly -	CO5	K2	Chalk and Board Lecture/Online Lecture with discussion	3
Component storage options - Assembly flow	CO5	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Understanding of basic mechanical ID design	CO5	K2	Chalk and Board Lecture/Online Lecture with discussion	2
Different mechanical enclosure options - Advantages & Disadvantages of different mechanical enclosure	CO5	K2	Chalk and Board Lecture/Online Lecture with discussion	3

Text Books:

1Vilas S bagad, "Electronics product design", Technical publications, Pune 2009.
2. Rajkamal, "Embedded sysytem- Architecture, programming and design", Mcgraw Hill, 2017.

Reference Books:

1. Shibu K.V, "Introduction to Embedded systems", Mcgraw Hill, 2017
2. Kiyofumi Tanaka, "Embedded systems –Theory and Methodology", Intech publication, Croatia, 2012.
3. Jack Ganssle, "The art of designing embedded system", 2nd Edition, Newness publication, 2008.

Course Instructor

HOD/ECE 2/3/2022

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Theory Course Plan - Even Semester - 2022-2023

Date: 04.01.2023

Course Code and Title	:	19EC42E-Embedded System Analysis and Risk Management
Programme	:	B.E.-Electronics and Communication Engineering
Semester	:	VI
Course Instructor	:	Mr.T.Devakumar, AP-SG/ECE

Prerequisite Course: 19EC41E Embedded System Architecture

Course Outcomes and its Mapping with Program Outcomes:

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Explain embedded product design specific feasibility analysis	K2	PO3, PO6	PSO1	65
CO2	Explain embedded product component specific feasibility analysis.	K2	PO3, PO5	PSO1	65
CO3	Understand the concept of embedded product validation	K2	PO3, PO12	PSO1	65
CO4	Distinguish different certification standards.	K2	PO3, PO7	PSO1	65
CO5	Understand the concept of Risk management.	K2	PO3, PO7	PSO1	65

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I FEASIBILITY ANALYSIS: DESIGN SPECIFIC				
CO1 Explain embedded product design specific feasibility analysis				
Conceptual design arrival to Final Product(**MISTRAL/TATA ELAXI**)	CO1	K2	Lecture with Discussion , PPT and Videos	3
Use Case Analysis	CO1	K2		2
Product Feature Analysis	CO1	K2		2
End application Analysis	CO1	K2		2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT II FEASIBILITY ANALYSIS: COMPONENT SPECIFIC				
CO2 Explain embedded product component specific feasibility analysis				
EMI/EMC Analysis need and types	CO2	K2	Lecture with Discussion and PPT	2
MTBF Analysis-Reliability Analysis Thermal Analysis	CO2	K2		3
Signal Integrity testing methods	CO2	K2		1
Power Analysis-DC Analysis types-AC Analysis types	CO2	K2		3

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT III VALIDATION				
CO3 Understand the concept of embedded product validation				
Validation concepts and methods	CO3	K2	Lecture with Discussion and PPT	2
Validation through Environmental Concern	CO3	K2		2
Design for manufacturing (DFM)	CO3	K2		2
Design for testability	CO3	K2		3

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT IV VALIDATION				
CO4 Understand the concept of embedded product validation				
Types of Certifications for embedded system product	CO4	K2	Lecture with Discussion and PPT	2
FCC/CE and UL standards	CO4	K2		2
DO254 standards and its components	CO4	K2		2
DO178 Standards and its components	CO4	K2		3

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT V MARKET RESEARCH & RISK MANAGEMENT				
CO5 Understand the concept of risk management				
Different schemes for existing products analysis and gap analysis	CO5	K2	Lecture with Discussion and PPT	2
Product competitor analysis for existing products arrival of Product cost	CO5	K2		2
Product feature enhancement analysis	CO5	K2		2
Methods of Market research for products	CO5	K2		3

TEXT BOOKS

1. Vilas S Bagad, "Electronics product design", Technical publications, Pune 2009.
2. John P.Uyemura, "Introduction to VLSI circuits and Systems", Wiley student Edition, 2006.

REFERENCES

1. Gunarschirner, "Embedded system: Design, Analysis and verification", Springer, 2013.
2. Edward Ashford Lee, "Introduction to Embedded Systems – a cyber-physical system approach", 2nd Edition, MIT press, 2017.
3. Shibu K.V, "Introduction to Embedded systems", Mcgraw Hill, 2017.
4. Kiyofumi Tanaka, "Embedded systems –Theory and Methodology", Intech publication, Croatia, 2012. 5. Arnold Berger, "Embedded system Design –An Introduction to process, Tolls and Techniques", CMP Books, 2002.
6. Jack Ganssle, "The art of designing embedded system", 2nd edition, Newness publication, 2008.
7. Kim H Pries, "Testing complex and embedded systems", CRC Press, 2010.

ONLINE REFERENCES

1. https://users.ece.utexas.edu/~valvano/Volume1/E-Book/C7_DesignDevelopment.htm
2. https://awrcorp.com/download/faq/english/docs/simulation/dc_analysis.html
3. https://www.alberta.ca/how-demand-and-supply-determine-market-price.aspx
4. https://www.aha.io/roadmapping/guide/requirements-management/what-are-product-features

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT	Cognitive Domain Tool	Affective Domain Tool	Course End survey	
	(Weightage 0.5)	(Weightage 0.2)	(Weightage 0.2)	(Weightage 0.2)	
CO1	IAT	MCQ/Assignment	Viva	CO end survey	0.2
CO2	IAT	MCQ/Tutorial	Viva	CO end survey	0.2
CO3	IAT	MCQ /Assignment	Viva	CO end survey	0.2
CO4	IAT	MCQ/Tutorial	Viva	CO end survey	0.2
CO5	IAT	MCQ	Viva	CO end survey	0.2

Rubrics for Evaluation of Cognitive domain tools:

CATEGORY	4 point	3 point	2 point	1 point
Content: FOCUS	Topic is clear, it is explicitly	Topic is generally clear though it	Topic may be vague	Topic is unclear or confusing
	stated	may not be explicitly stated		
Content: SUPPORT	Support information is supportive of the topic	Support information has minor weakness	Support information has major weakness	Support information was unrelated
Content: ELABORATION	Elaboration consists of specific developed details	Elaboration consists of some specific details	Elaboration consists of general and/or undeveloped details.	Elaboration is sparse; almost no details
Content: ORGANIZATION	Organizational structure establishes in perfect	Organizational structure with minor lapses may be present	Organizational structure is minimally complete.	Structure is incomplete or confusing.

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Viva-Voce (Knowledge of Subject)	Demonstrated with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructor
(T. Devakumar)

Module Coordinator
(T. Devakumar)

N. Age

Programme Coordinator

HOD/ECE

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI - 628 503
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Estd : 1984

Course Committee Meeting (Academic Year: 2022- 2023 Even semester)

Course Code and Title	:	19EC43C-Microprocessor and Microcontrollers
Programme	:	Electronics and Communication Engineering
Semester	:	IV
Regulations	:	R-2019
No. of Credits	:	3
Course Instructors	:	1. Dr.K.J.Prasanna Venkatesan, Asso.Prof/ECE 2. Mrs.C.Kalleswari, AP/ECE 3. Ms.A.Apsara, AP/ECE
Course Coordinator	:	Dr.K.J.Prasanna Venkatesan, Asso.Prof/ECE

Course committee meeting has been conducted for discussing the course plan, content delivery method, fixing the assessment methods and weightage for CO calculations on 30.12.2022 at 2:30 p.m.

Minutes of Meeting

1. Based on the course content, the blooms level and course outcome, target and threshold has been confirmed as follows.

COs	CO Statements: Upon the completion of the course, the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Explain the internal architecture and organization of 8085 Microprocessor	K2	PO1,PO3	-	65
CO2	Develop assembly language programming using microprocessor	K2	PO1, PO2, PO3,PO12	PSO1	65
CO3	Describe the internal architecture and organization of 8051 Microcontroller	K2	PO1, PO3, PO12	-	65
CO4	Design microcontroller-based system	K3	PO1, PO3, PO4,PO12	PSO1	65
CO5	Explain the basics of RISC processor	K2	PO1,PO5	-	65

2. The weightage for the assessments in course outcome evaluation has been decided as follows.

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.5)	Other Assessment Tools			
		Cognitive Domain Tool (Weightage – 0.2)	Affective Domain Tool (Weightage – 0.2)	Course End Survey (Weightage – 0.1)	
CO1	IAT	MCQ/Assignment	Viva	CO end survey	0.2

CO2	IAT	MCQ/Tutorial	Viva	CO end survey	0.2
CO3	IAT	MCQ/Assignment	Viva	CO end survey	0.2
CO4	IAT	MCQ/Tutorial	Viva	CO end survey	0.2
CO5	IAT	MCQ	Viva	CO end survey	0.2

3. Percentage of Knowledge level in IAT has been decided as follows.

COs	% wise contribution of questions in three internal assessment tests			% of Weightage of CO for Internal Mark
	K1	K2	K3	
CO1	2%	18%		20%
CO2	2%	18%		20%
CO3	2%	8%		20%
CO4		8%	12%	20%
CO5	2%	8%		20%

4. It is proposed to conduct minimum of three meeting with concerned faculties in order to plan the course delivery planning and review of the progress.
5. Separate Moodle Classroom for the course should be opened before reopening day.
6. It is proposed to conduct two tests for the evaluation of all 5 COs.
7. The question paper meeting for internal assessment test must be based on Blooms level.

Course Instructors

Course Co-ordinator

04.01.2023
Module Co-ordinator
(T. Deva Kumar)

Programme Co-ordinator

HoD/ECE

Dr.A.SHENBAGAVALLI M.E., Ph.D.
PROFESSOR & HEAD
Department of Electronics and Communication Engg
National Engineering College
K.R. Nagar, KOVILPATTI 628 503

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OFINFORMATION TECHNOLOGY
Theory Course Plan - Odd Semester - 2022-2023

NEC/AC/02 (a)
Date: 05/08/2022

Course Code and Title	:	**19IT32C DATASTRUCTURES AND ALGORITHMS**
Programme	:	INFORMATION TECHNOLOGY
Semester & Year	:	III & II
Course Instructor	:	Ms.N.Gowthami

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	apply the concepts of array and linked list for solving problems.	K3	1,2	1	65	75%
CO2	apply stack and queue data structures to solve problems.	K3	1,2,3,4	1,2	60	70%
CO3	apply tree data structure concepts to solve any computing problems.	K3	1,2,3,4	1	65	75%
CO4	analyze the various hashing techniques and heaps and apply them to solve problems.	K3	1,2,3,4	1,2	65	75%
CO5	apply graph data structure concepts to solve problems.	K3	1,2,3,4	1,2	60	75%

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak ☐- No

In 2021-2022 academic year, the 2020 batch student studied this subject and the following target and threshold have been fixed. With the continuation, the attainment value was tabulated.

	2021-2022			2022-2023	
Cos	Threshold	Target	Attainment	Threshold	Target
CO1	60	70%	73%	65	75%
CO2	60	70%	62%	60	70%
CO3	60	75%	79%	65	75%
CO4	60	85%	86%	65	75%
CO5	55	80%	83%	60	75%

- **CO1** – In previous year, threshold =60, target =70% and the attainment % at the end of unit 1 is 73%. So for this academic year, the threshold and target has been increased from 70% to 75%.
- **CO2**– In previous year, threshold =60, target =70% and the attainment % at the end of unit 2 is 62%. The target % is reasonable and acceptable for this course content. So Instead of updating target and threshold, here the content delivery method has been updated as problem solving with demonstration.
- **CO3** – In previous year, threshold =60, target =75% and the attainment % at the end of unit 3 is 79%. So for this academic year, the threshold has been increased from 60 to 65.
- **CO4** – In previous year, threshold =60, target =85% and the attainment % at the end of unit 4 is 86%. So for this academic year, the threshold has been increased from 60 to 65.
- **CO5** – In previous year, threshold =55, target =80% and the attainment % at the end of unit 5 is 83%. So for this academic year, the threshold has been increased from 55 to 60.

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled	Page No in Books
UNIT I LINEAR DATA STRUCTURES – ARRAY & LIST					
Introduction	CO1	K2	M-Learning	1	R1-1
Abstract Data Types	CO1	K3	Power Point Presentation		R5 – 10
Arrays: Operations	CO1	K3	Video Lectures	1	R1-13
searching and sorting on arrays	CO1	K3	Chalk & Board with problem based learning	1	R2 – 424
Linear search - binary search on a sorted array	CO1	K3			R2 – 424
Bubble sort – Selection sort	CO1	K3		1	R2 – 434, 440
Insertion sort - Merge Sort	CO1	K3		1	R2 – 438, 443
Quick sort - Counting sort	CO1	K3		1	R2 - 446
Heap sort	CO1	K3		1	R2 - 454
Radix sort- bucket sort	CO1	K3		1	R2 - 450
Singly Linked Lists	CO1	K3		1	EB1 -57
Doubly Linked Lists – Circular Linked List	CO1	K3		2	EB1 - 67
Applications of Linked Lists	CO1	K3	Classroom Discussion	1	R2-199
UNIT II LINEAR DATA STRUCTURES – STACK & QUEUE					
Recursion	CO2	K3	Video Lectures	1	R2 - 243
Stack ADT: Representation	CO2	K3	Video Lectures	2	R5 -79
Operations – Applications	CO2	K3	Chalk & Board with problem based learning	2	R5 -95
Evaluating arithmetic expressions	CO2	K3		1	R5 – 118
Conversion of Infix to postfix expression	CO2	K3	Problem Solving with Demonstration	2	R5 - 110

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled	Page No in Books
Queue ADT: Operations	CO2	K3	Chalk & Board with problem based learning	1	R5 -147
Circular Queue	CO2	K3	Problem Solving with Demonstration	1	R2 -260
Priority Queue	CO2	K3	Video Lectures	1	R2 -268
Applications of Queues	CO2	K3	Classroom Discussion	1	R5 -188
UNIT III TREE DATA STRUCTURES					
Introduction	CO3	K3	Video Lectures	1	EB1 - 105
Tree representation and other tree parameters	CO3	K3	Chalk & Board with problem based learning	2	EB1 – 105
Tree traversal	CO3	K3		2	R5 - 301
Application of binary trees in Huffman coding	CO3	K3		2	R5 - 262
Expression trees	CO3	K3		2	EB1 – 113
Binary search trees	CO3	K3		2	EB1 -116
Balanced binary search trees	CO3	K3		1	R1 - 276
UNIT IV HASHING AND BINARY HEAP					
Hashing: Introduction	CO4	K3	Video Lectures	1	R2 -464
properties of good hash functions - collisions	CO4	K3	Chalk & Board with problem based learning	1	R2 -465
open and closed hashing	CO4	K3		2	R2 -469
Priority Queues	CO4	K3		2	R2 - 268
Binary heaps with application to in-place sorting	CO4	K3		2	R2 -362
Binomial Heaps	CO4	K3		2	R2 -365
Disjoint Sets	CO4	K3		2	R2 -381
UNIT V GRAPH DATA STRUCTURES					
Introduction	CO5	K3	Video Lectures	1	R1 – 356
Representations (Matrix and Adjacency List)	CO5	K3	Chalk & Board with problem based learning	1	R1 – 358
Traversal techniques: Depth First Search - Breadth First Search (Stacks and Queues)	CO5	K3		3	R5 - 465
Prim"s and Kruskal"s Algorithm for Minimum Spanning Tree	CO5	K3		3	R1 – 407

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled	Page No in Books
Single Source Shortest Path algorithm	CO5	K3	Chalk & Board with problem based learning	2	R1 -393
Biconnectivity	CO5	K3		2	EB1 - 338

TEXT BOOK

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2016.

REFERENCES

1. Debasis Samanta, "Classic Data Structures", Second Edition, Prentice Hall, 2012.
2. Reema Thareja, "Data Structures Using C", Second Edition, Oxford University Press, 2019.
3. Alfred V. Aho, John E. Hopcroft, Jeffrey D.Ullman, "Data Structures and Algorithms", Pearson Education, 2012.
4. Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Second Edition, Universities Press, 2008.
5. Richard Gilberg, Behrouz Forouzan, "Data Structures: A Pseudocode Approach with C", v Edition, Cengage Learning, 2004.

Extra Books for reference:

1. T Cormen, C Leiserson, R Rivest, C Stein, "Introduction to Algorithms", Third Edition, MIT Press, 2009.

Online Materials:

1. https://people.ok.ubc.ca/ylucet/DS/Algorithms.html - Data Structure Visualization tool
2. https://visualgo.net/en - Data Structure Visualization tool
3. http://oscar.iitb.ac.in/oscarHome.do - Animation Repository
4. https://nptel.ac.in/courses/106/102/106102064/ - NPTEL Lecture series

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Weightage – 0.15)	Affective Domain Tool (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT1	Cross Word Puzzle	Viva	COES1	0.2
CO2	IAT1	Surprise Test – Problem Solving Skillrack	Role Play	COES2	0.2
CO3	IAT1 & IAT2	Skillrack	Role Play	COES3	0.2
CO4	IAT2	Skillrack	Take and Talk	COES4	0.2
CO5	IAT2	Skillrack	Take and Talk	COES5	0.2

Rubrics for Evaluation of Affective domain Tools:

Rubrics for Evaluation of Viva-Voce/ Take and Talk:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Subject Knowledge	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Answering Queries	Answers all parts of the question correctly and thoroughly	Answers all parts of the question correctly	Answers part of the question or is partially correct	Attempts to answer the question but is incorrect	Does not answer appropriately
Communication	Communicate effectively with proper explanation	Communicate with proper explanation	Communicate with some kind of explanation	Communicate with some irrelevant explanation	Improper Communication with irrelevant explanation

Rubrics for Evaluation of Role Play:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
General presentation and communication	Outstanding work is distinguished by its completeness, thoroughness, and creativity with excellent communication	Level of work is best characterized as solid, well thought out and dependable with well communication	Level of work is good and meets requirements of written work and communication should be improved	Meeting minimum requirements of written work with poor communication	The assignment work does not meet minimum Requirements poor communication
Variety of sources with real time examples	Proper evidence from the relevant sources with suitable real time example	few evidence from the relevant sources with suitable real time example	few evidence from the relevant sources with unsuitable real time example	Single evidence from the relevant sources with unsuitable real time example	No evidence from the relevant sources with unsuitable real time example
Creative Thinking/Innovation	New and Innovative to the approach and has created own design	Student adapts other idea to design, Some originality shown	Student adapts other idea to design, very little originality shown	Creative but no originality shown	Creativity and originality is absent
Subject Knowledge	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructor
(N. Gowtham)

Module Coordinator

HOD/IT

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF INFORMATION TECHNOLOGY
Theory Course Plan - EVEN Semester –2022-2023

NEC/AC/02 (a)
p05.09.2019

Course Code and Title	:	**19IT44C – Computer Networks**
Programme	:	**Information Technology**
Semester	:	**IV**
Regulations	:	**R - 2019**
No. of Credits	:	**3**
Course Instructors	:	**Mrs. R.Madhu AP/IT**
Course Coordinator	:	**Dr.L. JesuJulus, Associate Professor/IT**

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Describe the functionalities of physical and data link layer	K1	1,2	-	70
CO2	Explain the routing algorithms for the given network	K2	1,2,4,12	1,2	70
CO3	Develop simple applications using sockets	K2	1,2,3,12	2	65
CO4	Implement the application layer protocol for the given application	K2	1,2,4,12	1,2	60
CO5	Analyze the various issues involved in transition from IPv4 to IPv6	K2	1,2,6,7,10,12	-	65

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I - PHYSICAL AND DATALINK LAYER				
Data Communication, Network models	CO1	K1	Chalk &Talk	1
OSI model – TCP/IP model	CO1	K1	PPT with Animation	1
Topology	CO1	K1	PPT with Animation	1
Transmission Media	CO1	K1	Animation Video	1
Error Detection and correction	CO1	K1	Chalk &Talk with PPT	2
Parity – LRC – CRC	CO1	K1	Lecture with Demonstration	2
Hamming code	CO1	K1	Lecture with	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
			Demonstration	
Flow Control – Sliding window	CO1	K1	Chalk &Talk with PPT	2
Ethernet – IEEE 802.11 – FDDI – Bridges	CO1	K1	Chalk &Talk with PPT	1
UNIT II NETWORK LAYER				
Circuit switching vs. packet switching	CO2	K2	Lecture with Demonstration	1
IP addressing	CO2	K2	Lecture with Demonstration	1
Internet Protocol	CO2	K2	Animation	1
ARP	CO2	K2	Chalk &Talk with PPT	1
IGMP	CO2	K2	Chalk &Talk with PPT	1
ICMP	CO2	K2	PPT with Demonstration	1
OSPF – RIP	CO2	K2	Packet racer Activity	2
Distributed Bellman-Ford algorithm	CO2	K2	Video Lecture	1
UNIT III TRANSPORT LAYER AND ELEMENTARY SOCKETS				
Process to process delivery	CO3	K2	Chalk & Board	1
TCP and UDP – segment format – services and features	CO3	K2	Video Lectures	1
Congestion control and avoidance	CO3	K2	Video Lectures	1
QoS	CO3	K2	Video Lectures	1
Sockets	CO3	K2	Lecture with PPT	2
Iterative Server – Concurrent Server	CO3	K2	Lecture with PPT	1
I/O multiplexing	CO3	K2	Lecture with PPT	1
TCP variants -Reno, Tahoe, Vegas, Compound and CUBIC	CO3	K2	Lecture with Demo	1
UNIT IV APPLICATION LAYER				
Domain Name System (DNS) – Dynamic DNS	CO4	K2	Lecture with PPT	2
E-mail – Message transfer agent: SMTP	CO4	K2	Video Demonstration	2
Message access agent: IMAP, POP3	CO4	K2	Lecture with PPT	1
File Transfer Protocol	CO4	K2	Video lecture	2
Anonymous FTP	CO4	K2	Video lecture	1
Simple Network Management Protocol	CO4	K2	Chalk &Talk with PPT	1
RMON	CO4	K2	Chalk &Talk with PPT	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT V IPv6				
IPv6 Introduction	CO5	K2	Lecture with PPT	2
Packet format – Extension Headers - IPv6 addressing	CO5	K2	Lecture with PPT	1
IPv6 Protocol – I2B - B2B	CO5	K2	Video lecture	1
ICMPv6 Protocol - Transition from IPV4 to IPV6	CO5	K2	Lecture with Demonstration	1
Dual Stack - Tunneling	CO5	K2	Lecture with Demonstration	1
Header Translation	CO5	K2	Chalk &Talk with PPT	1
Advantages of Ipv6	CO5	K2	Chalk &Talk with PPT	1
Strategies – use of IP addresses	CO5	K2	Lecture with Demonstration	1

Text Books:

1. Kurose and Ross, "Computer Networking - A top-down approach", 7th Edition, Pearson, 2017.
2. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw-Hill, 5th Edition, 2017.
3. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Morgan Kaufmann Publishers Inc., 3rd Edition, 2011.

Reference Books:

1. Ying-Dar Lin, Ren-Hung Hwang, Fred Baker, "Computer Networks: An Open Source Approach", McGraw-Hill, 2011
2. William Stallings, "Data and Computer Communication", Pearson Education, 9th Edition, 2014
3. Andrew S. Tanenbaum, "Computer Networks", Pearson Education, 5th Edition, 2013.
4. D.E. Comer, "Internetworking with TCP/IP Vol- III", (BSD Sockets Version), Pearson Education, 2nd Edition, 2003.
5. W. Richard Stevens, "UNIX Network Programming Vol-I", Pearson Education, 4th Edition, 2000.

WEB REFERENCES

1. http://nptel.ac.in/courses/106105081/
2. http://nptel.ac.in/courses/Webcourse-contents/IIT%20Kharagpur/
3. Computer%20networks/New_index1.html
4. Nptel Video references
5. http://compnetworking.about.com/od/basicnetworkingconcepts/a/network_types.htm
6. http://www.protocols.com/pbook/tcpip1.htm
7. http://csp3book.info.ucl.ac.be/network/network/
8. http://docs.oracle.com/cd/E23824_01/html/821-1453/ipv6-troubleshoot-2.html
9. http://searchsecurity.techtarget.com/tip/Get-ready-for-IPv6-Five-security-issues-toconsider
10. http://www.highteck.net/EN/Application/Application_Layer_Functionality_and_Protocols.htm

Online Materials:

https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-829-computer-networks-fall-2002/

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool	Affective Domain Tool	Course End Survey	
		(Weightage – 0.15)	(Weightage – 0.15)	(Weightage – 0.1)	
CO1	IAT	Group Activity	Viva	CO End Survey	0.2
CO2		MCQ	Viva	CO End Survey	0.2
CO3		Real Time Quiz	Viva	CO End Survey	0.2
CO4		Real Time Quiz	Viva	CO End Survey	0.2
CO5		MCQ	Viva	CO End Survey	0.2

Rubrics for Evaluation of Viva-Voce:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Subject Knowledge	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Answering Queries	Answers all parts of the question correctly and thoroughly	Answers all parts of the question correctly	Answers part of the question or is partially correct	Attempts to answer the question but is incorrect	Does not answer appropriately
Communication	Communicate effectively with proper explanation	Communicate with proper explanation	Communicate with some kind of explanation	Communicate with some irrelevant explanation	Improper Communication with irrelevant explanation

Rubrics for Evaluation of Model Demonstration:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
General presentation and communication	Outstanding work is distinguished by its completeness, thoroughness, and creativity with excellent communication	Level of work is best characterized as solid, well thought out and dependable with well communication	Level of work is good and meets requirements of written work and communication should be improved	Meeting minimum requirements of written work with poor communication	The assignment work does not meet minimum Requirements poor communication
Variety of sources with real time examples	Proper evidence from the relevant sources with suitable real time example	few evidence from the relevant sources with suitable real time example	few evidence from the relevant sources with unsuitable real time example	Single evidence from the relevant sources with unsuitable real time example	No evidence from the relevant sources with unsuitable real time example
Creative Thinking/Innovation	New and Innovative to the approach	Student adapts other idea to design, Some	Student adapts other idea to design, very	Creative but no originality shown	Creativity and originality is absent

	and has created own design	originality shown	little originality shown		
Subject Knowledge	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructor
Mrs.R.Madhu

Course Coordinator
Dr.L.JerartJulus

Module Coordinator
Dr.R.Muthukkumar

HOD/IT
Dr.K.G.Srinivasagan

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OFINFORMATION TECHNOLOGY

Theory Course Plan - Even Semester - 2022-2023

NEC/AC/02 (a)
04.01.2023

Course Code and Title	:	**19IT45C - ALGORITHMICS**
Programme	:	**B.Tech – Information Technology**
Semester & Year	:	**IV & II**
Course Instructors	:	**Dr.R.Muthukkumar, Ms.N.Gowthami**
Course Coordinator	:	**Dr.R.Muthukkumar**
Starting Date	:	**04.01.2022**

Course Outcomes (COs):

COs	CO Statements	CO Level	Related PO	Related PSO	Threshold
Upon the completion of the course the students will be able to					
CO1	Analyze the asymptotic performance of algorithms.	K3	1,2,3,4	1	70
CO2	Derive and solve recurrences describing the performance of dynamic programming and divide and-conquer algorithms.	K3	1,2,3,4	1	70
CO3	Find optimal solution by applying various methods.	K3	1,2,3,4	1,2	70
CO4	Apply number theoretic algorithms to solve computing problems.	K3	1,2,3,4	1	70
CO5	Find optimal solution by applying approximation algorithms.	K3	1,2,3,4	1,2	70

Course Content Delivery Methods:

Course Content	Level of Content	Content Delivery	No. of Hours to be Handled
CO1: Analyze the asymptotic performance of algorithms.			
Role of algorithms in computing	K3	Powerpoint with problem based learning	1
Analyzing and Designing algorithms	K3		1
Asymptotic notations	K3	Chalk & Board with problem based learning	1
Efficiency of algorithms	K3		1
Notion of time and space complexity	K3		1

Course Content	Level of Content	Content Delivery	No. of Hours to be Handled
Amortized analysis	K3		1
CO2: Derive and solve recurrences describing the performance of dynamic programming and divide and-conquer algorithms.			
Strassen's algorithm for matrix multiplication	K3	Chalk & Board with problem based learning	1
The substitution method for solving recurrences	K3		1
Dynamic programming: Warshall's and Floyd's algorithm for shortest path	K3		2
Optimization problems	K3		1
Optimal binary search trees	K3	Chalk & Board with problem based learning + Visualgo.net tools	1
CO3: Find optimal solution by applying various methods.			
Minimum Spanning Trees	K3	Chalk & Board with problem based learning + Visualgo.net tools Learning	1
Dijkstra's algorithm	K3		1
Scheduling	K3	Chalk & Board with problem based learning	2
Huffman code	K3		1
Knapsack problem	K3		1
CO4: Apply number theoretic algorithms to solve computing problems.			
Elementary number theoretic notions	K3	Chalk & Board with problem based learning	1
Solving modular linear equations	K3		1
The Chinese remainder theorem	K3		1
RSA public-key cryptosystem	K3		1
Primality testing	K3		1
Integer factorization	K3		1
CO5: Find optimal solution by applying approximation algorithms.			
Introduction - N-Queens Problem	K3	Problem based Learning	1
Hamiltonian Circuit Problem	K3		1
Subset Sum problem Assignment Problem	K3		1
Graph coloring problem	K3		1
0/1 Knapsack problem	K3		1
Travelling Salesmen Problem	K3		1

TEXT BOOK

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein , "Introduction to Algorithms", Third Edition, 2009.
2. Anany Levitin, "Introduction to The Design & Analysis of Algorithms", Second Edition, Pearson Education, 2016.

REFERENCES

1. Richard Neapolitan, "Foundations of Algorithms", Fifth Edition, Jones and Bartleft Publishers,2015.
2. Parag H.Dave, Himanshu B.Dave, "Design and Analysis of Algorithms", Pearson Education, 2008.
3. Brassard Gills, Bratley Paul, "Fundamentals of Algorithmics", Prentice Hall India Pvt.Ltd., 2001
4. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, 2006.
5. Donald E. Knuth, "The Art of Computer Programming", Volumes 1 & 3, Pearson Education,2009.
6. Steven S. Skiena, "The Algorithm Design Manual", Second Edition, Springer, 2008.

Web References:

1. https://visualgo.net/en
2. https://gbhat.com/algorithms/n_queens.html

Extra Books for reference:

1. Gilles Brassard and Paul Bratley, "Fundamentals of Algorithmics", Prentice Hall, 1996.
2. David Harel, Yishai Feldman, "Algorithmics: The Spirit of Computing", 3rd Edition, Pearson Education, 2004.

Online Materials:

1. https://onlinecourses.nptel.ac.in/noc21_cs89/preview - NPTEL Lecture series

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Weightage – 0.15)	Affective Domain Tool (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT1	MCQ Test	Think-Pair-Share Activity	COES1	0.2
CO2	IAT1	Case Study	Role Play	COES2	0.2
CO3	IAT1 & IAT2	MCQ Test	Role Play	COES3	0.2
CO4	IAT2	Classroom Test	Think-Pair-Share Activity	COES4	0.2
CO5	IAT2	Case Study	Role Play	COES5	0.2

Rubrics for Evaluation of Cognitive domain Tools:

Rubrics for Case Studies:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
General presentation	Outstanding work is distinguished by its completeness, thoroughness, and creativity	Level of work is best characterized as solid, well thought out and dependable	Level of work is good and meets requirements of written work.	Meeting minimum requirements of written work.	The assignment work does not meet minimum requirements
Variety of sources with real time examples	Proper evidence from the relevant sources with suitable real time example	few evidence from the relevant sources with suitable real time example	few evidence from the relevant sources with unsuitable real time example	Single evidence from the relevant sources with unsuitable real time example	No evidence from the relevant sources with unsuitable real time example
Depth and breath discussion	Information is presented in Well manner and is accurate	Discussion centers on some of the points and covers them adequately	Less important points are too briefly narrated.	Important Information may be missing and discussion is minimal	None in evidence; superficial at most
Idea generation and flow	Original ideas, those that go beyond the reference material are presented, The writing is clear, logical, and internally consistent.	Some original thinking is evident, though it may not be at the depth	There is little indication of original thinking or creative use of the information.	The writing is clear, but may lack some internal consistency or logical flow.	Writing is vague or ambiguous; ideas do not follow a logical flow

Rubrics for Evaluation of Think-Pair-Share:

Performance Indicators	4 point	3 point	2 point	1 point
Level of engagement in class	Student proactively contributes to class by offering ideas and asking more questions	Student proactively contributes to class by offering ideas and asking less questions	Student rarely contributes to class by offering ideas and asking questions	Student never contributes to class by offering ideas and more asking questions

Listening, questioning and discussing	Respectfully listens, discusses and asks questions and helps direct the group in problem solving	Respectfully listens, discusses and asks questions	Has trouble listening with respect, and takes over discussions	Does not listen with respect, argues with teammates and does not consider other ideas
Behavior	Student almost never displays disruptive behavior during class discussions and group activities	Student rarely displays disruptive behavior during class discussions and group activities	Student occasionally displays disruptive behavior during class discussions and group activities	Student almost always displays disruptive behavior during class discussions and group activities
Problem Solving	Actively seeks and suggests solutions to problems	Improves on solutions suggested by other group members	Does not offer solutions, but willing to try solutions suggested by other group members	Does not try to solve problems or help others
Team Work	Worked excellent with the group and no arguing with team mates	Worked well with the group and less arguing with team mates	Worked with the group and some arguing with team mates	Didn't work with the group and arguing with team members

Rubrics for Evaluation of Role Play:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
General presentation and communication	Outstanding work is distinguished by its completeness, thoroughness, and creativity with excellent communication	Level of work is best characterized as solid, well thought out and dependable with well communication	Level of work is good and meets requirements of written work and communication should be improved	Meeting minimum requirements of written work with poor communication	The assignment work does not meet minimum Requirements poor communication
Variety of sources with real time examples	Proper evidence from the relevant sources with suitable real time example	few evidence from the relevant sources with suitable real time example	few evidence from the relevant sources with unsuitable real time example	Single evidence from the relevant sources with unsuitable real time example	No evidence from the relevant sources with unsuitable real time example

Creative Thinking/Innovation	New and Innovative to the approach and has created own design	Student adapts other idea to design, Some originality shown	Student adapts other idea to design, very little originality shown	Creative but no originality shown	Creativity and originality is absent
Subject Knowledge	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructors **Course Coordinator** **Module Coordinator** **HOD/IT**

Dr. K.G. SRINIVASAGAN, M.E., Ph.D.
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NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF CIVIL ENGINEERING

Course Plan - Odd Semester – 2022-23

Course Code and Title : 19CE53C WASTE WATER TREATMENT AND MANAGEMENT
Programme : B.E Civil Engineering
Semester : V
Course Instructors : Mr.B.Gowtham & Mr.P.Kasirajan
Course Coordinator : Mr.B.Gowtham

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Threshold	Target
CO1	Examine the various sources of waste water and their characteristics	K3	2.3.4.5.6,9. 11&12	70	80
CO2	Design the sewer system and classify the pumps and plumbing system	K3	1,2,3,4,5,6, 7,8,10,11,& 12	70	75
CO3	Design the components of primary treatment of a waste water treatment plant	K3	1,2,3,5,6,11 &12	70	75
CO 4	Design the components of secondary treatment of a waste water treatment plant	K3	1,2,3,5,6,8, 10,11&12	70	75
CO5	Explain the various methods of sludge and sewage disposal	K3	1,2,3,5,6,10 ,11&12	70	75

Mapping of Course Outcome (CO) with Programme Outcome (PO)

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak ☐- No

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I- PLANNING OF SEWERAGESYSTEM				
Sources of wastewater generation – Effects	CO1	K3	Chalk & Talk and PPT	2
population equivalent - Estimating quantity of sewage	CO1	K3	Chalk & Talk and PPT	2
Storm runoff estimation - Sewerage	CO1	K3	Chalk & Talk and PPT	2
Factors affecting Characteristics	CO1	K3	Chalk & Talk and PPT	1
composition of sewage and their significance	CO1	K3	Chalk & Talk and PPT	3
Effluent standards – Legislation requirements	CO1	K3	Chalk & Talk and PPT	2
UNIT II SEWER DESIGN				
Sewerage – Hydraulics of flow in sewers	CO2	K3	Chalk & Talk and PPT	2
Objectives – Design period - Design of sanitary and storm sewers	CO2	K3	Chalk & Talk and PPT	4
Small bore systems - Computer applications	CO2	K3	Chalk & Talk and PPT	2
Laying, joining & testing of sewers – appurtenances	CO2	K3	Chalk & Talk and PPT	2
Pumps – selection of pumps and pipe Drainage - Plumbing System for Buildings	CO2	K3	Chalk & Talk and PPT	3
One pipe and two pipe system	CO2	K3	Chalk & Talk and PPT	2
UNIT III PRIMARY TREATMENT OF SEWAGE				
Objective – Unit Operation and Processes	CO3	K3	Chalk & Talk and PPT	1
Selection of treatment processes – Onsite sanitation - Septic tank	CO3	K3	Chalk & Talk and Video	2
Principles, functions design and drawing of screens	CO3	K3	Chalk & Talk and Video	4
grit chambers	CO3	K3	Chalk & Talk and Video	4
primary sedimentation tanks – Operation	CO3	K3	Chalk & Talk and Video	2
primary sedimentation tanks – maintenance	CO3	K3	Chalk & Talk and Video	2
UNIT IV SECONDARY TREATMENT OF SEWAGE				
Objective – Aerobic and Anaerobic treatment	CO4	K3	Chalk & Talk and Video	2
Selection of Treatment Methods	CO4	K3	Chalk & Talk and Video	2
ASP – Design, operation & maintenance	CO4	K3	Chalk & Talk and PPT	2
TF – Design, operation & maintenance	CO4	K3	Chalk & Talk and Video	2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Oxidation ditches	CO4	K3	Chalk & Talk and Video	1
UASB	CO4	K3	Chalk & Talk and Video	2
Biomethanisation and Gobar gas plant	CO4	K3	Chalk & Talk and Video	2
Reclamation and Reuse of sewage	CO4	K3	Chalk & Talk and PPT	1
Operation & Maintenance of Sewage Treatment Plants - Online monitoring system	CO4	K3	Chalk & Talk and PPT	1
UNIT V DISPOSAL OF SEWAGE AND SLUDGE				
Standards for Disposal – Methods	CO5	K3	Chalk & Talk and PPT	1
Self purification of surface water bodies – Oxygen sag curve	CO5	K3	Chalk & Talk and PPT	3
Soil dispersion system - Sludge characterization	CO5	K3	Chalk & Talk and PPT	2
Thickening – Sludge digestion – Biogas recovery	CO5	K3	Chalk & Talk and PPT	4
Sludge Conditioning and Dewatering – disposal	CO5	K3	Chalk & Talk and PPT	2
Composting (Vermi)	CO5	K3	Chalk & Talk and PPT	1
Advances in Sludge Treatment and disposal	CO5	K3	Chalk & Talk and PPT	2

Text Books:

1. Garg, S.K., Environmental Engineering Vol. II, Khanna Publishers,New Delhi,2015.

Reference Books:

1. Metcalf and Eddy- Wastewater Engineering–Treatment and Reuse, Tata Mc.GrawHill Company, New Delhi,2010.
2. Syed R. Qasim ―Wastewater Treatment Plants‖, CRC Press, WashingtonD.C.,2010
3. Gray N.F, ―Water Technology‖, Elsevier India Pvt. Ltd., New Delhi, 2006

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT	Other Assessment Tools			
	(Weightage – 0.6)	Cognitive Domain Tool	Affective Domain Tool	Course End Survey	
		(Weightage – 0.15)	(Weightage – 0.15)	(Weightage – 0.1)	
CO1	IAT 1	MCQ/Assignment	Presentation	CES	0.2
CO2	IAT 1	MCQ & Tutorial	Viva	CES	0.2
CO3	IAT 1 & IAT 2	MCQ & Tutorial	Viva	CES	0.2
CO4	IAT 2	MCQ & Tutorial	Presentation	CES	0.2
CO5	IAT 2	MCQ & Tutorial	Viva	CES	0.2

Rubrics for Evaluation of Viva:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Rubrics for Evaluation of Seminar/Presentation:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and explain the concepts to solve the field problems	Explanation shows substantial understanding of the concepts to solve the field problems	Explanation shows some understanding of the concepts to solve the field problems	Explanation shows very Limited understanding	Failed to explain the concepts
Presentation	All information are clear, accurate and thorough	Most of the information are clear, accurate and thorough	Most of the information are clear, accurate but not thorough	Very few information are clear	Information are not clear

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DEPARTMENT OF CIVIL ENGINEERING

Theory Course Plan - Odd Semester–2022-23

Course Code and Title	**:**	19ID02E – Disaster Management
Programme	**:**	B.E Civil Engineering
Semester	**:**	VI
Course Instructors	**:**	Mr.B.Gowtham (Assistant Professor) Mr.P.Kaasirajan (Assistant Professor)
Course Coordinator	**:**	Mr.P.Kaasirajan (Assistant Professor)

Course Outcomes (COs):

COs	**CO Statements** Upon the completion of the course the students will be able to	**CO Level**	**Related PO**	**Related PSO**	**Threshold**
CO1	Classify the various types of disaster	K2	1,6,7	1	70
CO2	Interpret various natural and manmade disasters.	K2	1,5,7,9	1	70
CO3	Choose a Hazard Assessment procedure.	K3	1,5,7,10	1,2	70
CO4	Construct the protection measures against Disaster.	K3	2,5,8,12	1,2	75
CO5	Apply Science and Technology in Disaster Management	K3	2,5,8,12	1,2	75

Course Content Delivery Method:

Course Content	**COs**	**Level of Content**	**Content Delivery**	**No. of Hours to be Handled**
UNIT I INTRODUCTION TO DISASTER				
Hazard, risk, vulnerability	CO1	K2	Lecture with Discussion	2
Disaster significance, nature, importance, dimensions	CO1	K2	PPT	2
scope of disaster management - national disaster management frame work	CO1	K2	PPT & Think, Pair, Share	3
financial arrangements- disaster-management cycle	CO1	K2	PPT	2
UNIT II SOURCES OF DISASTER				
Natural disasters- significance, nature, types and effects -- floods, drought, cyclone, earthquakes, landslides, avalanches	CO2	K3	Lecture with Discussion	2
volcanic eruptions, heat and cold waves, climatic change - global warming - sea level rise - ozone depletion	CO2	K3	PPT, Videos	2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Manmade disasters- nuclear ,chemical, biological, building fire, coal fire, forest fire, oil fire	CO2	K3	Videos & Chalk and Talk	2
air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents and sea accidents	CO2	K3	Videos & Chalk and Talk	3
UNIT III DISASTER MITIGATION AND HAZARDS ASSESSMENT				
Factors affecting damage – types, social status, habitation pattern, physiology and climate	CO3	K3	Lecture with Discussion	2
Factors affecting mitigation measures - prediction – preparation - communication - area and accessibility - population	CO3	K3	Lecture with Discussion	2
physiology and climate - Vulnerability Assessment and seismic strengthening of buildings	CO3	K3	Videos & Chalk and Talk	3
Vulnerability Assessment of Buildings procedure - Hazard Assessment-Visual Inspection and Study of Available Documents.	CO3	K3	PPT, Videos & Chalk and Board	3
UNIT IV DISASTER MANAGEMENT				
Disaster management - efforts to mitigate natural disasters at national and global levels	CO4	K2	PPT & Videos	2
International strategy for disaster reduction	CO4	K2	PPT	2
Rescue, relief And Rehabilitation, Role of National and International Agencies in Disaster Management	CO4	K2	PPT &Videos	3
National Disaster Policy of India (Salient Features)	CO4	K2	Lecture with Discussion	2
UNIT V APPLICATIONS OF SCIENCE AND TECHNOLOGY AND CASE STUDIES				
Applications of Science and Technology (RS, GIS, GPS)	CO5	K2	PPT &Videos	2
Early Warning and Prediction Systems	CO5	K2	Lecture with Discussion	2
Earthquake, cyclone, landslides	CO5	K2	PPT &Videos	2
fire accidents, accidents- case studies	CO5	K2	PPT	2

TEXT BOOKS

1. S.K.Singh, S.C.Kundu, Shobha Singh A, —Disaster Management, William Publications, New Delhi, 1997.
2. Vinod K Sharma, —Disaster Management, IIPA, New Delhi, 1995

REFERENCES

1. Annual Report, 2009-10, Ministry of Home Affairs, GOI.
2. K.Palanivel, ―Disaster Management, Allied Publishers, 2015.

E-sources:

1. https://nptel.ac.in/courses/105104183 - **NPTEL**
2. https://onlinecourses.swayam2.ac.in/cec19_hs20/preview - **NPTEL**

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Weightage – 0.15)	Affective Domain Tool (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT 1	MCQ	Viva	CES	0.2
CO2	IAT 1	Assignment	Presentation	CES	0.2
CO3	IAT 1 & IAT 2	Assignment	Presentation	CES	0.2
CO4	IAT 2	MCQ	Presentation	CES	0.2
CO5	IAT 2	Assignment	Case Study Discussion	CES	0.2

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2-1 point
Content	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.
Communication	Speaks clearly and distinctly all the time	Speaks clearly and distinctly all the time, but mispronounces one word.	Speaks clearly and distinctly most (94-85%) of the time. Mispronounces no more than one word.	Often mumbles or cannot be understood OR mispronounces more than one word.
Preparedness	Student is completely prepared and has obviously rehearsed.	Student seems pretty prepared but might have needed a couple more rehearsals.	The student is somewhat prepared, but it is clear that rehearsal was lacking.	Student does not seem at all prepared to present.

Comprehension	Students are able to accurately answer almost all questions posed by classmates about the topic.	Students are able to accurately answer most questions posed by classmates about the topic.	Students are able to accurately answer a few questions posed by classmates about the topic.	Students are unable to accurately answer questions posed by classmates about the topic.
Evaluates Peers	Fills out peer evaluation completely and always gives scores based on the presentation.	Fills out almost all of the peer evaluation and always gives scores based on the presentation.	Fills out most of the peer evaluation and always gives scores based on the presentation.	Fills out most of the peer evaluation but scoring appears to be biased.

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI - 628 503

(An Autonomous Institution, Affiliated to Anna University - Chennai)

DEPARTMENT OF CIVIL ENGINEERING

Department Theory Course Syllabus - EVEN Semester (2022-23)

Course Code and Title	:	**19CE43C - Water Supply Treatment and Management**
Programme	:	B.E Civil Engineering
Semester	:	IV
Course Instructors	:	Mr.B.Gowtham & Mr.Kasirajan.P
Course Coordinator	:	Mr.Kasirajan.P

COURSE OUTCOMES **L T P C 3 1 0 4**

Upon Successful completion of this course, the students will be able to

CO1: Examine the various sources of water and their characteristics. (K3)
CO2: Classify the different types of conveyance system, pipes and pumping system. (K3)
CO3: Design the components of a water treatment plant. (K3)
CO4: Explain the various processes of advanced water treatment. (K3)
CO5: Analyze distribution networks and water supply to buildings. (K3)

UNIT I PLANNING FOR WATER SUPPLY SYSTEM **12**

Public water supply system - Planning - Objectives - Design period - Population forecasting - Water demand - Sources of water and their characteristics - Surface and Groundwater - Impounding reservoir well hydraulics - Development and selection of source - Water quality - Characterization - Water quality standards.

UNIT II CONVEYANCE SYSTEM **12**

Water supply - intake structures - Functions and drawings - Pipes and conduits for water - Pipe materials - Hydraulics of flow in pipes - Transmission main design - Laying, jointing and testing of pipes - Drawings appurtenances - Types and capacity of pumps - Selection of pumps and pipe materials.

UNIT III WATER TREATMENT **12**

Objectives - Unit operations and processes - Principles, functions design and drawing of flash mixers, flocculators, sedimentation tanks and sand filters - Filter press - Disinfection - Ozonation and UV - Residue Management - TSDF - Co-processing and co-incineration.

UNIT IV ADVANCED WATER TREATMENT **12**

Aerator - Iron and manganese removal - Defluoridation and demineralization - Water softening - Desalination - membrane Systems - Construction, Operation & Maintenance aspects of Water Treatment Plants - Recent advances - Membrane Processes - Arsenic treatment.

UNIT V WATER DISTRIBUTION AND SUPPLY TO BUILDINGS **12**

Requirements of water distribution - Components - Service reservoirs - Functions and drawings – Network design - Economics - Computer applications - Analysis of distribution networks - Appurtenances - operation and maintenance - Leak detection, methods principles of design of water supply in buildings - House service connection - Fixtures and fittings - Systems of plumbing and drawings of types of plumbing.

L: 45; T: 15; TOTAL: 60 PERIODS

TEXT BOOKS

1. Garg, S.K., - Environmental Engineering‖ Vol.1 Khanna Publishers, New Delhi, 2014.
2. Punmia, B.C., Ashok K Jain and Arun K Jain, - Water Supply Engineering, Laxmi Publications Private Limited, New Delhi, 2014.

REFERENCES

1. Manual on Water Supply and Treatment, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, 2013.
2. Syed R.Qasim and Edward M.Motley Guang Zhu, - Water Works Engineering Planning, Design and Operation‖ Prentice Hall of India Private Limited, New Delhi, 2006.
3. Modi, P.N. - Water Supply Engineering‖ Vol. I Standard Book House, New Delhi, 2010.
4. K.N Duggal, - Elements of Water Resource Engineering‖ New age publishers, New Delhi, 2005.

Course Instructors | Course Coordinator | HOD/CIVIL

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI - 628 503

(An Autonomous Institution, Affiliated to Anna University - Chennai)

DEPARTMENT OF CIVIL ENGINEERING

Theory Course Plan - Even Semester (2022-23)

Course Code and Title : **19CE43C - Water Supply Treatment and Management**

Programme : B.E Civil Engineering

Semester : IV

Course Instructors : Mr.B.Gowtham & Mr.Kasirajan.P

Course Coordinator : Mr.Kasirajan.P

Course Outcomes (CO's):

CO's	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Examine the various sources of water and their characteristics	K3	2,3,4,5,6,8, 9,10,11,12	1,2	70
CO2	Classify the different types of conveyance system, pipes and pumping system	K3	1,2,3,4,5,6,7, 8,10,11,12	1,2	70
CO3	Design the components of a water treatment plant.	K3	1,2,3,5,6,8, 10,11,12	1,2	70
CO 4	Explain the various processes of advance water treatment.	K3	1,2,3,5,6,8, 10,11,12	1	70
CO5	Analyze distribution networks and water supply to buildings.	K3	1,2,3,5,6, 10,11,12	1	70

Course Content Delivery Method:

Course Content	CO's	Level of Content	Content Delivery	No. of Hours Needed
CO1 - Examine the various sources of water and their characteristics				
Public water supply system - Planning - Objectives	CO1	K3	Discussion & PPT	2
Design period - Population forecasting -Water demand	CO1	K3	Chalk & Talk, PPT	2
Sources of water and their characteristics - Surface and Groundwater	CO1	K3	Discussion & Videos	2
Impounding reservoir well hydraulics - Development and selection of source	CO1	K3	Chalk & Talk, PPT	2
Water quality	CO1	K3	Chalk & Talk, PPT	2
Characterization -Water quality standards	CO1	K3		2
CO2 - Classify the different types of conveyance system, pipes and pumping system				
Water supply - intake structures - Functions and drawings	CO2	K3	Discussion, PPT & Videos	2
Pipes and conduits for water - Pipe materials - Hydraulics of flow in pipes	CO2	K3	Chalk & Talk, PPT	2
Transmission main design	CO2	K3	Tutorial & PPT	2
Laying, jointing and testing of pipes - Drawings	CO2	K3	Discussion, PPT & Videos	2

Course Content	CO's	Level of Content	Content Delivery	No. of Hours Needed
appurtenances				
Types and capacity of pumps	CO2	K3	Chalk and Talk	2
Selection of pumps and pipe materials	CO2	K3	PPT & Videos	2
CO3 - Design the components of a water treatment plant				
Objectives - Unit operations and processes	CO3	K3	Chalk and Talk, Tutorial	2
Principles, functions design and drawing of flash mixers, flocculators	CO3	K3		2
Principles, functions design and drawing of sedimentation tanks and sand filter	CO3	K3	Chalk and Talk & PPT	2
Disinfection - Ozonation and UV	CO3	K3		2
Residue Management - TSDF	CO3	K3	PPT & Videos	2
Co-processing and co-incineration	CO3	K3	Chalk & Talk, PPT	2
CO4 - Explain the various processes of advance water treatment				
Aerator - Iron and manganese removal	CO4	K3	Chalk & Talk, PPT	2
Defluoridation and demineralization	CO4	K3	Chalk & Talk, PPT	2
Water softening - Desalination	CO4	K3	Chalk & Talk, Videos	2
Membrane Systems	CO4	K3	Chalk & Talk, PPT	2
Construction, Operation & Maintenance aspects of Water Treatment Plants	CO4	K3	Chalk & Talk, PPT, Videos	2
Recent advances in Treatment plants	CO4	K3	PPT & Videos	1
Membrane Processes - Arsenic Treatment	CO4	K3	Chalk & Talk, PPT	1
CO5 - Analyze distribution networks and water supply to buildings				
Requirements of water distribution - Components - Service reservoirs	CO5	K3	Discussion & Videos	2
Functions and drawings - Network design - Economics - Computer applications	CO5	K3	Discussion, PPT & Videos	2
Analysis of distribution networks - Appurtenances -	CO5	K3	Discussion, PPT & Videos	2
operation and maintenance , Leak detection	CO5	K3	Discussion, PPT & Videos	2
Principles of design of water supply in buildings	CO5	K3	Chalk & Talk, PPT	2
House service connection - Fixtures and fittings	CO5	K3	Discussion, PPT & Videos	1
Systems of plumbing and drawings of types of plumbing	CO5	K3	Chalk & Talk, PPT	1

Text Books:

1. Garg, S.K., "Environmental Engineering", Vol.1 Khanna Publishers, New Delhi, 2014.
2. Modi, P.N. "Water Supply Engineering", Vol. I Standard Book House. New Delhi, 2010.
3. Punmia, B.C., Ashok K Jain and Arun K Jain, "Water Supply Engineering", Laxmi Publications Private Limited, New Delhi, 2014.

Reference Books:

1. Manual on Water Supply and Treatment, CPHEEO, Ministry of Urban Development. Government of India, New Delhi, 2013.
2. Syed R.Qasim and Edward M.Motley Guang Zhu, "Water Works Engineering Planning, Design and Operation", Prentice Hall of India Private Limited, New Delhi, 2006.

E-Source - NPTEL Videos:

1. https://www.digimat.in/nptel/courses/video/105105201/L01.html
2. https://www.youtube.com/watch?v=zVZ9c6EXfTA
3. https://www.youtube.com/watch?v=5NzMt6PErYo

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage - 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Weightage - 0.15)	Affective Domain Tool (Weightage - 0.15)	Course End Survey (Weightage - 0.1)	
CO1	IAT	MCQ/Assignment	Case Study Presentation	CES	0.2
CO2	IAT	MCQ & Tutorial	Viva	CES	0.2
CO3	IAT	MCQ & Tutorial	Viva	CES	0.2
CO4	IAT	MCQ & Tutorial	Presentation	CES	0.2
CO5	IAT	MCQ & Tutorial	Viva	CES	0.2

Rubrics for Evaluation of Viva:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Rubrics for Evaluation of Seminar/Presentation:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and explain the concepts to solve the field problems	Explanation shows substantial understanding of the concepts to solve the field problems	Explanation shows some understanding of the concepts to solve the field problems	Explanation shows very Limited understanding	Failed to explain the concepts
Presentation	All information are clear, accurate and thorough	Most of the information are clear, accurate and thorough	Most of the information are clear, accurate but not thorough	Very few information are clear	Information are not clear

Course Instructors

Course Coordinator

Module Coordinator

Programme Co-ordinator

HOD/CIVIL

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF CIVIL ENGINEERING

Laboratory Course Plan - EVEN Semester – 2022-23

Course Code and Title	:	19CE58E Product Development Laboratory
Programme	:	B.E., Civil Engineering
Semester	:	VI
Regulations	:	Regulation 2019
No. of Credits	:	2
Course Instructors	:	Mrs.M.Balamaheswari , Mrs.S.Bhuvaneshwari & Dr.V.Kannan
Course Coordinator	:	Mrs.M.Balamaheswari

Prerequisite Courses:

- Knowledge of Civil Engineering Subjects

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	recognize the needs of the customer and select concept to meet the requirements	K4	2,3,5,10	1	70
CO2	verify the functionality of the concept through prototyping	K4	4,5,11,12	1	70

Course Content Delivery Method:

Experiment Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
CO1: recognize the needs of the customer and select concept to meet the requirements (K4)				
Need Identification, Planning, Problem Definition, Target Specifications and Concept Selection	**CO1**	K4	Study/ Demonstration/ / Experimentation with Model	20
CO2: verify the functionality of the concept through prototyping (K4)				
Prototype development and demonstration - cost estimation - product documentation	**CO2**	K4	Study/ Demonstration/ / Experimentation with Model	25

REFERENCES

1. Michael G Luchs, Scott Swan, Abbie Griffin, –Design Thinking: New Product Development Essentials from the PDMA‖ Willey, 2015
2. Christian Muller-Roterberg, –Design Thinking‖ Wiley Publications, 2021
3. Anita Goyal, Karl T Ulrich, Steven D Eppinger, –Product Design and Development‖ Tata Mc Graw Hill Education, 4th Edition, 2011.

4. George E Dieter, Linda C Schmidt, –Engineering Design‖ Mc-Graw Hill International Edition 5th Edition, 2013
5. Kevin Otto, Kristin Wood, –Product Design‖ Indian Reprint, Pearson Education, 2013

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	Review	Other Assessment Tools			
	(Weightage – 0.50)	Cognitive Domain Tool (Weightage – 0.25)	Affective Domain Tool (Weightage – 0.15)	Course End Survey (Weightage –0.10)	
CO1	Review I	Report Draft	Viva	CES	0.5
CO2	Review II	Report Draft	Viva	CES	0.5

Rubrics for Evaluation of Review:

For Presentation:

Performance Indicators	5 point	4 point	3 point	2-1 point
Content	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.
Communication	Speaks clearly and distinctly all the time	Speaks clearly and distinctly all the time, but mispronounces one word.	Speaks clearly and distinctly most (94-85%) of the time. Mispronounces no more than one word.	Often mumbles or cannot be understood OR mispronounces more than one word.
Preparedness	Student is completely prepared and has obviously rehearsed.	Student seems pretty prepared but might have needed a couple more rehearsals.	The student is somewhat prepared, but it is clear that rehearsal was lacking	Student does not seem at all prepared to present

Comprehension	Students are able to accurately answer almost all questions posed by classmates about the topic.	Students are able to accurately answer most questions posed by classmates about the topic.	Students are able to accurately answer a few questions posed by classmates about the topic.	Students are unable to accurately answer questions posed by classmates about the topic.
Evaluates Peers	Fills out peer evaluation completely and always gives scores based on the presentation.	Fills out almost all of the peer evaluation and always gives scores based on the presentation.	Fills out most of the peer evaluation and always gives scores based on the presentation.	Fills out most of the peer evaluation but scoring appears to be biased.

For Viva:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructors

DR.V KANNAN

S.BHUVANESHWARI

M.BALAMAHESWARI

Course Coordinator

Module Coordinator

Programme Coordinator

HOD/CIVIL

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF CIVIL ENGINEERING

Theory Course Plan – EVEN Semester – 2022-23

Course Code and Title	:	19CE45C& SOIL MECHANICS
Programme	:	B.E Civil Engineering
Semester	:	IV
Course Instructors	:	Dr.C.Chella Gifta & Mrs.M.Balamaheswari
Course Coordinator	:	Mrs.M.Balamaheswari

Prerequisite Courses:

- Mechanics of solids/Strength of materials

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Classify the soil based on Index and Engineering properties	K2	1,2 ,4,5 & 10	1,2	70
CO2	Explain the principle of soil water movement and its effect on stress distribution	K2	1,3,4,5 & 11	1,2	70
CO3	Explain the stresses in the soil and principle of consolidation	K2	1,3,4,5, 11 & 12	1,2	70
CO4	Determine the shear strength parameters of soil	K2	1,3,4,5,11 & 12	1,2	70
CO5	Analyse the stability of slopes and slope protection measures	K2	1,3,5,10, 11 & 12	1,2	70

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
CO1: classify the soil based on Index and Engineering properties (12)				
Nature of Soil - Problems with soil	CO1	K2	Chalk and Talk	1
Phase relation	CO1	K2	PPT	2
Index properties	CO1	K2	Videos	1
Clay mineralogy structural arrangement of grains	CO1	K2	Chalk and Talk	1
Sieve analysis, sedimentation analysis	CO1	K2	PPT & Videos	2
Atterberg''s limits	CO1	K2	PPT & Videos	1
Classification for engineering purposes,	CO1	K2	Chalk and Talk	2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
BIS Classification system -				
Soil compaction - factors affecting compaction – Field compaction methods.	CO1	K2	PPT & Videos	2
CO2: explain the principle of soil water movement and its effect on stress distribution (12)				
Soil water – Various forms – Capillary rise – Suction	CO2	K2	PPT & Videos	1
Effective stress concepts in soil – Total, neutral and effective stress distribution in soil -	CO2	K2	Problem Based Learning	2
Permeability – Darcy"s Law	CO2	K2	PPT & Videos	1
Permeability measurement in the laboratory	CO2	K2	PPT & Videos	1
field measurement pumping out in unconfined and confined aquifer	CO2	K2	Chalk and Talk	1
Factors influencing permeability of soils	CO2	K2	Chalk and Talk	2
Quick sand condition – Seepage-Laplace Equation	CO2	K2	Chalk and Talk	2
Introduction to flow nets –Properties and uses - Application to simple problems	CO2	K2	PPT & Videos	2
CO3: explain the stresses in the soil and principle of consolidation (12)				
Stress distribution in soil media, Boussinesque formula	CO3	K2	Problem Based Learning	1
Stress due to line load and Circular and rectangular loaded area	CO3	K2	Problem Based Learning	2
Approximate methods	CO3	K2	Chalk and Talk	1
Use of influence charts	CO3	K2	Chalk and Talk	1
Components of settlement - Immediate and consolidation settlement -	CO3	K2	PPT & Videos	1
Terzaghi's one dimensional consolidation theory - Laboratory consolidation test	CO3	K2	Chalk and Talk	2
Computation of rate of Settlement. √t and log t methods. e-log p relationship	CO3	K2	Chalk and Talk	2
Consolidation settlement N-C clays – O.C clays	CO3	K2	PPT & Videos	1
Problems on final and time rate of consolidation.	CO3	K2	Problem based Learning	1
CO4: determine the shear strength parameters of soil (12)				
Shear strength of cohesive and cohesionless soils	CO4	K2	Chalk and Talk	2
Mohr - Coulomb failure theory	CO4	K2	Chalk and Talk	3
Measurement of shear strength, direct shear, Triaxial compression test	CO4	K2	PPT & Videos	3
Measurement of shear strength UCC and Vane shear tests	CO4	K2	PPT & Videos	2
Pore pressure parameters – Factors influences shear strength of soil-Liquefaction of sand.	CO4	K2	PPT & Videos	2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
CO5: analyse the stability of slopes and slope protection measures (12)				
Slope failure mechanisms	CO5	K2	Chalk and Talk	1
Modes - Infinite slopes - Finite slopes	CO5	K2	PPT & Videos	1
Method of slices	CO5	K2	Chalk and Talk	1
Modified Bishop"s method - Friction circle method - Stability number	CO5	K2	PPT & Videos	4
Problems	CO5	K2	Problem based Learning	3
Slope protection measures	CO5	K2	PPT & Videos	2

Text Books:

1. Punmia, B.C., "Soil Mechanics and Foundations", Laxmi Publications Pvt. Ltd., New Delhi, 2005.
2. Arora, K.R, "Soil Mechanics and Foundation Engineering", Standard Publishers, 7th Edition, 2017 (Reprint).
3. Murthy, V.N.S, "Soil Mechanics and Foundation Engineering", UBS Publishers Distribution Ltd, New Delhi, 2009.
4. Gopal Ranjan and Rao, A.S.R."Basic and Applied Soil Mechanics", Wiley Eastern Ltd., New Delhi (India), 2006.

Reference Books:

1. Murthy, V.N.S., "Text book of Soil Mechanics and Foundation Engineering", CBS Publishers Distribution Limited., New Delhi, 2014.
2. Craig.R.F., "Soil Mechanics", E & FN Spon, London and New York, 2012.
3. Gopal Ranjan, A S R Rao, "Basic and Applied Soil Mechanics", New Age International Publication, 3rd Edition, 2016.
4. Palanikumar.M., "Soil Mechanics", Prentice Hall of India, Learning Private Limited Delhi, 2013
5. Das, B.M. "Principles of Foundation Engineering (5th edition), Thomson Books /COLE, 2013
6. Bowles, J.E. "Foundation analysis and design", McGraw-Hill, 2001
7. Venkatramaiah,C."Geotechnical Engineering", New Age International Publishers, New Delhi, 2014

E-sources:

1. https://freevideolectures.com/course/95/soil-mechanics
2. http://cvrsessonline.tasr.res.in/mod/page/view.php?id=125126
3. https://nptel.ac.in/courses/105/103/105103097

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Weightage – 0.15)	Affective Domain Tool (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT	MCQ/ASMT/Tutorials	PPT Presentation	CES	0.2
CO2	IAT	MCQ/ASMT/Tutorials	Viva	CES	0.2
CO3	IAT	MCQ/ASMT/Tutorials	Viva	CES	0.2
CO4	IAT	MCQ/ASMT/Tutorials	PPT Presentation	CES	0.2
CO5	IAT	ASMT/Tutorials	Viva	CES	0.2

Rubrics for Evaluation of Affective domain Tools:

For Presentation:

Performance Indicators	5 point	4 point	3 point	2-1 point
Content	Shows a full understanding of the topic.	Shows a good understanding of the topic.	Shows a good understanding of parts of the topic.	Does not seem to understand the topic very well.
Communication	Speaks clearly and distinctly all the time	Speaks clearly and distinctly all the time, but mispronounces one word.	Speaks clearly and distinctly most (94-85%) of the time. Mispronounces no more than one word.	Often mumbles or cannot be understood OR mispronounces more than one word.
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For Viva:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Course Instructors **Course Coordinator** **Module Coordinator**

Programme Coordinator **HOD/CIVIL**

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)
DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Theory Course Plan –Even Semester - 2022-23

NEC/AI&DS/CP/Even / 2022-2023/27.03.23

Course Code and Title	:	19AD011–Statistical Foundations for Data Science
Programme	:	B.E – AI & DS
Semester& Year	:	IISem& I Year
Course Instructor and Course Coordinator	:	Dr.V.KALAIVANI, Professor& HOD/AI &DS

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Understand the fundamentals of statistics for data science.	K2	P1,P2, P3	1	60%	75%
CO2	Deploy statistical foundations on data science.	K3	P1,P2, P3	1	60%	75%

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I -FOUNDAMENTALS OF DESCRIPTIVE STATISTICS				
Introduction – types of data – types of variables	CO1	K2	Chalk & Board Power point presentation	1
Histogram charts – scatter plots			Chalk & Board Power point presentation	1
measures of central tendency: mean, median and mode,			Chalk & Board Power point presentation	2
measuring asymmetry: skewness – Measuring variability: Variance..	CO1	K2	Chalk & Board Power point presentation	2
Standard deviation, Covariance. Correlation			Simulation	2

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
coefficient				
UNIT IIINFERENTIAL STATISTICS				
Distributions: Normal distribution , standard normal distribution	CO2	K3	Online video Lectures	2
Central Limit Theorem			Online video Lectures	2
Estimations: Confidence			Own voice video Lectures (Prerecorded / Live recording)	2
Intervals- Hypothesis Testing			Power point presentation/ Video lecture	1

Reference Books:

1. JianqingFan ,Runze Li ,Cun-Hui Zhang HuiZou "Statistical Foundations of Data Science", Chapman and Hall/CRC, 1stEdition,2017.
2. Walter W. Piegorsch ,"Statistical Data Analytics: Foundations for Data Mining, Informatics, and Knowledge Discovery", Wiley, 1stEdition,2015

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial/....) (Weightage – 0.15)	Affective Domain Tool (Viva /Seminar/Presentation /.....) (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT	MCQ(Online)	Viva	CIS 1	20
CO2	IAT	MCQ(Online)	Viva	CIS 2	20

Rubrics for Evaluation of Affective domain Tools: Viva

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Technical Proficiency	Very good understanding and good ability in relating with real time applications	good understanding and good ability in relating with	Only know the core concepts of the course	Need Improvement	Not up to the mark

	and current state of the art in that particular domain	real time applications			
Responses to Questions	Gives well-constructed, confident responses that are genuine.	Gives well-constructed responses, does not sound rehearsed, student somewhat hesitant or unsure.	Gives well-constructed responses, but sounds rehearsed or unsure.	Try to give related responses, but it is not well defined	Answers with "yes' or "no" and fails to elaborate or explain.
Communication	Speaks clearly and distinctly with no lapse in sentence structure and grammar usage; speaks concisely with correct pronunciation	Speaking is clear with minimal mistakes in sentence structure and grammar.	Speaking is unclear - lapses in sentence structure and grammar.	Speaking is messy - very difficult to understand message of what is being said.	Try to speak in english

Course Instructor **Course Coordinator** **HOD/AI & DS**

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATASCIENCE

Theory Course Plan - Even Semester - 2023-2024

Date : 20-12-23

Course Code and Title	:	**19AD07E Exploratory Data Analysis**
Programme	:	**B.Tech., (AI&DS)**
Semester	:	**IV**
Regulation	:	**2019**
No. of Credits	:	**3**
Course Instructors	:	**Dr.V.Kalaivani, Professor and Head/AI&DS**

Course Content Delivery Method:

Course Content	Content Delivery	No. of Hours to be Handled
UNIT I INTRODUCTION CO1: Describe the fundamentals of exploratory data analysis.(K2)		
EDA fundamentals – Describing data science – Significance of ED	Lecture with discussion	2
Making sense of data	Lecture with discussion	1
Comparing EDA with classical and Bayesian analysis	Think-Pair-Share	1
Software tools for EDA	PPT Presentation	1
Visual Aids for EDA	Lecture with discussion	1
Data transformation techniques	Jig saw	1
Merging database	Lecture with discussion	1
Reshaping and pivoting	Lecture with demonstration	1
UNIT II EDA USING PYTHON CO2: Implement the data visualization using Matplotlib.(K3)		
Data Manipulation using Pandas – Pandas Object	Flipped Learning	1
Data Indexing and Selection	Lecture with Discussion	2
Operating on Data – Handling Missing Data	Think Pair Share	1
Hierarchical Indexing	Lecture with Discussion	1
Combining datasets – Concat, Append,Merge and Join	Lecture + Group Quiz	1

Course Content	Content Delivery	No. of Hours to be Handled
Aggregation and groupings	Lecture with demonstration	1
Pivot Tables	PPT Presentation	1
Vectorized String Operations	Jig saw	1
UNIT III UNIVARIATE ANALYSIS CO3:Perform univariate data exploration and analysis (K3)		
Introduction to Single variable	Lecture with Discussion	1
Distribution Variables	Flipped Learning	2
Numerical Summaries of Level and Spread	Lecture with Discussion	2
Scaling and Standardizing	Lecture with Discussion	2
Inequality	Jigsaw	2
UNIT IV BIVARIATE ANALYSIS CO4: Apply biveriate data exploration and analysis.(K3)		
Relationships between Two Variables	Lecture + Group Quiz	1
Percentage Tables	Lecture with Discussion	2
Analyzing Contingency Tables	Flipped Learning	2
Handling Several Batches	Lecture + Jigsaw	2
Scatter plots and Resistant Lines	Role Play	2
UNIT V MULTIVARIATE AND TIME SERIES ANALYSIS CO5: Apply Data exploration and visualization techniques for multivariate and time series data.(K3)		
Third Variable - Causal Explanations	Lecture + PPT Presentation	1
Three-Variable Contingency Tables and Beyond	Lecture + Jig Saw	1
Fundamentals of TSA - Characteristics of time series data	Think pair share	2
Data Cleaning	Role Play	1
Time-based indexing	Lecture with Discussion	1
Visualizing	Muddiest Point	1
Grouping - Resampling	Role Play	2
	Total Hours	**45**

Text Books:

1. Suresh Kumar Mukhiya, Usman Ahmed, —Hands-On Exploratory Data Analysis With Python, Packt Publishing, 2020.
2. Jake Vander Plas,"Python Data Science Handbook: Essential Tools for Working with Data", 2ndEdition, OReilly, 2022.
3. Catherine Marsh, Jane Elliott, —Exploring Data: An Introduction to Data Analysis for Social Scientists, Wiley Publications, 2ndEdition, 2008.

Reference Books:

1. Ernesto Pellegrino, Manuel Andre Bottiglieri, et al., —Managing and Visualizing Your BIMData: Describe the fundamentals of computer science for data visualization using Autodesk Dynamo, Revit, and Microsoft Power BII, 2021.
2. Erio Pimpler, Data Visualization and Exploration with R, Geo Spatial Training service, 2017.
3. Claus O. Wilke, —Fundamentals of Data Visualizationl, O'reilly publications, 2018.

Assessment Procedure:

CO	Assessment Tools			
	IAT	Other Assessment Tools		
		Cognitive Domain Tool	Affective Domain Tool	Course End Survey (Weightage –0.1)
CO1	CO1(0.6)	Multiple Choice Questions(0.15)	Viva (0.15)	CIS 1
CO2	CO2(0.6)	Assignments(0.2)	Presentation(0.1)	CIS 2
CO3	CO3(0.6)	Multiple Choice Questions(0.2)	Viva(0.1)	CIS 3
CO4	CO4(0.5)	Assignment(0.2)	Case study(0.2)	CIS 4
CO5	CO5(0.5)			CIS 5

Rubrics for Evaluation of Affective domain Tools:

For Viva:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Responses to Questions	Answers all parts of the question in a well-constructed manner	Answers all parts of the question correctly	Answers part of the question or unsure	Attempts to answer the question but it is not well defined	Does not answer appropriately

For Presentation:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Background content	Material sufficient for clear understanding AND exceptionally presented	Material sufficient for clear understanding AND effectively presented	Material sufficient for clear understanding but not clearly presented	Material clearly but not sufficient	Material not clearly related to topic OR background dominated seminar
Organization of presentation	Information presented as interesting story in logical, easy to follow sequence	Information presented in logical sequence; easy to follow	Most of information presented in sequence	Hard to follow: sequence of information jumpy	Very minimal work is done in preparing the presentation

Mapping of Course Outcome(CO) with Programme Outcome(PO) and Programme Specific Objectives(PSO):

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

V.K 22/12/23
Course Instructor

V.K 22/12/23
HOD/AI&DS

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF ARTIFICIAL INTELLIGENCE & DATASCIENCE

Theory Course Plan - odd Semester - 2023-2024

Date:08.08.2023

Course Code and Title	:	**19AD32C-FUNDAMENTAL OF DATA SCIENCE**
Programme	:	**B.Tech., (AI&DS)**
Semester	:	**III**
Course Instructor	:	**Dr.V.Kalaivani, Professor /AI &DS**
Course Coordinator	:	**Dr.V.Kalaivani, Professor & HOD/AI &DS**

Prerequisite Courses:

- Python Programming

Course Content Delivery Method:

Course Content	Content Delivery	No. of Hours to be Handled
UNIT I– INTRODUCTION TO DATA SCIENCE		
CO1: Understand fundamentals of data analytics.(K2)		
Need for data science- Benefits and uses	Lecture with Discussion	1
Facets of data – Data science process	Lecture with Discussion	2
The research goal – Retrieving data	PPT Presentation	2
Cleansing, Integrating, and Transforming data –	PPT Presentation	2
Exploratory data analysis - Build the models	Think-Pair-Share	
Presenting and building applications	PPT Presentation	2
UNIT II– DESCRIPTIVE ANALYTICS		
CO2: Describe and visualize the data.(K3)		
Frequency distributions – Outliers	Lecture with Discussion	1
Interpreting distributions – Graphs	Think-Pair-Share	1
Averages describing variability – Interquartile range	Lecture with Discussion	1
Variability for qualitative and ranked data -	PPT Presentation	1
Normal distributions – Z scores –Correlation	Collaborative Learning	1
Scatter plots – Regression – Regression line	Jigsaw	1
Least squares regression line	Muddiest point/clearest point	1
Standard error of estimate – Interpretation of r2	Lecture with Discussion	1
Multiple regression equations – Regression toward the mean	PPT Presentation	1
UNIT III-INFERENTIAL STATISTICS		
CO3: Perform statistical inferences from data.(K3)		
Populations – Samples – Random sampling	Lecture with Discussion	2
Sampling distribution- Standard error of the mean	Lecture with Discussion	1
Hypothesis testing – Z-test – Z-test Procedure	Jigsaw	2

Decision rule – Calculations – Decisions	Role playing	1
Interpretations - One-tailed and two-tailed tests	Hybrid/Blended Learning	1
Estimation – Point estimate – Confidence interval	PPT Presentation	1
Level of confidence – Effect of sample size	Think-Pair-Share	1
UNIT IV-ANALYSIS OF VARIANCE		
CO4: Analyze the variance in the data.(K2)		
t-test for one sample – sampling distribution of t	Lecture with Discussion	1
t-test procedure – t-test for two independent samples – p-value	PPT Presentation	2
Statistical significance – t-test for two related samples	Collaborative Learning	2
F-test – ANOVA – Two factor experiments	Flipped Learning	2
Three f-tests – two-factor ANOVA	Muddiest point/ Clearest point	1
Introduction to chi-Square tests.	PPT Presentation	1
UNIT V- GRAPH STRUCTURES		
CO5: Apply graph data structure concepts to solve problems. (K3)		
Linear least squares – Implementation	Lecture with Discussion	1
Goodness of fit – Testing a linear model weighted resampling	Jigsaw	2
Regression using Stats Models – Multiple regression	Think-pair-share	1
Nonlinear relationships – Logistic regression	PPT Presentation	1
Estimating parameters – Time series analysis	Minutes paper and Writing assignments	1
Moving averages – Missing values	Collaborative Learning	1
Serial correlation-autocorrelation. Introduction to survival analysis.	Jigsaw	2
	Total Hours	**45**

Text Books:

1. Jake VanderPlas, "Python Data Science Handbook", 2nd edition, O'Reilly, 2022.
2. David Cielen, Arno D. B. Meysman, and Mohamed Ali, "Introducing Data Science", Manning Publications, 2016.
3. Robert S. Witte and John S. Witte, "Statistics", 11th Edition, Wiley Publications, 2017.

Reference Books:

1. Sanjeev J. Wagh, Manisha S. Bhende, Anuradha D. Thakare, "Fundamentals of Data Science", CRC Press, 2022.
2. VineetRaina, Srinath Krishnamurthy, "Building an Effective Data Science Practice: A Framework to Bootstrap and Manage a Successful Data Science Practice", Apress, 2021.
3. Chirag Shah, "A Hands-On Introduction to Data Science", Cambridge University Press, 2020.

Assessment Procedure:

CO	Assessment Tools			
	IAT	Other Assessment Tools		
		Cognitive Domain Tool	Affective Domain Tool	Course End Survey
CO1	IAT I(0.6)	Controlled test(0.15)	Viva (0.15)	CIS 1(0.1)
CO2	IAT I(0.6)	Multiple Choice Question (0.15)	Viva (0.15)	CIS 2(0.1)
CO3	IAT I(0.6)	Multiple Choice Question (0.15)	MDP(0.15)	CIS 3(0.1)
CO4	IATII(0.5)	Assignment(0.15)	Case Study (0.25)	CIS 4(0.1)
CO5	IATII(0.5)			CIS 5(0.1)

Rubrics for Evaluation of Affective domain Tools:

For Presentation:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Content Delivery	Material sufficient for clear understanding and exceptionally presented	Material sufficient for clear understanding and effectively presented	Material sufficient for clear understanding but not clearly presented	Material clearly but not sufficient	Material not clearly related to topic OR background dominated seminar

For Presentation with video:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Background content	Material sufficient for clear understanding andexceptionally presented	Material sufficient for clear understanding and effectively presented	Material sufficient for clear understanding but not clearly presented	Material clearly but not sufficient	Material not clearly related to topic OR background dominated seminar
Organization of presentation	Information presented as interesting story in logical, easy to follow sequence	Information presented in logical sequence; easy to follow	Most of information presented in sequence	Hard to follow: sequence of information jumpy	Very minimal work is done in preparing the presentation

For Case Study:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Organization of presentation	Research and Background with problem statement information clearly explained	Information presented in logical sequence; easy to follow	Most of information presented in sequence	Hard to follow: Methodology not mentioned	Very minimal work is done in preparing the presentation

Course Instructor

Course Coordinator

HOD/AI&DS

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF SCIENCE AND HUMANITIES

Theory Course Plan - Odd Semester – 2022-2023

NEC/ AC / 02 (a)

Course Code and Title	:	**19SH1MC Engineering Physics**
Programme	:	B.E / B.Tech (MECH,ECE,CSE,BEE, IT, CIVIL) (S1-S5) (Common to all branches Except AI&DS)
Semester	:	First
Course Instructors	:	Dr. A. Nicholson, Dr.A.Panimaya Valan Rakkini, Dr. V. Rama Subbu, Dr. M. Aravind, Dr. M.Ganapathy
Course Coordinator	:	Dr.A.Panimaya Valan Rakkini

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	summarize the properties and structures of crystal solids.	K2	1,10	-	65%	85%
CO2	understand the principle and propagation of different types of waves	K2	1,10	-	60%	85%
CO3	choose the appropriate Laser technique for industrial and medical application.	K2	1,10	-	65%	85%
CO4	describe the different types, fabrication, losses of optical fibers and their applications in communication and instrumentation.	K2	1,10	-	65%	85%
CO5	explain the physical properties of photons & electrons and their applications in different electron microscopes. (K2)	K2	1,10	-	60%	85%

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note : Correlation 3 – Strong 2 – Medium 1 – Weak ☐- *No*

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I Crystallography				
Basic terminology : Lattice, basis Unit cell, crystal system	CO1	K2	Chalk & Talk Videos	1
Bravais lattice, Lattice planes-Miller indices	CO1	K2	Videos	1
d-spacing-derivation, Characteristics of SC	CO1	K2	Chalk & Talk 3D static Models	1
Characteristics of BCC, FCC	CO1	K2	3D static Models	1
HCP structure	CO1	K2	3D static Models	1
Crystal defects, Problems	CO1	K2	PPT/ Flipped Classroom	1
UNIT II Waves				
Simple harmonic oscillators	CO2	K2	Chalk & Talk PPT	1
Damped harmonic oscillator	CO2	K2	Demonstration Integrated Learning	1
Mechanical and electrical oscillators	CO2	K2	Chalk & Talk Demonstration	1
Transverse wave on a string - the wave equation on a string	CO2	K2	Chalk & Board Demonstration	1
Harmonic waves - longitudinal waves - wave equation- Problems	CO2	K2	Videos Chalk & Talk	1
Acoustics waves	CO2	K2	Flipped Classroom	1
UNIT III LASER				
Characteristics of laser, Principle of spontaneous emission and stimulated emission	CO3	K2	Demonstration Integrated Learning	1
Population inversion, Pumping, Einstein's A and B coefficients	CO3	K2	Chalk & Talk	1
Different types of lasers: gas lasers (CO_2)	CO3	K2	Videos	1
Solid-state lasers (Nd-YAG)	CO3	K2	PPT	1
Applications of lasers in science, engineering and medicine	CO3	K2	Flipped Classroom	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Problems	CO3	K2	Chalk & Talk	1
UNIT IV Fibre Optics				
Principle - Total internal reflection	CO4	K2	Chalk & Talk PPT	1
Acceptance angle and Numerical aperture	CO4	K2	Demonstration Integrated Learning	1
Types of optical fibers - Double crucible technique – Splicing	CO4	K2	Chalk & Talk /Videos	1
Losses in optical fibers	CO4	K2	PPT	1
Fiber optic communication system, Medical Endoscope	CO4	K2	PPT/ Flipped Classroom	1
Applications - Fiber optic sensors; Problems	CO4	K2	Chalk & Talk Videos	1
UNIT V Quantum Physics				
Basic theories, Planck's Black Body Radiation	CO5	K2	Chalk & Talk	1
Matter Waves - Heisenberg's Uncertainty principle	CO5	K2	Flipped Classroom	1
Schrodinger's wave equation	CO5	K2	Chalk & Board	1
Particle in one dimensional box	CO5	K2	Chalk & Board Videos	1
Electron microscope - Scanning electron microscope	CO5	K2	PPT, Videos	1
Transmission electron microscope, Problems	CO5	K2	PPT, Videos	1

Text Books:

1. David Halliday, Robert Resnick, Jearl Walker, "Fundamentals of Physics", 11th Edition, John Wiley & Sons Inc.USA, 2018.
2. Arthur Beiser, "Concepts of Modern Physics", 7th Edition, McGraw Hill Publications Private Limited, 2017.
3. D. J. Griffiths, "Quantum mechanics", 2nd edition, Cambridge University Press, 2014

Reference Books:

1. Renk, Karl.F "Basics of laser physics", 2nd Edition, Springer international publishing, 2017.
2. H. J. Pain,Patricia Rankin "Introduction to vibration and waves", 1st edition,Wiley, 2015
2. K.S.Mathur, "Fundamentals of Fiber Optics",1st edition, Zorba books, 2018.
3. S.O. Pillai & Sivakami, "Text Book of Engineering Physics", Mew Age International Publishers, 2012
4. M. N. Avadhanulu & P. G. Kshirsagar, A text book of engineering Physics; S. Chand & company Pvt. Ltd. Revised edition 2015

E-sources:

1. NPTEL

Unit I
https://nptel.ac.in/courses/115/104/115104109/
https://nptel.ac.in/courses/115/105/115105099/
Unit II
https://nptel.ac.in/courses/115/106/115106119/
https://nptel.ac.in/courses/122/105/122105023/
Unit III
https://nptel.ac.in/courses/104/104/104104085/
https://www.youtube.com/watch?v=FNp81kkxj5c
Unit IV
https://nptel.ac.in/courses/115/107/115107095/
http://www.digimat.in/nptel/courses/video/115107095/L02.html
Unit V
https://nptel.ac.in/courses/115/104/115104096/
https://nptel.ac.in/courses/115/101/115101107/
https://nptel.ac.in/courses/122/106/122106034/

2. Web Materials/e-Books/...
   (i) S.O. Pillai, Solid State Physics, 6th Edition, New Age Science
   (ii) Uttarakhand Open University, Haldwani, Nainital, "Oscillations and Waves" 2017
   (iii)Uma Mukerji, Engineering Physics, 2nd Edition, Alpha Science International Ltd, Oxford, U.K
   (iv)H.J Pain, The Physics of Vibrations, 6th Ed. John Wiley & Sons Ltd.
   (v) Jearl Walker, Fundamentals of Physics Halliday & Resnick 10th Ed. Wiley.

Topics for Integrated Learning and Flipped Classroom:

CO	Mode of Learning	Topic/Activity
CO1	Flipped class room	Student grouped into teams discuss about different forms of crystal defects and analytical tool to detect them then present it to the whole class
CO2	Integrated Learning	The concept will be demonstrated through Compound pendulum / Torsional pendulum experiment of determination if g/ή. Transverse wave on a string is analyzed by the wave formation in musical instrument (stringed)
	Flipped class room	Analysis of ultrasonic wave velocity and compressibility in different liquids (water, Kerosene, Acetone) and its applications.
CO3	Integrated Learning	The characteristic properties of laser (i.e high directionality) is demonstrated by measuring angle of divergence using He-Ne gas laser
	Flipped class room	Student grouped into teams discuss about laser applications in different field (Medical, Industrial) - Case study
CO4	Integrated Learning	The measurement of acceptance angle and numerical aperture of optical fibre is demonstrated using He-Ne gas laser
	Flipped class room	Student grouped into teams discuss about methods of splicing and application of optical fibre in communication and presentenced to the whole class
CO5	Flipped class room	Student grouped into teams to discuss about the application of matter waves in Electron Microscope in medical field

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for Internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial/.....) (Weightage – 0.15)	Affective Domain Tool (Viva /Seminar/ Presentation/...) (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT 1	Assignment	Viva-Voce	Course End Survey	20
CO2	IAT 1	MCQ	Viva-Voce	Course End Survey	20
CO3	IAT 1 & 2	MCQ	Seminar	Course End Survey	20
CO4	IAT 2	Assignment	Project Presentation	Course End Survey	20
CO5	IAT 2	Tutorials (Problems)	Viva-Voce	Course End Survey	20

Rubrics for Evaluation of Affective domain Tools:

Viva-Voce

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Indicator 1 (Subject Knowledge)	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Indicator 2 (Presentation Ability)	More relevant content, very good coherence with adequate illustrations.	More relevant content, good coherence with less illustrations	More relevant content, moderate coherence with less illustrations.	Less relevant content, poor coherence with inadequate illustrations	Very Less relevant content, poor coherence with inadequate illustrations
Indicator 3 (Communication Skills)	clear, expressive voice; poised, good posture, no distracting mannerisms.	clear voice, but not as expressive; a little nervous, not as polished.	Unclear voice-not expressive nervous, not as polished.	Unclear voice-not expressive more nervous, not as polished	Difficult to hear; occasional eye contact; no expression; nervous, some distracting mannerisms;

Seminar

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Indicator 1 (Knowledge and Understanding of the Subject)	Demonstrated through knowledge of facts, terms and concepts	Demonstrated through considerable knowledge of facts, terms and concepts	Demonstrated through some knowledge of facts, terms and concepts	Demonstrated through limited knowledge of facts, terms and concepts	Demonstrated without knowledge of facts, terms and concepts
Indicator 2 (Thinking Inquiry)	Exhibited impartially with a high degree of success.	Exhibited impartially with a considerable success.	Exhibited impartially with some success.	Exhibited impartially with limited success.	Exhibited impartially without success.
Indicator 3 (Communication –Oral)	Language and/or delivery resulted information being communicated orally with high degree of effectiveness	Language and/ or delivery resulted information being communicated orally with considerable effectiveness	Language and/or delivery resulted information being communicated orally with some effectiveness	Language and/or delivery resulted information being communicated orally with limited effectiveness	Language and/or delivery resulted information being communicated orally without effectiveness
Indicator 4 (Application)	Seminar was organized in a highly effective manner Very effective facilitation of class discussion	Seminar was organized in an effective manner Effective facilitation of class discussion	Seminar was organized in a somewhat effective manner Moderately effective facilitation of class discussion	Seminar was not organized in an effective manner Ineffective facilitation of class discussion	Seminar was not organized in an effective manner poor facilitation of class discussion

Project Presentation

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Indicator 1 (Knowledge of Subject)	Clear knowledge with excellent interpretation.	Clear knowledge with good interpretation	Sufficient knowledge of subject with sufficient interpretation.	Sufficient knowledge of subject but insufficient interpretation.	insufficient knowledge of subject
Indicator 2 (Presentation skill)	Presented confidently well with good verbal and body language	Communicated with a local accent	Content is good but insufficient explanation	Body language shows lack of confidence and preparation	Read the slide without any explanation and body language

Indicator 3 **(Response to the Questions)**	Listened the questions fully and answer clearly with practical examples	Answered all questions with moderate explanations	Answered all questions but failed to explain	Answered most of the questions without explanations	Answered irrelevantly or a few questions

Course Instructors
Dr. A.Nichelson
Dr. A.Panimaya Valan Rakkini
Dr. V. Rama Subbu
Dr. M. Aravind
Dr. M.Ganapathy

Course Coordinator
Dr. A. Panimaya Valan Rakkini

HOD(S&H)
Dr. M.A. NEELAKANTAN

NATIONAL ENGINEERINGCOLLEGE,K.R. NAGAR,KOVILPATTI–628503

(AnAutonomousInstitutionAffiliatedtoAnnaUniversity–Chennai)

Department of Science & Humanities

CourseCurriculum – ODDSemester-2022-23

Date: 22/09/2022

Course Code and Title	:	**19AD11C –English – I**
Programme	:	**B.Tech (AI&DS)**
Semester	:	**I**
Course Instructors	:	**Ms. S. Kanimolvi, Ms. N. Vidhya**
Course Coordinator	:	**Ms. N. Vidhya**

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold	Target
CO1	Enhance their basic language skills to understand various aspects of communication skills	(K3)	9,10		65	80
CO2	Express their thoughts with correct usage of language in formal writings	(K3)	9,10		65	80
CO3	Understand various language components and develop the pronunciation skills.	(K3)	9,10		65	80
CO4	Prepare effective technical documents and interpret any pictorial representation.	(K3)	9,10		65	80
CO5	Frame sentences and write effective reports.	(K3)	9,10		65	80

Mapping of Course Outcome (CO) with Programme Outcome (PO) and Programme Specific Objectives (PSO):

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

Note: Correlation 3–Strong 2–Medium 1–Weak □–No

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I				
Parts of Speech – Newspaper article presentation – Greetings and Self-Introduction – Instruction Writing –Technical vocabulary – Purpose of Listening –Listening for general information.	CO1	K3	Chalk and Talk method &ABL method, Flash Cards, Handouts, Audio files	6hrs
UNIT II				
Transformation of words into different grammatical forms – Letter to Friends/ Parents/ Siblings – Process description –Letter writing (for Industrial visit and training) – Talks on technology – Listening to scientific talks.	CO2	K3	Chalk and Talk Method &ABL method, Auditory method (Language Lab), Digital Presentation.	6hrs
UNIT III				
Personality Adjectives – Phonetics (Vowels – Consonants – Diphthongs – Transcriptions) - Kinds of Sentences (Statement, Interrogative, Imperative & Exclamatory) –Situational Conversation.	CO3	K3	Chalk and talk method, Situation-based discussion method, ICT tools (Orell Talk - Software)	6hrs
UNIT IV				
Technical terms and extended definitions – Active and Passive Voices – Note-making – E-mail writing –Picture Description – Checklists. ***You Tube as a tool to improve communication skills. (Project)**	CO4	K3	Flipped Classroom, Chalk and Talk Method, Pair work, Demonstration method, Project Based Learning	6hrs
UNIT V				
Homophones – Concord – Foreign Words and Phrases – Verbal Analogies – Report writing (Types –Structure – Stages in Report writing – Model Report).	CO5	K3	Chalk and Talk method, Illustrations, Visual Aids, ICT tools (Clarity SNET - Software)	6hrs

TextBooks:

1. Anderson, Paul V. "Technical Communication: A Reader-Centered Approach," 9th edition, New Delhi: Cengage, 2018.

2. Murphy, Raymond. "Basic Grammar Practice on Tense," New Delhi: Cambridge University Press, 2018.

References

1. McCarthy, Michael. "English Grammar, The Basics," 1st edition, New York: Routledge, 2021.

2. Raman, Meenakshi., and Sharma, Sangeetha. "Technical Communication: Principles and Practice," 3rd ed., New Delhi: Oxford University Press,2015

3. Lucantoni, Peter. "English as a Second Language," Cambridge: Cambridge University Press, 2022

E-sources:

1. https://www.youtube.com/watch?v=0l69KEx7GQo
2. https://www.youtube.com/watch?v=uRGVtGfoXvI
3. https://www.youtube.com/watch?v=4ToZ2weiwuU
4. https://www.youtube.com/watch?v=oUa4FqVn2pA&t=164s
5. https://www.youtube.com/watch?v=2189sv8Bvy4

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage–0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Multiple Choice Question /Assignment/ Tutorial/…..)	Affective Domain Tool (Viva /Seminar/Presentation/ ……)	Course End Survey	
		(Weightage –0.15)	(Weightage –0.15)	(Weightage –0.1)	
CO1	IAT-I	Assignment	Digital Presentation	CES	20%
CO2	IAT-I	Assignment	Oral Presentation	CES	20%
CO3	IAT-I &IAT-II	MCQ (Orell Talk)	Team Activity	CES	20%
CO4	IAT-II	Assignment	Presentation	CES	20%
CO5	IAT-II	MCQ (Clarity SNET)	Viva	CES	20%

RubricsforEvaluationofCognitiveDomainTool

Indicator1 Submission	Submission within deadline	Submission after deadline – 1 day	Submission after deadline – 2 days	Submission afterdeadlin e–3 days	Submission afterdeadlin e–1 week
Indicator 2Content	Contentwith 90-100% relevance	Content with80-70% relevance	Content with60-50% relevance	Contentwi th40-30 % relevance	Contentwi th20-10 %relevance

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5point	4point	3point	2point	1point
Indicator1 (Knowledge Of Subject)	Clear knowledge Of subject; in Depth coverage, Adequate interpretation, Ability to interpret information	Clear Knowledge of subject: in depth coverage, adequate interpretation, unable to interpret information	Clear Knowledge of subject: in depth coverage, inadequate interpretation,	Sensible knowledge Of subject	Less knowledge of subject
Indicator 2(Verbal and Non-verbal Delivery)	Continual contact with audience, Good Delivery	Confident delivery both verbal and non-verbal	Moderate delivery both verbal and non-verbal	Moderate delivery inadequate verbal and non-verbal	Weak eye contact, tone, audibility
Indicator 3 (Responded Effectively to Questions)	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions

Performance Indicators	5points	4points	3points	2points	1point
Indicator 1Content	Content with90-100% relevance	Content with80-70% relevance	Content with60-50% relevance	Contentwith40-30 %relevance	Content with 20-10% relevance
Indicator 2Presentation	Good coherence with Perfectly framed Sentences without grammatical errors	Good coherence with Perfectly framed Sentences without grammatical errors	Moderatecoherencewith PerfectlyframedSentenceswithoutgrammaticalerrors	ModeratecoherencewithPerfectlyframedSentenceswithoutgrammaticalerrors	Poor coherence with Imperfectly framed Sentences without grammatical errors

Course Instructor **Course Coordinator** **Module Coordinator**

27.5.22

HOD/S&H

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF SCIENCE AND HUMANITIES

THEORY COURSE PLAN - EVEN SEMESTER – 2022-23

25.03.2023

Course Code and Title	:	**19CS24C, BIOLOGY FOR ENGINEERS**
Programme	:	B.E., - CSE
Semester	:	II
Course Instructors	:	Dr. E. Ramachandran, Dr. B. Annaraj and Dr. B. Rajkumar
Course Coordinator	:	**Dr. E. Ramachandran**

Course Outcomes (COs):

COs	CO Statements: Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Describe and comprehend the fundamental concepts of cell biology.	K2	PO1	1	85
CO2	Understand the various bimolecular interactions in living organisms.	K2	PO1	1	85
CO3	Familiar with biological database	K2	PO1	1	85
CO4	Understand the thermodynamic concepts in living organisms.	K2	PO1	1	85
CO5	Apply the molecular modeling methods in the drug design.	K2	PO1	1	85

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I CELL BIOLOGY				
Introduction, prokaryotic and eukaryotic cells	CO1	K2	Chalk and Talk, PPT, Video	01
Structural and function of Mitochondria and Chloroplast	CO1	K2	Chalk and Talk, PPT, Video	02
Plasma membrane, Structural and function of Lysosomes, Golgi bodies	CO1	K2	Chalk and Talk, PPT, Video	02
Cell division: mitosis and meiosis	CO1	K2	Chalk and Talk, PPT, Video	02
UNIT II BIO MOLECULAR INTERACTIONS				
Introduction - DNA and RNA	**CO2**	**K2**	Chalk and Talk, PPT, Video	**01**
Hydrophobicity and hydrophilicity	**CO2**	**K2**	Chalk and Talk, PPT, Video	**01**
Molecular interactions: types - covalent and non covalent interactions	**CO2**	**K2**	Chalk and Talk, PPT, Video	**02**
Protein - protein interaction,	**CO2**	**K2**	Chalk and Talk, PPT,	**02**

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
Protein - DNA interactions			Video	
Spectroscopic methods to measure the interactions	CO2	K2	Chalk and Talk, PPT, Video	01
UNIT III BIOLOGICAL DATABASES				
Introduction ,Primary and secondary sequence databases	CO3	K2	Chalk and Talk, PPT, Video	02
Composite protein sequence databases	CO3	K2	Chalk and Talk, PPT, Video	01
General concepts of sequence analysis :Identification of functional sequences	CO3	K2	Chalk and Talk, PPT, Video	01
Protein Data Bank (PDB)	CO3	K2	Chalk and Talk, PPT, Video	02
Nucleic Acid Data Bank (NDB)	CO3	K2	Chalk and Talk, PPT, Video	02
UNIT IV BIOCHEMICAL THERMODYNAMICS				
First and Second laws of thermodynamics, Details of thermodynamic variables and functions.	CO4	K2	Chalk and Talk, PPT, Video	02
Application of thermodynamic laws in Life Science with examples.	CO4	K2	Chalk and Talk, PPT, Video	01
Bioenergetics: Energy rich bonds , Coupled reactions-Group transfer	CO4	K2	Chalk and Talk, PPT, Video	01
Autotrophic and Heterotrophic principle of energy transductions	CO4	K2	Chalk and Talk, PPT, Video	01
Gibbs free-energy calculation for Bioredox reactions	CO4	K2	Chalk and Talk, PPT, Video	01
Thermodynamics of ligand binding: Association and dissociation constant.	CO4	K2	Chalk and Talk, PPT, Video	01
UNIT V DRUG DESIGN AND MOLECULAR MODELING				
Introduction, Principles of drug development, Structure based drug designing approaches	CO5	K2	Chalk and Talk, PPT, Video	01
Target identification and validation	CO5	K2	Chalk and Talk, PPT, Video	01
Partition coefficient (Log p): octanol - water system - Lipinski's rule of five	CO5	K2	Chalk and Talk, PPT, Video, Demo	01
Semi-empirical calculations - single point calculations - full-geometry optimization methods	CO5	K2	Chalk and Talk, PPT, Video, Demo	02
Molecular docking programs: AutoDock.	CO5	K2	Chalk and Talk, PPT, Video, Demo	02

Text Books:

1. Y. Nelson, L. David, Lehninger Principles of Biochemistry, International Edition, W.H.Freeman, Macmillan Learning, New York, 7th Edition, 2017.

2. Nagata, Kazuhiro, Real-Time Analysis of Biological Interactions, Springer, Japan, 3rd Edition, 2015.

3. I. Bertini, H. B Gray, Bioinorganic Chemistry, Viva Books Private Limited, New Delhi, 4 th Edition, 2014.

Reference Books:

1. S.A. Bunin, B. Siesel, G. Morales, J. Bajorath, Chemoinformatics: Theory, Practice, & Products, Springer, 2nd Edition, 2014.

2. A. Nag and B. Dey , Computer aided drug design and delivery system, McGraw-Hill, ISBN: 978-0-07-170125-9, 2011.

3. B. Wang, E.V. Anslyn, Chemosensor: Principles, Strategies, and Applications, a John Wiley & Sons, Inc., Publication, 2011.

E-sources:

1. NPTEL: Biology for engineers and other non-biologists by Prof. G. Suresh Kumar, IITM
   Biology by Prof. GurMantra - shiksha ka granth, IITB
   Computational Systems Biology by Prof. Karthik raman, IITM
   Bioenergetics of Life Processes by Prof. Mainak Das | IIT Kanpur
2. Journals
   (i) Practical Considerations in Virtual Screening and Molecular Docking - Advances in Protein Chemistry and Structural Biology, 2014
   (ii) Applications in Protein–Ligand Docking "Computational Molecular Modeling in Structural Biology"

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial.) (Weightage – 0.15)	Affective Domain Tool (Viva /Seminar/Presentation) (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT-1	MCQ	Viva	CES	20
CO2	IAT-1	MCQ	Viva	CES	20
CO3	IAT-1, IAT-2	MCQ	Viva	CES	20
CO4	IAT-2	MCQ	Viva	CES	20
CO5	IAT-2	MCQ	Viva	CES	20

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Communication	Presentation is clearly structured	Presentation is clearly structured with only some exceptions	Presentation is structured but quality of presentation is mixed	Quality of presentation is sometimes clear sometimes hard to follow.	No structure
Real time applications	Discussed excellently	Discussed in V. good manner	Discussed in good manner	Satisfied discussion	Sparsely knowledge

Course Instructors
Dr. E. Ramachandran
Dr. B. Annaraj
Dr. B. Rajkumar

Course Coordinator
(Dr. E. Ramachandran)

Module Coordinator
(Dr.S.Thalamuthu)

Programme Coordinator
(Dr. S. Thalamuthu)

HOD/ (S&H)
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Dr. M.A. Neelakantan, M Sc., M Phil., B Ed., Ph D
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NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503
(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF SCIENCE AND HUMANITIES

Theory Course Plan - Second Semester – 2022-23

Course Code and Title	**:**	19GNO2C-தமிழர் மரபு-Heritage of Tamils
Programme	**:**	B.E/B.Tech Common to all branches
Semester	**:**	II
Regulations	**:**	2019
Credits	**:**	1
Course Instructors	**:**	Dr. S.Chithra, AP/Tamil Dr.S.Chithirai Kumar, AP/Chemistry, Mr.J.Thamba, AP/Chemistry Dr.E.Ramachandran, AP/Chemistry, Dr.A.Nichelson , AP/Physics Dr.V.Ramasubbu, AP/Physics, Mr.N.Sivananthan, AP/Maths Dr.M.Aravind, AP/Physics, Dr.M.Ganapathy, AP/Physics Dr.T.Arjun, AP/Maths, Dr.M.Prabhu, AP/Physics Mr.P. Tamilarignan, AP/English

Prerequisite Courses:

- **Plus two level of knowledge in Tamil**

Course Outcomes (COs):

COs	**CO Statements** இப்பாடம் முடிந்ததும் மாணவர்கள் அறிந்து கொள்வது	**CO Level**	**Related PO**	**Graduate Attributes**	**Related PSO**	**Threshold**
CO1	தமிழ் மொழியின் இலக்கிய வளம், ஓவிய, சிற்பக் கலையின் பரிணாம வளர்ச்சி, நாட்டுப்புறக் கலை மற்றும் வீர விளையாட்டுக்கள்	K2	8,9,10, 12	Ethics, Individual and Team work, Communication, Lifelong learning	-	70%
CO2	தமிழர்களின் திணை சார் கோட்பாடுகள் இந்திய பண்பாட்டில் தமிழர்களின் பங்கு	K2	8,9,10, 12		-	70%

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
அலகு I மொழி மற்றும் இலக்கியம்:				
இந்திய மொழிக் குடும்பங்கள் – திராவிட மொழிகள் – தமிழ் ஒரு செம்மொழி – தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயசார்பற்ற தன்மை – சங்க இலக்கியத்தில் பகிர்தல் அறம்	CO1	K2	Chalk and Talk	1
திருக்குறளில் மேலாண்மைக் கருத்துக்கள் – தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள்	CO1	K2	Chalk and Talk	1
சிற்றிலக்கியங்கள் – தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி– தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.	CO1	K2	Chalk and Talk	1
அலகு II மரபு – பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை – சிற்பக் கலை				
நடுகல் முதல் நவீன சிற்பங்கள் வரை – ஐம்பொன் சிலைகள்– பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள்	CO1	K2	Chalk and Talk	1
தேர் செய்யும் கலை – சுடுமண் சிற்பங்கள் – நாட்டுப்புறத் தெய்வங்கள் – குமரிமுனையில் திருவள்ளுவர்	CO1	K2	Chalk and Talk	1
சிலை – இசைக்கருவிகள் – மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் – தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.	CO1	K2	Flipped classroom	1
அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்				
தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து,	CO1	K2	Video presentation	1
ஒயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம்,	CO1	K2	Chalk and Talk	1
வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.	CO1	K2	PPT	1

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்				
தமிழகத்தின் தாவரங்களும், விலங்குகளும் – தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள்	CO2	K2	Chalk and Talk	1
தமிழர்கள் போற்றிய அறக்கோட்பாடு – சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் – சங்ககால நகரங்களும் துறைமுகங்களும்	CO2	K2	Chalk and Talk	1
சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி – கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி	CO2	K2	Chalk and Talk	1
அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு				
இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு – இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம்	CO2	K2	Chalk and Talk	1
சுயமரியாதை இயக்கம் – இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு	CO2	K2	Chalk and Talk	1
கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப் புத்தகங்களின் அச்சு வரலாறு.	CO5	K2	Chalk and Talk	1

Text Books:

1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் – முனைவர் இல. சுந்தரம் . (விகடன் பிரசுரம்).
3. கீழடி – வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை – ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)

Reference Books:

1. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
2. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
3. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
4. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)

5. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
6. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
7. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
8. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

E-sources:

1. https://www.keetru.com/index.php/2010-06-24-04-31-11/ungal-noolagam-sep16/31521-2016-09-23-03-32-56
2. https://www.youtube.com/watch?v=RwbVHCUrETE
3. https://www.youtube.com/watch?v=XQF0jWokTjg

Assessment Procedure:

CO	Assessment Tools		Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools Cognitive Domain Tool (Multiple Choice Question, /Assignment / Tutorial/…..) (Weightage –0.4)	
CO1	IAT I	Assignment	50%
CO2	IAT II	Assignment	50%

Rubrics for Evaluation of Cognitive domain Tools:

Assignment

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Indicator 1 Content	Content with 80-100 % relevance	Content with 60-80 % relevance	Content with 40-60 % relevance	Content with 20-40 % relevance	Content with 10-20 % relevance
Indicator 2 Presentation	good coherence with adequate illustrations.	good coherence with less illustrations.	moderate coherence with less illustrations.	moderate coherence with inadequate illustrations.	poor coherence with inadequate illustrations.
Indicator 3 Submission	Submission within deadline	Submission after deadline – 2 days	Submission after deadline – 4 days	Submission after deadline – 6 days	Submission after deadline – 1 week

Course Instructors
Dr.S.Chithira, AP/Tamil
Dr.S.Chithirai Kumar, AP/Chemistry
Mr.J.Thamba, AP/Chemistry
Dr.E.Ramachandran, AP/Chemistry
Dr.A.Nichelson , AP/Physics
Dr.V.Ramasubbu, AP/Physics
Mr.N.Sivananthan, AP/Maths
Dr.M.Aravind, AP/Physics
Dr.M.Ganapathy, AP/Physics
Dr.T.Arjun, AP/Maths
Dr.M.Prabhu, AP/Physics
Mr.P. Tamilarignan., AP/English

Program Coordinator
Dr.S.Thalamuthu, Asso Prof/Chemistry

HOD/S&H
Dr.M.A.Neelakantan ,Prof/Chemistry

NATIONAL ENGINEERING COLLEGE, K.R. NAGAR, KOVILPATTI – 628 503

(An Autonomous Institution, Affiliated to Anna University – Chennai)

DEPARTMENT OF Science and Humanities

Course Plan - Even Semester - 2022-2023

NEC/AC / 02 (a)

Course Code and Title	:	**19CE23C, LIFE SCIENCE**
Programme	:	B.E (CIVIL)
Semester	:	II
Course Instructors	:	Dr.S.Chithiraikumar, AP/S&H

Prerequisites: Basic knowledge in Chemistry

Course Outcomes (COs):

COs	CO Statements Upon the completion of the course the students will be able to	CO Level	Related PO	Related PSO	Threshold
CO1	Describe and comprehend the fundamental concepts of cell biology.	K2	1,2,7, 9,10 & 12		80
CO2	Understand the components and functions of ecosystem.	K2	1,2,7, 9,10 & 12		80
CO3	Familiar with the importance and toxicity of some transition elements in biologicalsystems.	K2	1,2,7, 9,10 & 12		80
CO4	Describe the various types of bioremediation process.	K2	1,2,7, 9,10 & 12		80
CO5	Recognize the various environmental monitors and waste treatment techniques	K2	1,2,7, 9,10 & 12		80

Course Content Delivery Method:

Course Content	COs	Level of Content	Content Delivery	No. of Hours to be Handled
UNIT I CELL BIOLOGY				
Introduction, prokaryotic and eukaryotic cells	CO1	K2	Chalk and talk, PPT	01
Structural and function of Mitochondria	CO1	K2	Chalk and talk, PPT	01
Structural and function of Chloroplast	CO1	K2	Chalk and talk, PPT	01
Structural and function of Lysosomes	CO1	K2	Chalk and talk, PPT	01
Structural and function of nucleus	CO1	K2	Seminar	01
Cell division: mitosis - various stages involves in mitosis	CO1	K2	PPT, Collaborative learning	01
Cell division: mitosis - various stages involves in meiosis	CO1	K2	Chalk and talk, PPT	01
UNIT II ECOLOGY				
Course Content	**COs**	**Level of Content**	**Content Delivery**	**No. of Hours to be Handled**
Ecosystems: Components, types structure: Biotic and abiotic factors	**CO2**	**K2**	Chalk and talk, PPT	**01**
Functions of ecosystem- Energy transfer (first and second law of	**CO2**	**K2**	Chalk and talk, PPT	**01**

thermodynamics)				
Community ecology: Characteristics, frequency, life forms, and biological spectrum	CO2	K2	Chalk and talk, PPT	01
Structure and functions of forest ecosystem	CO2	K2	PPT, Collaborative learning	01
Structure and functions of pond ecosystem	CO2	K2	Seminar	01
Food chain, food web and ecological pyramids.	CO2	K2	Chalk and talk, PPT	01
Numerical problems related to ecosystem	CO2	K2	Chalk and talk,	01
UNIT III METALS IN BIOLOGICAL SYSTEMS				
Introduction , Role of metal ions in biological systems	CO3	K2	Chalk and talk, PPT	01
Importance of Mg, Mn in biological systems	CO3	K2	Chalk and talk, PPT	01
Importance of Fe, Co, in biological systems	CO3	K2	Chalk and talk, PPT	01
Importance of Ni, Cu in biological systems	CO3	K2	Seminar	01
Importance of Zn in biological systems	CO3	K2	Chalk and talk, PPT	01
Metal toxicity	CO3	K2	PPT, Collaborative learning	01
UNIT IV BIOREMEDIATION				
Introduction about bioremediation	CO4	K2	Chalk and talk, PPT	01
Advantages and applications of bioremediation	CO4	K2	Chalk and talk, PPT	02
Types of bioremediation-Natural (attenuation)	CO4	K2	Chalk and talk, PPT	02
Ex-situ and In-situ.	CO4	K2	Chalk and talk, PPT	02
UNIT V ENVIRONMENTAL MONITORING AND WASTE TREATMENT				
Introduction: Bio-indicators and Biomarkers for the identification of waste water	CO5	K2	Chalk and talk, PPT	01
Biosensors for the identification of waste water	CO5	K2	Chalk and talk, PPT	01
Biotechnological processes for waste water treatment	CO5	K2	Chalk and talk, PPT	01
Waste treatment – Equalization and Neutralization	CO5	K2	Chalk and talk, PPT	01
Removal of suspended and dissolved organic solids - Chemical oxidation, Adsorption	CO5	K2	Seminar	01
Removal of dissolved inorganic solids.	CO5	K2	Collaborative learning	01
Numerical problems related to waste water removal	CO5	K2	Chalk and talk	01

Text Books:

1.A.K.Chatterji, Introduction to Environmental biotechnology, PHI Learning Private Limited, New Delhi, 2011.

2.R.M Maier, I.L. Pepper and C.P.Gerba, Environmental Microbiology, Academic Press, 2000.

Reference Books:

1.G. Karp, Cell and Molecular Biology: Concepts and Experiments, John Wiley, 6th Edition, 2009.
2.Dieter Rehder, Bioinorganic Chemistry, Oxford University Press, 1st Edition, 2014.
3.S. Manahan, Environmental Chemistry, CRC Press, 10th Edition, 2017.

E-sources:

1. NPTEL: Biology for engineers and other non-biologists by Prof. G. Suresh Kumar, IITM Biology by Prof. GurMantra - shiksha ka granth,
2. Journals : i) Biosensors: A tutorial review, IITB, 0278-6648/06/$20.00 © 2006 IEEE

   ii) Immunosensors—principles and applications to clinical chemistry, Clinica Chimica Acta, 2001

Video: 1. https://www.youtube.com/watch?v=URUJD5NEXC8

2. https://www.youtube.com/watch?v=4KlPYJdB5Y4

Assessment Procedure:

CO	Assessment Tools				Weightage of CO for internal mark
	IAT (Weightage – 0.6)	Other Assessment Tools			
		Cognitive Domain Tool (Multiple Choice Question /Assignment / Tutorial.) (Weightage – 0.15)	Affective Domain Tool (Viva /Seminar/Presentation) (Weightage – 0.15)	Course End Survey (Weightage – 0.1)	
CO1	IAT-1	MCQ	Viva	CES	20
CO2	IAT-1	MCQ	Viva	CES	20
CO3	IAT-1, IAT-2	MCQ	Viva	CES	20
CO4	IAT-2	MCQ	Viva	CES	20
CO5	IAT-2	MCQ	Viva	CES	20

Rubrics for Evaluation of Affective domain Tools:

Performance Indicators	5 point	4 point	3 point	2 point	1 point
Knowledge of Subject	Demonstrated full knowledge and able to explain with practical examples	Answered all questions with elaboration	Answered all questions but failed to elaborate	Answered most questions	Answered only rudimentary questions
Communication	Presentation is clearly structured	Presentation is clearly structured with only some exceptions	Presentation is structured but quality of presentation is mixed	Quality of presentation is sometimes clear sometimes hard to follow.	No structure
Real time applications	Discussed excellently	Discussed in V. good manner	Discussed in good manner	Satisfied discussion	Sparsely knowledge

Course Instructor
(Dr.S.Chithiraikumar)

Module Coordinator
(Dr.B. Annaraj)

Programme Coordinator
(Dr.S.Thalamuthu)

25.7.23

HOD/ S&H
(Dr.M.A.Neelakantan)