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|--------------------|-----------|--------------------|--------|------------------------|---|------------|---|---|---|---|
| Course Code | 21LEH103T | Course Name | FRENCH | Course Category | H | HUMANITIES | L | T | P | C |
| | | | | | | | 2 | 1 | 0 | 3 |

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|-----------------------------------|--------------------------------------|-----------------------------|--------------------------------------|----------------------------|------------|
| Pre-requisite Courses | <i>Nil</i> | Co-requisite Courses | <i>Nil</i> | Progressive Courses | <i>Nil</i> |
| Course Offering Department | <i>English and Foreign Languages</i> | | <i>Data Book / Codes / Standards</i> | <i>Nil</i> | |

| Course Learning Rationale (CLR): | | Program Outcomes (PO) | | | | | | | | | | | |
|--|---|--|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| The purpose of learning this course is to: | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-1 : | Extend the knowledge in the French Language using basic grammar, Self-introduction and Greetings. | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CLR-2 : | Illustrate lexicon related to adjectives, prepositions, possessives Adjectives, using 1st group verbs. | | | | | | | | | | | | |
| CLR-3 : | Construct phrases using 2nd group verbs, pronominal verbs, future tense and time, framing questions with Interrogative words. | | | | | | | | | | | | |
| CLR-4 : | Make use of 3rd group verbs, demonstrative adjectives and vocabularies related to clothing. | | | | | | | | | | | | |
| CLR-5 : | Utilize the adverbs related to alimentation, partitive articles and negation. | | | | | | | | | | | | |
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| Course Outcomes (CO): | | At the end of this course, learners will be able to: | | | | | | | | | | | |
| CO-1: | develop a dialogue by using French greetings, expressions and self- Introduction. | - | - | - | - | - | - | - | - | - | 3 | - | 3 |
| CO-2: | create the map and find directions. | - | - | - | - | - | - | - | - | - | 3 | - | 3 |
| CO-3: | write simple routine tasks using reflexive verbs. | - | - | - | - | - | - | - | - | - | 3 | - | 3 |
| CO-4: | compile paragraph to describe a person with adjectives, colours and clothing. | - | - | - | - | - | - | - | - | - | 3 | - | 3 |
| CO-5: | apply adverbs of quantity related to food in sentences. | - | - | - | - | - | - | - | - | - | 3 | - | 3 |

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| Unit-1 - : L'alphabet | 9 Hour |
| Les accents - Les salutations - Les pronoms sujets - Les verbes : être, avoir, s'appeler, habiter - Se présenter / Présenter quelqu'un - S'informer sur qqn - Les articles indéfinis - communiquer en classe - Les nombres de 0 à 69 - Les jours - Les mois - Des portraits de pays francophones - Les articles définis - Les pronoms toniques - Demander poliment - Répondre poliment. | |
| Unit-2- | 9 Hour |
| Les nombres de 70 à 1000 - Le 1er groupe verbe - Les verbes venir et aller - les professions - les couleurs - Les pays - la nationalité - Le genre des adjectifs - les nombre des adjectifs - Les prépositions de lieu (1) - Décrire son voisin - Décrire votre profession - La description physique - Les adjectifs possessifs (sing. / pl.) - Les orientations - les monuments - la monnaie - La famille | |
| Unit-3- | 9 Hour |
| Les mots interrogatifs - Les verbes : Vouloir, pouvoir, devoir - les verbes pronominaux - Les 2eme groupes verbes - Faire une enquête - Les goûts des autres - Les temps libres et les loisirs - Parler de ses loisirs - Exprimer ses goûts / préférence - Exprimer une envie - Activité quotidienne - Le futur proche - L'heure - Demander / dire l'heure - Le système éducatif en France. | |
| Unit-4 - | 9 Hour |
| Les adjectifs démonstratifs - le saisons - Les verbes : sortir, partir - Les 3eme groupes verbes - Proposer une sortie à qqn - Proposer à qqn de faire quelque chose - Apprécier qqn - Ne pas apprécier qqn - Les vêtements - Les adverbs de fréquence - Les adverbs de temps - Décrire une tenue - Décrire les accessoires - la mode en France - Demander le prix - Faire des courses. | |
| Unit-5- | 9 Hour |
| Les articles partitifs (du..) et les quantités - Les verbes (er, ger, yer, cer) - Les adverbs de quantité - le pronom "en" de quantité - Les expressions de quantité - L'Impératif - Les habitudes alimentaires - la négation - Ecrire une recette - commander au restaurant - Donner son appréciation - S'exprimer à table - Les Fêtes en France. | |

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| Learning Resources | 1. SAISONS 1 - Didier – 2017 2. BIENVENUE - Course Book in French - Department of EFL, SRMIST - 2017. | |
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| Learning Assessment | | | | | | | |
|---------------------|------------------------------|--|----------|--------------------------------------|----------|---|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | Summative Final Examination (40% weightage) | |
| | | Formative CLA-1 Average of unit test (50%) | | Life Long Learning CLA-2 (10%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 40% | - | 40% | - | 40% | - |
| Level 2 | Understand | 30% | - | 30% | - | 30% | - |
| Level 3 | Apply | 30% | - | 30% | - | 30% | - |
| Level 4 | Analyze | - | - | - | - | - | - |
| Level 5 | Evaluate | - | - | - | - | - | - |
| Level 6 | Create | - | - | - | - | - | - |
| | Total | 100 % | | 100 % | | 100 % | |

| Course Designers | | |
|---|--|-------------------------------------|
| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| 1. Ms. Woanyuh Zoe Tsou, Founder and proprietor, IF Lingua Cultural studio, Hsinchu, Taiwan | 1. Mr. Eric Perrotel Attaché de coopération pour le français - Zone Sud Institut français en Inde - Embassy of France in India, Bureau de France - Chennai | 1. Dr. P. Tamilarasan, SRMIST. |
| | 2. Dr. J. Mangayakarasi, Dean of Academics Affairs & Head, PG and Research, Dept. of English, Ethiraj College for Woman, Chennai. | 2. Mr. J. Sabastian Satish, SRMIST |
| | | 3. Dr. Walter Hugh Parker, .SRMIST, |

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|--------------------|-----------|--------------------|---------------------------|------------------------|---|------------|---|---|---|---|
| Course Code | 21GNH101J | Course Name | PHILOSOPHY OF ENGINEERING | Course Category | H | HUMANITIES | L | T | P | C |
| | | | | | | | 1 | 0 | 2 | 2 |

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|-----------------------------------|-----|-----------------------------|-------------------------------|----------------------------|-----|
| Pre-requisite Courses | Nil | Co-requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | --- | | Data Book / Codes / Standards | Nil | |

| Course Learning Rationale (CLR): <i>The purpose of learning this course is to:</i> | | Program Outcomes (PO) | | | | | | | | | | | |
|--|--|-----------------------|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| CLR-1 : | <i>Inspire a holistic overview of engineering</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-2 : | <i>Enlighten the methods and methodologies for building ontologies for systems engineering</i> | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CLR-3 : | <i>Acquaint with engineering knowledge, building engineering knowledge and value of engineering</i> | | | | | | | | | | | | |
| CLR-4 : | <i>Upskill the engineering design process in aspects of conceive, design, implement and operate methodology</i> | | | | | | | | | | | | |
| CLR-5 : | <i>Instill the role of engineers in society, code of ethics and socio-politics of technology and engineering</i> | | | | | | | | | | | | |
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| Course Outcomes (CO): <i>At the end of this course, learners will be able to:</i> | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CO-1: | <i>Analyze the relation between Arts, Mathematics, Science, Technology and Engineering and desired attributes of an engineer</i> | 1 | - | - | 3 | - | 1 | - | 1 | 3 | 3 | - | 3 |
| CO-2: | <i>Build ontologies for systems engineering using concept/mind mapping techniques</i> | 3 | - | - | 3 | 3 | - | - | - | 3 | 3 | - | 3 |
| CO-3: | <i>Analyze the knowledge base in engineering, distinctive features of engineering design and RIASEC model</i> | 3 | - | - | 3 | - | - | - | - | 3 | 3 | - | 3 |
| CO-4: | <i>Illustrate the engineering design process for the given application, analyze the requirements of CDIO engineers</i> | 3 | 1 | 3 | 3 | 3 | - | - | - | 3 | 3 | - | 3 |
| CO-5: | <i>Evaluate designs on their environmental and societal aspects and do organizational analysis on profession engineering organizations</i> | 3 | 3 | 3 | 3 | - | 3 | 3 | 3 | 3 | 3 | - | 3 |

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| Unit-1 : Introduction to Philosophy of Engineering | 9 Hour |
| Define Engineering - History of Engineering Development - Practice 1: Compare Prehistory, Medieval and Present Engineering Development - Relation between Arts, Mathematics, Science, Technology and Engineering - STEAM Pyramid - Practice 2: STEAM Pyramid Analysis: Is Art Context Necessary? - Desired Attributes of an Engineer - Engineering Habits of Mind - Practice 3: Case Study on Attributes of an Engineer. | |
| Unit-2 : Ontology of Engineering | 9 Hour |
| Ontology - Reference Ontology and Application Ontology - Practice 4: Reference Ontology using Concept/Mind Mapping - Suites of Ontology Modules - Functions and Capabilities - Practice 5: Engineering Application Ontology using Concept/Mind Mapping - Product Life Cycle - Commodities, Services and Infrastructure - Practice 6: Product Life Cycle Ontology using Concept/Mind Mapping | |
| Unit-3: Epistemology of Engineering | 9 Hour |
| Relations between Science, Technology and Engineering - Questions on Philosophy of Engineering - Practice 7: Analyze the nature, contents and complexity of the knowledge base in engineering Four Dimensions of Engineering - RIASEC Model - Practice 8: Case Study on RIASEC Theory of Career Choice - Epistemology of Engineering Design - Rigour, Creativity and Change in Engineering - Practice 9: Analyze Distinctive Features of Epistemology of Engineering Design | |
| Unit-4 : Methodology of Engineering | 9 Hour |
| Difference between Scientific Method and Engineering Design (ADDIE)- CDIO Engineers in Industry - Practice 10: Relate ADDIE and CDIO Methodology - Conceive and Design - Engineering Design Process Practice 11: Illustrate the Engineering Design Process for the given Application - Implement and Operate - Operational Factors in System Design - Practice 12: Analyze the Requirements of Operational Engineers | |
| Unit-5: Axiology of Engineering | 9 Hour |
| Engineering and Society- Engineers Code of Ethics - Practice 13: Evaluate Popular Inventions and apply their new point of view to Re-Design - Sustainability and Diversity - Engineer's role to achieve Sustainable Development - Practice 14: Case Study on Achieving Sustainable Development Goals - Socio-Politics of Technology & Engineering - Professional Engineering Organizations - Practice 15: Case Study on Professional Engineering Organizations | |

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| Learning Resources | 1. Louis L. Bucciarelli, <i>Engineering Philosophy, Illustrated</i> , DUP Satellite, 2007 | 4. Christensen, S.H, <i>Engineering Identities, Epistemologies and Values</i> , Springer, 2015 |
| | 2. Gregory Bassett, <i>Philosophical Perspectives of Engineering and Technology Literacy</i> , I, Original writing Ltd, 2014 | 5. Van De Poel, Ibo, <i>Philosophy and Engineering, An Emerging Agenda</i> , Springer, 2010 |
| | 3. <i>Philosophy of Engineering, Volume I</i> , Royal Academic of Engineering (UK), 2010 | 6. Diane P. Michelfelder, <i>The Routledge Handbook of The Philosophy of Engineering</i> , Routledge, 2020 |

| Learning Assessment | | | | | | | |
|---------------------|------------------------------|--|----------|---|----------|---|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | Summative Final Examination (40% weightage) | |
| | | Formative CLA-1 Average of unit test (45%) | | Life Long Learning CLA-2 – Practice (15%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 20% | - | - | 15% | 20% | - |
| Level 2 | Understand | 20% | - | - | 15% | 20% | - |
| Level 3 | Apply | 20% | - | - | 20% | 20% | - |
| Level 4 | Analyze | 20% | - | - | 20% | 20% | - |
| Level 5 | Evaluate | 10% | - | - | 15% | 10% | - |
| Level 6 | Create | 10% | - | - | 15% | 10% | - |
| | Total | 100 % | | 100 % | | 100 % | |

| Course Designers | | |
|---|--|---|
| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| 1. Dr. Sainarayanan Gopalakrishnan, HCL Technologies, sai.jgk@gmail.com | 1. Dr. R. Kumar, NIT Nagaland, rajagopal.kumar@nitnagaland.ac.in | 1. Dr. Rajeev Sukumaran, SRM-CARE, SRMIST |
| 2. Dr. Sricharan Srinivasan, Wipro Technologies, sricharanms@gmail.com | 2. Dr. B. Surendiran, NIT Puducherry, surendiran@nitpy.ac.in | 2. Dr. G. Vairavel, SRM-CARE, SRMIST |

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|--------------------|-----------|--------------------|---------|------------------------|---|----------------|---|---|---|---|
| Course Code | 21BTB103T | Course Name | BIOLOGY | Course Category | B | BASIC SCIENCES | L | T | P | C |
| | | | | | | | 2 | 0 | 0 | 2 |

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|-----------------------------------|---------------|--------------------------------------|-----|----------------------------|-----|
| Pre-requisite Courses | Nil | Co-requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | Biotechnology | Data Book / Codes / Standards | Nil | | |

| Course Learning Rationale (CLR): | | The purpose of learning this course is to: | | Program Outcomes (PO) | | | | | | | | | | | |
|----------------------------------|---|--|--|-----------------------|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| CLR-1 : | Describe the cell structure and function and its organization | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-2 : | Explain the molecular and biochemical basis of an organism | | | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CLR-3 : | Acquire knowledge of microbial implications in disease and in health | | | | | | | | | | | | | | |
| CLR-4 : | Define biosensors and its environmental and clinical applications | | | | | | | | | | | | | | |
| CLR-5 : | Acquire knowledge of mechanical motors within the cell and biologically nontoxic biomaterials | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| Course Outcomes (CO): | | At the end of this course, learners will be able to: | | | | | | | | | | | | | |
| CO-1: | Explain cell growth, replication, reproduction, and differentiation with the potential of stem cells | | | 2 | - | - | - | - | - | - | - | - | - | - | - |
| CO-2: | Integrate the concepts and principles of biochemistry in health | | | 2 | - | - | - | - | - | - | - | - | - | - | - |
| CO-3: | Relate microbes and their usefulness in human health and industrialization | | | 2 | 3 | - | - | - | - | - | - | - | - | - | - |
| CO-4: | Apply the knowledge on biosensors and molecular motor in applications of human health and the environment | | | 3 | 2 | 2 | - | - | - | - | - | - | - | - | - |
| CO-5: | Elaborate biomaterials with applications in biomimetics | | | 3 | - | 2 | - | - | - | - | - | - | - | - | - |

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| Unit-1 : Cell: Basic Unit of Life | 6 Hour |
| <i>Organelles of cells, cell cycle, Cell division and differentiation, Stem cells - types and applications</i> | |
| Unit-2 : Macromolecules and Metabolism | 6 Hour |
| <i>Structure of carbohydrates, lipids, proteins, enzymes, DNA, and RNA. Metabolism of glucose, amino acids, and Fatty acid; Photosynthesis</i> | |
| Unit-3: Microbiology in Human Life | 6 Hour |
| <i>Medical Microbiology: Pathogenic microorganisms: Bacteria and Virus; Antibiotics; Vaccines; Environmental Microbiology; Industrial Microbiology</i> | |
| Unit-4 : Basics of Biosensors and Molecular Motors | 6 Hour |
| <i>Types of Biosensors, components of biosensors, and medical applications of biosensors. Linear motors: actin and myosin, rotatory motors: flagella motor and ATPase</i> | |
| Unit-5: Basics of Biomaterial and its Applications | 6 Hour |
| <i>Properties of biomaterials, types of biomaterials, biomimetics in dental and bone applications</i> | |

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| Learning Resources | <ol style="list-style-type: none"> 1. Thyagarajan S, N.Selvamurugan, MP Rajesh, RA.Nazeer Richard W Thilagaraj, S Barathi, MK Jaganathan ., Biology for engineers McGraw Hill Education. 2012 2. Norman Lewis, Gabi Nindl Waite, Lee R. Waite et.al., Applied Cell and Molecular Biology for Engineers. McGraw-Hill Education. 2007 3. Michael J Pelczar, ECS Chan, Noel R Krieg. Microbiology, Tata McGraw-Hill, 2019 |
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| Learning Assessment | | | | | | | |
|---------------------|------------------------------|--|----------|--|----------|---|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | Summative Final Examination (40% weightage) | |
| | | Formative CLA-1 Average of unit test (50%) | | Life Long Learning CLA-2 – (10%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 15% | - | 15% | - | 15% | - |
| Level 2 | Understand | 25% | - | 20% | - | 25% | - |
| Level 3 | Apply | 30% | - | 25% | - | 30% | - |
| Level 4 | Analyze | 30% | - | 25% | - | 30% | - |
| Level 5 | Evaluate | - | - | 10% | - | - | - |
| Level 6 | Create | - | - | 5% | - | - | - |
| | Total | 100 % | | 100 % | | 100 % | |

| Course Designers | | |
|--|---|---------------------------------|
| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| 1. Dr. C. N. Ramchand, Saksin Life sciences, ramchand@saksinlife.com | 1. Dr. K Subramaniam, IITM Chennai, subbu@iitm.ac.in | 1. Dr. Lilly M Saleena, SRM IST |
| 2. Dr. S. Sam Gunasekar, Orchid Pharma Ltd., sam@orchidpharma.com | 2. Dr. R. B. Narayanan, Anna university, arbeen09@gmail.com | 2. Dr. S Barathi, SRM IST |

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|--------------------|-----------|--------------------|--|------------------------|---|----------------|---|---|---|---|
| Course Code | 21MAB102T | Course Name | ADVANCED CALCULUS AND COMPLEX ANALYSIS | Course Category | B | BASIC SCIENCES | L | T | P | C |
| | | | | | | | 3 | 1 | 0 | 4 |

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|-----------------------------------|-------------|--------------------------------------|-----|----------------------------|-----|
| Pre-requisite Courses | Nil | Co- requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | Mathematics | Data Book / Codes / Standards | Nil | | |

| Course Learning Rationale (CLR): | | The purpose of learning this course is to: | | | | | | | | | | | |
|----------------------------------|--|--|---|---|---|---|---|---|---|---|----|----|----|
| CLR-1 : | Determine the Double and triple Integral and apply then in problems in Science and Engineering. | Engineering Knowledge | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-2 : | Gain knowledge in interpretation of vector differentiation and vector integration which relates line integral, Green's, Stoke's and Gauss divergent theorem. | | | | | | | | | | | | |
| CLR-3 : | Identify the techniques of Laplace Transforms and inverse transform and extend them in the problems of Science and Engineering | | | | | | | | | | | | |
| CLR-4 : | Construct the analytic function, discuss conformal mapping and bilinear transformation in Engineering Problems | | | | | | | | | | | | |
| CLR-5 : | Evaluate complex integrals and power series using various theorems | | | | | | | | | | | | |
| Course Outcomes (CO): | | At the end of this course, learners will be able to: | | | | | | | | | | | |
| CO-1: | Apply multiple integrals in solving problems in Science and Engineering | 3 | 3 | - | - | - | - | - | - | - | - | - | - |
| CO-2: | Analyze vector differentiation and vector integration and related theorems | 3 | 3 | - | - | - | - | - | - | - | - | - | - |
| CO-3: | Apply Laplace transform techniques in solving Engineering problems | 3 | 3 | - | - | - | - | - | - | - | - | - | - |
| CO-4: | Utilize complex integrals and power series in solving engineering problems | 3 | 3 | - | - | - | - | - | - | - | - | - | - |
| CO-5: | Gain knowledge in evaluating improper integrals using Residue theorem involving problems in Science and Engineering | 3 | 3 | - | - | - | - | - | - | - | - | - | - |

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| Unit-1 : Integral Calculus | 12 Hour |
| Evaluation of double integration Cartesian and plane polar coordinates - Evaluation of double integration of plane polar coordinates. Evaluation of double integral by changing of order of integration - Evaluation of double integral by changing of order of integration -Area as a double integral (Cartesian) - Area as a double integral (polar) - Triple integration in Cartesian coordinates -Conversion from Cartesian to polar in double integrals - Conversion from Cartesian to polar in double integrals -Triple integration in Cartesian coordinates -Area of triple Integral. | |
| Unit-2 : Vector Calculus | 12 Hour |
| Review of vectors in Two and Three dimensions - Gradient, divergence, - curl – Solenoidal - Irrotational fields - Vector identities -(without proof) – Directional derivatives - Line integrals - Surface integrals - Surface integrals - Volume Integrals - Green's theorem (without proof), Green's theorem (without proof), - Gauss divergence theorem (without proof), verification -Gauss divergence theorem (without proof) applications to cubes. - Gauss divergence theorem (without proof applications to parallelepiped. -Stoke's theorems (without proof) – Verification Stoke's theorems (without proof) – Applications to cubes - Stoke's theorems (without proof) – Applications to parallelepiped only. | |
| Unit-3: Laplace Transform | 12 Hour |
| Laplace Transforms of standard functions -Transforms properties - Transforms of Derivatives and Integrals - Transform of derivatives and integrals - Initial value theorems (without proof) and verification for some problems - Final value theorems (without proof) and verification for some problems - Inverse Laplace transforms using partial fractions - Inverse Laplace transforms sing Partial fractions -Inverse Laplace transforms section shifting theorem - LT using Convolution theorem -problems only - LT using Convolution theorem - problems only -ILT using Convolution theorem - problems only -Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficient only -Solution of Integral equation and integral equation involving convolution type | |
| Unit-4 : Analytic Functions | 12 Hour |
| Definition of Analytic Function- Cauchy Riemann equations - Cauchy Riemann equations -Properties of analytic function functions -Determination of analytic function using – Milne-Thomson's method - Conformal mappings: magnification -Conformal mappings: rotation Conformal mappings: inversion - Conformal mappings: inversion -Conformal mappings: reflection - Conformal mappings: reflection bilinear transformation - Cauchy's integral theorem (without proof) -Cauchy's integral theorem applications | |

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| Unit-5: Complex Integration | 12 Hour |
| Cauchy's integral formulae- Problems-Taylor's expansions with simple problems -Taylor's expansions with simple problems - Laurent's expansions with simple problems- Singularities -Types of Poles and Residues - Cauchy's residue theorem (without proof)- Contour integration: Unit circle. -Contour integration: Unit circle. -Contour integration: semicircular contour. -Contour integration: semicircular contour. | |

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|---------------------------|---|--|
| Learning Resources | 1. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006. 2. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010. 3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008 | 4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010 5. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson,Reprint, 2002 6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008 |
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| Learning Assessment | | | | | | | |
|---------------------|------------------------------|--|----------|--|----------|---|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | Summative Final Examination (40% weightage) | |
| | | Formative CLA-1 Average of unit test (50%) | | Life Long Learning CLA-2 – (10%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 20% | - | 20% | - | 20% | - |
| Level 2 | Understand | 20% | - | 20% | - | 20% | - |
| Level 3 | Apply | 30% | - | 30% | - | 30% | - |
| Level 4 | Analyze | 30% | - | 30% | - | 30% | - |
| Level 5 | Evaluate | - | - | - | - | - | - |
| Level 6 | Create | - | - | - | - | - | - |
| | Total | 100 % | | 100 % | | 100 % | |

| Course Designers | | |
|---|---|------------------------------|
| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| 1. Mr.V.Maheshwaran, CTS, Chennai, maheshwaranv@yahoo.com | 1. Dr.K.C.Sivakumar, IIT Madras, kcskumar@iitm.ac.in | 1. Dr.A.Govindarajan, SRMIST |
| | 2. Dr.Y V S S. Sanyasiraju, IIT Madras, sryedida@iitm.ac.in | 2. Dr. N. Balaji, SRMIST |

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|-------------|-----------|-------------|-----------|-----------------|---|----------------|---|---|---|---|
| Course Code | 21CYB101J | Course Name | CHEMISTRY | Course Category | B | BASIC SCIENCES | L | T | P | C |
| | | | | | | | 3 | 1 | 2 | 5 |

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|----------------------------|-----------|-------------------------------|-----|---------------------|-----|
| Pre-requisite Courses | Nil | Co-requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | Chemistry | Data Book / Codes / Standards | Nil | | |

| Course Learning Rationale (CLR): | | The purpose of learning this course is to: | | | | | | | | | | | |
|----------------------------------|--|--|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| CLR-1 : | Exploit the periodic properties of elements for bulk property manipulation towards technological advancement and interpret water quality parameters | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CLR-2 : | Address concepts related to electrochemistry, such as corrosion, using thermodynamic principles and measure the acidic strength and redox potentials of aqueous solution | | | | | | | | | | | | |
| CLR-3 : | Employ various organic reactions towards the design of fine chemical and drug molecules for industries and measure the acidic strength and conductance of aqueous solution | | | | | | | | | | | | |
| CLR-4 : | Brief outline, reaction types and applications of polymers and determine average molecular weight of the polymer | | | | | | | | | | | | |
| CLR-5 : | Properties, surface characterization and applications of advanced engineering materials and measure the acidic strength of aqueous solution | | | | | | | | | | | | |
| Course Outcomes (CO): | | At the end of this course, learners will be able to: | | | | | | | | | | | |
| CO-1: | Rationalize bulk properties using periodic properties of elements, evaluate water quality parameters like hardness and alkalinity | 3 | - | 3 | 2 | - | - | - | - | - | - | - | - |
| CO-2: | Utilize the concepts of thermodynamics in understanding thermodynamically driven chemical reactions, determine acidic strength and redox potentials of aqueous solution | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - |
| CO-3: | Perceive the importance of stereochemistry in synthesizing organic molecules applied in pharmaceutical industries, determine acidic strength and conductance of aqueous solution | - | 3 | 3 | 2 | - | - | - | - | - | - | - | - |
| CO-4: | Utilize the concepts of polymer processing for various technological applications, determine average molecular weight of the polymer | 3 | - | 3 | 3 | - | - | - | - | - | - | - | - |
| CO-5: | Analyze the importance of advanced processing techniques towards engineering applications and measure the acidic strength of aqueous solution | 3 | - | 3 | - | 3 | - | - | - | - | - | - | - |

| | |
|--|----------------|
| Unit-1 : Periodic properties | 18 Hour |
| Coordination numbers and geometries - Crystal field theory - Octahedral & Tetrahedral complexes - Optical & magnetic properties of transition metal complexes - Isomerism in transitional metal compounds - Effective nuclear charge, penetration of orbitals - variations of orbital energies of atoms in the periodic table - Electronic configurations, atomic and ionic sizes - ionization energies, electron affinity and electronegativity - Hard soft acids and bases Practice: 1. Determination of the amount of sodium carbonate and sodium hydroxide in a mixture by titration 2. Determination of hardness (Ca ²⁺) of water using EDTA – Complexometry method. | |
| Unit-2 : Use of free energy in chemical equilibria | 18 Hour |
| Thermodynamic functions: Energy, Entropy and free energy - Estimation of entropy & free energies - Free energy and emf. Cell potentials - The Nernst equation and applications - Acid base, oxidation reduction - Solubility equilibria - Corrosion - Free energy of a corrosion reaction - Pourbaix diagram Salient Features and phase diagram for Iron Practice: 1. Determination of strength of an acid by Conductometry. 2. Determination of ferrous ion using potassium dichromate by Potentiometric titration | |
| Unit-3: Stereochemistry and Organic reactions | 18 Hour |

Representations of 3 dimensional structures - structural isomers and stereoisomers - configurations and symmetry and chirality - enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis - Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings - Synthesis of a commonly used drug molecule.

Practice:

1. Estimation of amount of chloride content of a water sample.
2. Determination of the strength of a mixture of acetic acid and hydrochloric acid by Conductometry

Unit-4 : Polymers

18 Hour

Introduction to concept of macromolecules - Tacticity - Classification of Polymers - Thermoplastics, Thermosets and Elastomers - Types of Polymerization - Important addition and condensation polymers – synthesis and properties – Polypropylene, polystyrene, PVC, Teflon, Nylon, PET, Polyurethane and Synthetic rubber, Conducting polymers – introduction, types – n and p doping, examples (polyacetylene and P3HT), applications

Practice:

1. Determination of molecular weight of polymer by viscosity average method.

Unit-5: Advanced Engineering Materials

18 Hour

Mechanical properties of solid – stress-strain relationship - Tensile strength, Hardness, Fatigue, Impact strength, Creep – Composite materials - introduction - Types of composites - Fibre Reinforced Composites. Particle Reinforced Composites. Metal Matrix Composites. Ceramic Matrix Composites. Examples and applications. Surface Characterisation techniques - XRD and XPS.

Practice:

1. Determination of strength of an acid using pH meter.

| | | |
|--------------------|--|---|
| Learning Resources | 1. B. H. Mahan, R. J. Meyers, University Chemistry, 4th ed., Pearson publishers, 2009. | 4. Peter W. Atkins, Julio de Paula, James Keeler, Physical Chemistry, 11th ed., Oxford publishers, 2021 |
| | 2. M. J. Sienko, R. A. Plane, Chemistry: Principles and Applications, 3rd ed., McGraw-Hill publishers, 1980 | 5. K. P. C. Vollhardt, N. E. Schore, Organic Chemistry: Structure and Function 7th ed., Freeman, 2014 |
| | 3. B. L. Tembe, Kamaluddin, M. S. Krishnan, Engineering Chemistry (NPTEL Web-book) http://nptel.ac.in/downloads/122101001/ | 6. W. D. Callister, D. G. Rethwisch, Materials Science and Engineering: An Introduction, 8th ed., Wiley, 2009 |
| | | 7. J. C. Kuriacose, J. Rajaram, Chemistry in Engineering and Technology, Tata McGraw-Hill Education, 1984 |

| Learning Assessment | | | | | | | |
|---------------------|------------------------------|--|----------|--------------------------------------|----------|---|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | Summative Final Examination (40% weightage) | |
| | | Formative CLA-1 Average of unit test (50%) | | Life Long Learning CLA-2 (10%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 10% | - | - | 20% | 10% | - |
| Level 2 | Understand | 30% | - | - | 20% | 30% | - |
| Level 3 | Apply | 30% | - | - | 20% | 30% | - |
| Level 4 | Analyze | 30% | - | - | 40% | 30% | - |
| Level 5 | Evaluate | - | - | - | - | - | - |
| Level 6 | Create | - | - | - | - | - | - |
| | Total | 100 % | | 100 % | | 100 % | |

Course Designers

| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
|--|--|-------------------------------------|
| 1. Dr. Ravikiran Allada, Head R&D, Analytical, Novugen Pharma, Malaysia, ravianalytical@gmail.com | 1. Prof. G. Sekar, IIT Madras, gsekar@iitm.ac.in | 1. Prof. M. Arthanareeswari, SRMIST |
| 2. Dr. Sudarshan Mahapatra, General Manager, Encube Ethicals Pvt. Ltd., Mumbai, sudarshan.m@encubeethicals.com | 2. Prof. Kanishka Biswas, JNCASR Bengaluru, kanishka@jncasr.ac.in | 2. Dr. K. Ananthanarayanan, SRMIST |

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|--------------------|-----------|--------------------|------------------|------------------------|---|------------|---|---|---|---|
| Course Code | 21PDM102L | Course Name | GENERAL APTITUDE | Course Category | M | NON CREDIT | L | T | P | C |
| | | | | | | | 0 | 0 | 2 | 0 |

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|-----------------------------------|---------------------------|--------------------------------------|-----|----------------------------|-----|
| Pre-requisite Courses | Nil | Co-requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | Career Development Center | Data Book / Codes / Standards | Nil | | |

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|---|--|------------------------------|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| Course Learning Rationale (CLR): | <i>The purpose of learning this course is to:</i> | Program Outcomes (PO) | | | | | | | | | | | |
| CLR-1 : | Recapitulate fundamental mathematical concepts and skills | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-2 : | Hone grammar skills to write error-free sentences | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CLR-3 : | Sharpen logical reasoning through skillful conceptualization, | | | | | | | | | | | | |
| CLR-4 : | Identification of relationships between words based on their function, usage and characteristics | | | | | | | | | | | | |
| CLR-5 : | Nurture passion for enriching vocabulary | | | | | | | | | | | | |
| Course Outcomes (CO): | <i>At the end of this course, learners will be able to:</i> | | | | | | | | | | | | |
| CO-1: | Build a strong base in the fundamental mathematical concepts | - | 3 | - | - | - | - | - | - | 3 | - | - | 2 |
| CO-2: | Identify the approaches and strategies to solve problems with speed and accuracy | - | - | - | - | - | - | - | - | 3 | - | - | 3 |
| CO-3: | Enhance lexical skills through systematic application of concepts and careful analysis of style, syntax, semantics and logic | - | - | - | - | - | - | - | - | 3 | 3 | - | 3 |
| CO-4: | Collectively solve problems in teams and groups | - | 3 | - | - | - | - | - | - | 3 | 3 | - | 2 |
| CO-5: | Build vocabulary and grammar through methodical approaches | - | - | - | - | - | - | - | - | 3 | 3 | - | 3 |

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|--|---------------|
| Unit-1 : | 6 Hour |
| Synonyms – Antonyms -Tenses – Voices – Simple Equations – Age Problems – Ration Proportion & Variation | |
| Unit-2 : | 6 Hour |
| Sentence Arrangement – Commonly Confusing Words – Linear Arrangement – Circular Arrangement – Selection and Distribution | |
| Unit-3: | 6 Hour |
| Percentage – Profit and loss – Closest Meaning – Word Analogy – Types of Sentences – Phrasal Verbs | |
| Unit-4 : | 6 Hour |
| Simple and Compound Interest – Blood Relations – Odd Words – Question Tags – Conditional Clauses | |
| Unit-5: | 6 Hour |
| Direction sense – Average – Conditional Clauses – Reading Comprehension | |

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|---------------------------|---|--|
| Learning Resources | 1. Nishit K. Sinha, The Pearson Guide to Quantitative Aptitude and Data Interpretation for the CAT 2. Dinesh Khattar-The Pearson Guide to QUANTITATIVE APTITUDE for competitive examinations 3. Charles Harrington Elstner, Verbal Advantage: Ten Easy Steps to a Powerful Vocabulary, Random House Reference, 2002 | 4. Norman Lewis, How to Read Better and Faster, Goyal, 4th Edition 5. Franklin GRE Word List, 3861 GRE Words, Franklin Vocab System, 2014Wiley's GMAT Reading Comprehension Grail, Wiley, 2016 6. Manhattan Prep GRE : Reading Comprehension and Essays, 5th Edition |
|---------------------------|---|--|

| Learning Assessment | | | | | | | | | |
|---------------------|------------------------------|--|----------|-------------------------------|----------|--------------------|----------|-------------------------------------|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | | | Final Examination (0% weightage) | |
| | | Formative CLA-1 Average of unit test (30%) | | Formative CLA-2 – (30%) | | Summative (40%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | - | 40% | - | 40% | - | 40% | - | - |
| Level 2 | Understand | - | 40% | - | 40% | - | 40% | - | - |
| Level 3 | Apply | - | 10% | - | 10% | - | 10% | - | - |
| Level 4 | Analyze | - | 10% | - | 10% | - | 10% | - | - |
| Level 5 | Evaluate | - | - | - | - | - | - | - | - |
| Level 6 | Create | - | - | - | - | - | - | - | - |
| | Total | 100 % | | 100 % | | 100% | | - | |

| Course Designers | | |
|---|--|----------------------------------|
| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| 1. Mr. Pratap Iyer, Study Abroad Mentors, pratap.iyer30@gmail.com | 1. Mr. Nishith Sinha, dueNorth India Academics LLP, nsinha.alexander@gmail.com | 1. Dr. P. Madhusoodhanan, SRMIST |
| 2. Mr. Ajay Zenner, Career Launcher, ajay.z@careerlauncher.com | 2. Dr. Dinesh Khattar, Delhi University, dinesh.khattar31@gmail.com | 2. Dr. Jayapragash J, SRMIST |
| | | 3. Dr. M. Snehalatha, SRMIST |

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|--------------------|-----------|--------------------|---------------------------------------|------------------------|---|------------|---|---|---|---|
| Course Code | 21GNM101L | Course Name | PHYSICAL AND MENTAL HEALTH USING YOGA | Course Category | M | NON CREDIT | L | T | P | C |
| | | | | | | | 0 | 0 | 2 | 0 |

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|-----------------------------------|-----------------|--------------------------------------|-----|----------------------------|-----|
| Pre-requisite Courses | Nil | Co-requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | Center For YOGA | Data Book / Codes / Standards | Nil | | |

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|----------------------------------|--|--|--|-----------------------|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| Course Learning Rationale (CLR): | | The purpose of learning this course is to: | | Program Outcomes (PO) | | | | | | | | | | | |
| CLR-1 : | Utilize rich Indian heritage and knowledge for self-healing and self-protection from diseases | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-2 : | Application of meditation techniques to balance emotions, state of mind and body equip attain happiness. | | | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CLR-3 : | Intellectually develop oneself by identifying oneness with divine state merging with absolute space. | | | | | | | | | | | | | | |
| CLR-4 : | Social transformations towards meaningful and purposeful humanity through the morality of the both the self and the society. | | | | | | | | | | | | | | |
| CLR-5 : | Spiritual enlightenment of self by purifying the body, mind and soul to attain the blissful stage. | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| Course Outcomes (CO): | | At the end of this course, learners will be able to: | | | | | | | | | | | | | |
| CO-1: | Identify Indian heritage, culture. Identify key anatomical structures in the human body and basic exercises for the same | | | 1 | - | - | 3 | - | 2 | - | 2 | 3 | 3 | - | 3 |
| CO-2: | Apply yoga meditation practices for emotional development and wellbeing | | | 3 | - | - | 3 | 3 | - | - | - | 3 | 3 | - | 3 |
| CO-3: | Identify educational and intellectual development methods using five sense realization and transformation | | | 3 | - | - | 3 | - | - | - | - | 3 | 3 | - | 3 |
| CO-4: | Demonstrate human values and emotions through thorough understanding about life, naturopathy and food habits | | | 3 | 1 | 2 | 3 | 3 | - | - | - | 3 | 3 | - | 3 |
| CO-5: | Impact self and society by peaceful coexistence with self-introspection and balanced diet charts | | | 3 | 3 | 2 | 3 | - | 3 | 3 | 3 | 3 | 3 | - | 3 |

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|---|---------------|
| Unit-1 : Physical Development | 6 Hour |
| Indian Heritage & Culture, Concept of Yoga, Objectives, Science & Art of Yoga, Classification, Misconceptions, History of Yoga, Women and Yoga Practice- Meditation (Self Realization), Relaxation - Importance of Guru in Yoga, Purusharthas, Yogic Anatomy – Naadi's, Chakra's and Pancha Koshas, Human anatomy Scientific view - Yogic creation of Universe, Nature of Soul and Prakriti, Understanding the Mind, Disease and Causes, Food Habits. Exercises: Hands, Legs, Neuro-Muscular breathing, Eye, Ears, Nostrils, kidney, brain- Digestive tract, stomach, lungs, spine, hip, neck. Pressure points in our body. Practices Practice1: Standing exercise, Surya Namaskar Practice2: Surya Namaskar, Sitting Exercises Practice3: Prone & Supine posture Exercises | |
| Unit-2 : Emotional Development | 6 Hour |
| Brain Functions, Bio-Magnetism, Cognitive Mind - Emotional The 3 levels of Consciousness and the Importance of Subconscious mind - Meditation (Five Sense Realization), Relaxation - Brain and its Functions, Bio Magnetism and its operation. Bio Magnetic Operation and Food Transformation - The 5 states of Mind and Brain waves- Meditation (mooladhara) & Relaxation - Asanas (Postures) for Body Structure: Full Body Structure Maintenance - Standing, Sitting, Prone & Supine Posture, Benefits of asanas Practices Practice4: Surya Namaskar, Standing asanas Practice5: Surya Namaskar, Sitting asanas Practice6: Surya Namaskar, Prone & Supine posture Asanas | |
| Unit-3: Concentration Development | 6 Hour |
| Current Challenges and sensory Overload, Need for better attention and awareness - Methods to improve Self Awareness and Concentration- Meditation (Five Sense Realization), Relaxation- Mind Taming Techniques, Nature of Divine states- Transformation of universe, living beings- Meditation (Agha) – Relaxation- Exercises: Intellectual development Brain Crown Centre (Thuriyam) Meditation- Five Senses Breath based Meditation Practices Practice7: Yoga for Youthfulness (Kayakalpa Yoga) | |

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| Practice8: Dynamic poses Yoga, Pranayama |
| Practice9: , Mudhras, Self-introspection Practice (Thought Analysis) |
| Unit-4 :Social Development 6 Hour |
| Introduction: Social Intelligence- Cultural values, Ethics & Morality- Service to Humanity, Self-Introspection- Yogic Ethics [Yama and Niyama]- Six Bad temperaments and Overcoming actions- Yoga Mudhras, Meditation (Santhi) & Relaxation- Therapy for Social Development: Gestures Yoga (Mudhras) – Body locks (Bhandhas)- Indian Medical System: Naturopathy, Food, Nutrition, Diet Chart for Youthfulness |
| Practices |
| Practice10: Kayakalpa, Bhandas, Meditation (Crown) |
| Practice11: Stay poses Yoga, Krisya Yoga |
| Practice12: Balancing Asanas |
| Unit-5: Spiritual Development 6 Hour |
| Spiritual Connect & Yoga: Self-Realization, Self-Awareness, Self-Actualization, Self-Motivation - Methods for Self-Realization: Karma, Bakthi, Janana and Raja Yoga- Meditation (Nine centre) & Relaxation- The Science of Cause and Effect: Karmic Theory. Internal Cleanliness- Self-Actualization and Maslows theory of Self Actualization- Meditation, Introspection, Sublimination- Spirituality for Stress Management(yoga break by ayush)- Yoga Practices for blissful existence, advance asanas. |
| Practices |
| Practice13: Management of Physical problems (Yoga therapy) |
| Practice14: Project Submission |

| | | |
|---------------------------|---|---|
| Learning Resources | <ol style="list-style-type: none"> 1. B.K.S.Iyengar, Light on yoga, 2006. 2. T.K.V.Desikachar, Heart of Yoga, Inner Traditions Bear and Company, 2003. 3. Swami Ramdev Ji Yog Its Philosophy and Practice, 2008. 4. Yogiraj Vethathiri Maharishi, Yoga for Modern Age, Tenth edition, Vethathiri Publications, 2007 | <ol style="list-style-type: none"> 5. Vivekananda Kenthria Prkasan Trust, Yogam, 2006. 6. Swami muktibodhananda, Hatha yoga Prathipika, Bihar School of Yoga 1985. 7. Swami Satyananda Saraswati, Asana Pranayama Mudra Bandha, Bihar School of Yoga, 1993 8. Dr. Asana Andiappan, Thirumoolar's Astanga Yoga, International Yoga Academy, 2017 |
|---------------------------|---|---|

| Learning Assessment | | | | | | | | | |
|---------------------|------------------------------|--------------------------------------|----------|-----------------------------|----------|--------------------|----------|-------------------------------------|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | | | Final Examination (0% weightage) | |
| | | Formative CLA-1 (30%) | | Formative CLA-2 (30%) | | Summative (40%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | - | 20% | - | 20% | - | 20% | - | - |
| Level 2 | Understand | - | 20% | - | 20% | - | 20% | - | - |
| Level 3 | Apply | - | 30% | - | 30% | - | 30% | - | - |
| Level 4 | Analyze | - | 30% | - | 30% | - | 30% | - | - |
| Level 5 | Evaluate | - | - | - | - | - | - | - | - |
| Level 6 | Create | - | - | - | - | - | - | - | - |
| | Total | 100 % | | 100 % | | 100% | | - | |

| Course Designers | | |
|--|--|-------------------------------|
| Professional Experts | Experts from Higher Technical Institutions | Internal Experts |
| 1. Dr s. Lakshmiganthan ,Assistant professor., MDINY., AYUSH., slk.pt@rediffmail.com | 1. Dr. N. Perumal, Director, Vision for Wisdom, Aliyar, visionacademy@vethathiri.edu.in. | 1. Dr.V.Parthiban, SRMIST |
| 2 .Dr. Manimekalai Narayanan, Sri Ramachandra Faculty of allied Health Sciences. m.manimekalai@sriramachandra.edu.in | 2. Shri.S. Sivakeerthi, Sr. Strategist APSEL Technologies, siva@apseltech.com | 2. Dr.V.Nithyananthan, SRMIST |

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|--------------------|-----------|--------------------|---------------------------------|------------------------|---|----------------------|---|---|---|---|
| Course Code | 21CSS101J | Course Name | PROGRAMMING FOR PROBLEM SOLVING | Course Category | S | ENGINEERING SCIENCES | L | T | P | C |
| | | | | | | | 3 | 0 | 2 | 4 |

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|-----------------------------------|----------------------------------|-------------------------------|-----|----------------------------|-----|
| Pre-requisite Courses | Nil | Co- requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | Computer Science and Engineering | Data Book / Codes / Standards | Nil | | |

| Course Learning Rationale (CLR): | | The purpose of learning this course is to: | | Program Outcomes (PO) | | | | | | | | | | | |
|----------------------------------|---|---|---|-----------------------|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| CLR-1: | | Think and evolve with a logic to construct an algorithm and pseudocode that can be converted into a program | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-2: | | Utilize the appropriate operators and control statements to solve engineering problems | | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CLR-3: | | Store and retrieve data in a single and multidimensional array | | | | | | | | | | | | | |
| CLR-4: | | Create custom designed functions to perform repetitive tasks in any application | | | | | | | | | | | | | |
| CLR-5: | | Create basic Abstract Data Types with python | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| Course Outcomes (CO): | | At the end of this course, learners will be able to: | | | | | | | | | | | | | |
| CO-1: | Solve problems through computer programming. Express the basic data types and variables in C | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 |
| CO-2: | Use appropriate data types in simple data processing applications. To create programs using the concept of arrays. | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 |
| CO-3: | Create string processing applications with single and multi-dimensional arrays. | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 |
| CO-4: | Create user defined functions with required operations. To implement pointers in applications with dynamic memory requirements. | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 |
| CO-5: | Create programs using the python data types, loops, control statements for problem solving | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 2 |

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|---|----------------|
| Unit-1 : | 15 Hour |
| Evolution of Programming & Languages - Problem solving through programming - Writing algorithms & Pseudo code - Single line and multiline comments - Introduction to C: Structure of the C program - Input and output statements. Variables and identifiers, Constants, Keywords - Values, Names, Scope, Binding, Storage Classes - Numeric Data types: integer, floating point Non-Numeric Data types: char and string - L value and R value in expression, Increment and decrement operator - Comma, Arrow and Assignment operator, Bitwise and Size-of operator - Arithmetic, Relational and logical Operators - Condition Operators, Operator Precedence - Expressions with pre / post increment operator | |
| Unit-2 : | 15 Hour |
| Conditional Control -Statements :Simple if, if...else - Conditional Statements : else if and nested if - Conditional Statements : Switch case - Un-conditional Control Statements : break, continue, goto - Looping Control Statements: for, while, do.while - Looping Control Statements: nested for, nested while - Introduction to Arrays -One Dimensional (1D) Array Declaration and initialization - Accessing, Indexing and operations with 1D Arrays - Array Programs – 1D - Initializing and Accessing 2D Array, Array Programs – 2D - Pointer and address-of operators -Pointer Declaration and dereferencing, Void Pointers, Null pointers Pointer based Array manipulation | |
| Unit-3: | 15 Hour |
| String Basics - String Declaration and Initialization - String Functions: gets(), puts(), getchar(), putchar(), printf() - Built-inString Functions: atoi, strlen, strcat, strcmp -String Functions: sprintf, sscanf, strev, strcpy, strstr, strtok - Operations on Strings - Function prototype declaration, function definition - Actual and formal parameters - Function with and without Arguments - Function with and without return values - Call by Value, Call by Reference - Passing Array to Function - Passing Array elements to Function - Function Pointers. | |
| Unit-4 : | 15 Hour |
| Python: Introduction to Python - Introduction to Google Colab - Basic Data Types: Integers, Floating Points, Boolean types - Working with String functions - Working with Input, Output functions - Python-Single and Multi line Comments/ Error Handling - Conditional & Looping Statements : If, for, while statements - Working with List structures - Working with Tuples data structures - Working with Sets - Working with Dictionaries - Introduction to Python Libraries - Introduction to Numpy - High Dimensional Arrays | |
| Unit-5: | 15 Hour |
| Creating NumPy Array -Numpy Indexing - Numpy Array attributes - Slicing using Numpy - Descriptive Statistics in Numpy: Percentile - Variance in Numpy -Introduction to Pandas - Creating Series Objects, Data Frame Objects - Simple Operations with Data frames - Querying from Data Frames -Applying Functions to Data frames - Comparison between Numpy and Pandas - Speed Testing between Numpy and Pandas - Other Python Libraries | |

Practice

Practice 1: Input, Output Statements, Variables

Practice 2: Data types & Operators-I

Practice 3: Data types & Operators-II

Practice 4: Control Statements (Branching, Looping)

Practice 5: Arrays

Practice 6: Arrays with Pointers

Practice 7: Strings

Practice 8: Functions

Practice 9 : Arrays and Functions

Practice 10: Input, Output in Python

Practice 11: Python data structures

Practice 12: Arrays in Python

Practice 13: Operations with Numpy

Practice 14: Operations with Pandas

Practice 15: case study: Data science with Numpy, Pandas

| | | |
|---------------------------|---|--|
| Learning Resources | 1. Programming in C, E.Balagurusamy, Mc Graw Hill, Eighth Edition. 2019. [chapters 1 to 6 & 8 To 11] | 5. https://www.tutorialspoint.com/cprogramming/index.htm |
| | 2. Head First C: A Brain-Friendly Guide, By David Griffiths, Dawn Griffiths, Oreilly. [Chapters 2 to 4] | 6. https://www.geeksforgeeks.org/c-programming-language/ |
| | 3. Let Us C, Fifth Edition, Yashavant P. Kanetkar, BPB publications. [Chapters 1 to 6, 8 to 9] | 7. Python Data Science Handbook, Oreilly, Jake VanderPlas, 2017. [Chapters 2 & 3] |
| | 4. Problem Solving & Programming Concepts, Maureen Sprankle, Jim Hubbard, Prentice Hall, Ninth Edition. [Chapters 1 to 7] | 8. Python For Beginners, Timothy C. Needham, 2019. [Chapters 1 to 4] |
| | | 9. https://www.tutorialspoint.com/python/index.htm |
| | | 10. https://www.w3schools.com/python/ |

| Learning Assessment | | | | | | | |
|---------------------|------------------------------|--|----------|--|----------|---|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | Summative Final Examination (40% weightage) | |
| | | Formative CLA-1 Average of unit test (45%) | | Life Long Learning CLA-2 –Practice (15%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 20% | - | - | 15% | 15% | - |
| Level 2 | Understand | 20% | - | - | 15% | 15% | - |
| Level 3 | Apply | 20% | - | - | 20% | 20% | - |
| Level 4 | Analyze | 20% | - | - | 20% | 20% | - |
| Level 5 | Evaluate | 10% | - | - | 15% | 15% | - |
| Level 6 | Create | 10% | - | - | 15% | 15% | - |
| | Total | 100 % | | 100 % | | 100 % | |

Course Designers

| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
|---|--|---------------------------------|
| 1. Dr. Sainarayanan Gopalakrishnan, HCL Technologies, sai.jgk@gmail.com | 1. Prof. Janakiram D, IIT Madras, djam@iit.ac.in | 1. Dr. E.Poovammal, SRMIST |
| 2. Dr. Sricharan Srinivasan, Wipro Technologies, sricharanms@gmail.com | | 2. Dr. B. Amutha, SRMIST |
| | | 3. Dr. Rajeev Sukumaran, SRMIST |

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|--------------------|-----------|--------------------|-------------------------------------|------------------------|---|----------------------|---|---|---|---|
| Course Code | 21MES101L | Course Name | BASIC CIVIL AND MECHANICAL WORKSHOP | Course Category | S | ENGINEERING SCIENCES | L | T | P | C |
| | | | | | | | 0 | 0 | 4 | 2 |

| | | | | | |
|-----------------------------------|----------------------------------|--------------------------------------|-----|----------------------------|-----|
| Pre-requisite Courses | Nil | Co-requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | Civil and Mechanical Engineering | Data Book / Codes / Standards | Nil | | |

| Course Learning Rationale (CLR): | | The purpose of learning this course is to: | | Program Outcomes (PO) | | | | | | | | | | | |
|----------------------------------|---|--|--|-----------------------|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| CLR-1 : | Practice machining and glass cutting shop floor trade | | | Engineering Knowledge | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-2 : | Practice arc & gas welding, and fitting and make new assemblies according to various dimensions and tolerances | | | | | | | | | | | | | | |
| CLR-3 : | Practice basic carpentry joints and sheet metal shop floor practices. | | | | | | | | | | | | | | |
| CLR-4 : | Practice casting, moulding, & smithy trades | | | | | | | | | | | | | | |
| CLR-5 : | Practice and make G.I & P.V.C. plumbing trade | | | | | | | | | | | | | | |
| Course Outcomes (CO): | | At the end of this course, learners will be able to: | | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CO-1: | Machine in a lathe. Drill using drilling machines. Cut glass. Create new components according to specifications | | | | | | | | | | | | | | |
| CO-2: | Weld joints using arc & gas welding. Fit pipes and fixtures. Make new assembly for given dimensions, and tolerances | | | | | | | | | | | | | | |
| CO-3: | Practice basic carpentry joints used in house hold furniture items, and sheet metal items used shop floor practices | | | | | | | | | | | | | | |
| CO-4: | Practice casting, moulding, & smithy trades | | | | | | | | | | | | | | |
| CO-5: | Make G.I & P.V.C pipe line connections used in the plumbing trade | | | | | | | | | | | | | | |

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|---|----------------|
| Unit-1 : Machining Process | 12 Hour |
| Machining, Drilling, Tapping, Glass cutting - Machining: Basics of Machining Processes Equipment's - Tools and demonstration of machining to produce models - Simple turning of cylindrical surface on MS rod using lathe machine tool - Simple turning of cylindrical surface on MS rod using lathe machine tool - Basics of drilling and tapping processes, Equipment's, tools - Demonstration of drilling and tapping to produce models. - Generate hole on a metal piece - Generate internal thread on a metal piece. Basics of Glass cutting processes, - Equipment's.- Tools and demonstration of producing models - Make glass panels for boxes | |
| Unit-2 : Metal Joining Process | 12 Hour |
| Welding (Arc and Gas) and fitting - Basics of Metal Arc welding operations, Equipment's - Tools and demonstration of producing models - Butt joint of two metal plates using arc welding process - Lap joint of two metal plates overlapping on one another using arc welding process. - Basics of gas welding operations, Equipment's, - Tools and demonstration of producing models - MIG welding of metal plates - TIG welding of metal plates - Basics of fitting practice, tools and method - of producing models - Tools and demonstration of producing models - Step fitting of two metal plates using fitting tools | |
| Unit-3: Carpentry and Sheet metal | 12 Hour |
| Basics of Carpentry operations, Equipment's - Tools and demonstration of producing models - Cross halving joint of two wooden pieces at perpendicular direction - To make duster from wooden piece using carpentry tools.- Basics of Sheet metal operations, Equipment's - Tools and demonstration of producing sheet metal models - To make Rectangular shaped tray using GI sheet - To make bigger size scoop using GI sheet. - Basics of different geometrical shapes in Sheet metal operations - Equipment's, tools and demonstration of producing models - To make geometrical shape like frustum, Cone and Prism using G.I sheet | |
| Unit-4: Foundry and Smithy | 12 Hour |
| Casting, moulding and smithy - Basics of Casting, processes, Equipment's - Tools and demonstration of producing models - To make the mould using stepped flange - To make the mould using stepped flange - Basics of injection moulding and processes, Equipment's, - Tools and demonstration of producing models - To make plastic models using injection moulding of simple part - To make plastic models using injection moulding of simple part - Basics of Smithy processes, Equipment's, - Tools and demonstration of producing models - To forge chisel from MS rod using black smithy | |
| Unit-5: Plumbing | 12 Hour |
| Plumbing (G.I and P.V.C) - Basics of Plumbing practices for G.I and P.V.C. - Tools and demonstration of producing models - Plumbing of bathroom/ kitchen fittings using G.I. fittings - Plumbing of bathroom/ kitchen fittings using G.I. fittings - PVC Plumbing of bathroom/ kitchen fittings using P.V.C. fittings - Tools and demonstration of producing models - Plumbing of bathroom/ kitchen fittings using P.V.C. fittings - Plumbing of bathroom/ kitchen fittings using P.V.C. fittings - Basics of Plumbing practices for G.I pipe - lines and fittings for pumps and machines - Equipment's, tools and demonstration of producing models. - Plumbing of pipe lines and fitting for Pumps using G.I fittings | |

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|---------------------------|--|--|
| Learning Resources | 1. Jeyachandran K., Natarajan S. & Balasubramanian S., A Primer on Engineering Practices Laboratory, Anuradha Publications, 2007 | 5. Kannaiah P. & Narayana K.L., Manual on Workshop Practice, Scitech Publications, 1999. |
| | 2. Jeyapoovan T., Saravanapandian M. & Pranitha S., Engineering Practices Lab Manual, Vikas Publishing House Pvt.Ltd, 2006. | 6. Hajra Choudhury S.K., Hajra Choudhury A.K., Nirjhar Roy S.K., Elements of Workshop Technology, Vol.I & Vol.II 2010, Media promoters and publishers private limited, Mumbai. |
| | 3. Bawa H.S., Workshop Practice, Tata McGraw, 2007. | 7. Rao P.N., Manufacturing Technology, Vol. I & Vol. II, Tata McGrawHill, 2017. |
| | 4. Rajendra Prasad A. & Sarma P.M.M.S., Workshop Practice, Sree Sai Publication, 2002. | 8. Gopal T.V, Kumar. T, Murali. G, A first course on workshop practice – Theory, Practice and Work Book, Suma Publications, Chennai, 2005. |

| Learning Assessment | | | | | | | | | |
|---------------------|------------------------------|--|----------|---|----------|--|----------|--|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | | | Summative Final Examination (0% weightage) | |
| | | CLA-1 Average of first cycle experiments (30%) | | CLA-2 Average of second cycle experiments (30%) | | Practical Examination (40% weightage) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | - | 20% | - | 20% | - | 20% | - | - |
| Level 2 | Understand | - | 20% | - | 20% | - | 20% | - | - |
| Level 3 | Apply | - | 30% | - | 30% | - | 30% | - | - |
| Level 4 | Analyze | - | 30% | - | 30% | - | 30% | - | - |
| Level 5 | Evaluate | - | - | - | - | - | - | - | - |
| Level 6 | Create | - | - | - | - | - | - | - | - |
| | Total | 100 % | | 100 % | | 100% | | 0 % | |
| | | | | | | | | | |

| Course Designers | | |
|--------------------------------------|--|-------------------------------|
| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| 1.Dr. R. Kalimuthu, ISRO, Trivandrum | 1. Dr. Ramkumar P, IIT Madras, ramkumar@iitm.ac.in | 1. Mr. A. Thirugnanam, SRMIST |
| 2.Dr. A. Velayutham, DRDO, Chennai | 2. Dr. Sourav Rakshit, IIT Madras, srakshit@iitm.ac.in | 2. Dr. S. Prabhu, SRMIST |

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|--------------------|-----------|--------------------|----------------------------------|------------------------|---|-------------------|---|---|---|---|
| Course Code | 21ECC101J | Course Name | ELECTRONIC SYSTEM AND PCB DESIGN | Course Category | C | PROFESSIONAL CORE | L | T | P | C |
| | | | | | | | 2 | 0 | 2 | 3 |

| | | | | | |
|-----------------------------------|---|-------------------------------|-----|----------------------------|-----|
| Pre-requisite Courses | Nil | Co-requisite Courses | Nil | Progressive Courses | Nil |
| Course Offering Department | Electronics and Communication Engineering | Data Book / Codes / Standards | Nil | | |

| Course Learning Rationale (CLR): | | Program Outcomes (PO) | | | | | | | | | | | |
|----------------------------------|--|--|------------------|---------------------------------|--|-------------------|--------------------------|------------------------------|--------|------------------------|---------------|------------------------|--------------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| CLR-1 : | Explore the basics of semiconductors and semiconductor devices | Engineering Knowledge | Problem Analysis | Design/development of solutions | Conduct investigations of complex problems | Modern Tool Usage | The engineer and society | Environment & Sustainability | Ethics | Individual & Team Work | Communication | Project Mgt. & Finance | Life Long Learning |
| CLR-2 : | Study of special semiconductor devices and fabrication techniques | | | | | | | | | | | | |
| CLR-3 : | Identify the applications of devices in circuit and measuring instruments | | | | | | | | | | | | |
| CLR-4 : | Create insights to the concepts of PCB design and rules | | | | | | | | | | | | |
| CLR-5 : | Analyze the design concept of PCB design for different applications | | | | | | | | | | | | |
| Course Outcomes (CO): | | | | | | | | | | | | | |
| | | At the end of this course, learners will be able to: | | | | | | | | | | | |
| CO-1: | Understand the properties of semiconductor materials and devices | 3 | 2 | - | - | - | - | - | - | - | - | - | - |
| CO-2: | Analyze working principle and characteristics of special semiconductor devices | 3 | 2 | - | - | 3 | - | - | - | - | - | - | - |
| CO-3: | Design basic electronic circuits and familiar with working principles of instruments | 3 | 3 | 1 | - | 3 | - | - | - | - | - | - | - |
| CO-4: | Apply the concept and rules for PCB design | 3 | 3 | - | - | 3 | - | - | - | - | - | - | - |
| CO-5: | Implement the design rules for various PCB design applications | 3 | - | 3 | - | 3 | - | - | - | - | - | - | - |

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|---|----------------|
| Unit-1 : | 12 Hour |
| Classifications of Semiconductor, Doping in Semiconductors, Conductivity of semiconductors, Energy Distribution and fermi level, Carrier Concentration in intrinsic semiconductor and Mass-Action Law, Problem Solving techniques, Drift and Diffusion Current , Einstein Relationship for semiconductors, Basic PN junction and applications, Bipolar junction transistor and MOSFETs, Challenges for Nano MOSFETs (Scaling Issues), SOI MOSFET and Double gate MOSFET (Working Principle), FinFET and IGFET (Basic Concept) Practice: Study of electron devices and electronic components- Passive electronic components, Study of electronic components- active devices, analog and digital integrated circuits (IC), Study of testing and measuring Instruments: Logic analyzer, spectrum analyzer, IC tester (Analog and Digital), LCR meters | |
| Unit-2 : | 12 Hour |
| Introduction to power electronics, applications and role of power electronics, Introduction to power semiconductor devices, Operating characteristics of Power Diodes, Gunn Diode, Schottky Diode, IMPATT Diode, Introduction to Thyristor, PNP Diode, Silicon Control Rectifier (SCR), Thyristor Rating, Physics of Power BJT and Switching Characteristics , Physics of Power MOSFET and Characteristics , Monolithic Fabrication Process, Fabrication of Monolithic Diode, Fabrication of monolithic capacitors and resistors Practice: Study on diodes using CAD tools, Design and analysis of RL and RC time constants using schematic in CAD tool, Design and analysis of RLC circuits using schematic in CAD tool | |
| Unit-3: | 12 Hour |
| Basic Building block of power supply and its requirements, Rectifiers (Half Wave and Full Wave), Rectifier circuits using SCR, Voltage Regulators (Line regulation and Load regulation) and problem solving , Switched Mode Power Supply (SMPS), Classifications of SMPS, Advantages and comparison, Wave Shaping Circuits, Multivibrators (Astable, Monostable and Bistable), Ammeter, Digital voltmeter, Digital multimeter, Cathode Ray Oscilloscope (CRO) , Spectrum Analyzer, Energy Meter, Power meter and distortion meter (block diagram and working principle) Practice: Schematic and PCB Layout in CAD tool. Regulated power supply design.- Full wave rectifier circuit design with fixed voltage regulator, wave shaping circuits. | |
| Unit-4 : | 12 Hour |
| Concept of PCB Design, Components of a PCB, Classifications and manufacturing of PCB, Layout planning and Design block diagram, Importance of PCB Design, Mechanical Design of PCB, Types of Boards, Mounting Techniques, Stress analysis , Electrical Design Consideration of PCB , Rules for Component Placement in PCB , Rules for Power supply and Ground, Connections layout, Component Assembly in PCB Practice: PCB Layout Design of single digit pulse counter using PCB design tool, PCB Layout Design - of RL, RC and RLC circuits | |
| Unit-5: | 12 Hour |

Environmental Factors on PCB Design, Cooling and Packaging of PCB, Layout Design of PCB and Checklist, Design rules for analog PCB, Design rules for digital PCB, Problems in Digital PCB (reflections, cross-talk, signal noise and interference), PCB Design for high frequency circuits, PCB Design for fast pulse circuits, PCB Design for microwave circuits
Practice: Mini Project – Circuit Schematic, PCB Layout Design, manufacturing, Assembly of components and testing (Open choice on any application circuit).

| | | |
|---------------------------|---|---|
| Learning Resources | 1. Simon Sze, Ming-Kwei Lee, "Semiconductor Devices, Physics and Technology" 3rd edition, John Wiley & Sons, Inc, 2015. 2. S. Salivahanan, N Suresh Kumar, "Electronic Device and Circuits" 3rd edition, McGraw-Hill Education, 2012 | 3. Raghbir Singh Khandpur, Printed Circuit Boards: Design, Fabrication, and Assembly, McGraw Hill Education; 1st edition (1 July 2017) 4. Ned Mohan, T. M. Undeland, W. P. Robbin, "Power Electronics: Converters, Applications, and Design" Wiley; Third edition (1 January 2007) |
|---------------------------|---|---|

| Learning Assessment | | | | | | | |
|---------------------|------------------------------|--|----------|--------------------------|----------|---|----------|
| | Bloom's Level of Thinking | Continuous Learning Assessment (CLA) | | | | Summative Final Examination (40% weightage) | |
| | | Formative CLA-1 Average of unit test (45%) | | CLA-2 –Practice (15%) | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 30% | - | - | 20% | 30% | - |
| Level 2 | Understand | 30% | - | - | 30% | 30% | - |
| Level 3 | Apply | 40% | - | - | 40% | 40% | - |
| Level 4 | Analyze | - | - | - | 10% | - | - |
| Level 5 | Evaluate | - | - | - | - | - | - |
| Level 6 | Create | - | - | - | - | - | - |
| | Total | 100 % | | 100 % | | 100 % | |

| Course Designers | | |
|---|---|-------------------------------------|
| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| 1. Mr. Mohan, Embedded 360, Chennai | 1. Dr. Venkatesan, Sr. Scientist, NIOT, Chennai | 1. Dr. Soumyaranjan Routray, SRMIST |
| 2. Mr. Sai Vineeth, ML Silicon Architect, Google Cloud TPU, USA | 2. Dr. S. A. Akbar, Chief Scientist, CEERI Pilani | 2. Dr. P. Eswaran, SRMIST |