



Excellence in Higher Education

AKSHAYA

COLLEGE OF ENGINEERING AND TECHNOLOGY

(Approved by AICTE, Recognized by UGC and Affiliated to Anna University)

Accredited by NAAC | Accredited by NBA : UG programmes of CSE, ECE & CIVIL

Kinathukadavu, Coimbatore-642109. www.acetcbe.edu.in

AN AUTONOMOUS INSTITUTION



CURRICULUM AND SYLLABI

REGULATIONS-2025

**Department of
Electronics and Communication Engineering**

I – VISION AND MISSION OF THE INSTITUTE

INSTITUTION VISION

Emerge as a Premier Institute, producing globally competent engineers.

INSTITUTION MISSION

- IM1 :** Achieve Academic diligence through effective and innovative teaching-learning processes, using ICT Tools.
- IM2 :** Make students employable through rigorous career guidance and training programs.
- IM3 :** Strengthen Industry Institute Interaction through MOUs and Collaborations.
- IM4 :** Promote Research & Development by inculcating creative thinking through innovative projects incubation.

II – VISION AND MISSION OF THE DEPARTMENT

DEPARTMENT VISION

Emerge as eminent Centre of learning in Electronics and Communication Engineering to produce engineers, capable of meeting the global challenges through design, development and research, for the welfare of the society and humanity.

DEPARTMENT MISSION

DM1 :	Adopt a systematic and technology enabled teaching-learning process with an ability to contribute for research..
DM2 :	Develop electronics and communication engineers with managerial skills and life-long learning practices, for sustainable economic growth, beneficial to the society.
DM3 :	Establish Centre of excellence in VLSI technologies and Embedded systems and provide a creative environment with industry linked initiatives for encouraging



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III - PROGRAM OUTCOMES (POs)

- PO1: Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem Analysis:** Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- PO3: Design/Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural, societal and environmental considerations.
- PO4: Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.
- PO5: Modern Tool Usage:** 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.
- PO6: The Engineer and Society:** Apply 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.
- PO7: Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.
- PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and Team Work:** Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
- PO11: Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.


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IV - PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1:	Professional skills: Students shall have skills and knowledge to work on analog and digital systems, adhoc and sensor networks, VLSI, embedded and communication systems
PSO2:	Competency: Students shall qualify at the State, National and International level competitive examination for employment, higher studies and research.

V - PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- PEO1:** The graduates will have successful careers in industries or pursue higher studies and research or emerge as entrepreneurs.
- PEO2:** The graduates will be able to apply fundamental and advanced knowledge, skills and techniques in devising innovative products for the benefits of society.
- PEO3:** The graduates will be able to critically analyze existing literature in an area of specialization and research oriented methodologies to solve the problems identified.

VI- PEO/PO MAPPING


Following three levels of correlation should be used:

1 : Low

2 :Medium

3 : High

PEO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEO1	3	2	2	3	3	1	1	1	1	1	1	2
PEO2	2	2	3	3	3	2	2	-	2	2	2	2
PEO3	1	2	1	1	1	2	2	-	3	3	3	3


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VI PROGRAM CURRICULUM

Curriculum Structure

The curriculum structure includes the following course categories:

Abbreviations:

HUM – Humanities (Languages, Management, Heritage, and others)	L – Laboratory Course
BS – Basic Science (Mathematics, Physics, Chemistry)	T – Theory
ES – Engineering Science (General (G), Programme Core (PC), Programme Elective (PE) & Emerging Technology (ET))	LIT – Laboratory Integrated Theory
SD – Skill Development	PW – Project Work
SL – Self Learning	IPW – Internship cum Project Work
CDP – Capstone Design Project	DIC – Department Introductory Course
OE – Open Elective	TCP – Total Contact Period(s)



B.E ELECTRONICS AND COMMUNICATION ENGINEERING
REGULATIONS – 2025
CHOICE BASED CREDIT SYSTEM
CURRICULUM FOR I & II
SEMESTERS

Semester – I							
S. No.	Course Code	Course Name	Course Type	Periods / Week		Credits	Category
				L-T-P	TCP		
1.	MA25C01	Applied Calculus	T	3-1-0	4	4	BS
2.	EN25C01	English Essentials – I	T	2-0-0	2	2	HUM
3.	UC25H01	தமிழர் மரபு / Heritage of Tamils	T	1-0-0	1	1	HUM
4.	EE25C04	Basic Electronics and Electrical Engineering	T	2-1-0	3	3	ES (PC)
5.	PH25C01	Applied Physics - I	LIT	2-0-2	4	3	BS
6.	CY25C01	Applied Chemistry - I	LIT	2-0-2	4	3	BS
7.	CS25C01	Computer Programming: C	LIT	2-0-2	4	3	ES (G)
8.	ME25C04	Makerspace	L	0-0-4	4	2	SD
9.	UC25A01	Life Skills for Engineers – I	---	1-0-2	3	1	HUM
10.	UC25A02	Physical Education – I	---	0-0-4	4	1	HUM
11.		NCC / NSS / NSO/ YRC	---	---	---	---	---
Total Credits					33	23	


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Semester – II							
S. No.	Course Code	Course Name	Course Type	Periods / Week		Credits	Category
				L-T-P	TCP		
1.	MA25C02	Linear Algebra	T	3-1-0	4	4	BS
2.	UC25H02	தமிழர்களும் தொழில்நுட்பமும் / Tamils and Technology	T	1-0-0	1	1	HUM
3.	EN25C02	English Essentials – II	LIT	1-0-2	3	2	HUM
4.	EC25C01	Electron Devices	T	3-0-0	3	3	ES (PC)
5.	EC25C02	Circuits and Network Analysis	T	3-0-0	3	3	ES (PC)
6.	CS25C05	Data Structures using C++	LIT	3-0-2	5	4	ES (G)
7.	ME25C05	Re-Engineering for Innovation	L	0-0-4	4	2	SD
8.	UC25A03	Life Skills for Engineers – II	---	1-0-2	3	1	HUM
9.	EC25C03	Devices and Circuits Laboratory	L	0-0-4	4	2	ES (PC)
10.	UC25A04	Physical Education – II	---	0-0-4	4	1	HUM
11.		Foreign Language [^]	LIT	1-0-2	3	1	HUM
Total Credits					37	24	

[^] Deutsch / Japanese / Korean


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Semester – III							
S. No.	Course Code	Course Name	Course Type	Periods/ Week		Credits	Category
				L-T-P	TCP		
1.		Transforms and its Applications	T	3-1-0	4	4	BS
2.		Signals and Systems	T	3-1-0	4	4	ES (PC)
3.		Computer Architecture and Organization	T	3-0-0	3	3	ES (PC)
4.		Electronic Circuits and Analysis	T	3-0-0	3	3	ES (PC)
5.		Digital System Design	LIT	3-0-2	5	4	ES (PC)
6.		Problem solving using python	LIT	1-0-2	3	2	ES(G)
7.		Electronic Circuits Laboratory	L	0-0-4	4	2	ES (PC)
8.		Skill Development Course-I	LIT	1-0-2	3	2	SD
9.		English Communication Skills Laboratory – II	L	0-0-2	2	1	HUM
Total Credits					31	25	

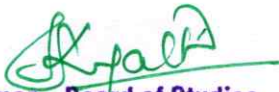

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Semester – IV							
S. No.	Course Code	Course Name	Course Type	Periods/ Week		Credits	Category
				L-T-P	TCP		
1.							
2.		Electro Magnetic Fields and Transmission Lines	T	3-1-0	4	4	ES (PC)
3.		Climate Change and Sustainability	T	2-0-0	2	2	HUM
4.		Linear Integrated Circuits	T	3-0-0	3	3	ES (PC)
5.		Control Systems	T	3-0-0	3	3	ES (PC)
6.		Skill Development Course – II	LIT	1-0-2	3	2	SD
7.		Linear Integrated Circuits Laboratory	L	0-0-4	4	2	ES (PC)
8.		Microprocessor and Microcontroller	T	3-0-0	3	3	ES (PC)
9.		Industry Oriented Course - I	LIT	1-0-2	3	1	SD
10.		Microprocessor and Microcontroller Laboratory	L	0-0-4	4	2	ES (PC)
11.		English Communication Skills – III	L	0-0-2	2	1	HUM
Total Credits					31	23	


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Semester – V							
S. No.	Course Code	Course Name	Course Type	Periods/ Week		Credits	Category
				L-T-P	TCP		
1.		Introduction to Standards in Electronics and Communication	T	1-0-0	1	1	ES (PC)
2.		Analog Communication	T	3-0-2	5	4	ES (PC)
3.		Data Communication Networks	LIT	3-0-2	5	4	ES (PC)
4.		Digital Signal Processing	T	3-0-2	5	4	ES (PC)
5.		Embedded systems and Industrial IOT	LIT	3-0-2	5	4	ES (PC)
6.		Programme Elective – I	T	3-0-0	3	3	ES (PE)
7.		Antenna Design	T	3-0-2	5	4	ES (PC)
8.		Skill Development Course – III	LIT	1-0-2	3	2	SD
9.		Analog Communication Laboratory	L	0-0-4	4	2	ES (PC)
10.		Digital Signal Processing	L	0-0-4	4	2	ES (PC)
Total Credits					40	30	

For Honours Degree							
1.		Capstone Design Project – Level I	CDP	0-0-12	12	6	SD
OR							
1.		Honours Elective – I	T	3-0-0	3	3	
2.		Honours Elective – II	T	3-0-0	3	3	
For Minor Degree							
1.		Minor Elective – I	T	3-0-0	3	3	
2.		Minor Elective – II	T	3-0-0	3	3	


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Semester – VI							
S. No.	Course Code	Course Name	Course Type	Periods / Week		Credits	Category
				L-T-P	TCP		
1.		Programme Elective – II	T	3-0-0	3	3	ES (PE)
2.		Programme Elective – III	T	3-0-0	3	3	ES (PE)
3.		Open Elective	T	3-0-0	3	3	ES (OE)
4.		Digital Communication	T	3-0-2	5	4	ES (PC)
5.		Artificial Intelligence & Machine Learning	LIT	2-0-2	4	3	ES (PC)
6.		CMOS VLSI Design	T	3-0-2	5	4	ES (PC)
7.		Digital Communication Laboratory	L	0-0-4	4	2	ES (PC)
8.		CMOS VLSI Design Laboratory	L	0-0-4	4	2	ES (PC)
9.		Industry Oriented Course - II	LIT	1-0-2	3	2	SD
10.		Self-Learning Course	---	---	0	1	SL
Total Credits					34	26	
For Honours Degree							
1.		Capstone Design Project – Level II	CDP	0-0-12	12	6	SD
OR							
1.		Honours Elective – III	T	3-0-0	3	3	
2.		Honours Elective – IV	T	3-0-0	3	3	
For Minor Degree							
1.		Minor Elective – III	T	3-0-0	3	3	
2.		Minor Elective – IV	T	3-0-0	3	3	


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Semester – VII							
S. No.	Course Code	Course Name	Course Type	Periods / Week		Credits	Category
				L-T-P	TCP		
1.		Engineering Entrepreneurship Development	T	2-0-2	4	3	HUM
2.		RF and Microwave Engineering	T	3-0-0	3	3	ES (PC)
3.		Wireless Communication	T	3-0-0	3	3	ES (PC)
4.		Programme Elective – IV	T	3-0-0	3	3	ES (PE)
5.		Programme Elective – V	T	3-0-0	3	3	ES (PE)
6.		Project Management	T	2-0-0	2	2	HUM
7.		Wireless Communication lab	I	0-0-4	4	2	ES (PC)
8.		Millimeter wave and Optical Communication	LIT	3-0-2	5	4	ES (PC)
9.		Microwave and Optical Lab	L	0-0-4	4	2	ES (PC)
10.		Summer Internship*	---	---	---	1	SD
Total Credits					31	26	
For Honours Degree							
1.		Capstone Design Project – Level III	CDP	0-0-12	12	6	SD
OR							
1.		Honours Elective – V	T	3-0-0	3	3	
2.		Honours Elective – VI	T	3-0-0	3	3	
For Minor Degree							
1.		Minor Elective – V	T	3-0-0	3	3	
2.		Minor Elective – VI	T	3-0-0	3	3	


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Semester– VIII							
S. No.	Course Code	Course Name	Course Type	Periods/Week		Credits	Category
				L-T-P	TCP		
1		Project Work / Internship cum Project Work	PW / IPW	0-0-16	16	8	SD
Total Credits					16	8	


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SEMESTER – I


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MA25C01	Applied Calculus	L	T	P	C
		3	1	0	4
<p>Course Objectives:</p> <ul style="list-style-type: none"> To provide technical competence of modelling engineering problems using calculus. To apply the calculus concepts in solving engineering problems using analytical methods and computational tools. 					
<p>Differential Calculus: Functions, graph of functions, New functions from old functions Limit of a function, Continuity, Limits at infinity, Derivative as a function, Maxima and Minima of functions of single variable, Mean value theorem, Effect of derivatives on the shape of a graph.</p> <p>Activities: Visualization of the functions, Maxima and Minima of a function using open-source software, Solving of Competitive Examination questions (Ex. GATE).</p>					
<p>Functions of Several Variables: Partial derivatives, Chain rule, Total derivative, Maxima and minima of functions of two variables, Method of Lagrange's Multipliers, Application problems in engineering.</p> <p>Activities: Partial Derivatives with two or three variables, Maxima and Minima of a function using open-source software, Solving of Competitive Examination questions (Ex. GATE).</p>					
<p>Integral Calculus: Fundamental theorem of Calculus, Indefinite integrals and the Net Change Theorem, Improper integrals, Arc Length, Area of Region, Area of surface of revolution.</p> <p>Activities: Definite and Indefinite Integrals, Determination of Area, Solving of Competitive Examination questions (Ex. GATE).</p>					
<p>Multiple Integrals: Iterated integrals and Fubini's theorem, Evaluation of double integrals, change of order of integration, change of variables between Cartesian and polar co-ordinates, evaluation of triple integrals-change of variables between Cartesian and cylindrical and spherical co-ordinates.</p> <p>Activities: Double integrals and triple integrals using open-source software, Solving of Competitive Examination questions (Ex. GATE).</p>					
<p>Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%.</p>					
<p>Assessment Methodology: Assignments (20%), Solution to application-oriented problems using software (20%), Solving of GATE questions (20%), Internal Examinations (40%).</p>					
<p>References:</p> <ol style="list-style-type: none"> Anton, H., Bivens, I. C., & Davis, S. (2021). Calculus: Early transcendentals. John Wiley & Sons. Ron Larson and David C. Falvo, (2013), Calculus: an Applied Approach. Cengage Learning. 					



3. Stewart, J., Clegg, D., & Watson, S. (2019). *Calculus: Early transcendentals*.
4. Thomas, G. B., Jr., Weir, M. D., Hass, J., & Heil, C. (2018). *Thomas' calculus: Early transcendentals*. Pearson.
5. Singh, K. (2019). *Engineering mathematics through applications*. Bloomsbury Publishing.
6. Grewal, B. S. (2012). *Higher engineering mathematics*. Khanna Publishers.

E-resources:

1. [https://math.libretexts.org/Bookshelves/Calculus/Map%3A_Calculus__Early_Transcendentals_\(Stewart\)/](https://math.libretexts.org/Bookshelves/Calculus/Map%3A_Calculus__Early_Transcendentals_(Stewart)/)
2. <https://openstax.org/books/calculus-volume-1/>
3. <https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx>
4. SCILAB, <https://www.scilab.org/>

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EN25C01	English Essentials – I	L	T	P	C
		2	0	0	2
<p>Course Objectives:</p> <ul style="list-style-type: none"> Enhance learners' listening and speaking skills to understand and deliver speeches effectively Equip students with the skills to write clear, coherent, and grammatically correct texts for various purposes. Strengthen the ability to comprehend, interpret, and analyse written English across diverse contexts. 					
<p>Speaking Skills: Self-Introduction (Tenses, Adjectives) Expressing opinions (Subject-Verb Agreement), Participating in Conversations (Speech Acts - agreeing & disagreeing – synonyms and antonyms)</p> <p>Suggested Activities: Self-Introduction, Just a Minute (JAM) Video recording, Situational role plays, Spell Bee, Word Substitution, Usage of Apps.</p>					
<p>Listening Skills: Listening to Simple Conversations (Understanding tone and intent), Short Speeches / Stories, Extracting information, Pronunciation, Listening to Various Accents.</p> <p>Suggested Activities: Listening and Repeating, Gap fill exercises, Note-taking</p>					
<p>Reading Skills: Reading Strategies – (Skimming, scanning, predicting) intensive reading - short passages and long passages on suggested themes (Sentence Patterns, Prefixes and suffixes, idioms and phrases).</p> <p>Activities: Reading - newspaper and digital articles, Cloze, Reading comprehension, note making and summarising,</p>					
<p>Writing Skills: Word Substitution, Sentence Formation, Hints Development (Guided Writing), Writing Different Types of Paragraphs - (Sentence Structure) – Letter Writing / Emails (Informal)</p> <p>Activities: Error Detection, Picture and poster description, Descriptive, Narrative and Comparative paragraphs, Brainstorming and Mind Mapping - Informal letters/ Emails</p>					
<p>Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%</p>					
<p>Assessment Methodology: Quiz (10%), Assignments (20%), Speaking Task (10%), Reading Task (10%), Writing Task (10%), Internal Examinations (40%).</p>					
<p>References:</p> <ol style="list-style-type: none"> Miller, K. Q., & Wahl, S. T. (2023). <i>Business and Professional Communication: KEYS for Workplace Excellence</i> (5th ed.). SAGE Publications. Kumar, Sanjay & Pushpalatha. (2018). <i>English Language and Communication Skills for Engineers</i>. India: Oxford University Press. 					



3. Sharma, S., & Mishra, B. (2024). *Communication Skills for Engineers and Scientists* (2nd ed.). PHI Learning.

E-resources:

1. Cambridge English – <https://www.cambridgeenglish.org/learning-english/grammar-and-vocabulary/>
2. Perfect English Grammar – <https://www.perfect-english-grammar.com/>
3. British Council – Learn English - <https://learnenglish.britishcouncil.org/grammar>
4. Speechling – <https://speechling.com/>
5. mePro by Pearson – <https://mepro.pearson.com/>
6. TED Talks – <https://www.ted.com/>


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UC25H01	Heritage of Tamils	L	T	P	C
		1	0	0	1
<p>Language and Literature: Language Families in India, Dravidian Languages, Tamil as a Classical Language, Classical Literature in Tamil, Secular Nature of Sangam Literature, Distributive Justice in Sangam Literature, Management Principles in Thirukural, Tamil Epics and Impact of Buddhism & Jainism in Tamil Land, Bakthi Literature Azhwars and Nayanmars, Forms of minor Poetry, Development of Modern literature in Tamil, Contribution of Bharathiyar and Bharathidhasan.</p>					
<p>Heritage - Rock Art Paintings to Modern Art – Sculpture: Hero stone to modern sculpture, Bronze icons, Tribes and their handicrafts, Art of temple car making, Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments, Mridhangam, Parai, Veenai, Yazh and Nadhaswaram, Role of Temples in Social and Economic Life of Tamils.</p>					
<p>Folk and Martial Arts: Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance, Sports and Games of Tamils.</p>					
<p>Thinai Concept of Tamils: Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature, Aram Concept of Tamils, Education and Literacy during Sangam Age, Ancient Cities and Ports of Sangam Age, Export and Import during Sangam Age, Overseas Conquest of Cholas.</p>					
<p>Contribution of Tamils to Indian National Movement and Indian Culture: Contribution of Tamils to Indian Freedom Struggle, The Cultural Influence of Tamils over the other parts of India, Self-Respect Movement, Role of Siddha Medicine in Indigenous Systems of Medicine, Inscriptions & Manuscripts, Print History of Tamil Books.</p>					
<p>References:</p> <ol style="list-style-type: none"> 1. தமிழக வரலாறு - மக்களும் பண்பொடும் - மகமக பிள்மள (தவளியீடு: தமிழ்நாடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்). 2. கணினித் தமிழ் - முமனவர் இல. சுந்தரம். (விகடன் பிரசுரம்). 3. கீழடி - மவமகநதிக்கமரயில் ஂங்ககொல நகர நொகரிகம் (குதொல்லியல் Fமற தவளியீடு) 4. தபொருமந - ஆற்றங்கமர நொகரிகம். (குதொல்லியல் Fமற தவளியீடு) 5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print) 6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies. 7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies). 8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) 9. 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) 10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author) 11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) 12. Journey of Civilization, Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book. 					

UC25H01	தமிழர் மரபு	L	T	P	C
		1	0	0	1

மமொழி மற்றும் இலக்கியம்: இந்திய தமொழிக் குடும்பங்கள், திரொவிட தமொழிகள், தமிழ் ஒரு தெம்தமொழி, தமிழ் தெவ்விலக்கியங்கள், ஂங்க இலக்கியத்தின் ஂமெய் ஂொர்பற்ற தன்மம, ஂங்க இலக்கியத்தில் பகிர்தல் அறம், திருக்குறளில் மமலொண்மமக் கருத்஑க்கள், தமிழ்க் கொப்பியங்கள், தமிழகத்தில் ஂமண தபெளத்த ஂமயங்களின் தொக்கம், பக்தி இலக்கியம், ஆழ்வொர்கள் மற்றும் நொயன்மொர்கள், சிறுறிலக்கியங்கள், தமிழில் நவீன இலக்கியத்தின் வளர்ஂசி, தமிழ் இலக்கிய வளர்ஂசியில் பொரதியொர் மற்றும் பொரதிதொஂன் ஆகிமயொரின் பங்களிப்பு.

மரபு - பொற்ற ஂவியங்கள் முதல் நவீன ஂவியங்கள் வறர - சிற்பக் கறல: நடுகல் முதல் நவீன சிற்பங்கள் வமர, ஂம்தபொன் சிமலகள், பழங்குடியினர் மற்றும் அவர்கள் தயொரிக்கும் மகவிமன்ப தபொருட்கள், தபொம்மமகள், மதர் தெய்யும் கமலு சுடுமண் சிற்பங்கள், நொட்டுப்புறத் ததய்வங்கள், குமரிமுமனயில் திருவள்ளவர் சிமல, இமெக் கருவிகள், மிருதங்கம், பமற, வீமண, யொழ், நொதஸ்வரம், தமிழர்களின் ஂமுக தபொருளொதொர வொழ்வில் மகொவில்களின் பங்கு.

நொட்டுப்புறக் கறலகள் மற்றும் வீர விறளயொட்டுகள்: ததருக்கூத்஑, கரகொட்டம், வில்லுப்பொட்டு, கணியொன் கூத்஑, ஂயிலொட்டம், மதொல்பொமவக் கூத்஑, சிலம்பொட்டம், வளரி, புலியொட்டம், தமிழர்களின் விமளயொட்டுகள்.

தமிழர்களின் திறைக் ககொட்பொடுகள்: தமிழகத்தின் தொவரங்களும், விலங்குகளும், ததொல்கொப்பியம் மற்றும் ஂங்க இலக்கியத்தில் அகம் மற்றும் புறக் மகொட்பொடுகள், தமிழர்கள் மபொற்றிய அறக்மகொட்பொடு, ஂங்ககொலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும், ஂங்ககொல நகரங்களும் ஑மற முகங்களும், ஂங்ககொலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி, கடல்கடந்த நொடுகளில் மொழர்களின் தவற்றி.

இந்திய கதசிய இயக்கம் மற்றும் இந்திய பைப்பொட்டிற்குத் தமிழர்களின் பங்களிப்பு: இந்திய விடுதலம்மபொரில் தமிழர்களின் பங்கு, இந்தியொவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பொட்டின் தொக்கம், சுயமரியொமத இயக்கம், இந்திய மருத்஑வத்தில், சித்த மருத்஑வத்தின் பங்கு, கல்தவட்டுகள், மகதயமுத்஑ப்படிக்கள், தமிழ்ப் புத்தகங்களின் ஂசு வரலொறு.

References:

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கக.கக. பிள்ளை (வவையீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முளனவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - ஂவளக நதிக்களரயில் சங்ககால நகர நாகரிகம் (வதால்லியல் துளை வவையீடு)
4. வபாருளந - ஆற்றைங்களர நாகரிகம். (வதால்லியல் துளை வவையீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
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10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
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EE25C04	Basic Electronics and Electrical Engineering	L	T	P	C
		2	1	0	3
Course Objectives:					
<ul style="list-style-type: none"> Students will understand the fundamentals and evolution of electronics, electrical systems 					
<p>Basic Electronics: Passive and active components – Resistors, Capacitors, Inductors-Types, features and specification, Energy band diagram of conductors, semiconductor, insulator – Intrinsic & extrinsic semiconductor - types. PN junction diode – zener diode.</p> <p>Activities: VI characteristics of PN junction and Zener diode.</p>					
<p>Electrical Machines: Construction, Principle of Operation, Basic Equations and Applications - DC Generators, DC Motors, Single Phase Transformer, Single phase Induction Motor, Three phase Induction Motor, Three phase Alternator, Stepper and BLDC motors.</p> <p>Activities: Demonstration of Electrical Machines.</p>					
<p>Measurements and Instrumentation: Functional elements of an instrument, Standards and calibration, Operating Principle, types - Moving Coil and Moving Iron meters, Measurement of three phase power, Energy Meter, Instrument Transformers-CT and PT, DSO- Block diagram- Data acquisition.</p> <p>Activities: Demonstration of measuring equipment's</p>					
<p>Basics of Power Systems: Power system structure -Generation, Transmission and distribution , Various voltage levels, Earthing – methods of earthing, protective devices-switch fuse unit- Miniature circuit breaker- moulded case circuit breaker- earth leakage circuit breaker, safety precautions and First Aid</p> <p>Activities: Demonstration of Earthing and safety precautions in electrical circuits</p>					
<p>Sensors and Transducers</p> <p>Solenoids, electro-pneumatic systems, proximity sensors, limit switches, piezoelectric, hall effect, photo sensors, Strain gauge, LVDT, piezo electric crystals, differential pressure transducer, optical and digital transducers, Smart sensors, Thermal Imagers</p>					
Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%					
Assessment Methodology: Quiz (10%), Assignments (40%), Internal Examinations (50%)					
<p>References:</p> <ol style="list-style-type: none"> Bell, D. (2008). <i>Electronic devices and circuits</i>. Oxford University Press. Tooley, M. A. (2006). <i>Electronic circuits: Fundamentals and applications</i>. Elsevier Limited. Malvino, A., & Bates, D. J. (2012). <i>Basic electronics: Problems and solutions</i>. Tata McGraw-Hill Publishing Company Pvt. Ltd. 					

4. Hughes, E. (2016). *Electrical and electronic technology*. Pearson.
5. Theraja, B. L. (2014). *A textbook of electrical technology*. S. Chand & Company.

E- Resources:

1. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science>
2. <https://www.khanacademy.org/science/electrical-engineering>


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PH25C01	Applied Physics – I	L	T	P	C
		2	0	2	3
<p>Course Objective(s):</p> <ul style="list-style-type: none"> To impart knowledge and expose the essentials of physics in various engineering applications. 					
<p>Properties of Matter: Elasticity, Cantilever –Young’s modulus (non-uniform bending), Girders: Bridges and buildings, Viscosity: Stokes method – Surface tension: drop weight method, Thermal expansion, Thermal stress, Bimetallic strips, Expansion joints</p> <p>Practical: Non-Uniform bending, Young’s modulus of the material, Torsional pendulum, Rigidity modulus of the wire and moment of inertia of the disc.</p> <p>Activities: Virtual demonstration of thermal stress.</p>					
<p>Oscillations: Simple Harmonic motion, Torsional pendulum, Couple per unit twist, Damped and Forced Oscillation</p> <p>Waves: Waves on a stretched string, Energy and Power, standing waves, Ultrasonics, piezo-electric method, Acoustic grating, Electromagnetic waves: Maxwell equation, Production of EM waves by dipole antenna, Propagation of EM waves in free space, wave equation, Cell phone reception</p> <p>Practical: Melde’s string experiment, Frequency of an electrically vibrating metal tip.</p> <p>Activities: Virtual demonstration of propagation of EM waves</p>					
<p>Quantum Mechanics: Black body radiation, Photoelectric effect, de Broglie hypothesis-Schrodinger Wave equation, Particle in a box (infinite potential well, three-dimensional box), Barrier penetration and quantum tunnelling.</p> <p>Practical: Photo-electric effect – Determination of Planck’s constant.</p> <p>Activities: Virtual demonstration of Scanning Transmission Electron Microscope</p>					
<p>Applied Optics: Interference: Air wedge, Michelson’s Interferometer, Fiber optics: Structure of a fiber – Fiber Optic Communication System – Fiber Sensors (Virtual demo) – Displacement, pressure sensor and Temperature sensor - Einstein Co-efficient - Nd:YAG laser, CO₂ laser (construction, functioning and applications), dye laser</p> <p>Practical: Ruling width of Compact disc using Laser, Thickness of a thin sheet/wire using Air wedge Method.</p> <p>Activities: Demonstration of sensors and applications of Lasers</p>					
<p>Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%</p>					
<p>Assessment Methodology: Quiz (5%), Assignments (20%), Flipped Class (5%), Practical (30%), Internal Examinations (40%)</p>					

References:

1. Young, H. D., & Freedman, R. A. (2020). University physics with modern physics. Pearson.
2. Gaur, R. K., & Gupta, S. L. (2022). Engineering physics. Dhanpat Rai Publications.
3. Mathur, D. S. (2010). Elements of properties of matter. S. Chand Publishing.
4. Griffiths, D. J. (2018). Introduction to quantum mechanics. Cambridge University Press.
5. Silfvast, W. T. (2008). Laser fundamentals (2nd ed.). Cambridge University Press.

E-resources:

1. Barrier penetration problem and Quantum tunnelling:
<https://archive.nptel.ac.in/courses/115/104/115104096/>
2. EM waves and wireless channelling:
https://onlinecourses.nptel.ac.in/noc24_ee31/preview
3. CO2 Laser : https://onlinecourses.nptel.ac.in/noc25_ph03/preview
4. Bimetallic Strips _ <https://www.youtube.com/watch?v=WZQ8lvxdzDk>
5. Cell phone Reception_ https://www.youtube.com/watch?v=1JZG9x_VOwA
6. Dipole Antenna_ <https://www.youtube.com/watch?v=4xF1Fq2wB1I>
7. Optical Sensors_ <https://auece.digimat.in/nptel/courses/video/108106173/L02.html>
8. Scanning Tunnelling Electron Microscope_
<https://www.youtube.com/watch?v=XNYZYbXNWQA>


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CY25C01	Applied Chemistry – I	L	T	P	C
		2	0	2	3
<p>Course Objectives:</p> <ul style="list-style-type: none"> To provide students with a solid understanding of the chemical principles for engineering applications. To introduce the chemical properties of materials and how these properties influence the selection and use of materials in engineering systems. To impart practical applications of chemistry in commonly used engineering devices. 					
<p>Water Technology: Water quality parameters and standards. Industrial feed water – Remediation. Municipal water treatment. Desalination.</p> <p>Practical: Analysis of alkalinity, hardness and dissolved oxygen.</p> <p>Activity: Coagulation of water sample using Alum</p>					
<p>Nano-chemistry: Classification, Size-dependent properties. Preparation of nanomaterials – Top-down and Bottom-Up approaches, Applications (Flipped classroom).</p> <p>Practical: Preparation of nanoparticles by Sol-Gel method.</p>					
<p>Electrochemistry: Electrochemical cell - Electrode potential- Redox reaction. Conductivity of electrolytes – Factors.</p> <p>Practical: Conductometric titrations</p> <p>Activity: Electrochemical cell demonstration</p>					
<p>Corrosion & Control: Chemical and electrochemical corrosions, galvanic series, factors influencing corrosion, Electrochemical protection. Organic and Inorganic coating.</p> <p>Practical:</p> <p>Corrosion study by weight loss and salt spray method. Potentiometry/UV-visible spectrophotometer.</p> <p>Activities: Case Study on Corrosion in Pipelines and Electronics, Control measures for a corroded metal</p>					
<p>Batteries: Conventional, Contemporary and Emerging battery storage technologies, Primary & Secondary Batteries, Battery Pack, Battery Materials, Performance Parameters, Testing, Safety aspects.</p> <p>Practical: Measurement of EMF, Internal Resistance, Charge and Discharge Characteristics.</p> <p>Activities: Demonstration of battery pack in e-vehicles.</p>					
<p>Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%</p>					
<p>Assessment Methodology: Quiz (5%), Assignments (20%), Flipped Class (5%), Practical (30%), Internal Examinations (40%)</p>					

References:

1. Jain, P. C., & Jain, M. (2015). *Engineering Chemistry*. Dhanpat Rai Publishing Company (P) Ltd.
2. Dara, S. S. (2004). *A Textbook of Engineering Chemistry*. Chand Publications.
3. Sachdeva, M. V. (2011). *Basics of Nano Chemistry*. Anmol Publications Pvt Ltd.
4. Friedrich, E. (2014). *Engineering Chemistry*. Medtech.

E-Resources:

1. Water and Wastewater Engineering (Prof. Ligy Philip, IIT Madras) –
<https://nptel.ac.in/courses/105106202>.
2. Electrochemical Energy Systems (Prof. S. Mitra, IIT Madras) –
<https://nptel.ac.in/courses/113106028>.
3. Corrosion (Prof. Kallol Mondal, IIT Kanpur) –
<https://nptel.ac.in/courses/112104088>
4. Chemistry of Battery Systems (Prof. V. R. Marathe, IIT Madras) –
<https://nptel.ac.in/courses/115106130>
5. Resource on all battery types, testing, and safety –
<https://batteryuniversity.com/articles>


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CS25C01	Computer Programming: C	L	T	P	C
		2	0	2	3
<p>Course Objectives:</p> <ul style="list-style-type: none"> To equip engineering students with the foundational knowledge and practical skills in 'C' programming to analyse and solve computational problems effectively. To foster problem-solving, critical thinking, and modular programming skills essential for engineering domains. 					
<p>Introduction to C: Problem Solving, Problem Analysis Chart, Developing an Algorithm, Flowchart and Pseudocode, program structure, Compilation & Execution process, Interactive and Script mode, Comments, Indentation, Error messages, Primitive data types, Constants, Variables, Reserved words, Arithmetic, Relational, Logical, Bitwise, Assignment, Conditional operators, Input/Output Functions, Built-in Functions.</p> <p>Practical: Create Problem Analysis Charts, Flowcharts and Pseudocode for simple C programs (Minimum three).</p>					
<p>Control Structures: if, if-else, nested if, switch-case, while, do-while, for, nested loops, Jump statements.</p> <p>Practical: Usage of conditional logics in programs. (Minimum three)</p>					
<p>Functions: Function Declaration, Definition and Calling, Function Parameters and Return Types, Call by Value and Call by Reference, Recursive Functions, Scope and Lifetime of Variables, Header files and Modular Programming.</p> <p>Practical: Usage of functions in programs. (Minimum three)</p>					
<p>Strings & Pointers: One-dimensional and Multi-dimensional Arrays, Array operations and traversals, String Handling: String declaration, input/output, string library functions, Pointer arithmetic, Pointers and Arrays, Pointers to function, Dynamic memory allocation.</p> <p>Practical: Programs using pointers, dynamic memory, pointer arithmetic, string manipulations, array operations. (Minimum three)</p>					
<p>Structures & Unions: Defining and using structures, Array of structures, Pointers to structures, Unions and their uses, Enumerations.</p> <p>Practical: Program to use structures and unions</p>					
<p>File Operations: Open, read, write, close file operations, Binary vs Text files, File pointers, Error handling in file operations.</p> <p>Practical: Programs reading/writing data in text and binary files (Minimum three).</p>					
<p>Standard Libraries & Header Files: Using standard libraries like stdio.h, stdlib.h, string.h, math.h, Creating and using user-defined header files and libraries.</p> <p>Practical: Use of standard and user-defined libraries in solving problems. (Minimum three), Project (Minimum Two)</p>					
<p>Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%</p>					




Assessment Methodology: Quiz (5%), Project (15%), Assignment Programs (25%), Practical (25%), Internal Examinations (30%)

References:

1. Thareja, R. (2021). Programming in C . Oxford University Press.
2. Balagurusamy, E. (2019). Programming in ANSI C. McGraw Hill Education.
3. Kanetkar, Y. (2020). Let us C. BPB Publications.
4. Kalicharan, N. (2022). Learn to program with C: An introduction to programming using the C language. Apress.
5. Forouzan, B. A., & Afyouni, H. (2023). Computer science: A structured programming approach in C (4th ed.). Cengage.

E-resources:

1. Learn-C.org - <https://www.learn-c.org/>
2. GeeksforGeeks - C Programming - <https://www.geeksforgeeks.org/c-programming-language/>
3. GNU C Library Documentation - <https://www.gnu.org/software/libc/manual/>
4. "Introduction to C Programming", Swayam MOOC Course, https://onlinecourses.swayam2.ac.in/imb25_mg71/


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ME25C04	Makerspace	L	T	P	C
		0	0	4	2

Course Objectives:

- To impart practical skills in the assembly, disassembly, and welding of components using appropriate tools and techniques.
- To provide hands-on training in electrical wiring practices, and the use of electronic components, sensors, and actuators.

List of Activities

(A). Dis-assembly & Assembly Practices

- Tools and its handling techniques.
- Dis-assembly and assembly of home appliances – Grinder Mixer Grinder, Ceiling Fan, Table Fan & Washing Machine.
- Dis-assembly and assembly of Air-Conditioners & Refrigerators.
- Dis-assembly and assembly of a Bicycle.

(B). Welding Practices

- Welding Procedure, Selection & Safety Measures.
- Power source of Arc Welding – Gas Metal Arc Welding & Gas Tungsten Arc Welding processes.
- Hands-on session of preparing base material & Joint groove for welding.
- Hands-on session of MAW, GMAW, GTAW, on Carbon Steel & Stainless Steel plates / pipes, for fabrication of a simple part.

(C). Electrical Wiring Practices

- Electrical Installation tools, equipment & safety measures.
- Hands-on session of basic electrical connections for Fuses, Miniature Circuit Breakers and Distribution Box.
- Hands-on session of electrical connections for Lightings, Fans, Calling Bells.
- Hands-on session of electrical connections for Motors & Uninterruptible Power Supply.

(D). Electronics Components / Equipment Practices

- Electronic components, equipment & safety measures.
- Dis-assembly and assembly of Computers.
- Hands-on session of Soldering Practices in a Printed Circuit Board.
- Hands-on session of Bridge Rectifier, Op-Amp and Transimpedance amplifier.
- Hands-on session of integration of sensors and actuators with a Microcontroller.
- Demonstration of Programmable Logic Control Circuit.

(E). Contemporary Systems

- Demonstration of Solid Modelling of components.
- Demonstration of Assembly Modelling of components.



- iii. Fabrication of simple components / parts using 3D Printers.
- iv. Demonstration of cutting of wood / metal in different complex shapes using Laser Cutting Machine.

References:

1. Stephen Christena, Learn to Weld: Beginning MIG Welding and Metal Fabrication Basics, Crestline Books, 2014.
2. H. Lipson, Fabricated - The New World of 3D Printing, Wiley, 1st edition, 2013.
3. Code of Practice for Electrical Wiring Installations (IS 732:2019)

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UC25A01	Life Skills for Engineers – I	L	T	P	C
		1	0	2	1
<p>Course Objectives:</p> <ul style="list-style-type: none"> To equip engineering students with essential life skills encompassing personal and emotional development, effective management of time and stress, financial literacy, digital safety, and civic responsibility. To enhance self-awareness, interpersonal skills, and resilience to prepare students for the professional and personal challenges of engineering careers and life beyond academics. 					
<p>Personal and Emotional Development: Self-Awareness & Personality, Emotional Intelligence & Empathy, Positive thinking, Right attitude, Stress & Anger Management, Goal-Setting & Time Management, Growth Mindset & Resilience.</p> <p>Activities: Personality tests (MBTI, DISC), reflection journals, Empathy circle, role-playing difficult conversations, Guided mindfulness sessions, stress relief toolkit creation, Vision board creation, weekly time audit and planner, Group challenge scenarios, resilience journal.</p>					
<p>Management Skills: Financial Literacy: Budgeting & Saving, Nutrition, Health, and Hygiene, Digital Literacy & Online Safety, Civic Responsibility & Ethics</p> <p>Activities: Create a monthly budget, financial simulation game, Meal planning workshop, physical wellness challenge, Social media audit, privacy and safety scenarios, Community service, values debate.</p>					
<p>Weightage: Continuous Assessment: 100%</p>					
<p>Assessment Methodology: Assignments (20%), Flipped Class & Worksheets (10%), Practical (30%), Internal Examinations (40%)</p>					
<p>References:</p> <ol style="list-style-type: none"> Khera, S. (2003). <i>You can win</i>. Macmillan. Levesque, H. (n.d.). <i>Life skills 101: A practical guide to leaving home and living on your own</i>. (Publication year not specified) Mitra, B. K. (2017). <i>Personality development & soft skills</i> (3rd impression). Oxford University Press. ICT Academy of Kerala. (2016). <i>Life skills for engineers</i>. McGraw Hill Education (India) Private Ltd. 					



UC25A02	Physical Education - I	L	T	P	C
		0	0	4	1
Course Objectives: <ul style="list-style-type: none"> To impart the fundamentals of physical education for development of students' physical, mental, and social well-being. To instill a lifelong appreciation for physical activity towards the development of positive attitude and fostering values of team work and sportsmanship. 					
Introduction to physical education: Exercise for Good Posture – Conditioning and Calisthenics for Before start, Jogging, Bending, Twisting, Standing, Sitting and Relaxation, Training on First Aid practices.					
Participation of athletic events: Rules and regulations of important athletic events, Sprint, Jumps, Throws and Hurdles.					
Skill development in any one of the following outdoor games: Basket Ball, Volley Ball, Ball Badminton, Football, Hockey, Kho-Kho, Kabaddi, Cricket, Hand ball and Tennis.					
Skill development in any one of the following indoor games: Shuttle Badminton, Chess and Table Tennis.					
Weightage: Continuous Assessment: 100%					
Assessment Methodology: Attendance (60%), Quiz (10%), Participation in Sports and Games (20%) and Viva Voce (10%)					
References: <ol style="list-style-type: none"> Singh, A. (2008). Essentials of physical education. Kalyani Publishers. Kamlesh, M. L. (2006). Psychology in physical education and sport (3rd ed.). Metropolitan Book Co. Mangal, S. K. (2009). <i>Psychology of sports performance</i>. Sports Publication. 					
E-resources: <ol style="list-style-type: none"> https://www.who.int/health-topics/physical-activity 					


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SEMESTER – II

MA25C02	Linear Algebra	L	T	P	C
		3	1	0	4
<p>Course Objectives:</p> <ul style="list-style-type: none"> To impart foundational knowledge in linear algebra essential for analysing and solving problems in engineering applications. To provide the knowledge on computation using software and interpret key linear algebra concepts using software. 					
<p>Vector Spaces Introduction to Vector Spaces, Examples, Subspaces, Linear Combinations, Span, Generating Sets, Linear Dependence and Independence, Basis and Dimension, Dimension of Subspaces.</p> <p>Activities: Open-Source software, exercises to test linear dependence and independence using rank, compute span and basis of a set of vectors, determine the dimension of subspaces, and illustrate the concept of subspace and basis in R^2/R^3 with visualization.</p>					
<p>Linear Transformations and Diagonalization: Null space, Range, Dimension Theorem (statement only), Matrix representation of a linear transformation, Eigenvalues & Eigenvectors, Diagonalizability.</p> <p>Activities: Open-Source software, exercises to compute the matrix representation of a linear transformation, find the null space and range of a matrix, and compute eigenvalues and eigenvectors of a matrix.</p>					
<p>Inner Product Spaces: Inner product, Norms, Cauchy, Schwarz inequality, Gram, Schmidt orthogonalization, Simple problems (up to R^3).</p> <p>Activities: Open-Source software, exercises to compute inner products and vector norms.</p>					
<p>Matrix Decomposition: Orthogonal transformation of a symmetric matrix to diagonal form - Positive definite matrices, QR decomposition, Singular Value Decomposition (SVD), Least squares solutions- simple problems (up to 3×3 matrices).</p> <p>Activities: Open-Source software, exercises to check if a matrix is positive definite, perform QR decomposition and SVD using built-in functions.</p>					
<p>Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%.</p>					
<p>Assessment Methodology: Assignment (20%), Software activity (20%), Quiz (20%), Internal Examinations (40%).</p>					
<p>References:</p> <ol style="list-style-type: none"> Friedberg, S. H., Insel, A. J., & Spence, L. E. (2022). <i>Linear algebra</i>. Pearson. Lay, D. C., Lay, S. R., & McDonald, J. J. (2020). <i>Linear algebra and its applications with MATLAB</i>. Pearson. 					



5. Bronson, R. (2011). *Schaum's outline of matrix operations*. McGraw-Hill Education.
6. Strang, G., & Thomson, R. (2005). *Linear algebra and its applications*. Brooks/Cole.
- Lipschutz, S., & Lipson, M. (2009). *Schaum's outline of linear algebra*. McGraw- Hill.
7. Kreyszig, E. (2018). *Advanced engineering mathematics*. Wiley India.

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UC25H02	தமிழர்களும் மதொழில்நுட்பமும் / Tamils and Technology	L	T	P	C
		1	0	0	1
<p>மநசவு மற்றும் பொறனத் மதொழில்நுட்பம்: ஂங்க கொலத்தில் தநெவுத் ததொழில், பொமனத் ததொழில்நுட்பம், கருப்பு சிவப்பு பொண்டங்கள், பொண்டங்களில் கீறல் குறியீடுகள்.</p>					
<p>வடிவறமப்பு மற்றும் கட்டிடத் மதொழில்நுட்பம்: ஂங்க கொலத்தில் வடிவமமப்பு மற்றும் கட்டுமொனங்கள் & ஂங்க கொலத்தில் வீட்டுப் தபொருட்களில் வடிவமமப்பு, ஂங்க கொலத்தில் கட்டுமொன தபொருட்களும் நடுகல்லும், சிலப்பதிகொரத்தில் மமமட அமமப்பு பற்றிய விவரங்கள், மொமல்லபுரெ சிற்பங்களும், மகொவில்களும், மொழர் கொலத்ப் தபருங்கொயில்கள் மற்றும் பிற வழிபொட்டுத் தலங்கள், நொயக்கர் கொலக் மகொயில்கள், மொதிரி கட்டமமப்புகள் பற்றி அறிதல், மஃமர மீனொட்சி அம்மன் ஆலயம் மற்றும் திருமமல நொயக்கர் மஹொல், தெட்டிநொட்டு வீடுகள், பிரிட்டிஷ் கொலத்தில் தென்மனயில் இந்மதொ-ஂொமரொதெனிக் கட்டிடக் கமல</p>					
<p>உற்பத்தித் மதொழில் நுட்பம்: கப்பல் கட்டும் கமல உமலொகவியல், இரும்புத் ததொழிற்ஂொமல, இரும்மப உருக்குதல், எஃகு, வரலொற்றுஂ ஂஂொன்றுகளொக தெம்பு மற்றும் தங்க நொணயங்கள், நொணயங்கள் ஂஂஂெத்தல், மணி உருவொக்கும் ததொழிற்ஂொமலகள், கல்மணிகள், கண்ணொடி மணிகள், சுடுமண் மணிகள், ஂங்கு மணிகள், எலும்புத்ஃண்டுகள், ததொல்லியல் ஂஂொன்றுகள், சிலப்பதிகொரத்தில் மணிகளின் வமககள்.</p>					
<p>கவலொஂஃறம மற்றும் நீர்ப்பொசனத் மதொழில் நுட்பம்: அமண, ஏரி, குளங்கள், மதகு, மொழர்கொலக் குழித் தூம்பின் முக்கியத்ஃவம், கொல்நமட பரொமரிப்பு, கொல்நமடகளுக்கொக வடிவமமக்கப்பட்ட கிணறுகள், மவலொண்மம மற்றும் மவலொண்மமெ ஂஂொர்ந்த தெயல்பொடுகள், கடல்ஂஂொர் அறிவு, மீன்வளம், முத்ஃ மற்றும் முத்ஃக்குளித்தல், தபருங்கடல் குறித்த பண்மடய அறிவு, அறிவுஂஂொர் ஂஂொகம்.</p>					
<p>அறிவியல் தமிழ் மற்றும் கைத்தமிழ்: அறிவியல் தமிழின் வளர்ஂஂி, கணித்தமிழ் வளர்ஂஂி. தமிழ் நூல்கமள மின்பதிப்பு தெய்தல். தமிழ் தமன்தபொருட்கள் உருவொக்கம். தமிழ் இமணயக் கல்விக்கழகம். தமிழ் மின் நூலகம். இமணயத்தில் தமிழ் அகரொதிகள். தொற்குமவத் திட்டம்.</p>					
<p>Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%</p>					
<p>Assessment Methodology: Quiz (20%), Assignments (30%), Internal Examinations (50%)</p>					
<p>References</p> <ol style="list-style-type: none"> 1. தமிழக வரலாறு – மக்களும் பண்பாடும் – கக.கக. பிள்ளை (வவையீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்). 2. கணினித் தமிழ் – முளனவர் இல. சுந்தரம். (விகடன் பிரசுரம்). 3. கீழடி – ஂவளக நதிக்களரயில் சங்ககால நகர நாகரிகம் (வதொல்லியல் துள வவையீடு) 4. வபாருளந – ஆற்ஂங்களர நாகரிகம். (வதொல்லியல் துள வவையீடு) 5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print) 					

1. Social Life of the Tamils – The Classical Period (Dr.S.Singaravelu) (Published by: Internationallnstitute of Tamil Studies).
2. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published International Institute of Tamil Studies) by:
3. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
4. 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)
5. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishedby: The Author)
6. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu).
Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.


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UC25H02	Tamils and Technology	L	T	P	C
		1	0	0	1
<p>Weaving and Ceramic Technology: Weaving Industry during Sangam Age, Ceramic technology, Black and red Ware Potteries (BRW), Graffiti on Potteries.</p>					
<p>Design and Construction Technology: Designing and Structural construction House & Designs in household materials during Sangam Age, Building materials and Hero stones of Sangam age, Details of Stage Constructions in Silappathikaram, Sculptures and Temples of Mamallapuram, Great Temples of Cholas and other worship places, Temples of Nayaka Period, Type study (Madurai Meenakshi Temple), Thirumalai Nayaka rMahal, Chetti Nadu Houses, Indo-Saracenic architecture at Madras during British Period.</p>					
<p>Manufacturing Technology: Art of Ship Building, Metallurgical studies, Iron industry, Iron smelting, steel -Copper and gold- Coins as source of history, Minting of Coins, Beads making-industries Stonebeads, Glass beads, Terracotta beads, Shell beads/ bone beats, Archeological evidences, Gem stone types described in Silappathikaram.</p>					
<p>Agriculture and Irrigation Technology: Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompuof Chola Period, Animal Husbandry, Wells designed for cattle use, Agriculture and Agro Processing, Knowledge of Sea, Fisheries, Pearl, Conche diving, Ancient Knowledge of Ocean, Knowledge Specific Society.</p>					
<p>Scientific Tamil & Tamil Computing: Development of Scientific Tamil, Tamil computing, Digitalization of Tamil Books, Development of Tamil Software, Tamil Virtual Academy, Tamil Digital Library, Online Tamil Dictionaries, Sorkuvai Project.</p>					
<p>Weightage: Continuous Assessment: 40%, End Semester Examinations: 60%</p>					
<p>Assessment Methodology: Quiz (20%), Assignments (30%), Internal Examinations (50%)</p>					


References

1. தமிழக வரலாறு - மக்களும் பண்பொடும் - மகமக பிள்மள (தவளியீடு: தமிழ்நாடு பொடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முமனவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - மவமகநதிக்கமரயில் ஂங்ககொல நகர நொகரிகம் (ததொல்லியல் Fமற தவளியீடு)
4. தபொருமந - ஆற்றங்கமர நொகரிகம். (ததொல்லியல் Fமற தவளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. 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)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.

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References:

1. Koneru Aruna. (2020). *English Language Skills for Engineers*. McGraw Hill Education.
2. Taylor, Shirley & Chandra .V. (2010). *Communication for Business A Practical Approach*. India: Pearson Longman.
3. Ian Badger, et al., (2014). *Listening: B2 (Collins English for Life: Skills)*, Collins. Raymond Murphy (2019), *Grammar in Use*, Cambridge University Press.

E-Resources:

1. Communication for Business Success -
<https://open.umn.edu/opentextbooks/textbooks/8>

TED Talks – <https://www.ted.com/>


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EN25C02	English Essentials – II	L	T	P	C
		1	0	2	2
<p>Course Objectives:</p> <ul style="list-style-type: none"> • Enable learners to improve fluency and accuracy in spoken and written communication. • Develop learners' ability to articulate ideas clearly and effectively in formal and informal spoken interactions. • Help learners construct well-organised written documents relevant to academic and workplace contexts. 					
<p>Oral Communication: Types (Verbal and Nonverbal), Interpersonal and group communication, Telephonic conversation.</p> <p>Suggested Activities: Short presentations, Debates, Formal Speeches (Welcome, Vote of Thanks and introducing guests), Listen and respond to short podcasts.</p>					
<p>Business Correspondence: Email Communication, Formal Letters (Types), Business Meeting.</p> <p>Suggested Activities: Email and letter writing (Complaint, request, permission), Agenda, minutes of the meeting.</p>					
<p>Academic Writing: Paraphrasing, Summarizing, Essay Writing, Instructions and Recommendations.</p> <p>Suggested Activities: Essay writing (Cause and effect, argumentative, persuasive), User guides/ manuals, policy document.</p>					
<p>Team Work: Leadership Skills (Team building, Team Leader, Team player), Negotiation and Problem solving skills</p> <p>Suggested Activities: SWOT Analysis, Brainstorming and Group discussions.</p>					
<p>Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%</p>					
<p>Assessment Methodology: Worksheets (10%), Group Activity (20%), Report Writing (20%), Internal Examinations (50%)</p>					

EC25C01	Electron Devices	L	T	P	C
		3	0	0	3
<p>Course Objective:</p> <ul style="list-style-type: none"> To acquaint with the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field Effect Transistors, Power control devices, LED, LCD and other Optoelectronic devices. 					
<p>Semiconductor: Types, Conductivity, Electron energy levels and energy band diagram, Carrier concentration, Mass action law, Characteristics and behavior of intrinsic semiconductors, Variation in properties with temperature, Carrier drift and diffusion, Current density equation, Excess carrier generation and recombination rates, Carrier life time. Continuity equation.</p> <p>Activity: Virtual demonstration of energy levels, Drift and diffusion current.</p>					
<p>PN Junction Diodes: Energy band diagram of open-circuited PN junction, Forward and reverse bias characteristics, Diode resistance, Transition and diffusion capacitance, Effect of temperature on diode behavior, clipper, clamper-Applications of PN junction diodes.</p> <p>Special Diodes: Zener diode – breakdown mechanisms and voltage regulation, Varactor diode, Tunnel diode, Photo diode – construction, operation, and applications.</p> <p>Activities: Virtual demonstration of characteristics of junction diodes, Design of a constant voltage regulator using Zener Diode.</p>					
<p>Bipolar Junction Transistors: Construction, working, characteristics in CB, CE, and CC configurations, regions of operation, current gain, input/output characteristics, Early effect. Other Devices: Multi-emitter transistor – construction and applications.</p>					
<p>Field Effect Transistors: JFET – construction, working, characteristics, parameters. MOSFET, MOS capacitor, depletion and enhancement modes, nMOS and pMOS, threshold voltage, transfer and output characteristics. CMOS – introduction and basic operation.</p>					
<p>Thyristors: Shockley diode, Silicon Controlled Rectifier (SCR), TRIAC and DIAC – operation and applications, Thyristor protection techniques.</p> <p>Unijunction Transistor (UJT): Construction, characteristics and application as relaxation oscillator.</p> <p>Optoelectronic Devices: LED, LCD, Photo transistor, Opto-coupler – principle, characteristics and applications. Power MOSFETs: Construction, switching characteristics and applications in power circuits.</p>					



Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (15%), Assignments (30%), Flipped Class (5%), GATE Questions 10 % Internal Examinations (40%)

References:

1. Neamen, D. A. (2012). *Semiconductor physics and devices*. Tata McGraw-Hill.
2. Boylestad, R. L., & Nashelsky, L. (2008). *Electronic devices and circuit theory*. Pearson Prentice Hall.
3. Yang, C. Y. (1978). *Fundamentals of semiconductor devices*. McGraw-Hill International.
4. Salivahanan, S., Suresh Kumar, N., & Vallavaraj, A. (2008). *Electronic devices and circuits*. Tata McGraw-Hill.
5. Floyd, T. L. (2018). *Electronic Devices: Conventional Current Version*. Pearson.

E-Resources:

1. <https://archive.nptel.ac.in/courses/108/108/108108122/>
2. https://onlinecourses.nptel.ac.in/noc21_ee80/preview
3. Razavi Electronics 1, Lec 1, Intro., Charge Carriers, Doping
4. Semiconductor Devices: Fundamentals

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EC25C02	Circuits and Network Analysis	L	T	P	C
		3	0	0	3
Course Objectives:					
<ul style="list-style-type: none"> To impart the fundamental principles of circuit laws, network theorems, and analysis techniques for DC and AC circuits. To gain analytical and simulation skills for both steady-state and transient behaviors in AC and DC circuits. 					
<p>Circuit Laws and Network Theorems: Basic electrical components, voltage, current, power, Network terminology- Node, Junction, Branch, Loop, Short and Open Circuits, DC and AC circuits, Ohm's Law, Kirchhoff's Laws, Resistors, inductors, and capacitors in series and parallel, voltage and current division rule, Mesh and Nodal Analysis for AC and DC circuits, Source transformation techniques, Star delta transformation techniques, principle of linearity, Thevenin's and Norton's theorems, Superposition theorem, Maximum power transfer theorem, Reciprocity theorem.</p>					
<p>Steady-State and Transient Analysis of Ac and DC Circuits: Components behavior (R, L, and C) in AC and DC, Characteristics of sinusoids, Phasor relationship for R, L, and C, Phasor diagram, Natural and forced response, Steady-state and Transient analysis of RL, RC, RLC circuits using Laplace Transform.</p>					
<p>Resonance and Coupled Circuits: Natural frequency and Damping ratio, Series resonance, Parallel resonance, Quality factor (Q), Bandwidth, Selectivity, Effect of Q on bandwidth and selectivity. Self-inductance, Mutual inductance, Dot conversion, Ideal Transformer.</p>					
<p>Linear Two-Port Network Analysis: Introduction to two-port networks, Characterization in terms of impedance, admittance, hybrid, and transmission parameters, parameter conversions, Interconnection of two-port networks – Symmetry and Reciprocity.</p>					
<p>Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%</p>					
<p>Assessment Methodology: Quiz (15%), Assignments (30%), Flipped Class (5%), GATE Questions 10 % Internal Examinations (40%)</p>					
<p>REFERENCE:</p> <ol style="list-style-type: none"> Hayt, W. H., Kemmerly, J. E., & Durbin, S. M. (2024). <i>Engineering circuit analysis</i>. McGraw Hill Education. Boylestad, R. L. (2014). <i>Introductory circuit analysis</i>. Pearson Education India. Alexander, C. K., & Sadiku, M. N. O. (2017). <i>Fundamentals of electric circuits</i>. McGraw Hill Education. Kuo, F. F. (2012). <i>Network analysis and synthesis</i>. Wiley India. 					



E-Resources:

1. <https://nptel.ac.in/courses/108102042>
2. <https://nptel.ac.in/courses/108105159>
3. <https://archive.nptel.ac.in/courses/108/104/108104139/>
4. <https://archive.nptel.ac.in/courses/117/106/117106108/>
5. https://www.ee.iitm.ac.in/videolectures/doku.php?id=ee2015_2017nk:start

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CS25C05	Data Structures using C++	L	T	P	C
		3	0	2	4

Course Objective:

- This course aims to provide an understanding of object-oriented programming principles using C++.

Data Abstraction & Overloading: Overview of C++, Structures, Class Scope and Accessing Class Members, Reference Variables, Initialization, Constructors, Destructors, Member Functions and Classes, Friend Function, Dynamic Memory Allocation, Static Class Members, Container Classes and Integrators, Proxy Classes, Overloading: Function overloading and Operator Overloading.

Practical:

- Program to Implement Constructors and Destructors.
- Program to implement Member Functions, Classes and Friend Functions.
- Program to Implement Dynamic Memory Allocation and Overloading.

Inheritance & Polymorphism: Base Classes and Derived Classes, Protected Members, Casting Class pointers and Member Functions, Overriding, Public, Protected and Private Inheritance—Constructors and Destructors in derived Classes, Implicit Derived, Class Object to Base, Class Object Conversion, Composition Vs. Inheritance, Virtual functions, This Pointer, Abstract Base Classes and Concrete Classes, Virtual Destructors, Dynamic Binding.

Practical:

- Program to Implement various inheritances.
- Program to Implement virtual functions and dynamic binding.
- Implementation of method overriding and operator overloading.

Linear Data Structures: Asymptotic Notations: Big-Oh, Omega and Theta, Best, Worst and Average case Analysis: Definition and an example, Arrays and its representations, Stacks and Queues, Linked lists, Linked list based implementation of Stacks and Queues, Evaluation of Expressions, Linked list based polynomial addition.

Practical:

- Program to implement various operations on arrays and linked lists.
- Program to implement various operations on stacks and queues using array and linked list.
- Program to evaluate the infix expressions by converting into prefix and postfix expressions

Non-Linear Data Structures: Trees, Binary Trees, Binary tree representation and traversals, Threaded binary trees, Binary tree representation of trees, Application of trees: Set representation and Union, Find operations, Graph and its representations, Graph Traversals, Connected components. Standard template library.

Practical:

1. Program to Implement Binary Tree Traversal and Graph Traversal Algorithm.
2. Program to Implement the Single Source Shortest Path Algorithm and All Pair Shortest Path Algorithm.
3. Program to find the Minimal Spanning Tree for a Graph.

Searching, Sorting and Complexity Analysis: Insertion sort, Merge sort, Quicksort, Heapsort, Linear Search, Binary Search.

Practical:

1. Program to Implement Linear Search and Binary Search Algorithms.
2. Program to Implement Insertion Sort, Merge Sort, Quick Sort and Heap Sort Algorithms.

Weightage: Continuous Assessment: 50%, End Semester Examinations: 50%

Assessment Methodology: Quiz (5%), Assignments (20%), Flipped Class (5%), Practical (30%), Internal Examinations (40%)

References

1. Deitel, P. J., & Deitel, H. M. (2005). *C++ how to program*. Pearson Education.
2. Ellis Horowitz, E., Sahni, S., & Mehta, D. (2007). *Fundamentals of data structures in C++*. Universities Press Pvt Ltd.
3. Weiss, M. A. (2007). *Data structures and algorithm analysis in C++*. Addison-Wesley.
4. Trivedi, B. (2010). *Programming with ANSI C++: A step-by-step approach*. Oxford University Press.
5. Goodrich, M. T., Tamassia, R., & Mount, D. (2004). *Data structures and algorithms in C++*. Wiley.

E-Resources:

1. <https://nptel.ac.in/courses/106/106/106106143/>
2. https://www.tutorialspoint.com/data_structures_algorithms/index.htm

UC25A03	Life Skills for Engineers – II	L	T	P	C
		1	0	2	1
<p>Course Objectives:</p> <ul style="list-style-type: none"> To impart and cultivate analytical reasoning, innovative thinking, effective collaboration, and ethical leadership to prepare students for complex challenges in professional and personal environments. 					
<p>Critical Thinking: Creativity, Critical Thinking, Collaboration, Problem Solving, Decision Making, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity, Critical thinking Vs Creative thinking, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.</p> <p>Activities: Two-Brainstorm Method, "30 Circles" Challenge, "Desert Survival" Simulation, Lateral thinking riddles and puzzles, "What If?" Scenario Writing, Fast vs. Slow Thinking Game, Creativity Myth Busters</p>					
<p>Problem Solving: Techniques, Six Thinking Hats, Mind Mapping, Forced Connections. Analytical Thinking, Numeric, symbolic, and graphic reasoning. Scientific temperament and Logical thinking.</p> <p>Activities: Case study analysis, Escape Room challenge.</p>					
<p>Leadership: Leadership Styles & Self-Assessment, Communication & Active Listening, Decision-Making & Responsibility, Teamwork & Delegation, Empathy, Integrity & Conflict Management, Vision, Motivation & Goal-Setting.</p> <p>Activities: Crisis Leadership Simulation, Tower Challenge, Leadership Dilemmas Role-Play, Team Vision Board</p>					
<p>Weightage: Continuous Assessment: 100%</p>					
<p>Assessment Methodology: Assignments (20%), Flipped Class & Worksheets (10%), Practical (30%), Internal Examinations (40%)</p>					
<p>References:</p> <ol style="list-style-type: none"> De Bono, E. (2017). <i>Six thinking hats</i>, Little, Brown Book Group. Facione, P. A. (2015). <i>Critical thinking: What it is and why it counts</i>. Insight Assessment. Kahneman, D. (2011). <i>Thinking, fast and slow</i>. Farrar, Straus and Giroux. Whetten, D. A., & Cameron, K. S. (2016). <i>Developing management skills</i>. Pearson. 					



EC25C03	DEVICES AND CIRCUITS LABORATORY	L	T	P	C
		0	0	4	2

Course Objectives:

- To learn the characteristics of basic electronic devices such as diode, BJT, FET, SCR & UJT.
- To gain hands on experience in KVL, KCL, Thevenin, Norton, Super position, Reciprocity and Maximum Power Transfer theorem.
- To understand the working of RL, RC and RLC Circuits.

List of Experiments:

1. Characteristics of PN junction & Zener Diode.
2. Input and Output Characteristics of BJT.
3. Drain and Transfer Characteristics of FET.
4. Design clipper and clamper circuits.
5. VI Characteristics of SCR & UJT.
6. Demonstration of rectifier Circuits.
7. Verification of KVL & KCL.
8. Verification of Thevenin and Norton theorem.
9. Verification of super position theorem & Reciprocity theorem.
10. Verification of Maximum power transfer theorem.
11. Determination of resonance frequency of series & parallel circuits.
12. Transient Analysis of RL and RC circuits.

TOTAL: 60 PERIODS


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UC25A04	Physical Education - II	L	T	P	C
		0	0	4	1
Course Objectives: <ul style="list-style-type: none"> To impart knowledge on gymnastic exercises and pressing needs for upskilling in a particular game. 					
Basic gymnastics exercises: Warming up, Suitable exercise, Lead up games, Safety education, Movement education, Balanced Walk, execution, floor exercise, tumbling/acrobatics, grip, release, swinging, parallel bar exercise, horizontal bar exercise, flic-flac-walk and pyramids.					
Upskilling in any one of the athletics: Broad Jump, High Jump, Triple Jump, Relay Sprints, Javelin Throw, Discuss Throw, Shot Put, Short and Long-distance Running.					
Advance skills in any one of the indoor/outdoor games, which has been opted by the student in the I semester.					
Weightage: Continuous Assessment: 100%					
Assessment Methodology: Attendance (60%), Quiz (10%), Participation in Sports and Games (20%) and Viva Voce (10%)					
References: <ol style="list-style-type: none"> Singh, A. (2008). Essentials of physical education. Kalyani Publishers. Kamlesh, M. L. (2006). Psychology in physical education and sport (3rd ed.). Metropolitan Book Co. Mangal, S. K. (2009). <i>Psychology of sports performance</i>. Sports Publication. Kandappan, K. (2004). <i>Foundations of physical education</i>. Friends Publications. 					
E-resources: <ol style="list-style-type: none"> https://www.who.int/health-topics/physical-activity 					


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ME25C05	Re-Engineering for Innovation	L	T	P	C
		0	0	4	2
<p>Course Objectives:</p> <ul style="list-style-type: none"> To cultivate foundational skills in prototyping, and automation for development of prototypes with real-world applications. To provide a comprehensive, hands-on exposure to product development through reverse engineering concepts. 					
<p>Bootcamp 1: Introduction to Product Development, Reverse Engineering, Overview of the product lifecycle, Hands-on disassembly of simple products, Practice of basic measurements and sketching, Introduction to CAD modeling of disassembled parts, Virtual assembly of parts.</p>					
<p>Bootcamp 2: Embedded System Programming (Open-source platforms), Practice of interfacing sensors, reading data, automation in home, healthcare and agriculture.</p>					
<p>Reverse Engineering: Sketch and prototype alternative designs, Group brainstorming sessions, Manufacture prototype parts using 3D printing and / or workshop tools, Assemble prototype product.</p>					
<p>Weightage: Continuous Assessment: 60%, End Semester Examinations: 40%</p>					
<p>Assessment Methodology: Project (30%), Assignment (10%), Practical (30%), Internal Examinations (30%)</p>					
<p>References:</p> <ol style="list-style-type: none"> Wang, W. (2010). Reverse engineering: Mechanisms, structures, systems & materials. CRC Press. Margolis, M. (2020). Arduino cookbook: Recipes to begin, expand, and enhance your projects. O'Reilly Media. 					
<p>E-Resources:</p> <ol style="list-style-type: none"> GrabCAD – https://grabcad.com/ GitHub – https://github.com/ 					

FOREIGN LANGUAGE^

UC25F01	Deutsch – I	L	T	P	C
		1	0	2	1
Course Objectives:					
<ul style="list-style-type: none"> To impart fundamentals of the Deutsch language, including reading, writing systems, pronunciation, and speaking. 					
<p>Basics & Introduction: German alphabet and pronunciation, Basic greetings and farewells, Introducing yourself and others (Ich heiße..., Wer bist du?), Numbers 1–100 and days of the week, Personal pronouns (ich, du, er, sie...), Sentence structure (SVO word order).</p> <p>Activities: Alphabet spelling game, short skits, Use color-coded cards for SVO sentences.</p>					
<p>Grammar Essentials & Everyday Vocabulary: Present tense of regular verbs (spielen, arbeiten, machen...), Common irregular verbs: sein (to be), haben (to have), gehen, kommen, Articles and gender (der, die, das; ein, eine), Simple questions and negation (nicht, kein), Describing people and things: adjectives and colors, Family, school, food, and common objects vocabulary.</p> <p>Activities: Conjugate regular and irregular verbs, “Question Chain” game, Create a simple family tree.</p>					
<p>Everyday Communication in German: Asking for and giving directions, Telling the time and talking about schedules, Ordering food and drinks at a café or restaurant, Talking about hobbies, weather, and daily routines, Listening to short conversations and responding appropriately, Introduction to German culture and formal/informal language use (du vs Sie).</p> <p>Activities: Ordering food and drinks, Give directions, Formal / Informal greetings, Do's and Don'ts.</p>					
Weightage: Continuous Assessment: 100%					
Assessment Methodology: Assignments (30%), Quiz (10%) and Internal Examinations 60%					
References:					
1. Funk, H., Kuhn, C., & Demme, S. (2015). <i>Menschen A1: Deutsch als Fremdsprache Kursbuch</i> . Hueber Verlag.					

UC25F02	Japanese – I	L	T	P	C
		1	0	2	1
<p>Course Objectives:</p> <ul style="list-style-type: none"> To impart fundamentals of the Japanese language, including reading, writing systems, pronunciation, and speaking. 					
<p>Writing Systems & Basic Communication: Introduction to Hiragana: vowels, basic characters, reading & writing, Introduction to Katakana: basic characters and usage, Basic greetings and farewells (こんにちは, おはようございます, さようなら), Introducing yourself (名前、出身、年齢), Basic sentence structure: Subject–Object–Verb, Numbers 1–100, days of the week, classroom expressions.</p> <p>Activities: Flashcard games and writing drills, Self-introduction, Numbers & date-matching, Greeting expressions, Listening to audio.</p>					
<p>Grammar & Everyday Vocabulary: Particles: は (wa), を (wo), の (no), へ (e), に (ni), Present tense verbs: です, ます-form conjugation (たべます、のみます), Negative forms: ではありません, ません, Describing people and objects using adjectives (い and な), Question formation: なに、どこ、だれ、いつ, Vocabulary for family, food, colors, and basic actions.</p> <p>Activities: Verb conjugation drills, Guessing game, Picture description, “Shopping” with food vocab and counters</p>					
<p>Conversation & Cultural Etiquette: Talking about routines and schedules (daily verbs, time expressions), Asking and giving simple directions (～はどこですか?), Ordering food and making polite requests (～をください、～をおねがいします), Expressing likes and dislikes (すき・きらい), Listening to short conversations and identifying key phrases, Introduction to formal/informal speech and Japanese etiquette.</p> <p>Activities: Skits and role-plays, daily schedule, beginner-level dialogue, Group discussion on etiquette.</p>					
<p>Activities: Practice worksheets and flashcards for hiragana, Writing drills and reading simple katakana words, Dialogue practice for greetings and self-introduction, Sentence construction exercises with basic SOV structure, Particle usage exercises and short dialogues, Role-play scheduling, shopping, and telling time, Verb conjugation drills for common verbs, Descriptive sentence exercises using adjectives, Practice Q&A dialogues forming questions and negations, Kanji writing practice and quizzes for basic characters, Vocabulary tests and conversational practice on daily topics, Oral presentations and listening comprehension quizzes.</p>					

Weightage: Continuous Assessment: 100%	
Assessment	Methodology: Assignments (30%), Quiz (10%) and Internal Examinations 60%
References: <ol style="list-style-type: none">1. Banno, E., Ikeda, Y., Ohno, Y., Shinagawa, C., & Tokashiki, K. (2011). Genki I: An integrated course in elementary Japanese. The Japan Times.2. The Japan Foundation. (2017). Marugoto Japanese language and culture starter (A1) course book for communicative language activities. Goyal Publishers.	


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UC25F03	Korean – I	L	T	P	C
		1	0	2	1
Course Objectives: <ul style="list-style-type: none"> To impart fundamentals of the Korean language, including reading, writing systems, pronunciation, and speaking. 					
Fundamentals of Korean: Introduction to Hangul: consonants and vowels, Basic pronunciation and syllable formation, Common greetings and self-introductions, Numbers (Sino-Korean and Native Korean basics), Basic sentence structure (Subject-Object-Verb), Simple expressions (e.g., 감사합니다, 안녕하세요). Activities: Writing and reading Hangul practice sheets, Pronunciation drills and audio repetition, Dialogue practice for greetings and self-introduction, Counting and number exercises.					
Essential Grammar and Vocabulary: Particles (은/는, 이/가, 을/를) and usage, Basic verbs and present tense conjugation, Sentence patterns: affirmative, negative, interrogative, Common adjectives and descriptive sentences, Expressing possession and location, Asking simple questions (어디, 뭐, 누구). Activities: Verb conjugation and sentence formation drills, Role-play conversations for shopping and daily routines, Descriptive writing and speaking exercises, Question and answer practice.					
Everyday Korean Communication: Polite speech levels and honorifics introduction, Talking about time, dates, and schedules, Ordering food, shopping phrases, counting objects, Simple directions and transportation vocabulary, Listening practice with short dialogues, Cultural notes on etiquette and communication. Activities: Role-play ordering at a restaurant or buying items, Listening comprehension exercises, Giving and asking for directions practice, Group conversations and presentations.					
Weightage: Continuous Assessment: 100%					
Assessment Methodology: Assignments (30%), Quiz (10%) and Internal Examinations 60%					
References: <ol style="list-style-type: none"> King, R., Yeon, J., & Brown, A. (2015). Elementary Korean (2nd ed.). Tuttle Publishing. Cho, Y., Lee, H., Schulz, C., Sohn, H.-M., & Sohn, S.-O. (2001). Integrated Korean: Beginning 1. University of Hawai'i Press. 					