Dr. MAHALINGAM
MCET
COLLEGE OF ENGINEERING AND TECHNOLOGY
Enlightening Technical Minds

An Autonomous Institution Since 2011.
Approved by AICTE / Affiliated to Anna University.
Accredited by NAAC with 'A++' Grade.
Tier-1* - Accredited by NBA.
Part of NIA Educational Institution

Curriculum and Syllabi

B.E. Computer Science and Engineering
(Cyber Security)

Semesters I to VIII

Regulations 2019

(2022 Batch Onwards)

Dr. Mahalingam College of Engineering and Technology

Department of Computer Science and Engineering

Vision

To develop competent professionals specialized in cyber security with global employability, entrepreneurship capability, research focus and social responsibility

Mission

• To develop proficient cyber security engineers by providing state of art academic environment and industry driven curriculum.

• Encourage students to become entrepreneurs and to take higher studies in the field of cyber security.

• To enrich the department through dedicated and technically sound faculty team with research focus in thrust areas cyber security.

• To provide technical solutions for cyber security problems and threats through technical innovations and projects in association with the industry, society and professional bodies.

Programme: B.E. Computer Science and Engineering

Programme Educational Objectives (PEOs) - Regulations 2019

B.E. Computer Science and Engineering (Cyber Security) graduates will:

PEO1. Technical Skills: The graduate will have strong technical and foundation in the field of computer science specialized in cyber security

PEO2. Security Experts: The graduates have the ability to address and provide feasible and viable solutions to security needs of modern computing industry

PEO3. Social awareness and ethics: The graduates will possess good ethical attitude, strong communication skills and greater awareness in social moral responsibilities.

Programme Outcomes (POs) - Regulations 2019

On successful completion of B.E. Computer Science and Engineering (Cyber Security) programme, graduating-students/graduates will be able to:

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 for complex problems.

PO5. Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling 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, commit to professional ethics, 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 multi-disciplinary 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 & 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 in multi-disciplinary 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.

Programme Specific Outcomes (PSOs) - Regulations 2019

On successful completion of B.E. Computer Science and Engineering (Cyber Security) programme, graduating-students/graduates will be able to:

PSO1. Security engineering: Ability to design and develop viable solution and systems to cater real world cyber security problems and issues in the field of computer based industries.

PSO2. Knowledge engineering: Ability to develop new products and services and perform research in the field of cyber security

Programme: B.E Computer Science and Engineering

(Cyber Security)

2019 Regulations
Curriculum for Semesters I to VIII

Course Code	Course Title	Duration	Credits	Marks
19SHMG6101	Induction Program	3 Weeks	-	100

Semester I

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19MABC1102	Linear Algebra and Infinite Series	3	1	0	4	100	CS,IT,AD, AM & SC
19ENHG2101	Communication Skills – I	2	0	2	3	100	All
19PHBC2002	Physics for Information Sciences	3	0	2	4	100	CS,IT,AD, AM & SC
19EESC2101	Introduction to Electrical and Electronics Engineering	3	0	2	4	100	CS,IT,AD, AM & SC
19CSSN2101	Fundamentals of Programming	3	0	2	4	100	CS,AD, AM & SC
19PSHG6001	Wellness for Students	0	0	2	1	100	All
Total		**14**	**1**	**10**	**20**	**600**	

Semester II

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19MABC1202	Calculus and Transforms	3	1	0	4	100	CS,IT,AD, AM & SC
19ENHG2201	Communication Skills – II	2	0	2	3	100	All
19ECSC2201	Digital System Design	2	0	2	3	100	CS,IT,AD, AM & SC
19CSSN2201	Programming with C	3	0	3	4.5	100	CS,AD, AM & SC
19MESC4001	Engineering Drawing	1	0	3	2.5	100	AU,CS,EC, EI,IT,ME, AD,AM &SC
19CSSC4001	IT Practices Lab	1	0	4	3	100	CS, IT, AD, AM & SC
19CHMG6201	Environmental Sciences	1	0	0	-	100	All
19PSHG6003	தமிழர் மரபு / Heritage of Tamils**	1	0	0	1	100	All
Total		**14**	**1**	**14**	**21**	**800**	

****** Applicable only for 2022 Batch

Semester III

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19MABC1303	Discrete Mathematics	3	1	0	4	100	CS, IT, AM & SC
19SCCC2301	Data Structures and Algorithm Analysis	3	0	2	4	100	SC & AM
19SCCC1301	Computer Organization and Architecture	3	0	0	3	100	SC & AM
19SCCN1301	Principles of Communication and Cyber Attacks	3	0	0	3	100	-
19SCCC2302	Database Design	3	0	2	4	100	SC & AM
19SCCC3301	Programming using Java Laboratory	0	0	3	1.5	100	SC & AM
19SCCC3302	Programming using Python Laboratory	0	0	3	1.5	100	SC & AM
19PSHG6002	Universal Human Values 2: Understanding Harmony	2	1	0	3	100	All
XXXXXXXXXX	One Credit Course	0	0	2	1	100	-
19PSHG6004	தமிழரும் தொழில் நுட்பமும் / Tamils and Technology**	1	0	0	1	100	All
Total		**18**	**2**	**12**	**26**	**1000**	

Semester IV

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19MABG1401	Probability and Statistics	3	1	0	4	100	All
19SCCC2401	Basics of Operating Systems	3	0	2	4	100	SC & AM
19SCCN1401	Computer Networks and Attacks	3	0	0	3	100	-
19SCCN1402	Cryptography and Security	3	0	0	3	100	-
19SCCN3401	Computer Network & Cyber Laboratory	0	0	4	2	100	-
19SCCN3402	Cryptography and Security Laboratory	0	0	4	2	100	-
19SCPN6401	Mini – Project	0	0	4	2	100	-
XXXXXXXXXX	One Credit Course	0	0	2	1	100	-
Total		**12**	**1**	**16**	**21**	**800**	

Course Code	Course Title	Duration	Credits	Marks
XXXXXXXXXX	Internship or Skill Development*	2 Weeks	1	100

*Refer to clause: 4.8 in UG academic regulations 2019

****** Applicable only for 2022 Batch

Semester V

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19SCCN1501	Applied Cryptography	3	0	0	3	100	-
19SCCN2501	System Security	3	0	2	4	100	-
19SCCN1502	Secure Coding	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective - I	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective - II	3	0	0	3	100	-
XXXXXXXXXX	Open Elective - I	3	0	0	3	100	-
19SCCN3501	Applied Cryptography Laboratory	0	0	3	1.5	100	-
19SCCN3502	System Security Laboratory	0	0	3	1.5	100	-
19PSHG6501	Employability Skills 1: Teamness and Interpersonal Skills	0	0	2	1	100	All
Total		**18**	**0**	**10**	**23**	**900**	

Semester VI

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19SCCN1601	Cyber Forensics	3	0	0	3	100	-
19SCCN1602	Network Security	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective – III	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective – IV	3	0	0	3	100	-
XXXXXXXXXX	Open Elective - II	3	0	0	3	100	-
19SCCN3601	Advanced Protocol Engineering and Security Laboratory	0	0	4	2	100	-
19CSPN6601	Innovative and creative project	0	0	4	2	100	-
19PSHG6601	Employability Skills 2: Campus to Corporate	0	0	2	1	100	All
Total		**15**	**0**	**10**	**20**	**800**	

Course Code	Course Title	Duration	Credits	Marks
XXXXXXXXXX	Internship or Skill Development*	2 or 4 Weeks	1	100

*Refer to clause: 4.8 in UG academic regulations 2019

Semester VII

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19SCCN1701	Web Application Security	3	0	0	3	100	-
19SCCN1702	Cloud Computing and Security	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective – V	3	0	0	3	100	-
XXXXXXXXXX	Professional Elective – VI	3	0	0	3	100	-
XXXXXXXXXX	Open Elective - III	3	0	0	3	100	-
19SCCN3701	Web Application Security Laboratory	0	0	3	1.5	100	-
19SCCN3702	Cloud Computing and Security Laboratory	0	0	3	1.5	100	-
Total		**15**	**0**	**6**	**18**	**700**	

Semester VIII

Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19CSPN6801	Project	0	0	16	8	200	-
Total		**0**	**0**	**16**	**8**	**200**	

Course Code	Course Title	Duration	Credits	Marks
XXXXXXXXXX	Internship or Skill Development*	8 or 16 weeks	4	100

*Refer to clause: 4.8 in UG academic regulations 2019

Total Credits (2022 Batch): 164

Vertical wise Electives

Vertical I Full stack Development Electives							
Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19SCEN1001	Web Technologies	3	0	0	3	100	-
19SCEN1002	App Development	3	0	0	3	100	-
19SCEN1003	Cloud Services Management	3	0	0	3	100	-
19SCEN1004	UI and UX Design	3	0	0	3	100	-
19SCEN1005	Software Testing and Automation	3	0	0	3	100	-
19SCEN1006	Principles of Programming languages	3	0	0	3	100	-
19SCEN1007	Devops	3	0	0	3	100	-
19SCEN1008	Web Application Security	3	0	0	3	100	-

Vertical II Machine Learning							
Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19SCEN1009	Digital Image Processing	3	0	0	3	100	-
19SCEN1010	Machine Learning in Cyber Security	3	0	0	3	100	-
19SCEN1011	Deep Learning and AI	3	0	0	3	100	-
19SCEN1012	Optimization Techniques	3	0	0	3	100	-
19SCEN1013	Artificial Intelligence and Neural Networks	3	0	0	3	100	-
19SCEN1014	Augmented Reality and AI	3	0	0	3	100	-
19SCEN1015	Expert Systems	3	0	0	3	100	-
19SCEN1016	Cognitive Analysis	3	0	0	3	100	-

Vertical III Cloud Computing and Data Center Technologies							
Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19SCEN1017	Cloud Computing	3	0	0	3	100	-
19SCEN1018	Virtualization	3	0	0	3	100	-
19SCEN1019	Cloud Services Management	3	0	0	3	100	-
19SCEN1020	Data Warehousing	3	0	0	3	100	-
19SCEN1021	Storage Technologies	3	0	0	3	100	-
19SCEN1022	Software Defined Networks	3	0	0	3	100	-
19SCEN1023	Security and Privacy in Cloud	3	0	0	3	100	-
19SCEN1024	Stream Processing	3	0	0	3	100	-

Vertical IV Cyber Security and Data Privacy							
Course Code	Course Title	Hours/Week			Credits	Marks	Common to Programmes
		L	T	P			
19SCEN1025	Ethical Hacking	3	0	0	3	100	-
19SCEN1026	Malware Analysis	3	0	0	3	100	-
19SCEN1027	Social Network Security	3	0	0	3	100	-
19SCEN1028	Wireless Sensor Network Security	3	0	0	3	100	-
19SCEN1029	Digital and Mobile Forensics	3	0	0	3	100	-
19SCEN1030	Crypto currency and Block chain Technologies	3	0	0	3	100	-
19SCEN1031	Security and Privacy in Cloud	3	0	0	3	100	-
19SCEN1032	Vulnerability Assessment and Penetration Testing	3	0	0	3	100	-

Vertical V Emerging Technologies							
Course Code	**Course Title**	**Hours/Week**			**Credits**	**Marks**	**Common to Programmes**
		L	**T**	**P**			
19SCEN1033	Augmented Reality / Virtual Reality	3	0	0	3	100	-
19SCEN1034	Robotic Process Automation	3	0	0	3	100	-
19SCEN1035	Neural Networks and Deep Learning	3	0	0	3	100	-
19SCEN1036	Quantum Computing	3	0	0	3	100	-
19SCEN1037	Real Time Cyber Security	3	0	0	3	100	-
19SCEN1038	Game Development	3	0	0	3	100	-
19SCEN1039	3D printing and Design	3	0	0	3	100	-
19SCEN1040	Internet of Things and Automation	3	0	0	3	100	-

Open Electives

(Offered to other Programmes)

Course Code	**Course Title**	**Hours/Week**			**Credits**	**Marks**
		L	**T**	**P**		
19SCOC1001	Cyber Laws	3	0	0	3	100
19SCOC1002	Edge Analysis	3	0	0	3	100
19SCOC1003	5G Technologies	3	0	0	3	100
19SCOC1004	Digital Watermarking and Steganography	3	0	0	3	100
19SCOC1005	Criminal psychology and Behavior Intelligence	3	0	0	3	100
19SCOC1006	Biometric and Security	3	0	0	3	100
19SCOC1007	Security audit and Risk Assessment	3	0	0	3	100
19SCOC1008	IOT Forensics	3	0	0	3	100

Regulations 2019
(2022 Batch onwards)

Detailed Syllabi for Semesters I to VIII

Course Code: 19SHMG6101	Course Title: INDUCTION PROGRAM (common to all B.E/B.Tech programmes)
Course Category: Mandatory Non-Credit Course	Course Level : Introductory
Duration : 3 Weeks	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Explain various sources available to meet the needs of self, such as personal items and learning resources.
2. Explain various career opportunities, opportunity for growth of self and avenues available in the campus.
3. Explain the opportunity available for professional development.
4. Build universal human values and bonding amongst all the inmates of the campus and society

Unit I Intellectual Property: An Introduction 9 Hours

Intellectual Property Law: Patent Law-Copyright Law-Trademark Law- Trade secret Law-Right of Publicity-Paralegal tasks in Intellectual Property Law-Ethical obligations of the paralegal in Intellectual Property Law-Trade secrets: Protectible as a trade secret-Maintaining trade secrets-Protecting an Idea

Unit II Patents: Rights and Limitations 9 Hours

Sources of patent law-Subject matter of Patents: Utility Patents-Plant Patents-Design Patents-Design Patents and copyright-Design Patents and trademarks-Computer Software, Business methods and Patent Protection-Rights under Patent Law-Patent Requirements-Limitations on Patent Rights-Patent Ownership

Unit III Patents: Research, Applications, Disputes, and International Considerations 9 Hours

Patent Search Process-Patent Application Process-Patent Infringement-Patent Litigation, International Patent laws

Unit IV Principles of Trademark **9 Hours**

Trademarks and Unfair Competition-Acquiring Trademark Rights-Types of Marks, Strong Marks Versus Weak Marks-Selecting and Evaluating a Trademark-International Trademark Laws

Unit V Principles of Copyrights **9 Hours**

Sources of Copyright Law- The Eight Categories of Works of Authorship-Derivative Works and Compilations- Rights and Limitations :Grant of Exclusive Rights-Copyrights Ownership-International Copyright Laws

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Describe the basics of Intellectual Property Law	Apply
CO2: Identify the Rights and Limitations of various patents	Apply
CO3: Apply the process of patent search and application filling process	Apply
CO4: Explain the concept of trademark and its types	Apply
CO5: Classify the concepts of copyrights and its limitations	Apply

Text Book(s):

T1. Richard Stim, “Intellectual Property: Copyrights, Trademark and Patents”, Cengage learning, 2nd edition 2012.

Reference Book(s):

R1. Deborah E. Bouchoux, “Intellectual Property: The Law of Trademarks, Copyrights, Patents and Trade Secrets”, Cengage Learning, Third Edition, 2013.

R2. Prabuddha Ganguli,”Intellectual Property Rights: Unleashing the Knowledge Economy”, McGraw Hill Education, 2017.

Web References:

https://ipindia.gov.in/writereaddata/Portal/ev/sections-index.html

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						2						2
CO2	2			2								
CO3		3	3								2	
CO4								2	2			
CO5					2		2					2

High-3; Medium-2; Low-1

Semester I

Course Code: 19MABC1102	Course Title: LINEAR ALGEBRA AND INFINITE SERIES (COMMON TO CS, IT, AD, AM & SC)		
Course Category: Basic Science		Course Level : Introductory	
L: T: P(Hours/Week) 3: 1: 0	Credits:4	Total Contact Hours:60	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Determine the solution of system of equations using echelon forms.
2. Apply the properties of vector spaces.
3. Use the Gram-Schmidt process to orthogonalize set of vectors.
4. Determine the canonical form of a quadratic form using orthogonal transformation.
5. Use different testing methods to check the convergence of infinite series.

Unit I Matrices 9+3 Hours

System of linear equations – Homogeneous and Non homogeneous forms – row echelon form- row reduced echelon form – rank of a matrix – Crout"s method – Applications to linear systems.

Unit II Basis and Dimension of Vector Spaces 9+3 Hours

Vector spaces – Linear dependence of vectors – Basis, dimension, row space, column space, null space, rank nullity theorem – Linear transformations – matrix associated with a linear map, range and kernel of linear map – Inverse of linear transformation.

Unit III Orthogonality and Inner Product Space 9+3 Hours

Inner product space of vectors – Inner product spaces – length of a vector, distance between two vectors, orthogonally of vectors – orthogonal projection of a vector – Gram-Schmidt process – orthonormal basis.

Unit IV Eigen Values and Eigen Vectors 9+3 Hours

Eigen values and vectors – symmetric, skew symmetric and orthogonal matrices –

Diagonalization of symmetric matrices through orthogonal transformation – reduction of quadratic forms to canonical form-rank ,index, signature nature of quadratic forms – Singular Value decomposition.

Unit V Sequences and Series 9+3 Hours

Sequences – definitions and examples – Series – Tests for convergence – comparison test, integral test, Cauchy‟s root test, Alembert‟s ratio test – Alternating series – Leibnitz‟s test.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Solve system of equations using echelon forms	Apply
CO2: Apply the properties of vector spaces	Apply
CO3: Determine orthogonal set of vectors using Gram Schmidt orthogonalprocess	Apply
CO4: Determine the canonical form of a quadratic form using orthogonaltransformation	Apply
CO5: Use different testing methods to check the convergence of infinite series	Apply

Text Book(s):

T1. Erwin Kreyszig, “Advanced Engineering Mathematics”, John Wiley & sons, 2010, 10th Edition

T2. David C Lay, “Linear Algebra and its Applications”, Pearson India, 2011, 3rd Edition.

T3. Howard Anton, Chris Rorres, “Elementary Linear Algebra Applications version”, 9th Edition.

Reference Book(s):

R1. T.Veerarajan, “Engineering Mathematics for first year”, Tata McGraw-Hill, New Delhi,2008.

R2. V. Krsihnamurthy, V. P. Mainra and J. L. Arora, “An Introduction to Linear Algebra”, Affiliated East-West press, Re-print 2005

Web References:

1. https://nptel.ac.in/downloads/111102011/

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19ENHG2101	Course Title: COMMUNICATION SKILLS – I (Common to all B.E/B.Tech Programmes)		
Course Category: Humanities		Course Level : Introductory	
L: T: P(Hours/Week) 2: 0: 2	Credits:3	Total Contact Hours:60	Max. Marks:100

Pre-requisites

- The student should have undergone English as his/her first or second language in school.

Course Objectives

The course is intended to:

1. Listen and understand monologues and dialogues of a native speaker on par with B1 of CEFR level.
2. Speak in simple sentences to convey their opinions and ideas on par with B1 of CEFR level
3. Read and infer a given text on par with B1 of CEFR level
4. Draft basic formal written communication on par with B1 of CEFR level

Unit I Listening 15 Hours

Importance of active listening – Physical condition needed for active listening – Identifying relevant points while taking notes – Framing questions at different linguistic contexts – Listening for specific details of concrete monologues and dialogues – Listening to organize ideas – Developing ideas – Listening to compose paragraphs – Paraphrasing the aural input

Unit II Speaking 15 Hours

map – Collecting points from various sources – Identifying relevant ideas needed for the speech – Using mind-map to organize thought processing – Prioritizing the ideas – Types of sentences – Frequently used words (Institution, home and leisure) – Mother Tongue Influence

– Expressing the thoughts in simple sentences – Tenses & Voices (Active & Passive) – Postures, gestures and eye contact – Intonation and Sentence stress – Express one's thoughts coherently.

Unit III Reading 15 Hours

Reading strategies – Skimming -Scanning - Interpretation of visual data – Factual texts on subjects of relevance – Inferring texts – Reading to write a review – Checking the accuracy of

reading while presenting the interpreted data – Reading to comprehend.

Unit IV Writing **15 Hours**

WritingSimple and short sentences – Writing E-mail, Memo, Note and Message – Letter Writing – Importance of punctuations – Identifying the main points – Organising the main ideas – Writing a draft.

List of Tasks

1. BEC Preliminary Listening Test – I & Speaking Test – 1
2. BEC Preliminary Listening Test – 2 & Speaking Test – 2
3. BEC Preliminary Listening Test – 3 & Speaking Test – 3
4. BEC Preliminary Listening Test – 4 & Speaking Test – 4
5. BEC Preliminary Listening Test – 5 & Speaking Test – 5
6. BEC Preliminary Listening Test – 6 & Speaking Test – 6

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Listen actively and paraphrase simple messages and specific details of concrete monologues and dialogues.	Apply
CO2: Express one's views coherently in a simple manner.	Apply
CO3: Read and comprehend factual texts on subjects of relevance.	Apply
CO4: Write texts bearing direct meanings for different contexts maintaining an appropriate style.	Apply

Text Book(s):

T1. Whitby Norman, “Business Benchmark Pre-intermediate to Intermediate Students‟ Book”, CUP Publications, 2nd Edition, 2014.

T2. Wood Ian, Williams Anne, Cowper Anna, “Pass Cambridge BEC Preliminary”, 2nd Edition, Cengage Learning, 2015.

T3. Learners Book prepared by the Faculty members of Department of English.

Reference Book(s):

R1. BEC-Preliminary - Cambridge Handbook for Language Teachers, 2nd Edition, CUP 2000.

R2. Hewings Martin - Advanced Grammar in use - Upper-intermediate Proficiency, CUP, 3rd Edition, 2013.

Web References:

http://www.grammarinenglish.com -Jan 23, 2018

https://www.northshore.edu/support_centre /pdf/listen-notes.pdf

http://www.examenglish.com/BEC/BEC_Vantage.html- Jan 23, 2018

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19PHBC2002	Course Title: PHYSICS FOR INFORMATION SCIENCES (common to CS, IT, AD, AM & SC)		
Course Category: Basic Science		Course Level : Introductory	
L: T: P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Explain the fundamental concepts of light.

2. Illustrate the characteristics, principles and applications of laser.

3 Explain the mode of propagation and losses in optical fibers.

4. Identify a suitable technique for fabricating integrated circuits.

5. Use the concept of luminescence in various electronic display devices..

Unit I Wave Optics 9 Hours

Nature of Light – Laws of reflection and refraction – Total internal reflection – Reflectivity and Transmissivity – The electromagnetic spectrum – properties of electromagnetic radiation – Interference of light waves- Young's double slit experiment – Newton's rings : determination of radius of bright and dark rings – Diffraction of light waves – Fresnel and Fraunhofer diffraction at single slit and circular aperture – Diffraction grating and resolving power.

Unit II Laser 9 Hours

Characteristics of laser light- Einstein's theory of matter radiation interaction A& B Coefficients- Stimulated and spontaneous emissions of radiations – Population inversion and pumping methods – Types of laser: Neodymium Yttrium Aluminum (Nd: YAG) laser and Carbon di oxide (CO_2) molecular gas laser – Semiconductor laser (Homo junction and hetro junction) – Applications: Holograms and Holographic data storage (record/read).

Unit III Fiber Optics 9 Hours

Optical fibers – Principle of light propagation through optical fibers – Expressions for numerical aperture and acceptance angle – Types of optical fibers based on material, refractive index, and mode of propagation – Fabrication of optical fiber: Double crucible method – Dispersion and attenuation in optical fiber – Photo detectors: PN, PIN & Avalanche photo diodes – Fiber

optic communication system and its advantages

Unit IV Integrated Circuits **9 Hours**

Introduction to semiconductors: Intrinsic and extrinsic semiconductors – Advantages of Integrated circuits (ICs) over discrete components – IC classification – Construction of bipolar transistor – Epitaxial growth & Oxidation – Photolithography- Isolation diffusion – Base diffusion- Emitter diffusion – Contact mask – Aluminium metallization – Passivation – Structures of integrated PNP transistor.

Unit V Display Devices **9 Hours**

Human vision – Red, Blue, and Green (RGB) color scheme – Primary and secondary colors – Color addition and subtraction – Optical Emissions: Luminescence, photoluminescence, cathodoluminescence – electroluminescence – Injection electro Luminescence – Displays (Working principles): Plasma display, LED display, Liquid crystal display (LCD) and Numeric display.

List of Experiments **30 Hours**

1. Determination of Laser parameters – Wave length and particle size.
2. Determination of Acceptance angle and Numerical aperture of an optical fiber.
3. Determination of band gap of semi conducting material – Thermistor.
4. Light Illumination characteristics of Light Dependent Resistor.
5. Thickness of thin material – Air wedge.
6. Determination of wavelength of the given light source using spectrometer.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Explain the fundamentals of light and properties of electromagnetic spectrum	Understand
CO2: Explain the application of Laser through their properties	Understand
CO3: Differentiate various types of optical fiber and its usefulness towards industrial applications	Understand
CO4: Explain the suitable methodology for fabricating integrated circuits	Understand
CO5: Describe the concept of colors and luminescence in various display devices	Understand

Text Book(s):

T1. M. N. Avadhanulu and P. G. Kshirsagar, “Text Book of Engineering Physics”, S. Chand & Company Ltd., New Delhi, 2018.
T2. David Armitage, “Introduction to Micro displays”, John Wiley & Ltd, 2006.

T3. D. Roy Choudhry, Shail Jain, “Linear Integrated Circuits”, 3rd Edition, New Age International Pvt. Ltd, 2010.

Reference Book(s):

R1. D. Halliday., R. Resnick and J. Walker, “Fundamentals of Physics”, Wiley Publications, 10th Edition, 2014

R2. Ajoy Ghatak,“Optics”,Tata McGraw-Hill Education, New Delhi, 5th Edition, 2012.

R3. A. Marikani,“Engineering Physics”, 2nd Edition, PHI Learning, New Delhi, 2014.

R4. Dr. Jayaraman, V.Umadevi, S.Maruthamuthu and B. Saravanakumar, “Engineering Physics Laboratory Manual”, Pearson Publishers, New Delhi, 2014

Web References:

1. https://onlinecourses.nptel.ac.in/noc17_cy07/preview
2. https://onlinecourses.nptel.ac.in/noc17_ph01/preview
3. http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19EESC2101	Course Title: INTRODUCTION TO ELECTRICAL AND ELECTRONICS ENGINEERING (common to CS, IT, AD, AM & SC)		
Course Category: Engineering Science		Course Level : Introductory	
L: T: P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Explain basics of DC circuits
2. Explain the fundamentals of AC circuits
3. Describe the basic electrical machines
4. Summarize the semiconductor devices
5. Outline the display devices and transducers
6. Utilize carpentry and piping methods

Unit I Fundamentals of DC Circuits 9 Hours

Definition, symbol and unit of quantities – Active and Passive elements – Ohm‟s Law: statement, illustration and limitation – Kirchhoff‟s Laws: statement and illustration – Resistance in series and voltage division rule – Resistance in parallel and current division rule – Method of solving a circuit by Kirchhoff‟s laws – Star to Delta and Delta to Star transformation.

Unit II AC Fundamentals 9 Hours

Magnetic Circuits: Definition of magnetic quantities – Law of electromagnetic induction – Generation of single phase alternating EMF – Terminology – 3 Phase System: 3-Wire and 4 Wire system – Root Mean Square (RMS) – Average value of AC – Phasor representation of alternating quantities – Pure Resistive, Inductive and Capacitive circuits

Unit III Electrical Machines3 9 Hours

DC Generator and DC Motor: Construction, Working Principle, Characteristics of shunt and series motor – Single phase transformer: Construction, working principle - Three phase and

Capacitor start and run single phase induction motor: Construction and Working Principle.

Unit IV Semiconductor Devices **9 Hours**

Theory of Semiconductor: PN junction diode, Forward Bias Conduction, Reverse Bias Conduction, V-I Characteristics – Bipolar Junction Transistor: Operation of NPN and PNP Transistor, Common Emitter Configuration – Field Effect Transistor & MOSFET: construction and working principle

Unit V Display Devices and Transducers **9 Hours**

Opto-Electronic Devices: Working principle of Photoconductive Cell, Photovoltaic Cell-solar cell Display Devices: Light Emitting Diode (LED) – Liquid Crystal Display (LCD) – Transducers: Capacitive and Inductive Transducer, Thermistors, Piezoelectric and Photoelectric Transducer.

List of Experiments **30 Hours**

[A]Electrical & Electronics :

1.Identification of resistor and capacitor values

2.Soldering practice of simple circuit and checking the continuity

3.Fluorescent tube, staircase, house wiring and need for earthing

[B]Civil & Mechanical:

1.Make a wooden Tee joint to the required dimension

2.Make a tray in sheet metal to the required dimension

3. Assemble the pipeline connections with different joining components for the given layout.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1:Explain basic laws and simplification techniques in electrical engineering using DC Circuits	Understand
CO2:Explain the fundamentals and basic principles of AC Circuits	Understand
CO3:Describe the principles of basic electrical machines	Understand
CO4:Summarize the working of semiconductor devices	Understand
CO5:Outline the features of display devices and transducers	Understand
CO6: Utilize Carpentry and Piping methods	Apply

Text Book(s):

T1.R.Muthusubramanian and S.Salivahanan, “Basic Electrical and Electronics Engineering”,

McGraw Hill India Limited, New Delhi, 2014.

Reference Book(s):

R1.B.L Theraja, “Fundamental of Electrical Engineering and Electronics”, S.Chand Limited – 2006

R2.J.B.Gupta, “Basic Electrical and Electronics Engineering”, S.K.Kataria & Sons, 2009.

R3. Smarajit Ghosh, “Fundamental of Electrical and Electronics Engineering”, 2nd Edition, PHI Learning Private Limited New Delhi, 2010.

R4. S. K. Sadhev, “Basic Electrical Engineering and Electronics ”, Tata Mcgraw Hill, 2017.

Web References:

1. https://www.nptel.ac.in/courses/108108076/

2.https://www.oreilly.com/library/view/basic-electrical-and/9789332579170/

3.http://www.ait.ac.jp/en/faculty/lab-enginnering/latter/elec-material/

4.http://www.electrical4u.com

5. http://www.allaboutcircuits.com

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	-	-	-	-	-	2	3	2	-	-	-	-
CO2	2	1	-	-	-	-	-	2	3	2	-	-	-	-
CO3	2	1	-	-	-	-	-	2	3	2	-	-	-	-
CO4	2	1	-	-	-	-	-	1	-	1	-	-	-	-
CO5	2	2	-	-	-	-	-	1	-	1	-	-	-	-
CO6	3	2	1	1	-	-	-	2	3	2	-	-	-	-

High-3; Medium-2; Low-1

Course Code: 19CSSN2101	Course Title: FUNDAMENTALS OF PROGRAMMING (Common to CS,AD,AM &SC)		
Course Category: Engineering Science		Course Level : Introductory	
L: T: P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Develop solutions using problem solving techniques.

2. Design pseudo code using suitable selection and repetition structures

3. Choose appropriate data types, variables and I/O statements

4. Develop programs using selection and iteration statements

5. Construct programs using arrays

Unit I Introduction to Programming 9 Hours

General Problem Solving Strategy - Program Development Cycle - Basic Programming Concepts: A Simple Program, Data Input, Program Variables and Constants - Data Types - Data Processing and Output - Problem solving techniques: Algorithm, flowchart, pseudocode.- Case study: RAPTORS

Unit II Program Development and Control Structures 9 Hours

Program Development: Program Design, Coding, Documenting and Testing a Program - Control Structures: Sequential Structure - Decision structure: single-alternative, dual-alternative, multiple-alternative structure - Loop structure: repeat-until, while, do-while, for.

Unit III Data Types and Operators In C 9 Hours

Overview of C – Structure of C program – Executing a C program – C Character set – keywords- Identifier - Variables and Constants - Data types - Type conversion - Operators and Expressions - Managing formatted and unformatted Input & Output operation.

Unit IV Control Structures 9 Hours

Statements: Selection statements: if, if-else, nested if-else, if-else-if ladder, switch – Jump statements: break, continue, goto, return - Iteration statements: for, nested for, while, do-while-

exit – Storage classes.

Unit V Arrays **9 Hours**

Declaration – Initialization – Characteristics of Array – One-dimensional array – Two-dimensional array – Array Operations – Applications: Linear search, Binary search, Selection sort, Bubble sort, Matrix Operations.

List of Exercises **30 Hours**

1. Solve simple problems using RAPTOR

2. Generate flowchart using control structures using RAPTOR

3. Create C Program to process data types, operators and expression evaluation

4. Develop C Program using formatted and unformatted I/O operations

5. Develop C Program using formatted and unformatted I/O operations

6. Construct C Program using selection and iteration statements

7. Develop C Program using arrays and array applications such as searching, sorting and matrix operations

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1.Develop solutions using problem solving techniques	Apply
CO2. Write pseudo code using suitable selection and repetition structures for a real time application	Apply
CO3. Choose appropriate data types, variables and I/O statements for solving problems	Apply
CO4: Develop programs using selection and iteration statements for a given scenario	Apply
CO5: Construct programs using arrays for various real time applications	Apply

Text Book(s):

T1.Venit S, and Drake E, “Prelude to Programming Concepts and Design”, 6th Edition, Pearson Education, 2015.
T2.Ajay Mittal, “Programming in C – A Practical Approach”, Pearson Education, 2010

Reference Book(s):

R1.R.G.Dromey, “How to Solve it by Computer”, 2nd Edition, Pearson Education, India, 2008
R2.Yashavant. P. Kanetkar “Let Us C”, 16th Edition, BPB Publications, 2018

R3. PradipDey, ManasGhosh, “Computer Fundamentals and Programming in C”, 2nd Edition, Oxford University Press, 2013

Web References:

http://raptor.martincarlisle.com/

http://www.cprogramming.com/

http://www.c4learn.com/

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	2	2	2	2	1	1	2	3	2	-	2	3	-
CO2	3	2	2	2	2	1	1	2	3	2	-	2	3	-
CO3	3	2	2	2	2	1	1	2	3	2	-	2	3	-
CO4	3	2	2	2	2	1	1	2	3	2	-	2	3	1
CO5	3	2	2	2	2	1	1	2	3	2	-	2	3	1

High-3; Medium-2; Low-1

Course Code: 19PSHG6001	Course Title: WELLNESS FOR STUDENTS		
Course Category: Humanities		Course Level : Introductory	
L: T: P(Hours/Week) 0: 0: 2	Credits:1	Total Contact Hours:30	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Set SMART goals for academic, career and life
2. Apply time management techniques
3. Articulate the importance of wellness for success in life.
4. Understand the dimensions of wellbeing and relevant practices

Unit I Goal Setting

Understanding Vision and mission statements - Writing personal mission statements –„Focus‟ as a way of life of most successful people. Clarifying personal values, interests and orientations – Awareness of opportunities ahead – Personal SWOT analysis - Principles driving goal setting: Principle of response and stimuli, Circle of influence and circle of concern, What you see depends on the role you assume. Potential obstacles to setting and reaching your goals - Five steps to goals setting: SMART goals, Inclusive goals, Positive stretch, Pain vs gain, Gun-point commitment.

Unit II Time Management - Tools and Techniques

Importance of planning and working to time. Pareto 80-20 principle of prioritization – Time quadrants as a way to prioritize weekly tasks – The glass jar principle - Handling time wasters – Assertiveness, the art of saying „NO‟ – Managing procrastination

Unit III Practices for Physical Wellness

Concept of wellness – impact of absence of wellness - Wellness as important component to achieve success. Wellbeing as per WHO - Dimensions of Wellbeing: Physical, Mental, Social, Spiritual – indicators and assessment methods.

Simplified Physical Exercises. Fitness as a subset of Wellness – health related physical fitness - skill related physical fitness. Joint movements, Warm up exercises, simple asanas,

WCSC simplified exercises

Unit IV Practices for Mental Wellness

Meditation: Mind and its functions - mind wave frequency – Simple basic meditation – WCSC meditation and introspection tables. Greatness of friendship and social welfare – individual, family and world peace – blessings and benefits.
Food & sleep for wellness: balanced diet - good food habits for better health (anatomic therapy) – hazards of junk food - food and the gunas

Unit V Putting into Practice

Practicals: Using the weekly journal – Executing and achieving short term goals – Periodic reviews.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1.Set well-articulated goals for academics career, and personal aspirations	Apply
CO2:Apply time management techniques to complete planned tasks on time	Apply
CO3: Explain the concept of wellness and its importance to be successful in career and life	Apply
CO4: Explain the dimensions of wellness and practices that can promote wellness	Apply
CO5: Demonstrate the practices that can promote wellness	Valuing

Text Book(s):

T1. Richard Stim, “Intellectual Property: Copyrights, Trademark and Patents”, Cengage learning, 2nd edition 2012.

Reference Book(s):

R1.Stephen R Covey, “First things first”, Simon & Schuster Uk, Aug 1997.

R2.Sean Covey, “Seven habits of highly effective teenagers”, Simon & Schuster Uk, 2004

R3.Vethathiri Maharishi Institute for Spiritual and Intuitional Education, Aliyar, “Valueeducation for harmonious life (Manavalakalai Yoga)”, Vethathiri Publications, Erode, I Ed. (2010).

R4. Dr. R. Nagarathna, Dr.H.R. Nagendra, “Integrated approach of yoga therapy for positive health”, Swami Vivekananda Yoga Prakashana, Bangalore, 2008 Ed.

R5. Tony Buzan, Harper Collins, The Power of Physical Intelligence (English).

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Semester II			
Course Code: 19MABC1202	**Course Title: CALCULUS AND TRANSFORMS (common to CS, IT, AD, AM & SC)**		
Course Category: Basic Science		**Course Level : Introductory**	
L: T: P(Hours/Week) **3: 1: 0**	**Credits: 4**	**Total Contact Hours: 60**	**Max. Marks:100**

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Determine the curvature and equation of evolutes of a curve
2. Apply partial derivatives to find extreme values of functions of two variables and to vector fields
3. Determine the solution of first and second order ordinary differential equations
4. Compute the Fourier series expansion for given periodic functions
5. Compute Z transform and inverse transform for discrete time sequences

Unit I Differential Calculus 9+3 Hours

Curvature – Cartesian and Polar coordinates – radius of curvature – center of curvature – circle of curvature – Evolutes and Involutes.

Unit II Multivariable Calculus 9+3 Hours

Partial derivatives – total derivatives – Jacobian – maxima and minima and saddle points – method of lagrange multipliers – Gradient – directional derivative – curl and divergence.

Unit III Ordinary Differential Equations of First and Second Order 9+3 Hours

Solution of differential equations of first order and first degree: homogeneous form – linear form and exact differential equations – Second order linear differential equations with constant coefficients – Solution by variation of parameters.

Unit IV Fourier Series 9+3 Hours

Fourier series – Dirichlet's condition – Half range sine and cosine series – Parseval's identity – Harmonic Analysis – Applications.

Unit V Z Transforms 9+3 Hours

Z transform – region of convergence – properties of z transforms – inverse transform – Solution to homogeneous linear constant difference equations – Interpretation of stability in Z domain.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Determine the curvature and equation of evolutes of a curve using differentiation techniques	Apply
CO2: Apply partial derivatives to find extreme values of functions and to vector fields	Apply
CO3: Solve the various types of first, second and higher order ordinary differential equations using various techniques	Apply
CO4: Compute the Fourier series expansion for given periodic functions	Apply
CO5: Compute Z transform and inverse transform for discrete time sequences	Apply

Text Book(s):

T1.Erwin Kreyszig, "Advanced Engineering Mathematics", 10th Edition, John Wiley & sons, 2010.

T2.B.S.Grewal, "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, 2014

Reference Book(s):

R1. Veerarajan, "Engineering Mathematics", 3rd Edition, Tata McGraw-Hill, New Delhi, 2010.

R2. Srimanta Pal &Subodh C. Bhunia. "Engineering Mathematics", Oxford University Press, 2015.

Web References:

1. https://nptel.ac.in/courses/117105134/15
2. https://nptel.ac.in/courses/122101003/44

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19ENHG2201	Course Title: COMMUNICATION SKILLS – II (Common to all B.E/B.Tech Programmes)		
Course Category: Humanities		Course Level : Introductory	
L: T: P(Hours/Week) 2: 0: 2	Credits: 3	Total Contact Hours: 60	Max. Marks:100

Pre-requisites

- Communication Skills – I

Course Objectives

The course is intended to:

1. Listen and understand monologues and dialogues of a native speaker on par with B2 of CEFR level

2. Speak in simple sentences to convey their opinion and ideas on par with B2 of CEFR level

3. Read and infer a given text on par with B2 of CEFR level

4. Draft basic formal written communication on par with B2 of CEFR level

Unit I Listening 15 Hours

Importance and purpose of extensive listening and intensive listening – Body Language – Listening tasks on complex and abstract themes – Correlating Ideas related to listening input – importance of empathetic – listening for main ideas – Paraphrasing – Listening to native speakers English – Compound and Complex sentences – Developing ideas – Listening to compose paragraphs.

Unit II Speaking 15 Hours

Jotting down ideas collected from listening to speak – organising the ideas – Expressing one's view coherently – Understanding grammatical elements (Noun – Pronoun Antecedent) – Expressing ideas assertively – Answering questions during presentations – Understanding the use of discourse markers – word stress and sentence stress – voice modulation and pauses – Highlighting significant points – interpretation of visual data – Using verbal cues – Preparing simple hand – outs.

Unit III Reading 15 Hours

Reading strategies – Skimming &Scanning – Inferring meaning- Barriers to reading – sub vocalisation, Eye fixation, Regression – Speed Reading Techniques - Reading different types of texts and their contexts with speed – Note making – Reading a review – Paraphrasing – Reading to comprehend.

Unit IV Writing **15 Hours**

Reported speech & Concord (Subject – verb Agreement) – Report writing – Different kinds of Report – Structure of the report – Writing Proposal – Plagiarism – References – Appendices – Techniques for Report writing – Registers.

List of Tasks

1.BEC Vantage Listening Test – I & Speaking Test – 1

2.BEC Vantage Listening Test – 2 & Speaking Test – 2

3.BEC Vantage Listening Test – 3 & Speaking Test – 3

4.BEC Vantage Listening Test – 4 & Speaking Test – 4

5.BEC Vantage Listening Test – 5 & Speaking Test – 5

6.BEC Vantage Listening Test – 6 & Speaking Test – 6

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Listen actively and empathetically, and paraphrase discussions and presentations on complex and abstract themes and topics	Apply
CO2: Express one's views coherently, fluently and confidently highlighting the significant points with supporting details	Apply
CO3: Read and comprehend different types of texts and their contexts reasonably at moderate speed	Understand
CO4:Write detailed reports on variety of subjects synthesizing information gathered during listening & reading citing appropriate references	Apply

Text Book(s):

T1. Whitby Norman, “Business Benchmark Upper Intermediate Students’ Book”, 2nd Edition, CUP Publications, 2014.

T2. Learners Book prepared by the Faculty members of Department of English.

T3.B.S.Grewal, “Higher Engineering Mathematics”, 43rd Edition, Khanna Publishers, 2014.

Reference Book(s):

R1. Cambridge BEC Vantage - Practice Tests, Self-study Edition, Cambridge University Press, 2002.

R2. Hewings Martin, “Advanced Grammar in use - Upper-intermediate Proficiency”, 3rd Edition, CUP, 2013.

Web References:

http://www.grammarinenglish.com-Jan 23,2018
https://www.northshore.edu/support_centre/pdf/listen-notes.pdf
http://www.examenglish.com/BEC/BEC_Vantage.html-Jan 23, 2018

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19ECSC2201	Course Title: DIGITAL SYSTEM DESIGN (common to CS, IT, AD, AM & SC)		
Course Category: Engineering Science		Course Level : Introductory	
L: T: P(Hours/Week) 2: 0: 2	Credits: 3	Total Contact Hours: 60	Max. Marks:100

Pre-requisites

- Introduction to Electrical and Electronics Engineering

Course Objectives

The course is intended to:

1. Identify and explain fundamental concepts of digital logic design
2. Explain logic processes and implement logical operations using combinational logic circuits
3. Understand concepts of synchronous sequential circuits and to analyze synchronous sequential systems
4. Understand concepts of asynchronous sequential circuits and to analyze asynchronous sequential systems
5. Understand the basic computer system and the peripherals

Unit I Digital Fundamentals 6 Hours

Number System Representation and Conversion - Logic Gates, Universal Gates - Boolean Algebra and Simplification Techniques: SOP – POS and Karnaugh Map Methods for Boolean Expression Simplification.

Unit II Combinational Circuits 6 Hours

Implementing Combinational Logic - Arithmetic Circuits: Full Adder – Full Subtractor - Magnitude Comparator – Multiplexer – Demultiplexer – Encoder and Decoder.

Unit III Synchronous Sequential Circuits 6 Hours

Flip-Flop: RS - JK – T and D – Types of Triggering – Analysis of synchronous sequential circuit- Shift Register.

UNIT IV Asynchronous Sequential Circuits 6 Hours

Analysis of asynchronous sequential circuit – Hazards – Static, Dynamic and Essential Hazards

Unit V Basic Computer System, Memory and I/O Peripherals 6 Hours

Computer System – Computer Memory - Random Access Memory - Read Only Memory - Expanding Memory Capacity – Input / Output Devices - Secondary Storage.

List of Experiments **30 Hours**

1. Verification of Boolean theorems using digital logic gates
2. Implementation of combinational circuits using basic gates
3. Logic verification of half adder and full adder
4. Logic verification of Multiplexer / Demultiplexer
5. Logic verification of 4 bit shift register
6. Logic verification of 3 bit binary counter

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Explain fundamental concepts in digital logic design	Understand
CO2: Explain the design of combinational logic circuits	Understand
CO3: Elucidate the analysis of synchronous sequential logic circuits	Understand
CO4: Elucidate the analysis of asynchronous sequential logic circuits	Understand
CO5: Categorize a computer system including Input /Output devices and Memory devices	Understand

Text Book(s):

T1. Anil K. Maini, “Digital Electronics Principles, Devices and Applications”, John Wiley & Sons, 2007.

T2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Naraig Manjikian, “Computer Organization and Embedded Systems”, 6th Edition, McGraw-Hill, 2011

Reference Book(s):

R1. Morris Mano, Michael ciletti, “Digital Degin”, 5th Edition, Pearson Publication, New Delhi, 2014.

R2. Charles H.Roth, Jr. “Fundamentals of Logic Design”, 7th Edition, Jaico publishing House, New Delhi, 2014.

R3. Tokheim, “Digital Electronics Principles and Applications”, Tata McGraw Hill, 6th Edition,

R4. Leach P Donald, Albert Paul Malvino and Goutam Saha, “Digital Principles and Applications”, 7th Edition, Mcgraw Hill, 2010.

Web References:

http://www.nptel.ac.in/courses/ 108105132
https://www.surrey.ac.uk/Projects/Labview/boolalegebra/index.html
https://scilab.in/textbook_run/2672/42/5

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19CSSN2201	Course Title: PROGRAMMING WITH C (Common to CS,AD,AM&SC)		
Course Category: Engineering Science		Course Level : Introductory	
L: T: P(Hours/Week) 3: 0: 3	Credits: 4.5	Total Contact Hours: 90	Max. Marks:100

Pre-requisites

- Fundamentals of Programming

Course Objectives

The course is intended to:

1. Write programs using control structures, arrays and functions
2. Construct programs using pointers
3. Choose appropriate string manipulation and graphics functions
4. Construct appropriate structure and union representations
5. Develop programs using preprocessor directives and files

Unit I C Basics and Functions 10 Hours

Program using Control structures and Arrays – Function Declaration & Definition – Return statement – Classification of functions – Parameter passing methods: call by value – call by reference – Passing Array to a Function– Returning Array from a function– Recursion.

Unit II Pointers 10 Hours

Features of Pointer – Pointer Declaration – void Pointer– Null Pointer – Operations on Pointers–Pointers and Arrays – Array of Pointers – Pointer to a Pointer– Pointer to an Array – Pointer to a function – Dynamic memory allocation.

Unit III Strings and Graphics 7 Hours

Strings: Declaration and Initialization of string – Display of strings with different formats – String standard Functions – String conversion functions – Graphics: Initialization of Graphics – Graphics functions – Programs Using Library Functions.

Unit IV Structures and Union 9 Hours

Declaration & Initialization of Structures – Structure within Structure – Array of Structures – Pointer to Structures – Structure and Functions – type def – Declaration & Initialization of Union–Operations on Union – Enumerated data type – Bit Fields.

Unit VPreprocessor Directives and Files **9 Hours**

Preprocessor Directives: Types – Macros – File inclusion – Conditional compilation directives Files: Streams – File access: Sequential access, Random access – File type – File operations (open, close, read, write) – Command line arguments

List of Experiments **45 Hours**

1. Construct programs using control structures and arrays
2. Develop programs using functions and pointers
3. Design programs for string manipulation
4. Construct programs using graphics functions
5. Develop programs using structures and union
6. Create programs using preprocessor directives and files

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Write programs using control structures, arrays and functions for a given scenario	Apply
CO2: Construct programs using pointers for a given problem	Apply
CO3: Choose appropriate string manipulation and graphics functions for a Given application	Apply
CO4: Construct appropriate structure and union representations for handling compound data	Apply
CO5: Develop programs using preprocessor directives and files for a given scenario	Apply

Text Book(s):

T1. Ashok N. Kamthane, Amit.A. Kamthane, “Programming in C”, 3rd Edition, Pearson Education India, 2015.

T2. Ajay Mittal, “Programming in C – A Practical Approach”, Pearson Education, 2010.

Reference Book(s):

R1.Yashavant. P. Kanetkar “Let Us C”,16th edition, BPB Publications, 2018.

R2.PradipDey, ManasGhosh, “Computer Fundamentals and Programming in C”, 2nd Edition, Oxford University Press, 2013.

R3.Byron S Gottfried, “Programming with C”, Schaum’s Outlines, 2nd Edition, Tata McGraw-Hill, 2006.

Web References:

1. https://electronicsforu.com/resources/15-free-c-programming-ebooks

2. https://www.fromdev.com/2013/10/c-programming-tutorials.html 3. https://books.goalkicker.com/CBook/

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19MESC4001	Course Title: ENGINEERING DRAWING (Common to AU, CS, EC, EI, IT, ME, AD, AM & SC)		
Course Category: Engineering Science		Course Level : Introductory	
L: T: P(Hours/Week) 1: 0: 3	Credits: 2.5	Total Contact Hours: 60	Max. Marks:100

Pre-requisites

NIL

Course Objectives

The course is intended to:

1. Develop skills for communication of concepts and ideas

2. Expose them to existing national standards related to technical drawings

Unit I Orthographic Projection 12 Hours

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning. Projection of points, Projection of straight lines located in the first quadrant. Determination of true lengths and true inclinations. Visualization principles – conversion of pictorial into orthographic views.

Unit II Projection of Solids 12 Hours

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by rotating object method.

Unit III Projection of Sectioned Solids 12 Hours

Sectioning of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by cutting planes inclined to one reference plane and perpendicular to the other – Orthographic views of sections of simple solids.

Unit IV Development of Surfaces 12 Hours

Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones.

Unit V Isometric Projection 12 Hours

Principles of isometric projection – Isometric scale – Isometric projections of simple solids and truncated solids.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Sketch the orthographic projections of the given pictorial view of the object using first angle projection	Apply
CO2: Sketch the projections of simple solids such as prism, pyramid, cylinder and cone using rotating object method	Apply
CO3: Sketch the projections of simple sectioned solids with all necessary dimensions meeting the standards	Apply
CO4: Sketch the lateral surface of simple solids using straight line and radial line development methods	Apply
CO5: Sketch the isometric view of simple solids and truncated solids using principles of isometric projection	Apply

Text Book(s):

T1. Cencil Jensen, Jay D.Helsel and Dennis R. Short, " Engineering Drawing and Design", Tata McGraw Hill India, New Delhi, 7th Edition, 2017.

T2. Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, Gujarat, 53rd Edition, 2015.

T3. K. V. Natrajan, "A Text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 48th Edition, 2018.

Reference Book(s):

R1. BasantAgarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill India, New Delhi, 2nd Edition, 2013.

R2. John K.C., "Engineering Graphics", PHI Learning, Delhi, 2009.

R3. Dhananjay A. Jolhe, "Engineering Drawing with an introduction to AutoCAD" TataMcGraw India, New Delhi, 3rd Edition, 2008.

Web References:

1. Engineering Drawing - http://nptel.ac.in/courses/112103019/ 2.

2. https://en.wikipedia.org/wiki/Engineering_drawing

Publications of Bureau of Indian Standards

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing sheets.

2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.

3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.

4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.

5.IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19CSSC4001	Course Title: IT PRACTICES LAB (common to CS, IT, AD, AM & SC)		
Course Category: Engineering Science		Course Level : Introductory	
L: T: P(Hours/Week) 1: 0: 4	Credits: 3	Total Contact Hours: 75	Max. Marks:100

Pre-requisites

- NIL

Course Objectives

The course is intended to:

1. Build a web page with all web page elements
2. Develop a web design for any real time application
3. Design a Mobile application with GUI components
4. Build a real time mobile application

Unit I Introduction 7 Hours

Internet and World Wide Web – Web Browser – Web Server – Web Page – URIs and URLs – Client Side Scripting – Server Side Scripting - Study of Open Source Tools: Open Element, MIT App Inventor, any other Open source Tool

Unit II HTML 8 Hours

Structure of HTML -Special Characters and Horizontal rules – Headers - Lists – Tables – Forms – Links – Images - Internal Linking – frameset element - meta Elements

List of Experiments

1. Web Applications
2. Develop a web page with image, text, links, tables
3. Build a web page with Menus, Image links and Navigations bars
4. Create a web page with containers and Media
5. Construct a web page to display own resume
6. Construct a web page to display the products of a company

Mobile Applications

7. Design an application with GUI widgets

8. Design an application with Layouts and Media

9. Create an application using Event handlers

10. Develop a calculator application to perform all arithmetic operations

11.Construct an application to calculate BMI

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Build a web page with all web page elements	Apply
CO2: Develop a web design for any real time application	Apply
CO3: Design a Mobile application using mobile development framework involving GUI components	Apply
CO4: Build a real time mobile application to handheld devices	Apply
Reference(s):	
R1. Harvey M. Deitel , Paul J. Deitel,"Internet and World Wide Web – How to Program", 4th Edition ,Pearson Education Asia, 2009.	
R2. David Wolber , Hal Abelson , Ellen Spertus, Liz Looney, "App Inventor 2: Create Your Own Android Apps", 2nd Edition,O'Reilly Media, 2014.	

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19CHMG6201	Course Title: ENVIRONMENTAL SCIENCES (Common to all B.E/B.Tech Programmes)	
Course Category: Mandatory Non-Credit Course	Course Level : Introductory	
L: T: P(Hours/Week) 1: 0: 0	Total Contact Hours: 15	Max. Marks:100

Pre-requisites

- NIL

Course Objectives

The course is intended to:

1. Create awareness for conservation and equitable use of natural resources.
2. Explain the measures of prevention of pollution and disaster management.
3. State the importance of environmental legislation in India.
4. Expose the general environmental issues relevant to human health.
5. Explain the innovative measures for day to day environmental issues.

Unit I Natural Resources 2 Hours

Role of individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

Unit II Environmental Pollution and Disaster Management 2 Hours

Role of an individual in prevention of pollution; Disaster management : floods, earthquake, cyclone and landslides.

Unit III Environmental Ethics and Legislations 2 Hours

Environmental ethics : Environment Protection Act; Air Act; Water Act ; Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislation.

Unit IV Environmental Issues and Public Awarness 2 Hours

Public awareness - Environment and human health

Unit V Environmental Activities 7 Hours

(a) Awareness Activities:

i) Small group meetings about water management, promotion of recycle use, generation of less waste, avoiding electricity waste

ii) Slogan making event

iii) Poster making event

(b) Actual Activities:

i) Plantation

ii) Cleanliness drive

iii) Drive for segregation of waste

iv) To know about the different varieties of plants

v) Shutting down the fans and ACs of the campus for an hour or so

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Describe the measures for conservation and equitable use of natural resources	Understand
CO2: Describe the measures for pollution prevention and disaster management	Understand
CO3: Brief the importance of environmental legislation in India	Understand
CO4: Explain the general environmental issues in relevant to human health	Understand
CO5: Demonstrate innovative measures for day to day environmental issues	Understand

Text Book(s):

T1.Benny Joseph, “Environmental Studies‟, Tata McGraw Hill, New Delhi, 2006.

T2.Mackenzie Davis and Susan Masten, “Principles of environmental engineering and science”, Mc-Graw Hill, 3rd Edition, 2014.

Reference Book(s):

R1.Trivedi R.K. “Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards‟, Vol.I and II, Enviro Media.

R2.Cunningham, W.P.Cooper,T.H. Gorhani, “Environmental Encyclopedia‟, Jaico Publishing House, Mumbai, 2001.

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19PSHG6003	Course Title:HERITAGE OF TAMILS (Common to all B.E/B.TechProgrammes)		
Course Category: Humanities		Course Level: Introductory	
L:T:P (Hours/Week) 1: 0 :0	Credit: 1	Total Contact Hours: 15	Max Marks:100

Pre–requisites

- NIL

Course Objectives

[illegible]

CO.1 [illegible]

CO.2 [illegible]

[illegible]

[illegible]

[illegible] **3**

[illegible]

[illegible] **3**

[illegible]

[illegible] **3**

[illegible]

4 **3**

3

TOTAL : 15 PERIODS

Course Outcomes	**Cognitive Level**
CO.1	(Understand)
CO.2	(Understand)

TEXT - CUM REFERENCE BOOKS

1. ..... (.....)
2. .....
3. .....
4. .....
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 C ivilization 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.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	1	-	-

High-3; Medium-2; Low-1

Course Code: 19PSHG6003	Course Title:HERITAGE OF TAMILS (Common to all B.E/B.TechProgrammes)		
Course Category: Humanities		Course Level: Introductory	
L:T:P (Hours/Week) 1: 0 :0	Credit: 1	Total Contact Hours: 15	Max Marks:100

Pre–requisites

- NIL

Course Objectives

The course is intended to:

1. Understand the Heritage of Tamils in terms of Language and Literature, Rock Art Paintings to Modern Art – Sculpture, Folk and Martial Arts, Thinai Concept.
2. Understand the Contribution of Tamils to Indian National Movement and IndianCulture.

HERITAGE OF TAMILS

UNIT I LANGUAGE AND LITERATURE 3

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.

UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART – SCULPTURE 3

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.

UNIT III FOLK AND MARTIAL ARTS **3**

Therukoothu, Karagattam, VilluPattu, KaniyanKoothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS **3**

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.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIANCULTURE **3**

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.

TOTAL : 15 PERIODS

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO.1 Understand the Heritage of Tamils in terms of Language and Literature, Rock Art Paintings to Modern Art – Sculpture, Folk and Martial Arts, Thinai Concept.	Understand
CO.2 Understand the Contribution of Tamils to Indian National Movement and IndianCulture.	Understand

TEXT - CUM REFERENCE BOOKS

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
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 C ivilization 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.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	1	-	-

High-3; Medium-2; Low-1

Course Code: 19MABC1303	Course Title: DISCRETE MATHEMATICS (common to CS, IT, AM &SC)		
Course Category: Basic Science		Course Level : Introductory	
L: T: P(Hours/Week) 3: 1: 0	Credits:4	Total Contact Hours:60	Max. Marks:100

Pre-requisites

- Linear Algebra and Infinite Series

Course Objectives

The course is intended to:

1. Use the concepts of propositional logic to test the validity of arguments

2. Use the concepts of sets, relations and functions in programming
3. Use combinatory in counting problems

4. Use the concepts of groups to study the algebraic structures

5. Use Euclidean algorithm to compute gcd and congruence equations

Unit I Logic **9 +3 Hours**

Propositions – Logical operators – Logical equivalences and implications – Normal forms – Rules of inference – Consistency and inconsistency – Theory of Inference – Proofs – Predicates- Quantifiers – Universe of discourse – Validity of arguments.

Unit II Relations, Lattices and Functions **9 +3 Hours**

Relations – Types of relations – Properties of relations – Equivalence relations – Relational matrix – Graph of relations – Partial ordering relation – Poset – Hasse Diagram – Lattices – Properties of Lattices. Functions – Type of functions: Injective, surjective and bijective functions – Composition of functions – Inverse functions.

Unit III Combinatory **9 +3 Hours**

Mathematical induction – Basics of counting – Pigeon hole principle – Permutations with and without repetition – Circular permutation – Combinations – Recurrence relations – Solution of linear recurrence relations.

Unit IV Algebraic Structures **9 +3 Hours**

Algebraic Systems – properties – Semi groups and monoids – Homomorphism – Sub semi groups and sub monoids – Groups – Abelian group – Cyclic group – Cosets – Lagrange's theorem – Codesand Group codes.

Unit V Divisibility and Congruence **9 +3 Hours**

Algorithm – Prime and Composite Numbers – Fundamental theorem of Arithmetic – Euclidean algorithm – GCD and LCM – Congruence – Linear congruence – Chinese Remainder Theorem

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO6: Apply logic to test the validity of arguments	Apply
CO7: Apply the concepts of sets, relations and functions in discrete structures	Apply
CO8: Solve the counting problems using combinatorics	Apply
CO9:Apply the concepts of groups and its properties to algebraic structures	Apply
CO5: Compute GCD using Euclidean algorithm and solve system of linear	Apply

Text Book(s):

T4. J.P.Tremblay, R. Manohar, "Discrete Mathematical Structures with applications to Computer Science", TMH International Edition, July 2017

T2. T.Veerarajan, "Discrete Mathematical Structures with Graph Theory and Combinatorics", Tata McGraw-Hill Education Private Limited, New Delhi, July 2017.

Reference Book(s):

R1. Kennth H. Rosen, "Discrete Mathematics and Its Applications", 7th Edition, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, July 2017.

R2. Ralph P Grimaldi, Ramana. B. V, " Discrete and Combinatorial Mathematics", 5th Edition,

R3. Tom M.Apostol,"Introduction to Analytic Number Theory", Springer Science+ Business

Course Articulation Matrix

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	1	1	-	1	-	1	1	1	1	2
CO2	3	2	1	1	-	1	-	1	1	1	1	2
CO3	3	2	1	1	-	1	-	1	1	1	1	2
CO4	3	2	1	1	-	1	-	1	1	1	1	2
CO5	3	2	1	1	-	1	-	1	1	1	1	2

High-3; Medium-2; Low-1

Course Code: 19SCCC2301	Course Title: DATA STRUCTURES AND ALGORITHM ANALYSIS (Common to SC & AM)		
Course Category: Professional Core		Course Level : Introductory	
L: T: P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Explain the algorithm to solve problems using design strategies and estimate their complexities.

2. Implement linear data structures.
3. Implement the stack and queue operations.
4. Implement non – linear data structures.
5. Implement solutions using various searching and sorting techniques to solve problems.

Unit I Algorithm Design and Analysis **9 Hours**

Introduction – Classification of Data Structures – Abstract data type – Algorithm properties – Fundamentals of Algorithmic Problem Solving –The Analysis framework – Asymptotic notations and Basic Efficiency classes.

Unit II Linked List **9 Hours**

Introduction to Abstract Data Type (ADT) – Linked list - Doubly-linked lists – circular linked list – Cursor implementation of linked lists - applications of lists.

Unit III Stack and Queue **9 Hours**

Stack – Implementation – Applications: Infix to Postfix conversion, Evaluation of Postfix expression – Queue – Array Implementation of Queues – Circular Queue – Applications

Unit IV Trees and Graphs **9 Hours**

Trees – Terminologies – Binary Trees – Search Tree ADT – AVL Trees - Tree Traversals - Graph: Definitions - Representation of Graph – Shortest Path Algorithms –

Depth First Search – Breadth First Search.

Unit VSearching and Sorting Algorithm **9 Hours**

Searching: Sequential and Binary - Hash Function - Separate Chaining - Open Addressing - Sorting: Bubble Sort – Selection Sort - Merge Sort.

List of Exercises **30 Hours**

1. Implementation of Stack and Queue

2. Implementation of Linked list

3. Applications of Stack

a. Infix to post fix conversion

b. Postfix Evaluation

4. Implementation of Binary Search Trees

5. Implementation of search – Linear, Binary

6. Implementation of sorting technologies – Bubble & Selection

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Explain algorithm to solve problems using design strategies and estimate their complexities	Apply
CO2: Implement linear data structures	Apply
CO3: Implement the stack and queue operations	Apply
CO4: Implement non – linear data structures	Apply
CO5: Implement solutions using various searching and sorting techniques to solve problems.	Apply

Text Book(s):

T1. Mark A. Weiss., “Data Structures and Algorithm Analysis in C”, 2nd Edition, Pearson, June 2003.

T2. Anany Levitin, “Introduction to the Design & Analysis of Algorithms”, 4th Edition, Pearson Education, February 2017

Reference Book(s):

R1. Robert kruse, C.L, Tondo, and Bruce Leung, “Data Structures & Program Design in C”, Pearson, 2014

R2. Michael T. Goodrich, Roberto Tamassia, David M. Mount, “Data Structures and Algorithms,2007
R3. Tom M.Apostol,”Introduction to Analytic Number Theory”, Springer Science+ Business

Web Reference(s):

1. Animation of Various Data Structures URL:http://visualgo.net/

2. NPTEL Course Content URL: http://nptel.ac.in/courses/106102064/ Data Structures and Algorithm

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	1	1	-	-	2	1	2	-	1
CO2	2	1	-	2	2	-	-	2	1	2	-	1
CO3	2	1	-	2	2	-	-	2	1	2	-	1
CO4	1	1	-	1	1	-	-	2	1	2	-	1
CO5	2	1	-	2	2	-	-	2	1	2	-	1

High-3; Medium-2; Low-1

Course Code: 19SCCC1301	Course Title: COMPUTER ORGANIZATION AND ARCHITECTURE (Common to SC & AM)		
Course Category: Professional Core		Course Level : Introductory	
L: T: P(Hours/Week) 3: 0: 0	Credits:3	Total Contact Hours:45	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Describe the basic principles of computer architecture.

2. Explain the input / output accessing and various processing element architectures.
3. Illustrate the concept memory organization
4. Understand various pipeline techniques.

5. Discuss the functional blocks of multiprocessors.

Unit I Basic Structure of a Computer System **9 Hours**

Functional Units - Basic Operational Concepts - Number Representation and Arithmetic - Operations - Character Representation - Performance - Memory Locations and Addresses- Addressing Modes - Instruction Sets - CISC Vs RISC.

Unit II Input / Output and Processing Unit **9 Hours**

Accessing I/O Devices – Interrupts – Bus Structure- Bus Operation - Instruction Execution - Hardware Components - Instruction Fetch and Execution Steps- Control Signals - Hardwired Control- CISC-Style Processors.

Unit III Memory System **9 Hours**

Semiconductor RAM Memories - Read-only Memories - Direct Memory Access - Cache Memories – Mapping function - Performance Considerations - Virtual Memory - Memory Management Requirements - Secondary Storage.

Unit IV Pipelining **9 Hours**

Pipeline Organization - Pipelining Issues - Data Dependencies - Memory Delays - Branch Delays - Resource Limitations - Performance Evaluation- Superscalar Operation- Pipelining in CISC Processors.

Unit VMultiprocessors **9 Hours**

Characteristics of multiprocessors - interconnection structures - inter processor arbitration - inter processor communication and synchronization- cache coherence- shared memory multiprocessors.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Describe the basic principles of computer architecture.	Understand
CO2: Explain the input / output accessing and various processing element.	Understand
CO3: Illustrate the concept memory organization.	Understand
CO4: Understand various pipeline techniques.	Understand
CO5: Discuss the functional blocks of multiprocessors.	Understand

Text Book(s):

T1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, and Naraig Manjikian “Computer Organization and Embedded Systems”, Mcgraw Hill Education, 6th edition, 2011.
T2. M.Morris Mano, “Computer System Architecture”, Pearson Publication, 2007

Reference Book(s):

R1. William Stallings, “Computer Organization and Architecture”, 7th Edition PHI ,2010.

R2.Daniel J,”Synthesis Lecture on Fault Tolerant Computer Architecture “, Pearson Education, 2019
R3.John P.Hayes, “Computer Architecure and Organization”, 3 rd Edition, McGraw-Hill

R4.Jim Ledin, “Modern Computer”, Pearson Education, 2017

Web Reference(s):

1. http://insy.ewi.tudelft.nl/content/image-and-video-compression-learning-tool-vcdemo
2. https://www.w3.org/standards/agents/authoring

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	-	-	-	-	-	-	2	-	1
CO2	2	1	-	-	-	-	-	-	-	-	-	1
CO3	2	1	1	1	-	-	-	-	-	-	-	1
CO4	1	1	-	-	-	-	-	-	-	-	-	1
CO5	1	1	-	-	-	-	-	-	-	-	-	1

High-3; Medium-2; Low-1

Course Code: 19SCCN1302	Course Title: PRINCIPLES OF COMMUNICATION AND CYBER ATTACKS		
Course Category: Professional Core		Course Level : Introductory	
L: T: P(Hours/Week) 3: 0: 0	Credits:3	Total Contact Hours:45	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Describe the fundamentals of computer communication
2. Learn about the networking concept, layered protocols.
3. Discuss various communications concepts
4. Explain Physical and Data link Layers
5. Discuss about the principles of attacks

UNIT - I: Overview of Computer Communications and Networking **9 Hours**

Introduction to Computer Networks - Types of Computer Networks. Network Addressing, Routing, Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT - II: Essential Terms and Concepts **9 Hours**

Essential Terms and Concepts of Computer Applications and Application Protocols - Computer Communications and Networking Models, Communication Service Methods and Data Transmission Modes, Analog and Digital Communications, Speed and Capacity of a Communication Channel, Multiplexing and Switching, Network Architecture and the OSI Reference Model.

UNIT - III: Analog and Digital Communication Concepts **9 Hours**

Analog and Digital Communication Concepts - Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth Reduction, Digital Carrier Systems.

UNIT - IV: Introduction to Physical and Data link Layer **9 Hours**

Physical and Data Link Layer Concepts -The Physical and Electrical Characteristics of Wire, Copper Media, Fiber Optic Media, Wireless Communications, Introduction to Data Link Layer, The Logical Link Control and Medium Access Control Sub-layers.

UNIT - V: Principles of Cyber Attacks **9 Hours**

Introduction to cyber-attacks, application security (design, development and testing), operations security, monitoring, identifying threats and remediating them, – Browser Attacks – Web Attacks targeting users – Obtaining user or website Data – Email attacks

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Describe the fundamentals of computer communication.	Understand
CO2: Learn about the networking concept, layered protocols.	Understand
CO3: Discuss various communications concepts.	Understand
CO4: Explain Physical and Data link Layers.	Understand
CO5: Discuss about the principles of attacks.	Understand

Text Book(s):

T1. Michel A. Gallo and William H. Hancock, “Computer Communications and Networking Technologies” , Thomson Brooks / Cole , 2002

T2. Behrouz A. Forouzan,”Data Communications and Networking”, Fourth Edition MC GRAW HILL

Reference Book(s):

R1. M. Barry Dumas, Morris Schwartz, “Principles of Computer Networks and Communications”, Pearson, 2012.

R2. James F. Kurose, K. W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, 3rd Edition, Pearson Education, 2017.

Web Reference(s):

1. https://study.com/learn/lesson/cybersecurity-overview-principles.html 2. https://www.javatpoint.com/cyber-security-principles

3.https://www.tutorialspoint.com/principles_of_communication/principles_of_communication_introduction.htm

1. https://study.com/learn/lesson/cybersecurity-overview-principles.html 2. https://www.javatpoint.com/cyber-security-principles

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19SCCC2302	Course Title: DATABASE DESIGN (Common to SC & AM)		
Course Category: Professional Core		Course Level : Practice	
L: T: P(Hours/Week) 3: 0: 2	Credits:4	Total Contact Hours:75	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Describe the fundamentals of database and data models
2. Draw the ER model and discuss normalization for given database
3. Construct relational tables and formulate SQL queries
4. Explain the concurrency control and recovery mechanisms.
5. Familiarize the various file organization techniques.

Unit I Introduction of DBMS **9 Hours**

Introduction – Database System – Terminologies – Need for DBMS – Data Models and its types – Functions of DBMS – Components of DBMS – DBMS Architecture – Key issues and Challenges in Database Systems

Unit II ER and Relational Models **10 Hours**

ER Models – ER to Relational Mapping Object Relational Mapping – Relational Model - Constraints – Keys – Dependencies – Relational Algebra - Normalization: 1NF, 2NF, 3NF, 4NF, BCNF – Join Dependencies

Unit III Database Design **10 Hours**

Basic DDL: Introduction to SQL: Data Definition – Data Manipulation – Set Operations - Aggregate functions – Joins - Nested Queries – triggers – cursors - Database Security, Embedded & Dynamic SQL

Unit IV Transaction Management **9 Hours**

Transaction Concepts – ACID Properties – Concurrency Control – Need for Concurrency – Lock based Protocols – Two Phase Locking – Deadlock – Transaction Recovery – Save

Points – Isolation Levels – SQL Facilities for Concurrency and Recovery.

Unit V Implementation techniques **9 Hours**

RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Query optimization using Heuristics and Cost Estimation Distributed Databases

List of Exercises **30 Hours**

1. Create database and write SQL queries to retrieve information

2. Design an employee record in an organization and perform the following operations: Insertion, Deletion, Modify, Alter, Update and View.

3. Implement Joins and Nested Queries to an existing Employee database.

a. IN and NOT IN, Exists and NOT EXISTS, UNIQUE, NOT UNIQUE, ALL, DISTINCT b. Aggregation operators

c. Grouping and Ordering Commands

a. Infix to post fix conversion

b. Postfix Evaluation

4. Implement trigger using PL / SQL block

5. Implement Cursor using PL / SQL block.

6. Implement transaction management- commit, rollback, save point

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Describe the fundamentals of database and data models.	Understand
CO2: Draw the ER model and discuss normalization for given database	Apply
CO3: Construct relational tables and formulate SQL queries	Analyze
CO4: Explain the concurrency control and recovery mechanisms	Understand
CO5: Familiarize the various file organization techniques.	Apply

Text Book(s):

T1. Thomas Connolly, Carolyn Begg, “Database Systems: A Practical Approach to Design, Implementation and Management”, 6th Edition, Pearson Education, 2015.

T2. A Silberschatz, H Korth, S Sudarshan, “Database System Concepts”, 7th Edition, McGraw - Hill, 2019.

Reference Book(s):

R1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Database System Concepts , McGraw Hill, 2015

R2. Ramez Elmasri and Shamkant B. Navathe, Fundamental Database Systems,Pearson Education, 2008

R3. Ramez Elmasri and Shamkant B. Navathe, Fundamental Database Systems,Pearson Education, 2008

R4. Peter Rob and Corlos Coronel, Database System, Design, Implementation and Management , Thompson Learning Course Technology, 2003

Web Reference(s):

1. NPTEL lecture videos and notes: https://onlinecourses.nptel.ac.in/noc23_cs41/course
2. SQL practice exercises with solutions: https://www.w3resource.com/sql-exercises/
3. https://www.geeksforgeeks.org/dbms/

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19SCCC3301	Course Title: PROGRAMMING USING JAVA LABORATORY (Common to SC & AM)		
Course Category: Professional Core		Course Level : Practice	
L: T: P(Hours/Week) 0: 0: 3	Credits: 1.5	Total Contact Hours:45	Max. Marks:100

Pre-requisites

- C Programming

Course Objectives

The course is intended to:

1. Implement the object oriented concepts, interfaces and packages
2. Demonstrate exception handling
3. Implement Applet programs
4. Use Event Handlers and Database Connectivity

List of Exercises **45 Hours**

1. Write a Java program using Classes and objects.
2. Write a Java program using Inheritance.
3. Write a Java program using Polymorphism, overloading, over riding.
4. Write a Java program using Interfaces and Packages.
5. Write a Java program to implement Applets.
6. Write a Java program using Exception handling
7. Write a Java program using Event Handlers
8. Write a Java program for database Connectivity using MYSQL.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1 : Implement the object oriented concepts, interfaces and packages	Apply
CO2 : Demonstrate exception handling.	Apply
CO3 : Implement Applet programs.	Apply

CO4 : Use Event Handlers and Database Connectivity. Apply

Text Book(s):

T1.Walter Savitch, “An introduction to computer science and programming.” 3rdEdition,O’Reilly, 2004.

T2. Samuel A.Rebelsky, “Experiments in java”, 4thEdition, O’Reilly, 2000.

Reference Book(s):

R1.Horstmann, C.S Cornell, “Core java-fundamentals”, 8thEdition, pearson, 2013

R2.Hall, M.Brown, “Core Servlet and Java Server pages”, 2nd Edition,pearson, 2003

Web Reference(s):

1. Official documentation of java 3.10: https://docs.java.org/3/tutorial/
2. Beginner to Advanced java developer guide: https://www.learnjava.org/
3. Java quick reference guide

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	3	-	-	-	-	-	1	1
CO2	2	2	2	3	3	-	-	-	-	2	1	1
CO3	2	2	2	3	3	-	-	-	-	2	1	1
CO4	2	2	2	3	3	-	-	-	-	2	1	1

High-3; Medium-2; Low-1

Assessment pattern

Course Code: 19SCCC3302	Course Title: PROGRAMMING USING PYTHON LABORATORY (Common to SC & AM)		
Course Category: Professional Core		Course Level : Practice	
L: T: P(Hours/Week) 0: 0: 3	Credits: 1.5	Total Contact Hours: 45	Max. Marks:100

Pre-requisites

- C Programming

Course Objectives

The course is intended to:

1. Implement the basic programming structures in python.

2. Demonstrate python data structures – lists, tuples, dictionaries.
3. Implement file management in python.

4. Develop application using various libraries in python.

5. Develop games using pygame

List of Exercises **45 Hours**

1. Write a Python Program

a. To exchange the values of two variables.

b. To implement Fibonacci series up to n using lambda.

c. To implement array rotation.

2. Write a Python Program

a. To reverse a string.

b. To check if a string is palindrome or not. c. To count number of characters in a string. d. To replace characters in a string.

3. Write a Python Program

a. To implement lists. b. To implement tuple.

c. To implement operations in dictionaries.

Write a Python Program

To find the factorial of a number using functions.

To find the largest number in a list using functions.

Write a Python Program

a. To copy a text from one file to another file. b. To count number of words in a file.

c. To find longest word in a file

Write a Python Program

a. To compare the elements of the two pandas series using pandas library. b. To test whether elements in given array using Numpy library.

c. To plot a graph using matplot lib library.

d. To return the specified unit in seconds using scipy library

a. To compare the elements of the two pandas series using pandas library. b. To test whether elements in given array using Numpy library.
Write a Python program to simulate bouncing ball using pygame.

Write a Python program to simulate elliptical orbits in pygame.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1 : Implement the basic programming structures in python.	Apply
CO2 : Demonstrate python data structures – lists, tuple, dictionaries.	Apply
CO3 : Implement file management in python.	Apply
CO4 : Develop application using various libraries in python.	Apply
CO5: Develop games using pygame .	Apply

Text Book(s):

T1.Peter Wentworth, Jeffrey Elkner, Allen B. Downey, and Chris Meyers, “How to Think Like a Computer Scientist: Learning with Python”,3rd Edition, O’Reilly, 2016.
T2.Mark Lutz, “Powerful Object Oriented Programming Python”, 4th Edition, O’Reilly, 2012

Reference Book(s):

R1. Mark Lutz, “Learning Python, Powerful OOPs”, 5th Edition, O’Reilly, 2013.

R2. Zelle, John M, “Python Programming: An Introduction to Computer Science”, Franklin Beedle& Associates, 2003

Web Reference(s):

1. Official documentation of python 3.10: https://docs.python.org/3/tutorial/
2. Beginner to Advanced Python developer guide: https://www.learnpython.org/
3. Python quick reference guide: https://www.pyschools.com/
4. https://www.geeksforgeeks.org/python-programming-examples/

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19PSHG6002	Course Title: UNIVERSAL HUMAN VALUES 2: UNDERSTANDINGHARMONY		
Course Category: Humanities		Course Level : Practice	
L: T: P(Hours/Week) 2: 1: 0	Credits:3	Total Contact Hours:45	Max. Marks:100

Pre-requisites

- Induction Program(UHV I)

Course Objectives

The course is intended to:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.

2. Strengthening of self-reflection
3. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence.

4. Development of commitment and courage to act

Unit I Introduction to Value Education **8 Hours**

Need for the Value Education Self -exploration as the process for value education ; Continuous Happiness and Prosperity: A look at basic Human Aspirations; Right understanding: Relationship and Physical Facilities ; Happiness and Prosperity: current scenario ; Method to fulfill the Basic human aspirations

Unit II Harmony in Human Being **10 Hours**

Human being as a co-existence of self (‘I’) and the material ‘Body’; needs of Self ('I') and 'Body'; The Body as an instrument of 'I' ; Harmony in the self(‘I’); Harmony of the self(‘I’) with body; Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya

Unit III Harmony in the Family and Society **9 Hours**

Harmony in the Family the basic unit of human interaction; Values in human to human relationship; Trust as the foundational values of relationship; Respect as the right evaluation; Understanding harmony in the society (society being an extension of family); Vision for the universal human order

Unit IV Harmony in the Nature 8 Hours

Understanding the harmony in the Nature Interconnectedness, self-regulation and mutual fulfillment among the four orders of nature; Existence as Co-existence at all levels; Holistic perception of harmony in existence

Unit V Hormony on Professional Ethics 10 Hours

Natural acceptance of human values ;Definitiveness of Ethical Human Conduct; Basic for Humanistic Education, Humanistic Constitution and Humanistic Universal Order; Competence in professional ethics ; Case study: holistic technologies, management models and production systems ; Strategy for transition towards value based life and profession.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Reflect on values, aspiration, relationships and hence identify strengths and weaknesses	Responding
CO2: Appraise physical, mental and social well-being of self and practice techniques to promote well being	Responding
CO3: Value human relationships in family and society and maintain harmonious relationships	Valuing
CO4: Respect nature and its existence for survival and sustainable of all life forms and hence practice conservation of nature	Receiving

Text Book(s):

T1. R R Gaur, R Sangal, G P Bagaria, “Human Values and Professional Ethics”, Excel books, new Delhi, 2010.
T2. A.N. Tripathi, “Human Values”, New Age Intl. Publishers, New Delhi, 2004.

Reference Book(s):

R1. Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, “Jeevan Vidya”, 1999.

R2. Annie Leonard, “The story of stuff”, Free Press, New York, 2010

Web Reference(s):

https://aktu.ac.in/hvpe/ResourceVideo.aspx

http://hvpenotes.blogspot.com/

3. https://nptel.ac.in/courses/109/104/109104068/

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	1	2	2	-	-	2
CO2	-	-	-	-	-	1	2	2	2	1	-	2
CO3	-	-	-	-	-	2	2	2	2	1	-	2
CO4	-	-	-	-	-	2	2	2	2	-	-	2
CO5	-	-	-	-	-	1	2	2	2	-	-	2

High-3; Medium-2; Low-1

Course Code: 19PSHG6004	Course Title:TAMILS AND TECHNOLOGY (Common to all B.E/B.TechProgrammes)		
Course Category: Humanities		Course Level: Introductory	
L:T:P (Hours/Week) 1: 0 :0	Credit: 1	Total Contact Hours: 15	Max Marks:100

Pre–requisites

- NIL

Course Objectives

CO.1

CO.2

3

3

3

4 **3**

5 **3**

TOTAL : 15 PERIODS

Course Outcomes	**Cognitive Level**
CO.1	(Understand)
CO.2	(Understand)

TEXT - CUM REFERENCE BOOKS

1.
2.
3.
4.
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 C ivilization 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.

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	-	-	-	-	-	1	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	1	-	-

High-3; Medium-2; Low-1

Course Code: 19PSHG6004	Course Title:TAMILS AND TECHNOLOGY (Common to all B.E/B.TechProgrammes)		
Course Category: Humanities		Course Level: Introductory	
L:T:P (Hours/Week) 1: 0 :0	Credit: 1	Total Contact Hours: 15	Max Marks:100

Pre–requisites

- NIL

Course Objectives

The course is intended to:

1. Understand Weaving and Ceramic Technology, Design and Construction Technology, Manufacturing Technology, Agriculture and Irrigation Technology.
2. Understand the Scientific Tamil & Tamil Computing.

TAMILS AND TECHNOLOGY

UNIT I WEAVING AND CERAMIC TECHNOLOGY 3

Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries.

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY 3

Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions inSilappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple)- ThirumalaiNayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period.

UNIT III MANUFACTURING TECHNOLOGY 3

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 Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3

UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING 3

TOTAL : 15 PERIODS

Course Outcomes	Cognitive Level

TEXT - CUM REFERENCE BOOKS

1 >ap& kycwp - d&& d n nwçd - в&.в&.na
(akdffç. >apµwç nwL a djpd &aaPBa n &a &p&d)
2. & ø >ap - p ku c. &j>yd (a&L [ny&yd)
3. pa - k & µ$&& yPa øm& &wc µ&y µw&n&d (a>wa&Ba m µ akdffç)
4. anw4 µ - gjµm& y µw&n&d (a>wa&Ba m µ akdffç)

Course Articulation Matrix

Semester IV

Course Code: 19MABG1401	Course Title: PROBABILITY AND STATISTICS (common to all B.E/B.Tech programmes)		
Course Category: Basic Science		Course Level : Introductory	
L: T: P(Hours/Week) 3: 1: 0	Credits:4	Total Contact Hours:60	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Calculate expectations and variances of random variables
2. Apply the concepts of standard distributions to solve practical problems
3. Calculate the correlation and regression for two variables
4. Test the samples based on hypothesis
5. Apply the samples based on variance

Unit I Probability and Random Variables **9+3 Hours**

Axioms of Probability – Conditional Probability – Total Probability – Baye's Theorem – Random Variables – Probability Mass Function – Probability Density Functions – Properties – Moments – Moment generating functions and their properties.

Unit II Standard Distributions **9+3 Hours**

ER Models – ER to Relational Mapping Object Relational Mapping – Relational Model - Constraints – Keys – Dependencies – Relational Algebra - Normalization: 1NF, 2NF, 3NF, 4NF, BCNF – Join Dependencies

Unit III Two Dimensional Random Variables **9+3 Hours**

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and regression – Transformation of random variables.

Unit IV Testing of Hypotheses **9+3 Hours**

Sampling Distributions – Testing of hypotheses for mean, variance, proportions and differences using Normal, t, Chi-Square and F distributions – Tests for independence of

attributes and Goodness of fit.

Unit V Design of Experiments **9 +3 Hours**

Analysis of Variance (ANOVA) – One way Classification - Completely Randomized Design(CRD) – Two way Classification – Randomized Block Design (RBD) – Latin square

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Calculate expectations and variances of random variables	Apply
CO2: Apply the concepts of standard distributions to solve practical problems	Apply
CO3: Calculate the correlation and regression for two variables	Apply
CO4: Test the samples based on hypothesis	Apply
CO5: Apply the samples based on variance	Apply

Text Book(s):

T1. Dr.J.Ravichandran, "Probability and Statistics for Engineers", Wiley India Pvt.Ltd., 2010.

T2. Douglas C.Montgomery and George C. Runger, "Applied Statistics and Probability for Engineers", 6th Edition, Wiley India Pvt.Ltd., 2017

T3. Veerarajan T, "Probability, Statistics and Random process", 4th Edition, Tata McGraw-Hill, New Delhi, 2013.

Reference Book(s):

R1.R.E. Walpole, R.H. Myers, S.L. Myers, and K Ye, "Probability and Statistics for Engineers and Scientists", 9th Edition Pearson Education, Asia, 2016.

R2.M.R. Spiegel,J. Schiller and R.A. Srinivasan, "Schaum's Outlines Probability and Statistics", 3rd Edition,Tata McGraw Hill edition, 2009.

R3.Morris DeGroot, Mark Schervish, "Probability and Statistics", Pearson Educational Ltd, 4th Edition, 2014.

R4.Johnson and C.B. Gupta,"Probability and Statistics for Engineers", 9th Edition, Pearson

Web Reference(s):

1. Probability, Random Variables, Standard Distributions, Two dimensional random variables, Testing of Hypotheses: https://onlinecourses.nptel.ac.in/111105041/

2. Probability, Random Variables, Standard Distributions, Two dimensional random variables,Testing of Hypotheseshttps://nptel.ac.in/courses/111105090/

3. Design of Experiments : https://nptel.ac.in/courses/111104075/

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19CSCN2401`	Course Title: BASICS OF OPERATING SYSTEMS (common to AIML & CYS)		
Course Category: Professional Core		Course Level : Introductory	
L: T: P(Hours/Week) 3: 1: 2	Credits:4	Total Contact Hours:75	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Describe the components of operating systems and its services
2. Solve process scheduling and synchronization problems
3. Compare different memory management techniques.
4. Develop solutions for free space management
5. Summarize various administrative tasks in Linux environment

Unit I Introduction **9 Hours**

Computer System Organization- Operating System Operations – Kernel Data Structures-Operating Systems Structures: System Components, Operating System Services, System calls, System Programs – Process Concepts: Process Scheduling, Operation on Process, CoOperating process, Inter Process Communication.

Unit II Process Management **9 Hours**

CPU scheduling: Scheduling Algorithms – Process Synchronization: The Critical Section Problem, Peterson's Solution, Hardware Support for Synchronization, Mutex Locks, Semaphores, Monitors – Classical problems of Synchronization – Deadlock: Deadlock Characterization – Methods for handling Deadlocks: Deadlock Prevention, Avoidance, Detection and Recovery from Deadlock

Unit III Memory Management **9 Hours**

Main Memory: Contiguous Memory Allocation, Paging, Structure of Page Table, Swapping –Virtual Memory: Demand paging, Copy-on-write, Page Replacement Algorithms, Allocation of Frames, Thrashing.

Unit IV File Systems **9 Hours**

Mass Storage Structure: Overview – Hard Disk Scheduling – RAID Structure – File System Interface: File Concepts, Access methods, Directory Structure, File Protection – File System Implementation: File System Structure and Operations, Directory Implementation, Allocation methods, Free Space Management.

Unit V Case Study-Linux **9 Hours**

History of Unix and Linux, Overview – Processes in Linux – Memory Management in Linux - Linux File System – Security in Linux, Android – History – Architecture - Applications

List of Exercises **30 Hours**

1. Implementation of Process and I/O System calls
2. Implementation of CPU Scheduling Algorithms
3. Implementation of Classical Synchronization problems using semaphores
4. Implementation of Memory Allocation Strategies
5. Implementation of Page Replacement Algorithms
6. Implementation of Disk Scheduling Algorithms

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Describe the components of operating systems and its services based on system calls	Understand
CO2: Solve process scheduling and synchronization problems using algorithms	Apply
CO3:Compare different memory management techniques using allocation schemes	Apply
CO4: Develop solutions for free space management using file systems and disk scheduling concepts	Apply
CO5: Summarize various administrative tasks in Linux environment using its components and services	Understand

Text Book(s):

T1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 10thEdition, John Wiley & Sons, 2018.
T2.Andrew S. Tanenbaum, “Modern Operating Systems”, 4th Edition, Pearson Education, 2015.

Reference Book(s):

R1.William Stallings, “Operating Systems Internals and Design Principles”, 9th Edition, Pearson Education, 2018.

Web Reference(s):

MIT open course on operating system engineering: http://ocw.mit.edu/courses/electrical-
Bell’s Course Notes on Operating Systems Processes: https://www2.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/3_Processes.html
NPTEL course on Operating System Fundamentals: https://nptel.ac.in/courses/106/105/106105214/

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1	-	1	1	-	-	2	1	2	-	1
CO2	2	1	-	2	2	-	-	2	1	2	-	1
CO3	2	1	-	2	2	-	-	2	1	2	-	1
CO4	1	1	-	1	1	-	-	2	1	2	-	1
CO5	2	1	-	2	2	-	-	2	1	2	-	1

High-3; Medium-2; Low-1

Course Code: 19SCCN1401	Course Title: COMPUTER NETWORKS AND ATTACKS		
Course Category: Professional core		Course Level: Introductory	
L: T: P(Hours/Week) 3: 0: 0	Credits:3	Total Contact Hours:45	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Discuss the Network components and Data link layers concepts.
2. Implement the network layer protocols.
3. Illustrate the functionalities of transport layer protocols.
4. Demonstrate the working principles of application layer protocols.
5. Identify the Concepts of Networks Attacks.

Unit I Network Components **9 Hours**

Network Requirements- Socket implementation -Bandwidth and Latency – Delay X Bandwidth product – Application Performance needs -Connection Perspectives – Encoding – Framing: (PPP, HDLC, SONET) – Error Detection (Parity, Internet Checksum, CRC).

Unit II Network Layer **9 Hours**

Internet Protocol (IP) – Service Model – Global Addresses – Datagram Forwarding in IP – Subnetting and Classless Addressing – ARP – DHCP – ICMP – Routing protocols: RIP and OSPF – IPv6 – Distance vector – Link state Routing Algorithm - Mobile IP

Unit III Transport Layer **9 Hours**

UDP: Segment format, Applications – TCP: Segment Format, Connection Establishment and Termination- TCP Congestion Control – Congestion Avoidance Mechanisms.

Unit IV Application Layer **9 Hours**

Electronic Mail: SMTP, MIME, IMAP – World Wide Web: HTTP – Web Services –

Infrastructure Services: Domain Name System, Simple Network Management Protocol –Firewalls.

UNIT V Network Attacks **9 Hours**

Network Attacks: Security attacks – Active and Passive, Denial of Service (DoS) and Distributed Denial of Service (DDoS) Attacks, Trojan horse and spyware attacks, Worms Attacks.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Discuss the Concepts of Network components and Data link layers.	Understand
CO2: Implement the various network layer protocols.	Apply
CO3: Use the functionalities of transport layer protocols.	Apply
CO4: Demonstrate the working principles of application layer protocols.	Apply
CO5: Describe the Concepts of Networks Attacks.	Understand

Text Book(s):

T1. A. S. Tanenbaum "Computer Networks", 6th edition, Pearson Education/ PHI, New Delhi, India, 2021.

T2. William Stallings ," Network Security Essentials : Applications and Standards" Sixth Edition, Pearson, 2018.

Reference Book(s):

R1. Behrouz A. Forouzan," Data communication and Networking", 4th Edition, Mc Graw-Hill, India, 2006

R2. Kurose, Ross, " Computer Networking: A top down approach", Pearson Education, India, 2010.

R3. Markus Jakobsson and Zulfikar Ramzan, "Crimeware, Understanding New Attacks and Defense", Symantec Press, 2008.

R4. Beaver.K., "Hacking for Dummies", 3rd Edition. John Wiley & sons., 2013.

Web Reference(s):

1. MIT Open course ware - Data Communication Networks: http://ocw.mit.edu/courses/ electrical- engineering- and- computer- science/6- 829- computer- networks- fall- 2002
2. NPTEL - Computer Networks: http://nptel.ac.in/courses/106105081

3. https://www.w3schools.com/cybersecurity/cybersecurity_network_attacks.php

4. https://www.educba.com/types-of-network-attacks

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19MSCCN1402	Course Title: CRYPTOGRAPHY AND SECURITY		
Course Category: Professional Core		Course Level : Introductory	
L: T: P(Hours/Week) 3: 0: 0	Credits:3	Total Contact Hours:45	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Learn to analyze the security and Encryption Techniques

2. Explain Data Encryption and Advanced Encryption Standard
3. Develop cryptographic algorithms for information security

4. Explain hash functions and Message Authentication code

5. Understand Security threats

Unit I Computer Security and Classical Encryption Techniques **9 Hours**

Introduction - Computer Security Concepts – Security Attacks – Security Mechanism – Symmetric Cipher Model – Substitution Techniques – Transposition Techniques.

Unit II Block Ciphers, Data Encryption Standard, Advanced Encryption Standard **9 Hours**

Block Cipher Structure – The Data Encryption Standard – DES Example – The strength of DES – Block Cipher Design Principles – AES Structure – AES transformation - AES example – Mode of Operations

Unit III Public Key Cryptography **9 Hours**

Principles of Public – Key Cryptosystems – The RSA Algorithm – Diffie – Hellman Key Exchange – The Algorithm – Key Exchange Protocols – Man-in-the-Middle Attack - Elgamal Cryptographic System - Elliptic Curve Cryptography.

Unit IV Hash Functions and Message Authentication Code **9 Hours**

Applications of Cryptographic Hash Functions – Hash functions based on Cipher Block Chaining - Secure Hash Algorithm – Message Authentications Requirements -

Functions – MACs Based on Block Ciphers DAA and CMAC - Digital Signatures.

Unit V Security Threats **9 Hours**

Introduction to Security Threats – Virus – Worms – Trojan Horse – Bombs – TrapDoor – Network and Services Attack – Denial-of-Service Attack – Types of DOS Attack – Examples – Electronic Mail Security – PGP – S/MIME - System Security – Intruders – Firewalls.

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO1: Learn to analyze the security and Encryption Techniques	Apply
CO2: Explain Data Encryption and Advanced Encryption Standard ures	Apply
CO3: Develop cryptographic algorithms for information security	Apply
CO4: Explain hash functions and Message Authentication code	Apply
CO5: Understand Security threats	Understand

Text Book(s):

T1. William Stallings "Cryptography And Network Security Principles And Practice", 7th Edition, Pearson Education.

T2. Mayank Bhushan, Rajkumar Singh Rathore, Aatif Jamshed, "Fundamentals of Cyber Security (Principles, Theory and Practices) " BBP Publications, First Edition

Reference Book(s):

R1. Wenbo Mao, "Modern Cryptography: Theory and Practice", Prentice Hall PTR.

R2. William Stallings, "Network Security Essentials: Applications and Standards", Pearson Education, 2001.

Course Articulation Matrix

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

High-3; Medium-2; Low-1

Course Code: 19SCCN3402	Course Title: COMPUTER NETWORKS AND CYBER LABORATORY		
Course Category: Professional Core		Course Level : Practice	
L: T: P(Hours/Week) 0: 0: 4	Credits: 2	Total Contact Hours:60	Max. Marks:100

Pre-requisites

- Python Programming

Course Objectives

The course is intended to:

1. Define and use network commands

2. Implement Routing Protocols
3. Configure and test various network protocols

4. Built application using simulation tools

5. Identify various Network attacks

List of Exercises

1. Learn to use commands like tcpdump, netstat, ifconfig, nslookup and traceroute. Capture ping and traceroute PDUs using a network protocol analyzer and examine

2. Write a HTTP web client program to download a web page using TCP sockets

3. Applications using TCP sockets like:

• Echo client and echo server

• Chat

• File Transfer

4. Simulation of DNS using UDP sockets.

5. Write a code simulating ARP /RARP protocols.

6. Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS

7. Study of TCP/UDP performance using Simulation tool.

8. Simulation of Distance Vector/ Link State Routing algorithm.

9. Performance evaluation of Routing protocols using Simulation tool.

10. Simulation of error correction code (like CRC).

Course Outcomes	**Cognitive Level**
At the end of this course, students will be able to:	
CO 1: Define and use network commands	Apply
CO 2: Implement Routing Protocols.	Apply
CO 3: Configure and test various network protocols.	Apply
CO 4: Built application using simulation tools.	Apply
CO5: Identify various Network attacks.	Apply

Text Book(s):

T1. S. Tanenbaum , Computer Networks, 4th edition, Pearson Education/ PHI, New Delhi, India.

T2. Zouheir Trabelsi, Kadhim Hayawi, Arwa Al Braiki, Sujith Samuel Mathew , Network Attacks and Defenses: A Hands-on Approach ,1st Edition, CRC Press, 2012.

Reference Book(s):

R1. Behrouz A. Forouzan (2006), Data communication and Networking, 4th Edition, Mc Graw-Hill, India. 2. Kurose, Ross (2010), Computer Networking: A top down approach, Pearson Education, India

R2. Markus Jakobsson and Zulfikar Ramzan, Crimeware, Understanding New Attacks and Defenses, Symantec Press, 2008, ISBN: 978-0-321-50195-0.

Web Reference(s):

1. https://www.geeksforgeeks.org/computer-network-tutorials/
2. https://www.geeksforgeeks.org/deniel-service-prevention/
3. https://www.w3schools.com/cybersecurity/cybersecurity_networking.php

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	-	-	-	-	-	1	-	1	-	1
CO2	2	1	-	-	-	-	-	1	-	1	-	1
CO3	3	2	2	2	2	-	-	2	3	2	-	1
CO4	3	2	2	2	2	-	-	2	3	2	-	1

High-3; Medium-2; Low-1

Course Code: 19SCCN3401	Course Title: CRYPTOGRAPHY AND SECURITY LABORATORY		
Course Category: Professional Core		Course Level : Practice	
L: T: P(Hours/Week) 0: 0: 4	Credits:2	Total Contact Hours:60	Max. Marks:100

Pre-requisites

- C / Python Programming

Course Objectives

The course is intended to:

1. Implement the Cipher techniques to perform encryption and decryption
2. Implement transposition techniques
3. Implement algorithms DES, AES, RSA, Diffie-Hellman, MD5, SHA-1
4. Demonstrate digital signature standard

List of Exercises

1. Write a program to implement the following cipher techniques to perform encryption and decryption i. Caesar Cipher 85 ii. Playfair Cipher iii. Hill Cipher

2. Write a program to implement the following transposition techniques (i) Rail fence technique – Row major transformation (ii) Rail fence technique - Column major transformation

3. Write a program to implement DES algorithm

4. Write a program to implement AES algorithm

5. Write a program to implement RSA Encryption algorithm

6. Write a program to implement the Diffie-Hellman Key Exchange mechanism. Consider one of the parties as Alice and the other party as bob.

7. Write a program to calculate the message digest of a text using the SHA-1 algorithm

8. Write a program to calculate the message digest of a text using the MD-5 algorithm.

9. Write a program to implement digital signature standard.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO 1: Implement cipher techniques	Apply
CO 2: Implement transposition techniques	Apply
CO 3: Implement DES, AES, RSA, Diffie – Hellman.MD5, SHA - 1	Apply
CO 4: Demonstrate digital signature standard	Apply

Text Book(s):

T1. William Stallings, “Cryptography and Network Security - Principles and Practices”, 7th Edition, Pearson Education, 2017.

T2. Atul Kahate, “Cryptography and Network Security”, 3rd Edition, Tata Mcgraw Hill, 2013.

Reference Book(s):

R1. Behrouz A Forouzan and Debdeep Mukhopadhyay, “Cryptography and Network Security”, 3rd Edition, Tata McGraw Hill, New Delhi, 2016.

R2. Atul Kahate, “Cryptography and Network Security”, 3rd Edition, Tata Mcgraw Hill, New R3. Douglas R Stinson, “Cryptography - Theory and Practice”, Chapman and Hall / CRC Press,

R3. Douglas R Stinson, “Cryptography - Theory and Practice”, Chapman and Hall / CRC Press

Web Reference(s):

1. NPTEL Course contents on Cryptography and Network Security URL:http://nptel.ac.in/courses/106105162/

2. Learn Internet Security at Tutorial point https://www.tutorialspoint.com/cryptography/index.htm

3. Khan Academy Course on cryptography https://www.khanacademy.org/computing/computer-science/cryptography

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	1	2	1	2	-	-	-	2	-	-
CO2	2	2	1	2	2	2	-	-	-	2	-	-
CO3	2	3	1	2	2	2	-	-	-	2	-	-
CO4	2	2	1	2	2	2	-	-	-	2	-	-

High-3; Medium-2; Low-1

Course Code: 19CSPN6401	Course Title: MINI – PROJECT		
Course Category: Project		Course Level : Practice	
L: T: P(Hours/Week) 0: 0: 4	Credits:2	Total Contact Hours:60	Max. Marks:100

Pre-requisites

- Nil

Course Objectives

The course is intended to:

1. Identify solutions to simple engineering problems.

2. Use the knowledge of Science, engineering & engineering tools to solve simple problems relevant to the discipline.

The objective of Project is to enable the student to take up investigative study in the broad field of Computer Science and Engineering, to solve relevant social/environmental/ethical issues on an individual basis or two/three students in a group, under the guidance of a Supervisor. This is expected to provide a good initiation for the student(s) in R&D work. The assignment will normally include:

1. Survey and study of published literature on the assigned topic.

2. Working out a preliminary Approach to the Problem relating to the assigned topic

3. Conducting Analysis, Design, Implementation/Modeling /Simulation

4. Preparing a Written Report of the Study/Work

5. Final Presentation before a departmental committee.

Course Outcomes	Cognitive Level
At the end of this course, students will be able to:	
CO1: Design, develop and implement solutions using relevant modern tools to simple engineering problems that are relevant to the discipline.	Apply
CO2: Work in teams performing different roles for effective accomplishment of project goals following ethical practices.	Apply
CO3: Demonstrate the use of prior knowledge of science and engineering and	Apply

engineering tools to formulate, analyze and investigate problems systematically	
CO4: Communicate the process, methods and materials, findings, results and solutions through reports and presentations in appropriate forums.	Apply

Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	3	-	3	3	3	-	-	-	-	3
CO2	-	-	-	-	-	-	-	3	3	-	3	-
CO3	3	3	-	3	-	3	3	-	-	-	-	3
CO4	-	-	--	-	-	-	3	-	-	3	-	-

High-3; Medium-2; Low-1