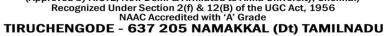# SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)

(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

CURRICULUM AND SYLLABI

FOR B.E. / B.Tech. DEGREE PROGRAMMES

(For the Students Admitted in the Academic Year 2019-2020 onwards)

B.E - COMPUTER SCIENCE AND ENGINEERING - FIRST SEMESTER

Course Code	Name of the Subject	Category	L	T	P	C	CIA	ESE	TOT
19HST101	Communicative Techno English - I	HS	3	0	0	3	40	60	100
19MAT101	Engineering Mathematics - I	BS	3	1	0	4	40	60	100
19CYE101	Engineering Chemistry	BS	3	0	2	4	40	60	100
19PHE101	Engineering Physics	BS	3	0	2	4	40	60	100
19GET101	Engineering Graphics	ES	3	0	0	3	40	60	100
19GEE101	Computer Fundamentals and Python Programming	ES	3	0	2	4	40	60	100
19EEC101	Life Skills for Engineers	EEC	0	0	2	0	100	-	100
19MDC101	Induction Program (2 Weeks)	MC	-	-	-	-	-	-	-
TOTAL CREDITS IN SEMESTER - I						22			

HS	:	Humanities and Social Sciences
BS	:	Basic Sciences
ES	:	Engineering Sciences
PC	:	Professional Core
PE	:	Professional Elective
OE	:	Open Elective
EEC	:	Employability Enhancement Courses
MC	:	Mandatory Courses
L	:	Lecture
T	:	Tutorial
P	:	Practical
C	:	Credit Point
CIA	:	Continuous Internal Assessment
ESE	:	End Semester Examination
TOT	:	Total

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

B.E - COMPUTER SCIENCE AND ENGINEERING - SECOND SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
19HST201	Communicative Techno English -II	HS	3	0	0	3	40	60	100
19CYT201	Environmental Science and Engineering	BS	3	0	0	3	40	60	100
19MAT201	Engineering Mathematics - II	BS	3	1	0	4	40	60	100
19PHT202	Solid State Physics and Nano Electronic Devices	BS	3	0	0	3	40	60	100
19GET203	Basic Civil and Mechanical Engineering	ES	3	0	0	3	40	60	100
19CSE201	C Programming	PC	3	0	2	4	40	60	100
19EEC202	Technical Skill (Multimedia)	EEC	0	0	2	0	100	-	100
19MDC201	NSS / YRC / RRC	MC	-	-	-	-	100	-	100
TOTAL CREDITS IN SEMESTER - II			20						

HS	:	Humanities and Social Sciences
BS	:	Basic Sciences
ES	:	Engineering Sciences
PC	:	Professional Core
PE	:	Professional Elective
OE	:	Open Elective
EEC	:	Employability Enhancement Courses
MC	:	Mandatory Courses
L	:	Lecture
T	:	Tutorial
P	:	Practical
C	:	Credit Point
CIA	:	Continuous Internal Assessment
ESE	:	End Semester Examination
TOT	:	Total

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

B.E - COMPUTER SCIENCE AND ENGINEERING - THIRD SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
19MAT301	Transforms and Partial Differential Equations	BS	3	1	0	4	40	60	100
19CST301	Data Structures	PC	3	0	0	3	40	60	100
19CST302	Computer Organization and Architecture	PC	3	0	0	3	40	60	100
19ECT302	Analog and Digital Communication	ES	3	0	0	3	40	60	100
19CSE301	Object Oriented Programming	PC	3	0	2	4	40	60	100
19ECE301	Digital Electronics	ES	3	0	2	4	40	60	100
19EEC301	Communication Skills	EEC	0	0	2	0	100	-	100
19MDC301	Leadership Enhancement Programme	MC	1	0	0	0	100	-	100
TOTAL CREDITS IN SEMESTER - III						21			

HS	:	Humanities and Social Sciences
BS	:	Basic Sciences
ES	:	Engineering Sciences
PC	:	Professional Core
PE	:	Professional Elective
OE	:	Open Elective
EEC	:	Employability Enhancement Courses
MC	:	Mandatory Courses
L	:	Lecture
T	:	Tutorial
P	:	Practical
C	:	Credit Point
CIA	:	Continuous Internal Assessment
ESE	:	End Semester Examination
TOT	:	Total

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

B.E - COMPUTER SCIENCE AND ENGINEERING - FOURTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
19MAT401	Probability and Queueing Theory	BS	3	1	0	4	40	60	100
19CST401	Design and Analysis of Algorithms	PC	3	1	0	4	40	60	100
19CST402	Operating Systems	PC	3	1	0	4	40	60	100
19CST403	Software Engineering	PC	3	0	0	3	40	60	100
19CSE401	Database Management Systems	PC	3	0	2	4	40	60	100
19ECE503	Microprocessors and Microcontrollers	ES	3	0	2	4	40	60	100
19EEC302	Entrepreneurship Development Activity	EEC	0	0	2	0	100	-	100
19MDC401	Value Added Course - I	MC	0	0	2	0	100	-	100
TOTAL CREDITS IN SEMESTER - IV			23						

HS	:	Humanities and Social Sciences
BS	:	Basic Sciences
ES	:	Engineering Sciences
PC	:	Professional Core
PE	:	Professional Elective
OE	:	Open Elective
EEC	:	Employability Enhancement Courses
MC	:	Mandatory Courses
L	:	Lecture
T	:	Tutorial
P	:	Practical
C	:	Credit Point
CIA	:	Continuous Internal Assessment
ESE	:	End Semester Examination
TOT	:	Total

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

B.E - COMPUTER SCIENCE AND ENGINEERING - FIFTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
19CST501	Artificial Intelligence	PC	3	0	0	3	40	60	100
19CST502	Theory of Computation	PC	3	1	0	4	40	60	100
19CST503	Resource Management Techniques	BS	3	1	0	4	40	60	100
19CSE501	Computer Networks	PC	3	0	2	4	40	60	100
19CSE502	Object Oriented Analysis and Design	PC	3	0	2	4	40	60	100
19MGT501	Engineering Economics and Management	HS	3	0	0	3	40	60	100
19EEC501	Quantitative Aptitude Learning	EEC	0	0	2	0	100	-	100
19MDC501	Value Added Course-II	MC	-	-	-	-	100	-	100
TOTAL CREDITS IN SEMESTER - V			22						

HS	:	Humanities and Social Sciences
BS	:	Basic Sciences
ES	:	Engineering Sciences
PC	:	Professional Core
PE	:	Professional Elective
OE	:	Open Elective
EEC	:	Employability Enhancement Courses
MC	:	Mandatory Courses
L	:	Lecture
T	:	Tutorial
P	:	Practical
C	:	Credit Point
CIA	:	Continuous Internal Assessment
ESE	:	End Semester Examination
TOT	:	Total

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

B.E - COMPUTER SCIENCE AND ENGINEERING - SIXTH SEMESTER

Course Code	Name of the Subject	Category	L	T	P	C	CIA	ESE	TOT
19CST601	Machine Learning Techniques	PC	3	0	0	3	40	60	100
19CST602	Compiler Design	PC	3	1	0	4	40	60	100
19CSE601	Mobile Computing	PC	3	0	2	4	40	60	100
19CSE602	Internet Programming	PC	3	0	2	4	40	60	100
	Professional Elective - I	PE	3	0	0	3	40	60	100
	Open Elective - I	OE	3	0	0	3	40	60	100
19CSJ601	Mini Project	EEC	0	0	2	1	100	-	100
19MDC601	Constitution of India	MC	3	-	-	-	100	-	100
TOTAL CREDITS IN SEMESTER- VI			22						

HS	:	Humanities and Social Sciences
BS	:	Basic Sciences
ES	:	Engineering Sciences
PC	:	Professional Core
PE	:	Professional Elective
OE	:	Open Elective
EEC	:	Employability Enhancement Courses
MC	:	Mandatory Courses
L	:	Lecture
T	:	Tutorial
P	:	Practical
C	:	Credit Point
CIA	:	Continuous Internal Assessment
ESE	:	End Semester Examination
TOT	:	Total

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

B.E - COMPUTER SCIENCE AND ENGINEERING - SEVENTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week				Credit	Maximum Marks		
			L	T	P	C		CIA	ESE	TOT
19CST701	Software Architecture and Design	PC	3	0	0	3		40	60	100
19CSE701	Cryptography and Network Security	PC	3	0	2	4		40	60	100
19CSE702	Cloud Computing	PC	3	0	2	4		40	60	100
	Professional Elective - II	PE	3	0	0	3		40	60	100
19CSJ701	Project Work (Phase - I)	EEC	0	0	2	1		100	-	100
TOTAL CREDITS IN SEMESTER - VII			15							

HS	:	Humanities and Social Sciences
BS	:	Basic Sciences
ES	:	Engineering Sciences
PC	:	Professional Core
PE	:	Professional Elective
OE	:	Open Elective
EEC	:	Employability Enhancement Courses
MC	:	Mandatory Courses
L	:	Lecture
T	:	Tutorial
P	:	Practical
C	:	Credit Point
CIA	:	Continuous Internal Assessment
ESE	:	End Semester Examination
TOT	:	Total

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

B.E - COMPUTER SCIENCE AND ENGINEERING - EIGHTH SEMESTER

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
	Professional Elective - III	PE	3	0	0	3	40	60	100
	Open Elective - II	OE	3	0	0	3	40	60	100
19CSJ801	Project Work (Phase - II)	EEC	0	0	20	10	40	60	100
TOTAL CREDITS IN SEMESTER - VIII			16						

HS	:	Humanities and Social Sciences
BS	:	Basic Sciences
ES	:	Engineering Sciences
PC	:	Professional Core
PE	:	Professional Elective
OE	:	Open Elective
EEC	:	Employability Enhancement Courses
MC	:	Mandatory Courses
L	:	Lecture
T	:	Tutorial
P	:	Practical
C	:	Credit Point
CIA	:	Continuous Internal Assessment
ESE	:	End Semester Examination
TOT	:	Total

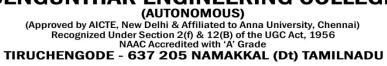**SENGUNTHAR ENGINEERING COLLEGE**
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF PROFESSIONAL CORE (PC) COURSES

Course Code	Name of the Subject	Category	Periods / Week			Credit	Maximum Marks		
			L	T	P	C	CIA	ESE	TOT
19CSE201	C Programming	PC	3	0	2	4	40	60	100
19CST301	Data Structures	PC	3	0	0	3	40	60	100
19CST302	Computer Organization and Architecture	PC	3	0	0	3	40	60	100
19CSE301	Object Oriented Programming	PC	3	0	2	4	40	60	100
19CST401	Design and Analysis of Algorithms	PC	3	1	0	4	40	60	100
19CST402	Operating Systems	PC	3	1	0	4	40	60	100
19CST403	Software Engineering	PC	3	0	0	3	40	60	100
19CSE401	Database Management Systems	PC	3	0	2	4	40	60	100
19CST501	Artificial Intelligence	PC	3	0	0	3	40	60	100
19CST502	Theory of Computation	PC	3	1	0	4	40	60	100
19CSE501	Computer Networks	PC	3	0	2	4	40	60	100
19CSE502	Object Oriented Analysis and Design	PC	3	0	2	4	40	60	100
19CST601	Machine Learning Techniques	PC	3	0	0	3	40	60	100
19CST602	Compiler Design	PC	3	1	0	4	40	60	100
19CSE601	Mobile Computing	PC	3	0	2	4	40	60	100
19CSE602	Internet Programming	PC	3	0	2	4	40	60	100
19CST701	Software Architecture and Design	PC	3	0	0	3	40	60	100
19CSE701	Cryptography and Network Security	PC	3	0	2	4	40	60	100
19CSE702	Cloud Computing	PC	3	0	2	4	40	60	100

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF PROFESSIONAL ELECTIVE (PE) COURSES

Course Code	Name of the Subject	Category	L	T	P	C	CIA	ESE	TOT
Professional Elective - I									
19CSPX01	Data Warehousing and Mining	PE	3	0	0	3	40	60	100
19CSPX02	Digital Signal Processing	PE	3	0	0	3	40	60	100
19CSPX03	Software Testing	PE	3	0	0	3	40	60	100
19CSPX04	Embedded Systems	PE	3	0	0	3	40	60	100
19CSPX05	Network Analysis and Management	PE	3	0	0	3	40	60	100
19CSPX06	Total Quality management	PE	3	0	0	3	40	60	100
19CSPX07	C# and .Net Programming	PE	3	0	0	3	40	60	100
19CSPX08	Natural Language Processing	PE	3	0	0	3	40	60	100
Professional Elective - II									
19CSPX09	Adhoc and Sensor Networks	PE	3	0	0	3	40	60	100
19CSPX10	Big Data Analytics	PE	3	0	0	3	40	60	100
19CSPX11	Green Computing	PE	3	0	0	3	40	60	100
19CSPX12	Agile Methodology	PE	3	0	0	3	40	60	100
19CSPX13	Game Programming	PE	3	0	0	3	40	60	100
19CSPX14	Software Project Management	PE	3	0	0	3	40	60	100
19CSPX15	Graph Theory and its Applications	PE	3	0	0	3	40	60	100
19CSPX16	Semantic Web	PE	3	0	0	3	40	60	100

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

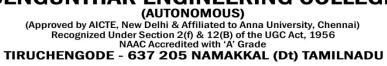| Course Code	Name of the Subject	Category	L	T	P	C	CIA	ESE	TOT
			Periods / Week			Credit	Maximum Marks		
Professional Elective - III									
19CSPX17	Internet of Things	PE	3	0	0	3	40	60	100
19CSPX18	Information Security	PE	3	0	0	3	40	60	100
19CSPX19	Service Oriented Architecture	PE	3	0	0	3	40	60	100
19CSPX20	Multicore Architectures and Programming	PE	3	0	0	3	40	60	100
19CSPX21	Knowledge Management	PE	3	0	0	3	40	60	100
19CSPX22	Software Quality Assurance	PE	3	0	0	3	40	60	100
19CSPX23	Soft Computing	PE	3	0	0	3	40	60	100
19CSPX24	Information Retrieval Techniques	PE	3	0	0	3	40	60	100

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF OPEN ELECTIVE (OE) COURSES FOR OTHER BRANCHES

Course Code	Name of the Subject	Category	L	T	P	C	CIA	ESE	TOT
Open Elective - I									
19CSOX01	Human Computer Interaction	OE	3	0	0	3	40	60	100
19CSOX02	Enterprise Resource Planning	OE	3	0	0	3	40	60	100
19CSOX03	Cyber Forensics	OE	3	0	0	3	40	60	100
19CSOX04	Unix Internals	OE	3	0	0	3	40	60	100
19CSOX05	Bio Informatics	OE	3	0	0	3	40	60	100
Open Elective - II									
19CSOX06	Web Designing	OE	3	0	0	3	40	60	100
19CSOX07	Customer Relationship Management	OE	3	0	0	3	40	60	100
19CSOX08	E-Commerce and Applications	OE	3	0	0	3	40	60	100
19CSOX09	Social Network Analysis	OE	3	0	0	3	40	60	100
19CSOX10	Multimedia Systems	OE	3	0	0	3	40	60	100

SCHEME FOR SYLLABI

B.E. –CSE

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

ESTD 2001

SEMESTER I

19HST101	**COMMUNICATIVE TECHNO ENGLISH - I**	**L T P C**
	(Common to Civil,CSE,ECE,EEE & Mechanical)	**3 0 0 3**

OBJECTIVES

To enable the students to,

* Understand the basics of the English Language in a graded manner.

* Enrich vocabulary for the development of all the four language skills (LSRW).

* Develop speaking skills through self introduction and delivering speeches**.**

* Write e-mails, informal letters.

* Improve writing skills to express thoughts freely.

UNIT I : VOCABULARY   8

Synonyms and Antonyms – Single Word Substitutes – Use of Abbreviations and Acronyms – Homonyms and Homophones – Business Vocabulary – Commonly Confused Words – Collocation – British and American Vocabulary – Word formation.

Activity: Grammar worksheets on the given topics.

UNIT II : GRAMMAR   10

Parts of speech – Comparative Adjectives – Numerical Adjectives – Be, Have and Do verbs – modal verbs – Types of Questions – Tenses – Impersonal Passive Voice – Direct and Indirect Speech – Gerunds and Infinitives – Same Word Used as Different Parts of Speech.

Activity: Grammar worksheets on the given topics.

UNIT III : INFORMAL WRITING   9

Letter Writing – Informal Letters – e-mail Writing – Informal Dialogues – Essay Writing – Informal Essays – Movie Reviews – Writing Instructions.

Activity: Giving topic and ask the students to write informal letters, e-mail.

UNIT IV : LANGUAGE ENHANCEMENT THROUGH SPEAKING   9

Self Introduction – (exchanging personal information) personal information, hobbies, strengths and weaknesses, likes and dislikes, special features of home town. Narrating Personal Experiences and Incidents – Two minute talk – Debate discussion.

Activity: Ask the students to speak about the above given topics.

UNIT V : READING SKILLS   9

Reading Comprehension – reading techniques, pre-reading, post-reading, comprehension questions (multiple choice questions or short questions) – Short comprehension passages,

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

practice skimming – scanning and predicting – Reading the passage and taking (Note making) Notes – Scan and understand main contents of the passage.

Activity: Giving topic and ask the students to find out answers for given passage

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, the students will be able to:

- Learn to acquire usage of English.
- Use a wide range of vocabulary in oral and written communication
- Give short informal presentations and participate in classroom discussions
- Write informal letters and other communications.
- Frame grammatically correct sentences.

TEXT BOOKS

1. Board of Editors, "Using English A Course book for Under graduate Engineers and Technologists"', Orient Black Swan Limited, Hyderabad, 2015.
2. Richards, C. Jack, "Interchange Students' Book – 2", New Delhi – CUP, 2015.

REFERENCES

1. Department of English, Anna University, "Mindscapes: English for Technologists and Engineers", 1st Edition, Orient Black Swan, Chennai. 2012.
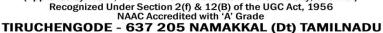2. Krishna Mohan, Meera Banerji ,"Developing Communication Skills", MacMillan Publishers, Paperback 2019.

E – RESOURCES

1. https://nptel.ac.in/courses/109/106/109106094/ (Introduction to Vocabulory)
2. https://nptel.ac.in/courses/109/106/109106129/ (Reading Comprehension)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19MAT101	ENGINEERING MATHEMATICS – I	L T P C
	(Common to Civil,CSE,ECE,EEE & Mechanical)	3 1 0 4

OBJECTIVES

To enable the students to,

- Develop the use of matrix algebra techniques that is needed by engineering for practical applications.
- Introduce the basic concepts of functions, limit of function, continuity, derivaties and extreme values.
- Provide the basic tools of calculus mainly for the purpose of modelling the engineering problems mathematically and obtaining solutions.
- Make the basic concepts of definite, indefinite, improper integrals and Bernoulli's formula.
- Acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I : MATRICES 9+3

Eigen values and Eigenvectors of a real matrix – Characteristic equation – Properties of Eigen values and Eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II : DIFFERENTIAL CALCULUS 9+3

Representation of function – Limit of a function – Continuity – Derivatives – Differentiation rule – Maximum and Minimum values – absolute Maximum and Minimum – local Maximum and Minimum.

UNIT III : FUNCTIONS OF SEVERAL VARIABLES 9+3

Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Jacobians –Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT IV : INTEGRAL CALCULUS 9+3

Definite and Indefinite integral-Substitution rule – Integration by parts – Trigoniometric substitutions – Integration of rational function by partial fraction – Improper integrals – Bernoulli's formula.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : MULTIPLE INTEGRALS 9+3

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

TOTAL : 45+15=60 PERIODS

OUTCOMES

After successfully completing the course, the student will be able to,

- Understand the ideas of matrix and its nature.
- Apply differentiation to solve maxima and minima problems.
- Understand the concept of Partial differentiation and Total derivative.
- Evaluate integrals using techniques of integration such as substitution, partial fractions and integration by parts.
- Apply integration to compute multiple integrals, area, volume, integrals in polar co–ordinates, in addition to change of order and change of variables.

TEXT BOOKS

1. Grewal B.S., "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015.

REFERENCES

1. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
2. Jain R.K. and Iyengar S.R.K.,"Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.
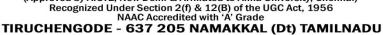
E – RESOURCES

1. https://nptel.ac.in/courses/111/105/111105121/ (Rolle`s Theorem)
2. https://nptel.ac.in/courses/111/105/111105035/ (Linear Algebra)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CYE101   **ENGINEERING CHEMISTRY**   **L T P C**
                                   (Lab Embedded Theory Course)   **3 0 2 4**
                                   (Common to Civil, CSE, ECE ,EEE & Mechanical)

OBJECTIVES

To enable the students to,

- Classify the impurities of water and know the treatment and the conditioning methods for domestic and industrial uses.

- Develop an understanding about fundamentals of polymers.

- Be familiar with the types of corrosion and control measures and working of batteries.

- Gain knowledge about the phase rule and its applications to engineering field.

- Explain the basics of Nanochemistry, synthesis, properties and applications of Nano materials.

- Acquire practical skills in the determination of water quality parameters, molecular weight of polymer, rate corrosion through volumetric and instrumental analysis.

UNIT I : WATER TECHNOLOGY   **9**

Introduction – Characteristics – hardness – estimation of hardness by EDTA method – alkalinity and its estimation – Boiler feed water – requirements – Boilers troubles (Scale and Sludge) – Internal conditioning (colloidal – phosphate – calgon and carbonate conditioning methods) – External conditioning – zeolite process, demineralization process – Desalination of brackish water by reverse osmosis – Municipality water treatment – Break point chlorination.

UNIT II : POLYMER CHEMISTRY   **9**

Introduction – Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types of polymerization: Addition condensation and copolymerization, Properties of polymers: Tg, Tacticity, Molecular weight – weight average, number average and polydispersity index. Preparation, properties and uses of PVC, Nylon 6,6, Polyethylene – Rubbers – types – vulcanization of rubber – Plastics – Moulding constituents of plastics – Moulding of plastics – compression, injection and blow moulding – Biodegradable polymers – Conducting polymers.

UNIT III :CORROSION AND BATTERY TECHNOLOGY   **9**

Corrosion – Types – Chemical Corrosion – Electrochemical Corrosion (galvanic and Differential aeration) – Factors influencing corrosion – Material selection and design aspects – control methods of corrosion – Sacrificial anodic and impressed current cathodic protection – Protective

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

coatings – paints – constituents and their functions – electroplating of Copper – electroless plating of Nickel.

Batteries: Definition, Types – example, Lead acid battery, Lithium ion battery – H2 – O2 fuel cell – solar cell.

UNIT IV : PHASE RULE AND ALLOYS   9

Phase rule – explanation of terms involved – one component system – water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only).

Alloys: Introduction – definition – properties of alloys – significance of alloying, functions and effect of alloying elements – ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

UNIT V :CHEMISTRY OF NANO MATERIALS   9

Nano chemistry – Basics (Surface area to volume ratio-Quantum confinement – 0D, 1D, 2D & 3D) – Distinction between Molecules, Nanoparticles and Bulk Materials – Characterisation of nano materials using XRD and SEM. Synthesis of nano materials: Top down approach – Ball milling – Bottom up approach – Sol-gel method, Chemical vapour deposition – Properties of nanomaterials and Applications of Nanomaterials (Nano products of today).

LIST OF EXPERIMENTS
(Any Eight Experiments to be conducted)

1. Determination of total, temporary & permanent hardness of water by EDTA method.
2. Determination of alkalinity in water sample.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by Argentometric method.
5. Determination of strength of given hydrochloric acid using pH meter.
6. Estimation of sodium and potassium present in water using flame photometer.
7. Determination of molecular weight of polyvinyl alcohol using Ostwald viscometer.
8. Conductometric titration of strong acid vs strong base.
9. Corrosion experiment-weight loss method.
10. Estimation of copper content in the brass by Iodometry.

TOTAL : 45+15=60 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Identify the method of removal of impurities from water for domestic and industrial purpose.
- Identify the different types of polymers, polymerisation processes and some special properties and applications of polymers.
- Analyze the causes of corrosion and discuss the control measures and discuss the functions of batteries.
- Apply of phase rule to alloy making for various engineering applications.
- Discuss the fundamentals of the nano materials and nano products of today.
- Outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

TEXT BOOKS

1. Jain P.C and Monika Jain, "Engineering Chemistry", Dhanpet Rai Publishing Company (P) Ltd.,New Delhi, 2013.
2. Viswanathan B, "Nanomaterials" Alpha Science International Ltd, 2009.

REFERENCES

1. S. S. Dara and S. S. Umare, "A Textbook of Engineering Chemistry", S. Chand & Company LTD, New Delhi, 2015.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw–Hill Publishing Company Ltd, New Delhi, 2012.

E – RESOURCES

1. https://nptel.ac.in/downloads/122101001/ (Corrosion)
2. https://nptel.ac.in/courses/122/101/122101001/ (Atomic Structure)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

ESTD 2001

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

19PHE101	**ENGINEERING PHYSICS**	**L T P C**
	(Lab Embedded Theory Course)	**3 0 2 4**
	(Common to Civil, CSE, ECE, EEE & Mechanical)	

OBJECTIVES

The main objective of this course is to,

- Recognize different lattices and crystal structures.

- Be aware of the basic concepts of stress and strain.

- Know the basics of photonics and its applications.

- Make known the principles of quantum theory.

- Understand the applications of acoustics and ultrasonics in industry.

- Demonstrate experiments to understand basic of Engineering Physics concepts to be applied in optics, thermal physics, properties of matter and liquids.

UNIT I :STRUCTURE OF SOLIDS 9

Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d-Spacing in Cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Crystal Growth Techniques – Solution, melt (Bridgman and Czochralski) and Vapour growth techniques(qualitative).

UNIT II : ELASTICITY 9

Elasticity – Stress – Strain diagram and its uses – Factors affecting elastic modulus and tensile strength – Torsional stress and deformations – Twisting couple – Torsion pendulum: theory and experiment – Bending of beams :Bending moment – Cantilever: Theory and Experiment – Uniform and Non-uniform bending: Theory and experiment – I-Shaped girders.

UNIT III : PHOTONICS 9

Introduction to interaction of radiation with matter – Spontaneous and Stimulated emission – Population Inversion – Derivation of Einstein's A and B coefficients – Principle and working of Laser – Nd:YAG laser – Direct bandgap and indirect bandgap semiconductors – Semiconductor diode Laser – Principle and propagation light in optical fibres – Derivation of Numerical aperture and Acceptance angle – Fibre optic communication system.

UNIT IV : QUANTUM PHYSICS 9

Black body radiation – Planck's theory (derivation) – Compton effect: theory and experimental verification – Wave particle duality – Electron diffraction – Concept of wave function and its Physical significance – Schrödinger's wave equation : Time independent and time dependent equations – Particle in a one-dimensional rigid box – QunatumTunnelling – Tunnelling Electron Microscope.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

ESTD 2001

UNIT V : ACOUSTICS AND ULTRASONICS 9

Classification of sound – decibel – Weber-Fechner law – Sabine's formula – Derivation using growth and decay method – Absorption Coefficient and its determination – Factors affecting acoustics of buildings and their remedies Introduction – Classification of Sound waves – Production of Ultrasonic's by magnetostriction and piezoelectric methods – Acoustic grating – Cavitation– Applications of Ultrasonics.

LIST OF EXPERIMENTS

(Any Eight Experiments to be Conducted)

1. Laser : Determination of wavelength of laser and particle Size.
2. Fiber Optics : Determination of Numerical Aperture and Acceptance angle.
3. Determination of bandgap of semiconductor.
4. Determination of wavelength of mercury spectrum-Spectrometer.
5. Determination of Youngs modulus – Non-Uniform bending.
6. Determination of Youngs modulus – Uniform bending.
7. Torsional Pendulum : Determination of moment of inertia and rigidity modulus.
8. Determination of velocity of ultrasonic in liquid.
9. Determination of Thickness of a thin wire – Air Wedge.
10. Determination of Viscosity of a liquid – Poiseulle's Method.

TOTAL : 45 +15 = 60 PERIODS

OUTCOMES

At the end of the course, the students will be able to

- Apply these basic principles of structures of Engineering materials.
- Make use of materials properties using the knowledge of Elasticity.
- Acquire the concepts of light propagation and its applications in lasers and fibre optics.
- Realize advanced physics concepts of quantum theory and its applications.
- Incorporate the Acoustics and ultrsound applications.
- Apply principles of elasticity,optics and acoustic properties in engineering applications.

TEXT BOOKS

1. Avadhanulu M.N & Kshirsagar P.G, "Text Book of Engineering Physics". S.Chand, 2006.
2. P.Mani, "Engineering Physics Practicals", Dhanam Publications, 2019.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

REFERENCES

1. Raghavan V, "Materials Science and Engineering: A First Course", PHI Publications, 2015.

2. Rajendran V. "Engineering Physics".Tata McGraw Hill Publications, 2012.

E – RESOURCES

1. https://nptel.ac.in/courses/122107035/ (Polarization)

2. https://ocw.mit.edu/courses/physics/ (Introduction)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19GET101	ENGINEERING GRAPHICS	L T P C
	(Common to Civil,CSE,ECE,EEE& Mechanical)	3 0 0 3

OBJECTIVES

The main objective of this course is to,

- Understand the principles in graphic skill to communicate the concepts, ideas and design of engineering components.

- Learn projections of points, lines, planes viewed in different positions.

- Learn the projection of solids viewed in different positions.

- Gain the knowledge about the section of solids and development of surfaces of the given solids.

- Expose the international standards of technical drawing.

UNIT I : GENERAL PRINCIPLES OF ORTHOGRAPHIC PROJECTION   **9**

Graphics significance in engineering applications – study of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – principle of Letter writing and dimensioning.Projections of points, lines and planes. Principles of orthographic projection – First angle projection only – Layout of views – Projection of points located in all quadrant – Projection of polygonal surface and circular lamina inclined to both reference planes.

UNIT II :PROJECTION OF SOLIDS   **9**

Projections of solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT III :SECTION OF SIMPLE SOLIDS   **9**

Section of solids – prisms, pyramids, cylinder and cone. Obtaining sectional views and true shape when the axis of the solid is vertical and cutting plane inclined to one reference plane.

UNIT IV :DEVELOPMENT OF SURFACES   **9**

Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones with cutout, perpendicular and inclined to the horizontal axis

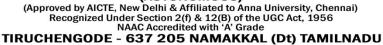**UNIT V : ISOMETRIC AND PERSPECTIVE PROJECTIONS**   **9**

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Conversion of isometric projection into orthographic projection.Perspective projection of prisms, pyramids and cylinders by visual ray method.

TOTAL : 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

The students can be able to,

- Construct multiple views of engineering components.

- Prepare pictorial drawings as per the standards.

- Develop the projection of solids.

- Draw the section of solids drawings and development of surfaces of given objects.

- Apply free hand sketching and concept of isometric in engineering practice.

TEXT BOOKS

1. Venugopal K. and Prabhu Raja V.,"Engineering Graphics", 15th Edition, New Age International (P) Limited, New Delhi, 2018.

2. Natarajan K.V., "Engineering Graphics", 32nd Edition, Dhanalakshmi Publishers, Chennai, 2019.

REFERENCES

1. K.R.Gopalakrishna, "Engineering Drawing Volume 1 & 2", 55th Edition, Subhas Publications, Bangalore, 2017.

2. T.Jeyapoovan, "Engineering Graphics using Auto CAD", 3rd Edition, Vikas Publishing house Pvt Ltd, New Delhi, 2017.

E – RESOURCES

1. https://nptel.ac.in/courses/112/103/112103019/ (Geometric Constructions)

2. https://nptel.ac.in/courses/105/104/105104148/ (Projections)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19GEE101   **COMPUTER FUNDAMENTALS AND PYTHON PROGRAMMING**   **L T P C**
(Lab Embedded Theory Course)   **3 0 2 4**
(Common to Civil, CSE, ECE, EEE & Mechanical)

OBJECTIVES

The main objective of this course is to,

* Enable the student to learn the major components of a computer system and software.

* Know the basics of algorithmic problem solving and fundamentals of python programming.

* Develop simple python programs.

* Define controls and functions in python.

* Use python data structures – lists, tuples and dictionaries.

* Practice the students to work with Word,excel and Python applications.

UNIT I : INTRODUCTION   **9**

Introduction, Characteristics of Computers, Generation and Classifications of Computers, Basic Computer Organization, Computer Software, Types of Software, Software Development Steps, Internet, Getting connected to Internet Applications.

UNIT II : PROBLEM SOLVING AND PYTHON FUNDAMENTALS   **9**

Algorithms, building blocks of algorithms (instructions/statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Introduction to Python: Basics of Python and history of Python – Unique features of Python, interpreter and interactive mode – values and types: int, float, boolean, string, and list; variables.

UNIT III : EXPRESSIONS AND STATEMENTS   **9**

Expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points.

UNIT IV :CONTROL FLOW AND FUNCTIONS   **9**

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions, Strings, Lists as arrays. Illustrative programs: square root, gcd, Tower of Hanoi, exponentiation, sum an array of numbers, linear search, binary search.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : LISTS, TUPLES AND DICTIONARIES   9

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing – list comprehension.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1.   Document Creation, Table Creation and Flow chart.
2.   Spread sheet– Chart, Formula, Sorting.
3.   Compute the GCD of two numbers.
4.   Find the square root of a number (Newton's method).
5.   Exponentiation (power of a number).
6.   Find the maximum of a list of numbers.
7.   Linear search and Binary search.
8.   First n prime numbers.
9.   Multiplication of two matrices.
10. Simulate elliptical orbits in Pygame.

TOTAL : 45 +15=60 PERIODS

OUTCOMES

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

- Know the Computer basics, Components and Sofwares.
- Develop algorithmic solutions to simple computational problems and Read, write, execute by hand simple Python programs.
- Structure simple Python programs for solving problems.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, and dictionaries.
- Apply the practical knowledge on Word,Excel and Python Applications.

TEXT BOOKS

1.   Ashok.N.Kamthane," Computer Programming", Pearson Education (India),2015.
2.   Allen B. Downey, ''Think Python: How to Think Like a Computer Scientist'', 2nd Edition, Shroff/O'Reilly Publishers, 2016.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

REFERENCES

1. Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python Revised and updated for Python 3.2", Network Theory Ltd., 2011.
2. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem–Solving Focus", Wiley India Edition, 2013.

E – RESOURCES

1. https://nptel.ac.in/courses/106/106/106106145/ (Introduction to Algorithms)
2. https://nptel.ac.in/courses/106/106/106106182/ (Joy of Computing)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19EEC101   **LIFE SKILLS FOR ENGINEERS**   **L T P C**
(Employability Enhancement Course)   **0 0 2 0**
(Common to Civil, CSE, ECE, EEE & Mechanical)

OBJECTIVES

To enable the students to,

- Develop communication competence for engineers and enable them to convey thoughts and ideas with clarity and focus.
- Inculcate critical thinking process on problem solving.
- Have an overview on career skills required in their profession.
- Learn professional Ethics and Moral values.
- Lead a team with more responsibilities to be succeedin their endeavour.

UNIT I : COMMUNICATION SKILL   **6**

Introduction to Communication, The Process of Communication, Barriers to Communication, Listening Skills, Non-verbal Communication and Body Language, Interview Skills, Group Discussion, Presentation Skills, Technology-based Communication – Technical Presentation.

UNIT II : CRITICAL THINKING & PROBLEM SOLVING   **6**

Creativity, Lateral thinking, Critical thinking, Multiple Intelligence, Problem Solving, Mind Mapping & Analytical Thinking.

UNIT III : CAREER SKILLS   **6**

Introduction to Employability and Career Skills – developing a long-term career plan – making career changes – Time Management – General awareness of Current Affairs – Stress management – Leadership straits – Team work – Career planning.

UNIT IV : ETHICS MORAL & PROFESSIONAL VALUES   **6**

Human Values, Civic Rights, Engineering Ethics, Engineering as Social Experimentation, Environmental Ethics, Global Issues.

UNIT V : LEADERSHIP SKILLS   **6**

Leadership, Levels of Leadership, Making of a leader, Types of leadership, Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation.

TOTAL : 30 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Communicate effectively and make effective presentations.

- Write different types of reports.

- Face interview & group discussion.

- Critically think on a particular problem.

- Get success in all aspects and develop public skills.

TEXT BOOKS

1. Remesh S and Vishnu R.G,"Life Skills for Engineers", McGraw Hill Education (India) Private Ltd., 2016.

2. E. Suresh Kumar et al.,"Communication for Professional Success",Orient Black swan: Hyderabad, 2015.

REFERENCES

1. Barun K. Mitra;, "Personality Development & Soft Skills", 1st Edition, Oxford Publishers,2011.

2. Kalyana, "Soft Skill for Managers"; 1st Edition, Wiley Publishing Ltd.,2015.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

SEMESTER II

19HST201	COMMUNICATIVE TECHNO ENGLISH II	L T P C
	(Common to Civil, CSE, ECE, EEE & Mechanical)	3 0 0 3

OBJECTIVES

To enable the students to,

- Acquire usage of grammar in English language.
- Enhance the reading skill to comprehend technical writing.
- Improve business writing skills.
- Develop presentation skills in analytical view.
- Help learners to develop their speaking skills and speak fluently in real contexts.

UNIT I : GRAMMAR   **9**

Compound words – prepositions – articles – conditionals – Direct and indirect speeches – subject verb agreement – active and passive voice.

Activity:Grammar worksheets on the given topics.

UNIT II : LANGUAGE ENHANCEMENT THROUGH LISTENING & READING   **9**

Syllabification – sentence stress – Intonation – Listening to You Tube Documentaries – Reading Vocabulary – Reading News Papers – Reading short stories.

Activity: Playing video & TED and identifying stress and intonation.

UNIT III : BUSINESS WRITING   **9**

Writing Recommendations – Checklist – Business Letters – Calling for Quotations, Placing Orders, Letter of Complaint, Letter of Clarification – Cover Letter with Résumé – Report Writing – Accident Report, Industrial Visit Report, Survey Report and Feasibility Report.

Activity: Giving topic and ask the students to prepare checklist and complaint.

UNIT IV :WRITING   **9**

Transcoding Graphics – Bar Chart, Flow Chart, Pie Chart and Tables – Tour Itinerary – Process Description – Agenda and Minutes of meeting.

Activity: Giving charts to the students and ask them to transcode.

UNIT V :SPEAKING   **9**

Collaborative task – Turn taking (initiating and responding appropriately) – Negotiating – Exchanging – suggesting – comparing and contrasting – expressing – Finding out facts, attitudes and opinions – Commonly mispronounced words.

TOTAL : 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Acquire advanced level gramatical knowledge.

- Improve their language usage in LSRW skills.

- Speak fluently using a wide range of vocabulary.

- Acquire the ability to understand different written texts.

- Enhance the writing skills to express the ideas in the business contexts.

TEXT BOOKS

1. S. SumantMaven ,"Technical English II",Vijay Nicole Publishers, 2011.

2. KN Shoba ,Lourdes Joavani Rayen, "Learning Communicative English", Cambridge University, 2017.

REFERENCES

1. Dr.K.Elango, Dr.Veena Selvam, Dr.Sujatha Priyadarshini, "Resonance English for Engineers and Technologists",Cambridge University Press, 1st Edition, Foundation Books,New Delhi, 2013.

2. Seely, John. Oxford, "Guide to Effective Writing and Speaking", Oxford University Press, 2005.

E – RESOURCES

1. https://nptel.ac.in/courses/109/104/109104031/ (Verbal and Non Verbal Communication)

2. https://nptel.ac.in/courses/109/106/109106094/ (Technical English for Engineers)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19MAT201	ENGINEERING MATHEMATICS – II	L T P C
	(Common to Civil, CSE, ECE, EEE & Mechanical)	3 1 0 4

OBJECTIVES

The Course objectives are to,

- Acquire sound knowledge of techniques in solving Ordinary Differential Equations that model engineering problem.
- Acquaint the concepts of vector calculus, needed for problems in all engineering disciplines.
- Understand the concept of bilinear transform and analytic functions.
- Understand the standard techniques of complex integration.
- Use Laplace transforms for solving the problems efficiently that occur in various branches of engineering disciplines.

UNIT I : DIFFERENTIAL EQUATIONS $\qquad$ **9+3**

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients.

UNIT II : VECTOR CALCULUS $\qquad$ **9+3**

Gradient and directional derivative – Divergence and curl – Line integral over a plane curve – Surface integral – Area of a curved surface – volume integral – Green's, Gauss divergence and Stoke's theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III : ANALYTIC FUNCTIONS $\qquad$ **9+3**

Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian and polar coordinates – Properties – Harmonic conjugates – Construction of analytic function – Conformal mapping – Mapping by function $W = \dfrac{1}{z}$ – Bilinear transformation.

UNIT IV : COMPLEX INTEGRATION $\qquad$ **9+3**

Cauchy's integral theorem – Cauchy's integral formula – Laurent's series – Application of residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour.

UNIT V : LAPLACE TRANSFORMS $\qquad$ **9+3**

Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems – Transforms of derivatives and

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

integrals – Inverse transforms – Convolution theorem – Transform of periodic functions – Application to solution of linear second order ordinary differential equations with constant coefficients.

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

After successfully completing the course, the student will be able to,

- Understand Higher order linear differential equations with constant coefficients and variable coefficient.
- Know about Green's,Gauss divergence and Stoke's theorems – Verification and application.
- Practise Analytic functions, conformal mapping and Bilinear transformation.
- Apply residue theorem for evaluation of real integrals on contour integral.
- Use Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.

TEXT BOOKS

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 43rd Edition, 2014.
2. James Stewart, "Calculus: Early Transcendentals", Cengage Learning, 7th Edition, New Delhi, 2015.

REFERENCES

1. Kreyszig Erwin, "Advanced Engineering Mathematics ", John Wiley and Sons, Delhi, 10th Edition, New 2016.
2. Jain R.K. and Iyengar S.R.K., "Advanced Engineering Mathematics", Narosa Publications, New Delhi, 3rd Edition, 2007.

E – RESOURCES

1. https://nptel.ac.in/courses/111/105/111105134/ (Vector Functions)
2. https://nptel.ac.in/courses/122/107/122107036/ (Complex Integration)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CYT201   **ENVIRONMENTAL SCIENCE AND ENGINEERING**   **L T P C**
(Common to Civil, CSE, ECE, EEE & Mechanical)   **3 0 0 3**

OBJECTIVES

To enable the students to,

- Understand the importance of the environment and interrelationship between living organism and environment.

- Understand the various kinds of pollutions.

- Gain knowledge about natural resources and resource management.

- Be familiar with the social issues to improve the quality of environment.

- Gain knowledge about biodiversity,waste management and population explosion.

UNIT I : ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY   11

Definition, scope and importance of environment – need for public awareness – concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, rivers, oceans) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity – India as a mega-diversity nation – hot-pots of biodiversity – threats to biodiversity – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Activity: Biodiversity in and around the campus and report submission.

UNIT II : ENVIRONMENTAL POLLUTION   9

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – e-waste – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake and cyclone.

Activity: Local Pollution Case Study and report submission.

UNIT III : NATURAL RESOURCES   10

Forest resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources.

Activity: Waste to wealth.

UNIT IV : SOCIAL ISSUES AND THE ENVIRONMENT   9

From unsustainable to sustainable development – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – waste land reclamation – Green Chemistry and principles – environment production act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – Public awareness.

Activity: Creating Environmental Awareness.

UNIT V : HUMAN POPULATION AND THE ENVIRONMENT   6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

Activity: Visit to local primary health center.

TOTAL : 45 PERIODS

OUTCOMES

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

- Find scientific, technological, economic and political solutions to environmental problems.
- Invent innovative solutions for pollutions to improve the quality of environment.
- Participate the conservation of natural resources to save earth.
- Promote sustainable development and understand the concept of green chemistry.
- Analyse the effects of human population and issues related to the environment and human health.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

TEXT BOOKS

1. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.

2. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education, 2004.

REFERENCES

1. ErachBharucha, 'Textbook of Environmental Studies', Universities Press(I) Pvt Ltd, Hydrabad, 2015.

2. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India Pvt Ltd, New Delhi, 2007.

E – RESOURCES

1. https://nptel.ac.in/courses/122102006/ (Nature of Environment)

2. https://nptel.ac.in/courses/127/105/127105018/ (Sustainability Concepts)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19PHT202 **SOLID STATE PHYSICS AND NANOELECTRONIC DEVICES** **L T P C**
(Common to CSE, ECE and EEE branches) **3 0 0 3**
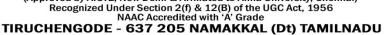
OBJECTIVES

The main objectives of this course is to,

- Learn the basic conduction process in conducting materials.
- Understand the fundamentals of semiconducting materials.
- Develop the knowledge in Superconducting and Dielectric materials
- Aware of the propagation of light phenomenon in optical materials.
- Comprehend the concept of Nano Electronic Devices.

UNIT I : CONDUCTING MATERIALS   9

Conductors – Classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann – Franz law , Lorentz number – Draw backs of classical theory – Ohm's law verification – Fermi Dirac distribution function – Effect of temperature on Fermi Function – Density of energy states – Carrier concentration in metal – Average energy of an electron. Effective mass of electron and Concept of hole.

UNIT II : SEMICONDUCTING MATERIALS   9

Elemental and compound semiconductors – Intrinsic semiconductor – Carrier concentration derivation – Fermi level – Derivation of carrier concentration in n-type and p-type semiconductor – Hall effect and applications – Working of PN junction diode – Schottky diode – Ohmic contacts – Tunnel diode.

UNIT III : SUPERCONDUCTING AND DIELECTRIC MATERIALS   9

Superconductivity: Properties – Type I and Type II superconductors – BCS theory of superconductivity – High Tc superconductors – General applications of superconductors – Cryotron and Magnetic levitation. Dielectric Materials: Electrical susceptibility – Dielectric constant – Electronic, ionic, orientation and space charge polarization – Internal filed and Clausius-Mosotti Relation – Ferro electricity and applications.

UNIT IV : OPTICAL MATERIALS   9

Introduction – optical materials – Carrier generation and recombination processes – Solar cell – Photo detectors – PIN diode – Light Emitting Diode (LED) – Organic Light Emitting Diode (OLED) – Laser diode – Liquid Crystal Display (LCD) – Excitons – Optical data storage techniques – Plasmonics.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : NANO ELECTRONIC DEVICES   9

Introduction – Quantum confinement – Quantum well, quantum wire and quantum dot structure – Tunneling: single electron phenomena and single electron transistor (SET) – Quantum dot laser – quantum bits (qubits) – quantum computing – Carbon Nano Tubes (CNT) structure, properties and applications. Concepts of Molecular Transisitor – Graphene Transistor – Carbon nano tube transistor – Applications of Nanodevices and Nanosensors.

TOTAL : 45 PERIODS

OUTCOMES

At the end of the course, the students will be able to,

- Gain knowledge on classical and quantum electron theories, and energy band structuues.
- Acquire knowledge on basics of semiconductor physics and its applications in various devices.
- Get knowledge on superconducting and dielectric properties of materials.
- Understand the function of optical materials for optoelectronics.
- Expand the knowledge on quantum structures and their applications in spintronics and Nano electronics.

TEXT BOOKS

1. Kasap, S.O., "Principles of Electronic Materials and Devices", McGraw–Hill Education, 2007.
2. Rajendran V., "Engineering Physics". Tata McGraw Hill Publications, 2012.

REFERENCES

1. Garcia, N. & Damask, A. "Physics for Computer Science Students". Springer–Verlag, 2012.
2. Hanson, G.W. "Fundamentals of Nanoelectronics". Pearson Education, 2009.

E – RESOURCES

1. https://nptel.ac.in/downloads/122101002/ (Introduction to Materials)
2. https://swayam.gov.in/nd1_noc19_ph14/preview (Solid State Physics)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

19GET203	BASIC CIVIL AND MECHANICAL ENGINEERING	L T P C
	(Common to CSE, ECE and EEE Branches)	3 0 0 3

OBJECTIVES

The main objectives of this course are, to

- Familiarize the materials and measurements used in Civil Engineering.
- Provide the exposure on the fundamental elements of civil engineering structures.
- Enable the students to distinguish the components and working principle of power plant and pumps.
- Distinguish the components and working principle of IC engines and various sources of energy.
- Understand refrigeration and air condition system, manufacturing and fabrication techniques.

UNIT I : CIVIL ENGINEERING MATERIALS AND SURVEYING   9

Role of civil engineering for the welfare of Society – Introduction – Bricks – stones – sand – cement – concrete – Necessity of special Concrete – steel – timber – modern materials – Surveying : Objects – Classification – Principles – Measurement of Distances – Angles – Levelling – Determination of Areas – Contours – Examples.

UNIT II : BUILDING COMPONENTS AND STRUCTURES   9

Foundations:Soil – General types of soil –Types of foundations – Bearing capacity and settlement – Factors affecting bearing capacity – Requirement of good foundations – causes of failure of foundations. Civil Engineering Structures: Super structure:Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering – Types of Bridges and Dams – floor area, carpet area – Classification and purposes governing selection of site – Water supply – sources and quality of water – Rain water harvesting.

UNIT III : POWER PLANT ENGINEERING   9

Introduction, Classification of Power Plants – Working principle of steam, Gas, Diesel, Hydro – electric and Nuclear Power plants – Merits and Demerits.

Pumps – working principle of Reciprocating Pumps (single acting and double acting) and Centrifugal Pumps, Turbines – working principle of Impulse and reaction turbine.

UNIT IV : IC ENGINES AND ALTERNATE SOURCES OF ENERGY   9

Internal combustion engines – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Automobile – important

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

components and its functions. Alternate Energy sources – Solar energy, Wind energy, Tidal and Geothermal energy.

UNIT V : AIR CONDITIONING AND MANUFACTURING TECHNOLOGY 9

Terminology of Refrigeration and Air Conditioning. Principle of vapour compression – Layout of typical domestic refrigerator – Window and Split type room Air conditioner. Principle and applications of Metal forming process – Foundry, Forging and Metal joining process – Welding.

TOTAL : 45 PERIODS

OUTCOMES

Upon completion of this course, the students can,

- Know the various functions of Civil Engineer and to identify the suitable construction materials.
- Demonstrate the various elements of sub–structure and super–structure.
- understand the basic concepts in thermal engineering and fluid mechanics.
- Display the IC engine working principles of various energy sources.
- Exhibit an understanding of principles and applications of mechanical power transmission components and basic manufacturing process.

TEXT BOOKS

1. K.Venugopal, V.Praburaja, G,.Sreekanjana "Basic Civil and Mechanical Engineering" Anuradha Publications, Chennai, 2001.
2. Shanmugam.G and Palanichamy.MS, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Publishing Co.,NewDelhi, 2018.

REFERENCES

1. Dr.B.C.Punmic, AshokeK.Jain, ArunK.Jain, "Basic Civil Engineering",Laxmi publications (P) LTD, New Delhi, 2008.
2. Shantha Kumar S R J., "Basic Mechanical Engineering", Hi–tech Publications.

E – RESOURCES

1. https://nptel.ac.in/courses/105/102/105102088/ (Functions of Buildings)
2. https://nptel.ac.in/courses/122/104/122104015/ (Engineering Mechanics)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSE201	**C PROGRAMMING**	**L T P C**
	(Lab Embedded Theory Course)	3 0 2 4

OBJECTIVES

The main objectives of this course are, to

- Develop C Programs using basic programming constructs.

- Develop C programs using arrays and strings.

- Know the applications in C using functions.

- Understand pointers and structures.

- Do input/output and file handling in C and perform read and write operations on file.

- Apply the practical knowledge through the various concepts in C.

UNIT I : BASICS OF C PROGRAMMING   **9**

Introduction to programming paradigms – Structure of C program – C programming: Data Types– variables–Storage classes – Constants – Enumeration Constants – Keywords – Operators: Precedence and Associativity – Expressions –Input/Output statements, Assignment statements – Decision making statements – Switch statement – Looping statements – Pre-processor directives – Compilation process.

UNIT II : ARRAYS AND STRINGS   **9**

Introduction to Arrays: Declaration, Initialization – One dimensional array – Example Program**:** Computing Mean, Median and Mode – Two dimensional arrays – Example Program: Matrix Operations (Addition, Scaling, Determinant and Transpose) – String operations: length, compare, concatenate, copy –Sorting – Selection sort, Insertion sort, Merge sort, quick sort – Searching – linear and binary search.

UNIT III : FUNCTIONS AND POINTERS   **9**

Introduction to functions: Function prototype, function call, Built–in functions (string functions, math functions) – Recursion – Example Program: Computation of Sine series, Scientific calculator using built-in functions – Pointers – Pointer operators – Arrays and pointers – Example Program: Sorting of names – Parameter passing: Pass by value, Pass by reference – Example Program: Swapping of two numbers and changing the value of a variable using pass by reference.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT IV :STRUCTURES   9

Structure – Example Programs – Nested structures – Pointer in Structures – Array of structures – Example Program using structures and pointers – Self referential structures – Dynamic memory allocation.

UNIT V :FILE PROCESSING   9

Files – Operations of File – Types of file processing: Sequential access, Random access – Sequential access file – Random access file – Command line arguments.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Programs using I/O statements,expressions and decision–making constructs.
2. Write a program to find whether the given year is leap year or Not.
3. Design a calculator to perform the operations, namely, addition, subtraction, multiplication, division and square of anumber.
4. Check whether a given number is Armstrong number ornot?
5. Given a set of numbers like <10, 36, 54, 89, 12, 27>, find sum of weights based on the following conditions.

   a) 5 if it is a perfectcube.
   b) 4 if it is a multiple of 4 and divisible by6.
   c) 3 if it is a prime number.

6. Sort the numbers based on the weight in the increasing order as shown below
   <10,its weight>, <36,its weight> <89,its weight>
7. Populate an array with height of persons and find how many persons are above the average height.
8. From a given paragraph perform the following using built–infunctions:(i)Find the total number ofwords.(ii)Capitalize the first word of eachsentence.(iii)Replace a given word with anotherword.
9. Solve towers of Hanoi using recursion.
10. Generate salary slip of employees using structures and pointers.
11. Count the number of account holders whose balance is less than the minimum balance using sequential accessfile.

TOTAL: 45 +15= 60PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Develop C programs for simple applications making use of basic constructs,
- Develop C programs for simple applications making use of basic arrays and strings.
- Develop C programs involving functions, recursion and pointers
- Develop C programs using structures.
- Design applications using sequential and random access file processing.
- Do logics for various programming methodologies.

TEXT BOOKS

1. E.Balagurusamy,"Programming in ANSI C", Tata McGraw Hill, 8th Edition, 2019.
2. Kernighan, B.W and Ritchie,D.M,"The C Programming language", 2nd Edition, Pearson Education, 2006.

REFERENCES

1. ReemaThareja, "Programming in C", Oxford University Press, 2nd Edition, 2016.
2. Juneja, B. L and Anita Seth, "Programming in C", CENGAGE Learning India pvt.Ltd., 2011.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105085/ (Introduction to C Programming)
2. https://nptel.ac.in/courses/106/106/106106210/ (Stack Operations)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19EEC201	**TECHNICAL SKILL (MULTIMEDIA)**	**L T P C**
	(Employability Enhancement Course)	**0 0 2 0**

OBJECTIVES

The main objective of this course is to,

- Explore the various multimedia editing tools like Flash and Photoshop.

- Know about the multimedia software tools and can interact with multimedia practically.

- Know the animation techniques in Flash.

- Enable to understand layers in Photoshop.

- Enhance the skills to do image processing.

- Exploit animations and games.

LIST OF TECHNICAL SKILLS TO BE LEARNED

Flash:

1. To create an animation to represent the growing moon.

2. To create an animation to indicate a ball bouncing on steps.

3. To change a circle into a square using flash.

4. To display the background given(filename: tulip.jpg) through your name.

5. To draw the fan blades and to give proper animation.

Photoshop:

6. To Design a visiting card containing atleast one graphic and text information.

7. To preparea cover page for thebook in your subject area. plan your own design.

8. To adjust the brightness and contrast of the picture so that it gives an elegant look.

9. To use appropriate tool(s) from the toolbox, cut the objects from 3 files.

    (f1.jpg, f2.jpg & f3.jpg); organise them in a single file and apply feather effects.

10. Apply crop, canvas and clone tools in an image.

TOTAL: 20 PERIODS

OUTCOMES

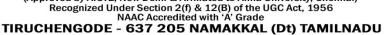Upon completion of the course, the students will be able to,

- Apply the tools on Photoshop.

- Create an application using Photoshop.

- Process the element using flash.

- Create animations.

- Understand the process of image processing.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

SEMESTER III

19MAT301 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS   **L T P C**
(Common to Civil, CSE, ECE, EEE & Mechanical)   **3 1 0 4**

OBJECTIVES

The objective of this course will enable students to,

- Introduce the basic concepts of PDE for solving standard partial differential equations.
- Introduce Fourier series analysis which is central to many applications in engineering apart from its use in solving boundary value problems.
- Acquaint the student with Fourier series techniques in solving heat flow problems used in various situations.
- Acquaint the student with Fourier transform techniques used in wide variety of situations.
- Introduce the effective mathematical tools for the solutions of partial differential equations that model several physical processes and to develop Z transform techniques for discrete time systems.

UNIT I : PARTIAL DIFFERENTIAL EQUATIONS   9+3

Formation of partial differential equations – Singular integrals – Solutions of standard types of first order partial differential equations – Lagrange's linear equation – Linear partial differential equations of second and higher order with constant coefficients of homogeneous types.

UNIT II : FOURIER SERIES   9+3

Dirichlet's conditions – General Fourier series – Odd and even functions – Half range Sine and Cosine series – Parseval's identity – Harmonic analysis.

UNIT III : APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS   9+3

Classification of partial differential equations – Method of separation of variables – Fourier Series Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two dimensional equation of heat conduction.

UNIT IV : FOURIER TRANSFORMS   9+3

Statement of Fourier integral theorem – Fourier transform pair – Fourier sine and cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : Z – TRANSFORMS AND DIFFERENCE EQUATIONS   **9+3**

Z-transforms – Elementary properties – Inverse Z-transform (using partial fraction and residues) – Initial and final value theorems – Convolution theorem – Solution of difference equations using Z-transform.

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

After successfully completing the course, the student will be able to,

- Understand how to solve the given standard partial differential equations.
- Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
- Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.
- Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
- Use the effective mathematical tools for the solutions of partial differential equations by using Z– transform techniques for discrete time systems.

TEXT BOOKS

1. Grewal B.S., "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, New Delhi, 2014.
2. Narayanan S., ManicavachagomPillay.T.K and Ramanaiah.G "Advanced Mathematics for Engineering Students", Vol. II & III, S.Viswanathan Publishers Pvt. Ltd, Chennai, 1998.

REFERENCES

1. N.P. Bali and Manish Goyal, "A Textbook of Engineering Mathematics", 9th Edition, Laxmi Publications Pvt. Ltd, 2014.
2. Erwin Kreyszig, "Advanced Engineering Mathematics",10th Edition, John Wiley,India,2016.

E – RESOURCES

1. https://nptel.ac.in/courses/111/105/111105035/ (Review Groups, Fields and Matrices)
2. https://nptel.ac.in/courses/111105035/27 (Complex Variables)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CST301	DATA STRUCTURES	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand the concepts of ADTs.
- Learn linear data structures – lists, stacks, and queues.
- Understand sorting algorithms.
- Apply Tree and Graph structures.
- Analyze searching and hashing techniques.

UNIT I : LINEAR DATA STRUCTURES – LIST   **9**

Abstract Data Types (ADTs) – List ADT – array-based implementation – linked list implementation – singly linked lists – circularly linked lists – doubly linked lists – applications of lists – Polynomial Manipulation – All operations (Insertion, Deletion, Merge, Traversal).

UNIT II : LINEAR DATA STRUCTURES – STACKS, QUEUES   **9**

Stack ADT – Operations – Applications – Evaluating arithmetic expressions – Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue – Priority Queue – deQueue – applications of queues.

UNIT III : NON LINEAR DATA STRUCTURES – TREES   **9**

Tree ADT – tree traversals – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT –Threaded Binary Trees – AVL Trees – B-Tree – B+ Tree – Red-Black trees – Splay trees – Heap – Applications of heap.

UNIT IV : NON LINEAR DATA STRUCTURES – GRAPHS   **9**

Definition – Representation of Graph – Types of graph – Breadth-first traversal – Depth-first traversal – Topological Sort – Minimum Spanning Trees – Kruskal and Prim algorithm – Shortest path algorithm – Dijkstra"s algorithm – Floyd-Warshall algorithm. Bi-connectivity – Cut vertex – Euler circuits – Applications of graphs.

UNIT V : SEARCHING, SORTING AND HASHING TECHNIQUES   **9**

Searching – Linear Search – Binary Search. Sorting – Bubble sort – Selection sort – Insertion sort – Shell sort – Radix sort. Hashing – Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

At the end of the course, the student should be able to,

- Implement abstract data types for linear data structures.

- Apply the different linear and non-linear data structures to problem solutions.

- Critically analyze the various sorting algorithms.

- Apply the hashing techniques to organize memory

- Analyze the various searching algorithms.

TEXT BOOKS

1. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education,1997.

2. ReemaThareja, "Data Structures Using C", 2nd Edition , Oxford University Press, 2011.

REFERENCES

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, Clifford Stein, "Introduction to Algorithms", 2nd Edition, Mcgraw Hill, 2002.

2. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education,1983.

E – RESOURCES

1. https://nptel.ac.in/courses/106/102/106102064/ (Introduction to Data Structures and Algorithms)

2. https://nptel.ac.in/courses/106/103/106103069/ (Searching and Sorting)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CST302   **COMPUTER ORGANIZATION AND ARCHITECTURE**   **L T P C**
3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Learn the basic structure and operations of a computer.
- Learn the arithmetic and logic unit and implementation of fixed–point and floating point arithmetic unit.
- Study the concepts of pipelining.
- Understand the nano programming concepts.
- Learn the hierarchical memory system including cache and virtual memories.

UNIT I : BASIC STRUCTURE OF COMPUTERS   9

Functional units – Basic operational concepts – Bus structures – Performance and metrics – Instructions and instruction sequencing – Hardware – Software Interface – Instruction set architecture – Addressing modes – RISC – CISC. ALU design – Fixed point and floating point operations.

UNIT II : ARITHMETIC FOR COMPUTERS   9

Addition and Subtraction – Multiplication – Division – Floating Point Representation – Floating Point Operations – Subword Parallelism.

UNIT III : BASIC PROCESSING UNIT   9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control – Nano programming.

UNIT IV : PIPELINING   9

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.

UNIT V : MEMORY I/O ORGANIZATION   9
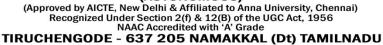
Cache memories – Improving cache performance – Virtual memory – Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

On Completion of the course, the students should be able to,

- Understand the basics structure of computers, operations and instructions.
- Understand pipelined execution and design control unit.
- Understand parallel processing architectures.
- Apply the DMA Concepts in I/O Communications.
- Learn the Nano Programming Techniques.

TEXT BOOKS

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky and NaraigManjikian,"Computer Organization and Embedded Systems", 6th Edition, Tata McGraw Hill, 2014.
2. M.Morris Mano, "Computer System Architecture", 3rd Edition, McGraw Hill Reprint, 2012.

REFERENCES

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 8th Edition, Pearson Education, 2010.
2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software interface", 3rd Edition, Elsevier, 2005.

E – RESOURCES

1. https://nptel.ac.in/courses/106/103/106103068/ (Representation of Information)
2. https://nptel.ac.in/courses/106/105/106105163/ (Evolution of Computer Systems)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

19ECT302   **ANALOG AND DIGITAL COMMUNICATION**   **L T P C**
                                                                                         3 0 0 3

OBJECTIVES

The students should be able to,

- Introduce the relevance of this course to the existing technology through demonstrations, case studies, simulations, contributions of scientist, national/international policies with a futuristic vision along with socio–economic impact and issues.
- Study the various analog and digital modulation techniques.
- Understand the principles behind information theory and coding.
- Study the various digital communication techniques.
- Familiarize with Information coding Techniques.

UNIT I : ANALOG MODULATION   **9**

Amplitude Modulation – AM, DSBSC, SSBSC, VSB – PSD, modulators and demodulators – Angle modulation – PM and FM – PSD, modulators and demodulators – Superheterodyne receivers.

UNIT II : PULSE MODULATION   **9**

Low pass sampling theorem – Quantization – PAM – Line coding – PCM, DPCM, DM, and ADPCM And ADM, Channel Vocoder – Time Division Multiplexing, Frequency Division Multiplexing.

UNIT III : DIGITAL MODULATION AND TRANSMISSION   **9**

Phase shift keying – BPSK, DPSK, QPSK – Principles of M-ary signaling M-ary PSK & QAM – Comparison, ISI – Pulse shaping – Duo binary encoding – Cosine filters – Eye pattern, equalizers.

UNIT IV : INFORMATION THEORY AND CODING   **9**

Measure of information – Entropy – Source coding theorem – Shannon-Fano coding, Huffman Coding, LZ Coding – Channel capacity – Shannon-Hartley law – Shannon's limit – Error control codes – Cyclic codes, Syndrome calculation – Convolution Coding, Sequential and Viterbi decoding.

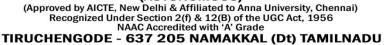**UNIT V : SPREAD SPECTRUM AND MULTIPLE ACCESS**   **9**

PN sequences – properties – m-sequence – DSSS – Processing gain, Jamming – FHSS – Synchronisation and tracking – Multiple Access – FDMA, TDMA, CDMA.

TOTAL : 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

Upon Completion of the course, the students will be able to,

- Comprehend and appreciate the significance and role of this course in the present contemporary world.
- Apply analog and digital communication techniques.
- Use data and pulse communication techniques.
- Analyze Source and Error control coding.
- Know about information coding techniques.

TEXT BOOKS

1. H Taub, D L Schilling, G Saha, "Principles of Communication Systems", 3rd Edition, TMH 2007.
2. S. Haykin,"Digital Communications",John Wiley, 2005.

REFERENCES

1. B.P.Lathi, "Modern Digital and Analog Communication Systems", 3rd edition, Oxford University Press, 2007.
2. H P Hsu,"Analog and Digital Communications", Schaum Outline Series,TMH, 2006.

E – RESOURCES

1. https://nptel.ac.in/courses/117/105/117105143/ (Fourier Series).
2. https://nptel.ac.in/courses/117/102/117102059/ (Communication Engineering)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSE301	OBJECT ORIENTED PROGRAMMING	L T P C
		3 0 2 4

OBJECTIVES

The student should be able to,

- Understand the Concept of Object Oriented Programming
- Understand multithreading.
- Impart the knowledge of java fundamentals.
- Apply the concepts of exception handling.
- Understand emerging trends of Generic Programming.
- Familiarize with all the concepts in Java.

UNIT I : OVERVIEW   **9**

Object Oriented Programming – Abstraction – objects and classes – Encapsulation – Inheritance – Polymorphism – Data Hiding and Member Functions – Object Creation and Destruction – OOP in Java – Characteristics of Java – The Java Environment – Java Source File Structure – Compilation.

UNIT II : JAVA FUNDAMENTALS   **9**

Fundamental Programming Structures in Java – Defining classes in Java – constructors, methods – access specifiers – static members – Comments, Data Types, Variables,Operators, Control Flow, Arrays , Packages – JavaDoc comments.

UNIT III : INHERITANCE AND INTERFACES   **9**

Inheritance – Super classes – sub classes – Protected members – constructors in sub classes – the Object class – abstract classes and methods – final methods and classes – Interfaces – defining an interface, implementing interface, differences between classes and interfaces and extending interfaces – Object cloning –inner classes, Array Lists – Strings.

UNIT IV : EXCEPTION HANDLING AND I/O   **9**

Exceptions – exception hierarchy – throwing and catching exceptions – built-in exceptions, creating own exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files

UNIT V : MULTITHREADING AND GENERIC PROGRAMMING   **9**

Differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, Inter-thread communication, daemon threads, thread groups.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF EXPERIMENTS

1. Develop a Java application to generate Electricity bill.

2. Develop a java application to implement currency converter using packages

3. Design a Java interface for ADT Stack. Implement this interface using array.

4. Write a program to perform string operations using ArrayList.

5. Write a Java program to implement user defined exception handling.

6. Write a java program that implements a multi–threaded application.

7. Write a java program to find the maximum value from the given type of elements using a generic function.

8. Develop a mini project for any application using Java concepts.

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

Upon completion of course, students will be able to,

- Gain the basic knowledge on Object Oriented concepts.

- Develop the applications using Java.

- Implement Multithreading concepts in real time environment.

- Apply Generic Programming.

- Understand the concepts of exception handling.

- Apply the concepts to produce solutions for various problems.

TEXT BOOKS

1. Herbert Schildt, "Java The complete reference", 8th Edition, McGraw Hill Education, 2011.

2. Cay S. Horstmann, Gary cornell, "Core Java Volume – I Fundamentals", 9th Edition, Prentice Hall, 2013.

REFERENCES

1. Paul Deitel, Harvey Deitel, "Java SE 8 for programmers", 3rd Edition, Pearson, 2015.

2. Steven Holzner, "Java 2 Black book", Dreamtech press, 2011.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105153/ (Challenges in OOPS)

2. https://nptel.ac.in/courses/106/105/106105191/ (Programming in Java)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

19ECE301	DIGITAL ELECTRONICS	L T P C
		3 0 2 4

OBJECTIVES

The main objective of this course is to,

* Introduce basic postulates of Boolean algebra and shows the correlation between Boolean expressions.

* Introduce the methods for simplifying Boolean expressions.

* Outline the formal procedures for the analysis and design of combinational circuits and sequential circuits.

* Introduce the concept of memories and programmable logic devices.

* Illustrate the concept of synchronous and asynchronous sequential circuits.

* Design combinational circuits using basic gates.

UNIT I : DIGITAL FUNDAMENTALS 9

Number Systems – Decimal, Binary, Octal, Hexadecimal, 1's and 2's complements, Codes – Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization.

UNIT II : COMBINATIONAL CIRCUIT DESIGN 9

Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder – Carry look ahead Adder, BCD Adder, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder, Verilog HDL for combinational circuits.

UNIT III : SYNCHRONOUS SEQUENTIAL CIRCUITS 9

Flip flops – SR, JK, T, D, Master/Slave FF – operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits – Design – Moore/Mealy models, state minimization, state assignment, circuit implementation – Design of Counters – Ripple Counters, Ring Counters, Shift registers, Universal Shift Register.

UNIT IV : ASYNCHRONOUS SEQUENTIAL CIRCUITS 9

Stable and Unstable states, output specifications, cycles and races, state reduction, race free assignments, Hazards, Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits, ASM chart.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : MEMORY DEVICES AND DIGITAL INTEGRATED CIRCUITS 9

Basic memory structure – ROM – PROM – EPROM – EEPROM – EAPROM, RAM – Static and dynamic RAM – Programmable Logic Devices – Programmable Logic Array (PLA) – Programmable Array Logic (PAL) – Field Programmable Gate Arrays (FPGA) – Implementation of combinational logic circuits using PLA, PAL.

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Verification of Boolean theorems using digital logic gates.
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
3. Design and implementation of 4–bit binary adder / subtractor using basic gates and MSI devices.
4. Design and implementation of parity generator / checker using basic gates and MSI devices.
5. Design and implementation of magnitude comparator.
6. Design and implementation of application using multiplexers/ demultiplexers
7. Design and implementation of Shift registers.
8. Design and implementation of Synchronous and Asynchronous counters
9. Simulation of combinational circuits and sequential circuits using Hardware Description Language (VHDL/Verilog HDL software required)
10. Design and implementation of a simple digital system (Mini Project).

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

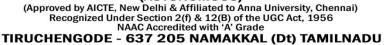Upon completion of the course, Students will be able to,

- Analyze different methods used for simplification of Boolean expressions.
- Design and implement Combinational circuits.
- Design and implement synchronous and asynchronous sequential circuits.
- Write simple HDL codes for the circuits.
- Understand the concepts of memory.
- Design combinational circuits and simple digital system using basic gates.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

ESTD 2001

TEXT BOOKS

1. M. Morris R. Mano, Michael D. Ciletti, "Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog", 6th Edition, Pearson Education, 2017.

2. David Harris ,"Digital Design and Computer Architecture", Morgan Kaufmann,2012.

REFERENCES

1. G. K. Kharate, "Digital Electronics", Oxford University Press, 2010

2. John F. Wakerly,"Digital Design Principles and Practices", 5th Edition,Pearson Education, 2017.

E – RESOURCES

1. https://nptel.ac.in/courses/117/106/117106086/ (Digital Design)

2. https://nptel.ac.in/courses/108/105/108105132/ (Integrated Circuits)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19EEC301	COMMUNICATION SKILLS	L T P C
		0 0 2 0

OBJECTIVES

The purpose of learning this course is to

- Improve fluency in English through well developed vocabulary.
- Improve the oral communication skills.
- Focus the effective reading of general and technical text.
- Improve writing skill.
- Communicate ideas in group discussion and interviews.

UNIT I : VOCABULARY   **6**

Vocabulary building – articulate ideas and thoughts; usage of palindromes,greetings, wishes, festival related words – homophones and homonyms – connotation – vocabulary words with sentences. – Idiomatic Expressions – One-word Substitutes.

Activities: Learn a word a week, Use newspaper to write unfamiliar words, Word association games.

UNIT II : LISTENING   **6**

Listening Skill – Its importance – Purpose – Process– Types – Barriers – Effective Listening strategies – Listening and note-taking – Listening to telephonic conversations – Ted talks – Watching Inspiring Speech videos on You tube – Listening native speaker's videos for pronunciation.

Activities:Listen and draw the different scenes in a story, Secret Message games,watching videos and listing difficult words.

UNIT III : SPEAKING   **6**

JAM Talk – Role play – Debate – Conversational skills (formal and informal) – Conversation practice – group discussion and interview skills – Introducing oneself and others – Presentation skills – Making presentations (individual and group) through seminars / PPTs.

Activities: Picture Description, Giving Directions and Guidelines, Making a short speech – Extempore.

UNIT IV : READING   **6**

Strategies for effective reading (Guessing meanings from contexts – Scanning, skimming, inferring meaning and critical reading) – Read and recognize different text types ranging from newspaper articles, magazines, books, Technical articles and Reading autobiographies.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

Activities:Reading online sources like e-books, e-journals and e-newspapers,cloze exercises,Reading and answering questions.

UNIT V : WRITING   6

Develop a paragraph: topic sentence, supporting sentences, concluding sentence – Writing simple Essays – argument, descriptive and comparative essays – Creative writing.

Activities: Write Essays with sub titles,Write a story that uses as many clichés and idioms, Write Paragraph.

TOTAL : 30 PERIODS

The following Practice Session will be conducted for the Communication Skills (CS) Lab sessions:

- Activities on Presentations Skills – Students make presentations on given topics.
- Activities on Group Discussion – Students participate in group discussions.
- Interview Skills – Students participate in Mock Interviews.
- Essay Writing – Students prepare their own paragraph and essay.

Guidelines for conducting assessments as per 2019 regulations

- 30 hours – Two consecutive hours allotted for each class.
- Three Continuous assessments only conducted and no end semester exam.
- For the award of Continuous assessment the best three activities from Essay Writing, Oral Presentation, Extempore,Group Discussion and Mock Interview (one –on – one basis) can be taken.

OUTCOMES

At the end of this course, learners will be able to

- Improve vocabulary and express the same contextually
- Communicate to his peer group properly and make presentations
- Comprehend the general and technical text
- Write simple paragraph and essay in any topic
- Participate in group discussions expressing ideas relevantly, coherently and cogently

TEXT BOOKS

1. Gramer F. Margot and Colin S. Ward,"Reading and Writing (Level 3)", Oxford University Press: Oxford, 2011
2. Brooks,Margret,"Skills for Success. Listening and Speaking. Level 4", Oxford University Press, Oxford, 2011

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

REFERENCES

1. Davis, Jason and Rhonda LIss,"Effective Academic Writing (Level 3)", Oxford University Press: Oxford, 2006.

2. E. Suresh Kumar and et al.,"Enriching Speaking and Writing Skills",2nd Edition,Orient Black swan.

E – RESOURCES

1. www.youglish.com (Introduction)

2. www.Newwellington University.com (Reading and Writing Skills)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19MDC301	**LEADERSHIP ENHANCEMENT PROGRAMME**	**L T P C**
	(Common to Civil,CSE,ECE,EEE & Mechanical)	**1 0 0 0**

OBJECTIVES

The objective of the course is enabling the students to,

- Find new, innovative ways of developing and managing people.

- Develop new business opportunities.

- Tackle the broader societal issues the face.

- Key benefits of leadership skills in different situations.

- formulate and implement effective leadership strategies.

TOIPICS TO BE COVERED

1. Leadership for an Engineering students: Skills & Strategies.

2. Qualities of good leaders and 21 irrefutable laws of Leadership.

3. Empowering Others and Managing People.

4. Leading Meetings.

5. Leadership competencies and Leadership Styles.

6. Difference between a boss and a leader.

7. Leadership and Assertiveness Skills : A Good Leader, Leadership Theories, Leadership Behaviour , Assertiveness skills.

8. Leadership development opportunities and suggestions.

9. Teamwork and Leadership : Concept of teams , Building Effective teams, Concept of leadership and sharpening leadership skills.

10. Teamwork and Leadership Activities : Group discussion, Solving Puzzle as a team, describing a leadership style.

TOTAL : 12 PERIODS

OUTCOMES

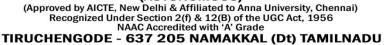At the end of the course, the students will be able to,

- Develop the capabilities needed to increase team's work productivity.

- Help to decrease employee turnover and increase engagement, creating a strong and united team.

- Develop communication skills, mastering the art of negotiation, influence and conflict management.

- More confident as a leader and find new ways of influencing the teams they lead.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

- Effectively connect to people, developing the ability to give constructive feedback, and critically seek the feedback of the team.

TEXT BOOKS

1. John maxwell, "21 Irrefutable Laws of Leadership", 2008.
2. Louis carter ,David ulrich , Marshall goldsmith,"Best practices in leadership development and Organization change".

REFERENCES

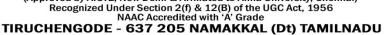1. Barry Benator, Albert Thumann,"Project Management and Leadership Skills for Engineering and Construction Projects", 2003.
2. Sydänmaanlakka Pentti. "Intelligent leadership and leadership competencies". Dissertation Series.

E – RESOURCES

1. https://nptel.ac.in/courses/122/105/122105021/ (Introduction to Leadership)
2. www.ccl.org/leadership/research/index.aspx. (Leadership and Assertive Skills)

![Sengunthar Engineering College logo]

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

SEMESTER IV

19MAT401   **PROBABILITY AND QUEUEING THEORY**   **L T P C**
                                                               3 1 0 4

OBJECTIVES

The objective of the course is enabling the students to,

* Provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of Science and Engineering.

* Understand the one and two dimensional random variables and to introducing some standard distributions.

* Understand the basic concepts of random processes which are widely used in IT fields.

* Understand the concept of queueing models and apply in engineering.

* Provide the required mathematical support in real life problems and develop probabilistic models which can be used in several areas of science and engineering.

UNIT I : PROBABILITY AND RANDOM VARIABLES   9+3

Probability – Axioms of probability – Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential and Normal distributions.

UNIT II : TWO – DIMENSIONAL RANDOM VARIABLES   9+3

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III : RANDOM PROCESSES   9+3

Classification – Stationary process – Markov process – Poisson process – Discrete parameter Markov chain – Chapman Kolmogorov equations – Limiting distributions.

UNIT IV : QUEUEING MODELS   9+3

Markovian queues – Birth and death processes – Single and multiple server queueing models – Little's formula – Queues with finite waiting rooms – Queues with impatient customers : Balking and reneging.
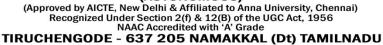
UNIT V : ADVANCED QUEUEING MODELS   9+3

Finite source models – M/G/1 queue – Pollaczek Khinchin formula – M/D/1 and M/E$_K$/1 as special cases – Series queues – Open Jackson networks.

TOTAL : 45+15 = 60 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

After successfully completing the course, the student will be able to,

- Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.
- Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.
- Apply the concept of random processes in engineering disciplines.
- Acquire skills in analyzing queueing models.
- Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner.

TEXT BOOKS

1. Gross, D., Shortle, J.F, Thompson, J.M and Harris. C.M, "Fundamentals of Queueing Theory", Wiley Student, 4th Edition, 2014.
2. Ibe, O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2007.

REFERENCES

1. Hwei Hsu, "Schaum's Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill Edition, New Delhi, 2004.
2. Taha,H.A., "Operations Research",9th Edition, Pearson India Education Services, Delhi, 2016.

E–RESOURCES

1. https://nptel.ac.in/courses/111/106/111106053/ (Review of Set Theory)
2. https://swayam.gov.in/nd1_noc19_ma22/preview (Higher Engineering Mathematics)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CST401   DESIGN AND ANALYSIS OF ALGORITHMS   L T P C
                                                                   3 1 0 4

OBJECTIVES

The objective of the course is enabling the students to,

- Understand and apply the algorithm analysis techniques.
- Critically analyze the efficiency of alternative algorithmic solutions for the same problem.
- Understand different algorithm design techniques.
- Understand the limitations of Algorithmic power.
- Solve P and NP complete problems.

UNIT I : INTRODUCTION   9+3

Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithm Efficiency – Asymptotic Notations andits properties. Analysis Framework – Empirical Analysis – Mathematical analysis for Recursive and Non–recursive algorithms – Visualization.

UNIT II : BRUTE FORCE AND DIVIDE–AND–CONQUER   9+3

Brute Force – Computing an String – String Matching – Closest – Pair and Convex – Hull Problems – Exhaustive Search – Traveling Salesman Problem – Knapsack Problem – Assignment problem. Divide and conquer methodology – Binary search– Merge sort – Quick sort – Heap Sort – Multiplication ofLarge Integers – Closest–Pair and Convex–Hull Problems.

UNIT III : DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE   9+3

Dynamic programming – Principle of optimality – Coin changing problem – Computinga Binomial Coefficient – Floyd's algorithm – Multi Stage Graph – Optimal Binary Search Trees – Knapsack Problem and Memory functions.Greedy Technique – Container Loading Problem – Prim's algorithm and Kruskal's Algorithm – 0/1 Knapsack Problem – Optimal Merge Pattern – Huffman Trees.

UNIT IV : ITERATIVE IMPROVEMENT   9+3

The Simplex Method –The Maximum-Flow Problem – Maximum Matching in BipartiteGraphs – The Stable marriage Problem.

UNIT V : COPING WITH THE LIMITATIONS OF ALGORITHM POWER   9+3

Lower-Bound Arguments – P, NP NP-Complete and NP Hard Problems – n-Queen Problem – Hamiltonian Circuit Problem – Subset Sum Problem. Branch and Bound – LIFO Search and FIFO Search – Assignment problem – Knapsack Problem – Traveling Salesman Problem.

TOTAL:45+15= 60 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

Upon completion of the course, Students will be able to,

- Design algorithms for various computing problems.
- Analyze the time and space complexity of algorithms.
- Critically analyze the different algorithm design techniques for a given problem.
- Modify existing algorithms to improve efficiency.
- Solve P and NP Complete Problems.

TEXT BOOKS

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", 3rd Edition, Pearson Education, 2012.
2. Ellis Horowitz, SartajSahni and Sanguthevar Rajasekaran, "Computer Algorithms/C++", 2nd Edition, Universities Press, 2007.

REFERENCES

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", 3rd Edition, PHI Learning Private Limited, 2012.
2. Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, "Data Structures and Algorithms", Pearson Education, Reprint 2006.

E – RESOURCES

1. https://nptel.ac.in/courses/106/101/106101060/ (Algorithm Analysis and Framework)
2. https://nptel.ac.in/courses/106/106/106106131/ (Searching and Sorting)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

methods, Directory Structure, Directory organization, File system mounting, File Sharing and Protection; File System Implementation – File System Structure, Directory implementation, Allocation Methods, Free Space Management, Efficiency and Performance, Recovery; I/O Systems – I/O Hardware, Application I/O interface, Kernel I/O subsystem, Streams, Performance.

UNIT V : CASE STUDY   9+3

Linux System – Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, Input-Output Management, File System, Inter-process Communication; Mobile OS – iOS and Android – Architecture and SDK Framework, Media Layer, Services Layer, Core OS Layer, FileSystem.

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to,

- Analyze various scheduling algorithms.
- Understand deadlock prevention and avoidance algorithms.
- Compare and contrast various memory management schemes.
- Understand the functionality of file systems.
- Understand the advanced operating systems.

TEXT BOOKS

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne,"Operating System Concepts", 9th Edition, John Wiley and Sons Inc., 2012.
2. Harvey M. Deitel, "An introduction to Operating Systems", 3rd Edition, Addison–Wesley,2007.

REFERENCES

1. Ramaz Elmasri, A.Gil Carrick, David Levine, 'Operating Systems – A Spiral Approach", Tata McGraw Hill Edition,2010.
2. Andrew S.Tanenbaum, "Modern Operating Systems", 2nd Edition, Pearson Education, 2004.

E–RESOURCES

1. https://nptel.ac.in/courses/106/105/106105214/ (Introduction to Operating Systems)
2. https://nptel.ac.in/courses/106/102/106102132/ (System Calls)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CST403   **SOFTWARE ENGINEERING**   **L T P C**
3 0 0 3

OBJECTIVES

The main objective of this course is to,

- Provide the understandings of the software engineering.
- Familiar with prototyping techniques for requirement engineering process.
- Address the design levels of software engineering.
- Develop the system from the scratch.
- Verify and validate the software.

UNIT I : INTRODUCTION 9

Introduction – S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) – system engineering – computer based system – verification – validation – life cycle process – development process – system engineering hierarchy.

UNIT II : PROJECT MANAGEMENT 9

Project Management Concepts – Software Project Planning Risk analysis and management project scheduling and tracking – Software Quality Assurance – Software configuration management

UNIT III : REQUIREMENT ANALYSIS 9

Functional and non-functional – user – system – Requirement Engineering process – feasibility studies – requirements elicitation – Validation and Management – Software Prototyping – Prototyping in the software process – rapid prototyping techniques – user interface prototyping – S/W document. Analysis and modeling – Data, Functional and Behavioural models – Structured Analysis and Data Dictionary.

UNIT IV : DESIGN AND DEVELOPMENT 9

Design process and concepts – Modular design – Design heuristic – Design model and document. Architectural design – Data design – Architectural design – Transform and transaction mapping – User interface design – Component level design. Real time systems – Real time software design – System design – Introduction to Agility – Agile process – Extreme programming – XP Process.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : TESTING AND MAINTENANCE 9

Taxonomy of software testing – levels – Black box testing – Testing boundary conditions – Structural testing – Test coverage criteria based on data flow mechanisms – Unit testing – Integration testing – Validation testing – system testing and debugging.Software Implementation Techniques: Coding practices – Refactoring – Maintenance and Reengineering – BPR model – Reengineering process model – Reverse and Forward Engineering.

TOTAL :45 PERIODS

OUTCOMES

Upon completion of the course, Students will be able to,

- Explore the strength and weakness of various life cycle models.
- Identify the functional and non–functional requirements for the project.
- Develop the project using lifecycle models.
- Verify and validate the software using different types of testing.
- Understand the concepts of Agile.

TEXT BOOKS

1. Roger Pressman.S, "Software Engineering : A Practitioner's Approach", 7th Edition, McGraw Hill, 2010.
2. Ian Sommerville,"Software Engineering ", 9th Edition, Pearson Education Asia, 2011.

REFERENCES

1. S.A. Kelkar, "Software Engineering, A Concise Study", Prentice Hall of India,2007
2. Carlo Ghezzi, MehdiJazayeri and Dino Mandrioli, "Fundamentals of Software Engineering", 2nd Edition, Prentice Hall of India, 2003.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105182/ (Software Models)
2. https://nptel.ac.in/courses/106/105/106105087/ (Structured Programming)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSE401	DATABASE MANAGEMENT SYSTEMS	L T P C
		3 0 2 4

OBJECTIVES

The main objective of the course is to,

* Learn the fundamentals of data models and to represent a database system using ER diagrams.

* Study SQL and relational database design.

* Understand the internal storage structures using different file and indexing techniques which will help in physical DBdesign.

* Understand the fundamental concepts of transaction processing– concurrency control techniques and recoveryprocedures.

* Acquire a knowledge about the Storage and Query processing Techniques.

* Provide a practical knowledge about various commands and procedures in a RDBMS.

UNIT I : RELATIONAL DATABASES   10

Introduction :Database System Application – Purpose of Database System – Views of data – Data Models – Database System Architecture – Introduction to relational databases – Relational Model – Keys – Relational Algebra – SQL fundamentals – Embedded SQL– Dynamic SQL.

UNIT II : DATABASE DESIGN   9

Entity-Relationship model – E-R Diagrams – Enhanced E-R Model – ER Design Issues – Functional Dependencies – Non-loss Decomposition – First, Second, Third Normal Forms Boyce/CoddNormal Form – Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT III : TRANSACTIONS   9

Transaction Concepts – ACID Properties – Schedules – Serializability – Concurrency Control – Need for Concurrency – Locking Protocols – Two Phase Locking – Deadlock – Transaction Recovery – Save Points – SQL Facilities for Concurrency and Recovery.

UNIT IV : IMPLEMENTATION TECHNIQUES   8

Overview of Physical Storage Media – Magnetic Disks – RAID – File Organization – Organization of Records in Files – Indexing and Hashing – Ordered Indices – B+ tree Index Files – Static Hashing – Dynamic Hashing – Query Processing Overview – Measure the Cost Estimation.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : ADVANCED TOPICS   9

Distributed Databases: Architecture, Data Storage, Transaction Processing – Object-based Databases: Object Database Concepts, Object-Relational features – XML Databases: XML Hierarchical Model, purpose of XML – Information Retrieval: IR Concepts and Advantages.

LIST OF EXPERIMENTS

(Any Eigth Experiments to be conducted)

1. Data Definition Commands, Data Manipulation Commands for inserting, deleting, updating and retrieving Tables and Transaction Control statements
2. Database Querying – Simple queries, Nested queries, Sub queries and Joins
3. Views, Sequences, Synonyms
4. Database Programming: Implicit and Explicit Cursors
5. Procedures andFunctions
6. Triggers
7. Exception Handling
8. Database Design using ER modelling, normalization and Implementation for any application
9. Database Connectivity with Front End Tools
10. Case Study using real life database applications

                                                    TOTAL : 45+15 = 60 PERIODS

OUTCOMES

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

- Use typical data definitions and manipulation commands.
- Design applications to test Nested and Join Queries
- Implement simple applications that useViews
- Implement applications that require a Front–end Tool
- Critically analyze the use of Tables, Views, Functions and Procedures

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 6th Edition, Tata McGraw Hill, 2011.
2. Ramez Elmasri,Shamkant B.Navathe," Fundamentals of Database Systems", 6th Edition, Pearson Education, 2011.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

REFERENCES

1. C.J.Date,A.Kannan,S.Swamynathan,"An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.

2. Raghu Ramakrishnan, "Database Management Systems", 4th Edition, McGraw–Hill College Publications, 2015.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105175/ (Introduction to DBMS)

2. https://nptel.ac.in/courses/106/106/106106093/ (Conceptual Designs)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

ESTD 2001

19ECE503   MICROPROCESSORS AND MICROCONTROLLERS   L T P C
3 0 2 4

OBJECTIVES

The main objective of the course is to,

- Understand the Architecture of 8086 microprocessor.

- Learn the design aspects of I/O and Memory Interfacing circuits.

- Interface microprocessors with supporting chips.

- Study the Architecture of 8051 microcontroller.

- Design a microcontroller based system.

- Understand and execute programs based on 8086 microprocessor.

UNIT I : THE 8086 MICROPROCESSOR   9

Introduction to 8086 – Microprocessor architecture – Addressing modes – Instruction set and assembler directives – Assembly language programming – Modular Programming – Linking and Relocation – Stacks – Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

UNIT II : 8086 SYSTEM BUS STRUCTURE   9

8086 signals – Basic configurations – System bus timing – System design using 8086 – I/O programming – Introduction to Multiprogramming – System Bus Structure – Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

UNIT III : I/O INTERFACING   9

Memory Interfacing and I/O interfacing – Parallel communication interface – Serial communication interface – D/A and A/D Interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

UNIT IV : MICROCONTROLLER   9

Architecture of 8051 – Special Function Registers(SFRs) – I/O Pins Ports and Circuits – Instruction set – Addressing modes – Assembly language programming.

UNIT V : INTERFACING MICROCONTROLLER   9

Programming 8051 Timers – Serial Port Programming – Interrupts Programming – LCD & Keyboard Interfacing – ADC, DAC & Sensor Interfacing – External Memory Interface – Stepper Motor and Waveform generation – Comparison of Microprocessor, Microcontroller, PIC and ARM processors.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF EXPERIMENTS

8086 Programs using kits and MASM

1. Basic arithmetic and Logical operations
2. Move a data block without overlap
3. Code conversion, decimal arithmetic and Matrix operations.
4. Floating point operations, string manipulations, sorting and searching
5. Password checking, Print RAM size and system date
6. Counters and Time Delay

Peripherals and Interfacing Experiments

7. Traffic light control
8. Stepper motor control
9. Digital clock
10. Key board and Display
11. Printer status
12. Serial interface and Parallel interface
13. A/D and D/A interface and Waveform Generation

8051 Experiments using kits and MASM

14. Basic arithmetic and Logical operations
15. Square and Cube program, Find 2's complement of a number
16. Unpacked BCD to ASCII

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

At the end of the course, the students should be able to,

- Know the architecture of 8086 microprocessor.
- Design Memory Interfacing circuits.
- Design and interface I/O circuits.
- Design and implement 8051 microcontroller based systems.
- Develop counters and Time delay circuits.
- Understand and execute programs based on 8086 microprocessor.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

TEXT BOOKS

1. Yu–Cheng Liu, Glenn A.Gibson,"Microcomputer Systems: The 8086 / 8088 Family – Architecture, Programming and Design", 2nd Edition, Prentice Hall of India, 2007. (UNIT I– III)

2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, "The 8051 Microcontroller and Embedded Systems: Using Assembly and C", 2nd Edition, Pearson education, 2011. (UNIT IV–V)

REFERENCES

1. Doughlas V.Hall,"Microprocessors and Interfacing, Programming and Hardware", TMH,2012.

2. A.K.Ray,K.M.Bhurchandi, "Advanced Microprocessors and Peripherals" 3rd Edition, Tata McGraw Hill, 2012.

E – RESOURCES

1. https://nptel.ac.in/courses/108/105/108105102/ (Basic Computer Organization)

2. https://nptel.ac.in/courses/106/108/106108100/ (8086 Microprocessor)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19EEC302	ENTREPRENEURSHIP DEVELOPMENT ACTIVITY	LT P C
	(Common to Civil,CSE,ECE,EEE & Mechanical)	0 0 2 0

OBJECTIVES

The Objectives are enabling the students to,

- Evaluate social and civil responsibilities of business ownership.

- Describe typical behavioral characteristics of an effective entrepreneur.

- Develop a business plan, including identifying an executive summary; conducting a marketing and competitive analysis report; and developing a marketing, management, and financial plan.

- Determine career opportunities, responsibilities, and educational and credentialing requirements related to various entrepreneurship ventures.

- Interpret research data to determine market–driven problems faced by entrepreneurs.

TOIPICS TO BE COVERED

1. Should You Become an Entrepreneur?

- Entrepreneurship: Present & Past

- Is Entrepreneurship Right for You

- Identify Business Opportunities & Set Goals

2. What Skills Do Entrepreneurs Need

- Communication Skills

- Math Skills

- Problem Solving Skills

3. Entrepreneurs in a Market Economy

- What is an Economy?

- The Concept of Cost

- Government in a Market Economy

4. Select a Type of Ownership

- Run an Existing Business

- Own a Franchise or Start a Business

- Choose the Legal Form of Your Business

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

5. Develop a Business Plan

    - Why Do You Need a Business Plan

    - What Goes into a Business Plan

    - Create an Effective Business Plan

6. Identify and Meet a Market Need

    - The Value of Market Research

    - How to Perform Market Research Entrepreneurship Syllabus

    - Identify Your Competition

7. Finance, Protect, and Insure Your Business

    - Put Together a Financial Plan

    - Obtain Financing for Your Business

    - Protect Your Business

8. Choose Your Location & Set Up for Business

    - Choose a Retail Business Location

    - Choose a Location for a Nonretail Business

    - Obtain Space and Design the Physical Layout

    - Purchase Equipment, Supplies, and Inventory

9. Market Your Business

    - The Marketing Mix

    - Product, Price, Distribution, Price, and Promotion

    - Set Marketing Goals

10. Hire and Manage a Staff

    - Hire Employees

    - Create a Compensation Package

    - Manage your Staff

11. Record–Keeping and Accounting

    - Set up a Record Keeping System

    - Understand Basic Accounting

    - Track Your Inventory

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

12. Financial Management

- Manage your Cash Flow
- Analyze Your Financial Performance
- Hire Experts

13. Use Technology

- Technology and Your Business
- Learn about the Interest
- Purchase Technology

14. Intellectual property Rights

- Patents
- Copyright
- Industrial design rights
- Trademarks
- Trade secrets

15. Innovation Contest

- Innovative Idea
- Proof of Concept (PoC)
- Prototype Creation

The students may be grouped into 2 to 3

TOTAL: 15 PERIODS

Outcomes

At the end of the course, students can

- Identify personal strengths and value systems.
- Recall important tenets of digital literacy.
- Discuss the essentials of matters pertaining to money.
- Prepare for employment and self-employment.
- Illustrate the basics of entrepreneurship and identify new business opportunities.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19MDC401	VALUE ADDED COURSE – I	L T P C
	(PC HARDWARE AND TROUBLESHOOTING)	- - - -

OBJECTIVES

The main objective of the course is to,

- Explore the various hardware components on a computer.

- Know about graphics card and types of CPU.

- Enhance the knowledge in system diagnostics.

- Exploit the problem solving techniques.

- Learn the ways of assembling the PC.

COURSE CONTENTS

1. Installation of Hardware Components and Identifying the Memory

2. Installing Graphics cards, USB and Configuring it for better performance

3. Virtual Memory Configuration

4. Registry Cleaner, Spyware Detector and Diagnosing Hardware failures

5. Configuring BIOS

6. Troubleshooting and Isolating Computer Problems

7. Working with Motherboard and CPU

8. Assembling Motherboard

9. Fault detection after assembling

OUTCOMES

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

- Explore the various hardware components on a computer.

- Know the graphics card usage and types of CPU.

- Enhance the knowledge in system diagnostics.

- Exploit the problem solving techniques.

- Learn the ways of assembling the PC.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CST501	ARTIFICIAL INTELLIGENCE	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand the various characteristics of intelligent systems.
- Learn different search methods in Artificial Intelligence.
- Learn representation of knowledge in solving AI problems.
- Know the different ways of designing software agents.
- Know about the various applications of AI.

UNIT I : INTRODUCTION 9

Introduction – Definition – Characteristics of intelligent agents – Typical Intelligent Agents – Problem Solving Approach to Typical AI Problems.

UNIT II : SEARCH METHODS FOR PROBLEM SOLVING 9

Problem Solving Methods – Search Strategies – Informed – Uninformed – Heuristics – Local Search Algorithms – Constraint Satisfaction Problems – Game Playing – Alpha-Beta Pruning.

UNIT III : KNOWLEDGE REPRESENTATIONS 9

Propositional Logic – First Order Logic (FOL) – Reasoning in FOL – Resolution in FOL – Forward and Backward Chaining – Categories and Objects – Events – Reasoning System for Categories.

UNIT IV : SOFTWARE AGENTS 9

Architecture for Intelligent Agents – Agent Communication – Negotiation and Bargaining – Argumentation among Agents – Trust and Reputation in Multi-Agent Systems.

UNIT V : APPLICATIONS 9

AI Applications – Language Models – Information Retrieval and Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robotics.

TOTAL : 45 PERIODS

OUTCOMES

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

- Study the software architecture and its quality attributes.
- Use appropriate search algorithm for any AI problems.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

- Represent a problem using Propositional and First Order Logic.

- Design software agents to solve a problem.

- Design various applications that use Artificial Intelligence.

TEXT BOOKS

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach", 4th Edition, Prentice Hall, 2020.

2. M. Tim Jones, "Artificial Intelligence: A Systems Approach (Computer Science)", 1st Edition,Jones and Bartlett Publishers, Inc. , 2008.

REFERENCES

1. Gerhard Weiss, "Multi Agent Systems", 2nd Edition, MIT Press, 2013.

2. David L. Poole and Alan K. Mackworth, "Artificial Intelligence: Foundations of Computational Agents", 1st Edition,Cambridge University Press, 2010.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105077 (Uninformed Search)

2. https://nptel.ac.in/courses/106/106/106106126 (Propositional and First Order Logic)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CST502	THEORY OF COMPUTATION	L T P C
		3 1 0 4

OBJECTIVES

The main object of the course is to,

- Understand the language hierarchy.
- Construct automata for any given pattern and find its equivalent regular expressions.
- Design a context free grammar for any given language.
- Understand Turing machines and their capability.
- Understand undecidable problems and NP class problems.

UNIT I : AUTOMATA FUNDAMENTALS 9+3

Introduction to formal proof – Additional forms of Proof – Inductive Proofs – Memory required to recognize a Language – Finite Automata – Deterministic Finite Automata – Non-deterministic Finite Automata – Finite Automata with Epsilon Transitions – Minimal Finite Automata.

UNIT II : REGULAR EXPRESSION AND REGULAR LANGUAGES 9+3

Regular Languages and Regular Expressions – Kleene's Theorem – Pumping Lemma for Regular Languages – FA and Regular Expressions – Proving Languages not to be regular – Closure Properties of Regular Languages.

UNIT III : CONTEXT FREE GRAMMARS AND PUSH DOWN AUTOMATA 9+3

CFG – Parse Trees – Ambiguity in Grammars and Languages – Definition of the Pushdown Automata – Languages of a Pushdown Automata – Equivalence of Pushdown Automata and CFG, Deterministic Pushdown Automata – Normal Forms.

UNIT IV : TURING MACHINES 9+3

Definitions and Examples – Computing Partial Functions with Turing Machines – Combining Turing Machines – Variations of Turing Machines with Multi tape TMs – Nondeterministic Turing Machines – Universal Turing Machines.

UNIT V : UNDECIABILITY 9+3

Non Recursive Enumerable (RE) Language – Undecidable Problem with RE – Undecidable Problems about TM – Post's Correspondence Problem, The Class P and NP – Halting Problem – Rice's Theorem.

TOTAL:45+15 = 60 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

After completing this course, students will be able to,

- Construct automata, regular expression for any pattern.

- Write Context free grammar for any construct.

- Design Turing machines for any language.

- Propose computation solutions using Turing machines.

- Derive whether a problem is decidable or not.

TEXT BOOKS

1. J.E.Hopcroft, R.Motwani and J.D Ullman, "Introduction to Automata Theory, Languages and Computations", 2nd Edition, Pearson Education, 2003.

2. J.Martin, "Introduction to Languages and the Theory of Computation", 3rd Edition, TMH, 2003.

REFERENCES

1. H.R.Lewis and C.H.Papadimitriou, "Elements of the theory of Computation", 2nd Edition, PHI, 2003.

2. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.

E – RESOURCES

1. https://nptel.ac.in/courses/106/104/106104028/ (Automata Theory)

2. https://people.math.sc.edu/mlevet/Lecture_Notes.pdf (Theory of Computation)

.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CST503   **RESOURCE MANAGEMENT TECHNIQUES**   **L T P C**
3 1 0 4

OBJECTIVES

The main objective of the course is to,

- Understand fundamentals of linear programming.
- Be familiar with resource management techniques.
- Learn to solve problems in linear programming and Integer programming
- Understand about classical optimization theory.
- Be exposed to Critical Path Method and PERT.

UNIT I : LINEAR PROGRAMMING   **9+3**

Principal components of decision problem – Modeling phases – LP Formulation and graphic solution – Resource allocation problems – Simplex method.

UNIT II : DUALITY AND NETWORKS   **9+3**

Definition of dual problem – Primal – Dual relation ships – Dual simplex methods – Post optimality analysis – Transportation and assignment model – Shortest route problem.

UNIT III : INTEGER PROGRAMMING   **9+3**

Cutting plan algorithm – Branch and bound methods, Multistage (Dynamic) programming.

UNIT IV : CLASSICAL OPTIMISATION THEORY   **9+3**

Unconstrained external problems, Newton – Ralphson method – Equality constraints – Jacobean methods – Lagrangian method – Kuhn-Tucker conditions – Simple problems.

UNIT V : OBJECT SCHEDULING   **9+3**

Network diagram representation – Critical path method – Time charts and resource leveling – Data Science Applications: E-Commerce – Website Recommendation – Health care – Fraud and Risk Detection.

T OTAL : 45+15 = 60 PERIODS

OUTCOMES

After successfully completing the course, the student will be able to,

- Solve optimization problems using graphic solution.
- Solve optimization problems using simplex methods.
- Apply integer programming and linear programming to solve real–life applications
- Use Jacobean methods solve Simple problems.
- Use PERT and CPM for problems in project management.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

TEXT BOOKS

1. H.A. Taha, "Operation Research", Prentice Hall of India, 2002.

2. Paneer Selvam, „Operations Research", Prentice Hall of India, 2002.

REFERENCES

1. Vohra, "Quantitative Techniques in Management", Tata Mc Graw Hill, 2002.

2. Winston, "Operation Research", Thomson Learning, 2003.

E – RESOURCES

1. https://nptel.ac.in/courses/111/102/111102012/ (Linear Programming Problems)

2. https://freevideolectures.com/course/4737/nptel–project–management/21(Project Management)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSE501	COMPUTER NETWORKS	L T P C
		3 0 2 4

OBJECTIVES

The main objective of the course is, to enable the students to,

- Understand the protocol layering and physical level communication.
- Understand the various data link protocols and media access.
- Learn the functions of network layer and the various routing protocols.
- Familiarize the protocols and congestion control of the Transport layer.
- Understand the functions of the application layer protocols.
- Apply the addressing concepts to enhance the networking.

UNIT I : INTRODUCTION AND PHYSICAL LAYER 9

Networks – Network Types – Protocol Layering – TCP/IP Protocol suite – OSI Model – Physical Layer: Performance – Transmission media – Switching – Circuit-switching – Packet Switching.

UNIT II : DATA-LINK LAYER & MEDIA ACCESS 9

Introduction – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols HDLC– PPP – Media Access Control – Wired LANs: Ethernet – Introduction to Wireless LANs – IEEE 802.11, Bluetooth – Connecting Devices.

UNIT III : NETWORK LAYER 9

Network Layer Services – Packet switched networks – Performance – IPV4 Addresses – Forwarding of IP Packets – Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms – Protocols – Multicasting Basics – IPV6 Addressing – IPV6 Protocol.

UNIT IV : TRANSPORT LAYER 9

Introduction – Transport Layer Protocols – Services – Port Numbers – User Datagram Protocol – Transmission Control Protocol – SCTP.– Congestion Control and Techniques.

UNIT V : APPLICATION LAYER 9

WWW and HTTP – FTP – Email –Telnet – SSH – DNS – SNMP.

LIST OF EXPERIMENTS

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.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

3. Applications using TCP sockets like:

    a. Echo client and echo server

    b. Chat

    c. 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.

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

On Completion of the course, the students should be able to,

- Understand the basic layers and its functions in computer networks.

- Understand the various data link protocols and media access.

- Analyze and design routing algorithms.

- Analyze the transport protocols and congestion control in transport layer.

- Understand the working of various application layer protocols.

- Apply the concepts and algorithms in networking applications.

TEXT BOOKS

1. Behrouz A Forouzan 'Data Communication and Networking', 4th Edition, Mcgraw Hill, 2016.

2. William Stallings, "Data and Computer Communications", 10th Edition, Pearson Education, 2013.

REFERENCES

1. Larry L. Peterson, Bruce S. Davie, Computer Networks: A Systems Approach, 5th Edition, Morgan Kaufmann Publishers Inc., 2012.

2. Nader F. Mir, Computer and Communication Networks, 2nd Edition, Prentice Hall, 2014.

E – RESOURCES

1. https://nptel.ac.in/courses/106/106/106106091/ (Introduction to Computer Networks)

2. https://nptel.ac.in/courses/106/105/106105082/ (Computer Networks)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSE502	OBJECT ORIENTED ANALYSIS AND DESIGN	L T P C
		3 0 2 4

OBJECTIVES

The main objective of the course is to,

- Understand the basic concepts of object modeling and UML diagrams.
- Design with static UML diagrams.
- Design with dynamic UML diagrams.
- Improve the software design with design patterns.
- Test the software with different testing techniques.
- Capture the requirements specification for an intended software system.

UNIT I : INTRODUCTION TO OOAD AND UML DIAGRAMS 9

Introduction to OOAD with OO basics – Unified Process – UML diagrams – Use Case – Class diagrams – Interaction diagrams – State diagrams – Activity diagrams – Package, Component and Deployment diagrams.

UNIT II : STATIC UML DIAGRAMS 9

Class Diagram – Elaboration – Domain Model – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition.

UNIT III : DYNAMIC UML DIAGRAMS 9

Dynamic Diagrams – UML interaction diagrams – System sequence diagram – Collaboration diagram – State machine diagram – Activity diagram – UML package diagram – Component and Deployment Diagrams.

UNIT IV : DESIGN PATTERNS 9

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller – Design Patterns – Creational – Factory method – Structural – Bridge – Adapter – Behavioral – Strategy –Observer.

UNIT V : CODING AND TESTING 9

Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – OO System Testing.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

ESTD 2001

LIST OF EXPERIMENTS

Draw standard UML diagrams using an UML modeling tool for a given case study and map design to code and implement a 3 layered architecture. Test the developed code and validate whether the SRS is satisfied.

1. Identify a software system that needs to be developed.
2. Document the Software Requirements Specification (SRS) for the identified system.
3. Identify use cases and develop the Use Case model.
4. Identify the conceptual classes and develop a Domain Model and also derive a Class Diagram from that.
5. Using the identified scenarios, find the interaction between objects and represent them using UML Sequence and Collaboration Diagrams
6. Draw relevant State Chart and Activity Diagrams for the same system.
7. Implement the system as per the detailed design.
8. Test the software system for all the scenarios identified as per the use case diagram.

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

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

- Design and Implement applications using OO concepts.
- Use the static UML diagrams for various applications.
- Use the dynamic UML diagrams for various applications.
- Apply the appropriate design patterns.
- Understand the various testing methodologies for OO software.
- Perform OO analysis and design for a given problem specification.

TEXT BOOKS

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object–Oriented Analysis and Design and Iterative Development", 3rd Edition, Pearson Education, 2005.
2. Ali Bahrami, "Object Oriented Systems Development ",Tata McGraw–Hill Education Pvt Ltd., 1st Edition, 2008.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

REFERENCES

1. Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object–Oriented Software", 1st Edition, Addison-Wesley, 2008.
2. Martin Fowler, "UML Distilled: A Brief Guide to the Standard Object Modeling Language", 3rd Edition, Addison Wesley, 2003.

E – RESOURCES

1. https://nptel.ac.in/content/storage2/courses/106105087/ (Design Patterns)
2. https://nptel.ac.in/courses/106/105/106105224/ (UML Diagrams)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

ESTD 2001

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

19MGT501	ENGINEERING ECONOMICS AND MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand the basics of Economics.
- Enable students to understand the fundamental economic concepts and value engineering.
- Enable the students to study the evolution of Management.
- Study the functions and principles of management.
- Learn the application of the principles in an organization.

UNIT I : INTRODUCTION TO ECONOMICS   **9**

Introduction to Economics – Flow in an economy, Law of supply and demand, Concept of Engineering Economics – Engineering efficiency, Economic efficiency, Scope of engineering economics – Element of costs, Marginal cost, Marginal Revenue, Sunk cost, Opportunity cost.

UNIT II : VALUE ENGINEERING   **9**

Break-even analysis – P/ V ratio, Elementary economic Analysis – Material selection for product – Design selection for a product, Process planning – Make or buy decision, Value engineering – Function, aims, Value engineering procedure.

UNIT III : INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS   **9**

Definition of Management – Science or Art – Manager Vs Entrepreneur – types of managers – managerial roles and skills – Evolution of Management – Scientific, human relations , system and contingency approaches – Types of Business organization – Sole proprietorship, partnership, company – public and private sector enterprises – Organization culture and Environment – Current trends and issues in Management.

UNIT IV : PLANNING AND ORGANISING   **9**

Nature and purpose of planning – planning process – types of planning – Planning premises – Strategic Management – Decision making steps and process – Nature and purpose of organization – Formal and informal organization – organization chart – organization structure – centralization and decentralization – HR Planning, Recruitment, selection.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : DIRECTING AND CONTROLLING 9

Motivation – motivation theories – motivational techniques – leadership – types – communication – process of communication – barrier in communication – communication and IT – System and process of controlling – use of computers and IT in Management control – direct and preventive control – reporting.

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the student will be able to,

- Apply the basics of economics and cost analysis to engineering applications.
- Summarize the steps involved in decision making with economic feasibility.
- Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management.
- Understand the planning process in the organization.
- Understand the concept of organization, directing and controlling.

TEXT BOOKS

1. Panneer Selvam, R, "Engineering Economics", Prentice Hall of India Ltd, New Delhi, 2nd Edition, 2013.
2. Stephen P. Robbins & Mary Coulter, "Management", Prentice Hall (India)Pvt. Ltd., 14th Edition, 2019.

REFERENCES

1. Chan S.Park, "Contemporary Engineering Economics", Prentice Hall of India, 6th Edition, 2016.
2. Donald.G. Newman, Jerome.P.Lavelle, "Engineering Economics and analysis" Engg. Press, Texas, 2010.

E – RESOURCES

1. https://nptel.ac.in/courses/112/107/112107209/ (Engineering Economic Analysis)
2. https://nptel.ac.in/courses/110/105/110105146/ (Principles of Management)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19EEC501	QUANTITATIVE APTITUDE LEARNING	L T P C
	(Common to Civil, CSE ,ECE ,EEE & Mechanical)	0 2 0 0

OBJECTIVES

The main objective of the course is to,

- Understand the basics of the numbers, highest common factor and least common multiple.

- Develop the use of decimal fraction and problems on ages.

- Introduced basic concepts of time, work, distance, calender and clock.

- Acquaint the student with the concept of simple and compound interest.

- Understand the knowledge of polynomial and quadratic equations.

UNIT I : NUMBERS, HIGHEST COMMON FACTOR AND LEAST COMMON MULTIPLE   9

Numbers and their basic classification – Types of number – Basic operations of numbers – Progression – Tests of divisibility – Highest common factor – Least common multiple.

UNIT II : DECIMAL FRACTION AND PROBLEMS BASED ON AGES   9

Decimal fraction – Types of fraction – Comparison of fractions – Inserting fractions in between two given fractions – Relation between decimal fraction and normal fraction – Conversion of a decimal fraction into a vulgar fraction – Types of decimals – Conversion of mixed recurring decimal into a vulgar fraction – Standard form of decimal – Problems based on ages.

UNIT III : TIME, WORK, DISTANCE, CALENDER AND CLOCK   9

General rule for time and work – General rule for work and wages – Speed – Unit of speed – Average speed – Some useful relations – Problems on Trains – Calenders and clocks – Odd days – Ordinary year – Leap year.

UNIT IV : SIMPLE INTEREST, COMPOUND INTEREST AND ELEMENTARY ALGEBRA   9

Simple interest – Compound interest – Some useful relations – Difference between compound interest and simple interest – Short cut methods to solve special types of problems – Elementary Algebra and averages.

UNIT V : POLYNOMIAL AND QUADRATIC EQUATIONS   9

Polynomial introduction – Degree of a polynomial – Types of polynomial – Operations on polynomial – Remainder and factor theorem – Quadratic equation – Pure Quadratic equation – Discriminant – Roots of the Quadratic equations – Solution of Quadratic equation – Framing of a Quadratic equation – Special types of roots.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

After successfully completing the course, the student will be able to,

- Understand the basic concepts and techniques of the numbers, Highest common factor and Least common multiple.

- Apply the concept of decimal fraction and problems on ages.

- Understand and apply the concept of time, work, distance, calender and clock.

- Acquire skills in simple interest, compound interest and elementary algebra.

- Be exposed to concepts and properties of polynomial and quadratic equations.

TEXT BOOKS

1. Aggarwal R.S., "Quantitative Aptitude", S.Chand & Company Ltd, New Delhi, 2012.

2. Dinesh Khattar, "Quantitative Aptitude for competitive examinations ", Pearson India Education Services Pvt. Ltd, New Delhi, 2019.

REFERENCES

1. Praveen R.V., "Quantitative Aptitude and Reasoning", PHI Learning Private Limited, Delhi, 2013.

2. Gupta P, "A unique Approach to Quantitative Aptitude ", Unique Publishers (I) Pvt. Ltd, New Delhi, 2017.

E – RESOURCES

1. https://youtube.com/playlist?list=RDQM5Xl256aOq24 (Time and Work)

2. https://youtu.be/KE7tQf9spPg (Aptitude)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19MDC501	**VALUE ADDED COURSE – II**	**LT P C**
	(WEB TECHNOLOGIES)	**- - - -**

(.NET/JAVASCRIPT/FIREBASE FRAMEWORK/ NODE JS WITH EXPRESS/ PHP)

Students shall undergo any one of the above said course

OBJECTIVES

The main objective of the course is, to enable the Students to,

- Learn the basic concepts in HTML, CSS, JavaScript.
- Understand the responsive design and development.
- Llearn the trendy frameworks and establishment.
- Learn the web project management and maintenance process.
- Design a website with HTML5, JS, CSS3.
- Understand the real time hosting.

COURSE CONTENTS

1. Basic concepts of Web Technology and Internet Fundamentals.
2. Creation of CSS, Scripting and Interactive web pages.
3. Discussions on Server side and Client side programming, Web and application servers, Hypertext Preprocessor (PHP) and content management systems.
4. Learn the basics to advance level with different projects using frameworks.
5. Insight into Internet security, e–commerce, databases, social networking, mobile device Web design, and cloud computing.
6. Learn different frameworks with frontend and backend activities.
7. Understand the database connectivity.
8. Establish the real time hosting.
9. Learn to build a responsive website.

OUTCOMES

On Successful completion of the course the students will be able to

- Design Website using HTML5, CSS3 and JS.
- Design Responsive Sites.
- Manage, Maintain and Support Web Apps.
- Design Simple Applications using the web technologies.
- Maintain Database Connectivity.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

TEXT BOOKS

1. Jon Duckett, "HTML and CSS: Design and Build Websites", John Wiley and Sons, 2014 Edition.

2. Uttam K. Roy, "Web Technologies" Oxford University Press, 13th impression, 2017.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105084/ (Introduction to Internets)

2. https://nptel.ac.in/courses/106/106/106106156/ (Modern Application Development)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

SEMESTER VI

19CST601	**MACHINE LEARNING TECHNIQUES**	**L T P C**
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Introduce the basic concepts and techniques of machine learning.

- Discuss the neural network algorithms.

- Understand the concept of genetic algorithms for machine learning techniques.

- Learn the learning set of rules.

- Understand the graphical models of machine learning algorithms.

UNIT I : INTRODUCTION   **9**

Introduction – Designing a Learning System – Perspectives and issues in Machine Learning – A Concept Learning Task – Version Spaces and the Candid Elimination Algorithm – Inductive bias – Decision Tree learning – Inductive bias in Decision Tree Learning – Issues in Decision Tree Learning.

UNIT II : NEURAL NETWORKS   **9**

Neural Network Representations – perceptrons – Multilayer and Backpropogation Algorithm – An Illustrative Examples:Face Recognition – Advanced Topics in Artificial Neural Networks**.**

UNIT III : GENETIC ALGORITHMS   **9**

Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning – Parallelizing Genetic Algorithms.

UNIT IV : LEARNING SET OF RULES   **9**

Introduction – Sequential Covering Algorithms – Learning First-Order Rules – learning Sets of First-Order Rules:FOIL – Induction as Inverted Deduction – Inverting Resolution.

UNIT V : GRAPHICAL MODELS   **9**

Introduction – Geberative Models – d-Separation – Belief Propogation – Learning the Structure of Graphical Models – Hidden Markov Model.

                                                  TOTAL: 45 PERIODS

OUTCOMES

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

- Study the software architecture and its quality attributes.

- Discuss and apply backpropogation algorithm for machine learning applications.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

- Discuss the genetic algorithms for various problems.

- Suggest set of rules for machine learning.

- Design systems that uses appropriate graph models of machine learning.

TEXT BOOKS

1. Tom M. Mitchell, "Machine Learning", McGraw–Hill Education (India) Private Limited, 2013.

2. Ethem Alpaydin, "Introduction to Machine Learning 3e (Adaptive Computation and Machine Learning Series)", 3rd Edition, MIT Press, 2014.

REFERENCES

1. Stephen Marsland, "Machine Learning: An Algorithmic Perspective", CRC Press, 2009.

2. Jason Bell, "Machine learning – Hands on for Developers and Technical Professionals", 1st Edition, Wiley, 2014.

E–RESOURCES

1. https://nptel.ac.in/courses/106/105/106105152/ (Different Types of Learning)

2. https://nptel.ac.in/courses/106/106/106106202/ (Learning Problem)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CST602   **COMPILER DESIGN**   **L T P C**
                                                               3 1 0 4

OBJECTIVES

The main objective of the course is to,

- Learn the various phases of compiler.
- Practise the various parsing techniques.
- Understand intermediate code generation and run-time environment.
- Learn to implement front-end of the compiler.
- Learn to implement code generator.

UNIT I : INTRODUCTION TO COMPILERS   9+3

The structure of compiler – Lexical analysis: Role of Lexical analyzer – Input buffering – Specification and recognition of tokens –The lexical analyzer generator Lex. Finite Automata – Regular Expressions to Automata – Minimizing DFA.

UNIT II : SYNTAX ANALYSIS   9+3

Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers – LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator.

UNIT III : INTERMEDIATE CODE GENERATION   9+3

Syntax Directed Definitions, Evaluation orders for syntax directed definitions, Syntax Directed Translation schemes – Variants of syntax trees – Three address codes – Types and Declarations – Translation of expression – Type checking – Control flow – Back patching – Switch statements – Intermediate code for procedures.

UNIT IV : OBJECT CODE GENERATION   9+3

Storage organization – Stack allocation space – Access to non–local data on the stack – Heap management – Issues in code generation – Target language – Addresses in target code – Design of code generator – Register allocation and assignment – Instruction selection by tree rewriting – Optimal code generation for expressions – Dynamic programming code generation.

UNIT V : CODE OPTIMIZATION   9+3

Basic blocks and Flow graphs – Optimization of basic blocks – Principal sources of optimization – Data flow analysis – Constant propagation – Partial redundancy elimination – Peephole optimization.

TOTAL :45+15 = 60 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

After completing this course, students will be able to,

- Understand the different phases of compiler.

- Design a lexical analyzer for a sample language.

- Apply different parsing algorithms to develop the parsers for a given grammar.

- Understand syntax-directed translation and run-time environment.

- Learn to implement code optimization techniques and a simple code generator.

TEXT BOOKS

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi, Jeffrey D.Ullman, "Compilers: Principles, Techniques and Tools", 2nd Edition, Dorling Kindersley(India) Pvt Ltd., 2011.

2. V. Raghavan, "Principles of Compiler Design", Tata McGraw–Hill Education Publishers, 2010.

REFERENCES

1. Allen I. Holub, "Compiler Design in C", Prentice–Hall software series, 2012.

2. Randy Allen, Ken Kennedy, "Optimizing Compilers for Modern Architectures: A Dependence–based Approach", Morgan Kaufmann Publishers, 2002.

E – RESOURCES

1. https://nptel.ac.in/courses/106/108/106108052/ (Compiler Design)

2. https://onlinecourses.nptel.ac.in/noc20_cs13/preview (Introduction to Compilers)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSE601	MOBILE COMPUTING	L T P C
		3 0 2 4

OBJECTIVES

The main objective of the course is to,

- Understand the basic concepts of mobile computing.

- Learn the basics of mobile telecommunication system.

- Be familiar with the network layer protocols and Ad–Hoc networks.

- Know the basis of transport and application layer protocols.

- Learn the various applications of Mobile OS.

- Gain knowledge about different mobile platforms and application development.

UNIT I : INTRODUCTION   9

Introduction to Mobile Computing – Mobile Computing Applications – Generations of Mobile Communication Technologies – Characteristics of Mobile computing – Structure of Mobile Computing Application – MAC Protocols – SDMA – TDMA – FDMA – CDMA.

UNIT II : MOBILE TELECOMMUNICATION SYSTEM   9

Introduction to Cellular Systems – GSM – Services & Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS – UMTS – Architecture – Handover – Security.

UNIT III : MOBILE NETWORK LAYER   9

Mobile IP – Key Mechanism in Mobile IP – DHCP – Ad Hoc – Proactive protocol – DSDV, Reactive Routing Protocols – DSR, AODV , Hybrid routing – ZRP, Multicast Routing – ODMRP, Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security.

UNIT IV : MOBILE TRANSPORT AND APPLICATION LAYER   9

Mobile TCP – WAP – Architecture – WDP – WTLS – WTP – WSP – WAE – WTA Architecture – WML.

UNIT V : MOBILE PLATFORMS AND APPLICATIONS   9

Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M-Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

LIST OF EXPERIMENTS

1. Develop an application that uses GUI components, Font and Colours

2. Develop an application that uses Layout Managers and event listeners.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

3. Develop a native calculator application.

4. Write an application that draws basic graphical primitives on the screen.

5. Develop an application that makes use of database.

6. Implement an application that implements Multi threading.

7. Write a mobile application to send an email.

TOTAL : 45+15 = 60 PERIODS

OUTCOMES

At the end of the course, the students should be able to,

- Understand the basics of mobile telecommunication systems.
- Illustrate the generations of telecommunication systems in wireless networks.
- Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network.
- Understand the functionality of Transport and Application layers.
- Understand the need for mobile operating systems.
- Develop a mobile application using android/blackberry/ios/Windows SDK.

TEXT BOOKS

1. Jochen Schiller,'Mobile Communications", Pearson India, 2009.

2. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt.Ltd, New Delhi,2012.

REFERENCES

1. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, "Mobile Computing : Technology, Applications and Service Creation", 2nd Edition, Tata McGraw Hill, 2010.

2. Theodore S.Rappaport," Wireless Communications – Principles and Practice", 2nd Edition, Pearson Education India, 2010.

E – RESOURCES

1. https://nptel.ac.in/courses/106/106/106106147/ (Introduction to Mobile Computing)

2. https://nptel.ac.in/courses/117/102/117102062/ (Wireless Communication)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU
ESTD 2001

19CSE602   **INTERNET PROGRAMMING**   **L T P C**
3 0 2 4

OBJECTIVES

The main objective of the course is to,

- Understand different Internet Technologies.
- Learn java-specific web services architecture.
- Expose to java specific web services architecture.
- Understand the validation of a backend process.
- Learn client and server Architectures.
- Apply the concepts of Internet Programming in various applications.

UNIT I : WEBSITE BASICS and WEB 2.0   **9**

Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – Web Clients – Web Servers – HTML5 – Tables – Lists – Image – HTML5 control elements – Semantic elements – Drag and Drop – Audio – Video controls – CSS3.

UNIT II : CLIENT SIDE PROGRAMMING   **9**

Java Script: An introduction to JavaScript – JavaScript DOM Model – Date and Objects – Regular Expressions – Exception Handling – Validation – Built-in objects – Event Handling – DHTML with JavaScript – JSON introduction – Syntax – SQL.

UNIT III : SERVER SIDE PROGRAMMING   **9**

Servlets: Java Servlet Architecture – Servlet Life Cycle – Form GET and POST actions – Session Handling – Understanding Cookies – DATABASE CONNECTIVITY: JDBC perspectives – JSP:Understanding Java Server Pages – JSP Standard Tag Library (JSTL) – Creating HTML forms by embedding JSP code.

UNIT IV : PHP and XML   **9**

An introduction to PHP: PHP – Using PHP – Variables – Program control – Built-in functions – Form Validation – Regular Expressions – File handling – Cookies – Connecting to Database.XML: Basic XML – Document Type Definition – XML Schema DOM and Presenting XML, XML Parsers and Validation.

UNIT V : AJAX and WEB SERVICES   **9**

AJAX: Ajax Client Server Architecture – XML Http Request Object – Call Back Methods; Web Services: Introduction – Java web services Basics – (WSDL) – Database Driven web service from an application – SOAP.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF EXPERIMENTS

(Any Eight Experiments to be Conducted)

1. Create a web page with the following using HTML
   a. To embed a map in a web page,
   b. To fix the hot spots in that map,
   c. Show all the related information when the hot spots are clicked.

2. Create a web page with the following.
   a. Cascading style sheets.
   b. Embedded style sheets.
   c. Inline style sheets.
   Use our college information for the web pages.

3. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.

4. Write programs in Java using Servlets: To invoke servlets from HTML forms

5. Session tracking using hidden form fields and Session tracking for a hit count

6. Write programs in Java to create three-tier applications using servlets for conducting online examination for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.

7. Install TOMCAT web server. Convert the static web pages of programs into dynamic web pages using servlets (or JSP) and cookies.Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.

8. Create and save an XML document at the server, which contains 10 users Information. Write a Program, which takes user Id as an input and returns the User details by taking the user information from the XML document.
   i. Validate the form using PHP regular expression.
   ii. PHP stores a form data into database.

9. Write a web service for finding what people think by asking 500 people's opinion for any consumer product.

TOTAL: 45+15 = 60 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

At the end of the course, the students should be able to,

- Construct a basic website using HTML and Cascading Style Sheets.
- Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.
- Develop server side programs using Servlets and JSP.
- Construct simple web pages in PHP and to represent data in XML format.
- Use AJAX and web services to develop interactive web applications.
- Learnt to apply the concepts to design web applications.

TEXT BOOKS

1. Deitel and Deitel and Nieto, "Internet and World Wide Web, How to Program", Prentice Hall, 5th Edition, 2011.
2. Gopalan N.P. and Akilandeswari J.,"Web Technology", Prentice Hall of India, 2011.
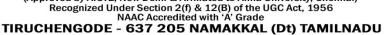
REFERENCES

1. Jeffrey C and Jackson,'Web Technologies A Computer Science Perspective', Pearson Education, 2011.
2. UttamK.Roy,"Web Technologies", Oxford University Press, 2011.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105084/ (Client and Server side programming)
2. https://nptel.ac.in/courses/106/105/106105166/ (PHP and Ajax)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSJ601	MINI PROJECT	L T P C
		0 0 2 1

OBJECTIVES

The main objective of this course is to,

- Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of articles.
- Develop the skills to formulate a technical project.
- Utilize new tools,algorithms and mechanisms that contribute to obtain the solution.
- Test and validate the results obtained through conformance.
- Prepare project reports and to face reviews and viva-voce examination.

GUIDELINES

The students in a group of 3 to 4 works on a topic approved by the Head of the Department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor.The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester.The project work is evaluated based on oral presentation and the project report jointly by the Project Coordinator and internal examiner constituted by the Head of the Department.

TOTAL: 30 PERIODS

OUTCOMES

On Completion of the project work students will be able to,

- Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of articles.
- Develop the skills to formulate a technical project.
- Test and validate the results obtained through conformance.
- Prepare project reports and to face reviews and viva voce examination.
- Take up any challenging practical problems and find the solution by formulating proper methodology.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19MDC601	CONSTITUTION OF INDIA	L T P C
	(Common to Civil,CSE,ECE,EEE& Mechanical)	3 0 0 0

OBJECTIVES

The main objective of this course is to,

- Understand the Meaning of the constitution law and constitutionalism.
- Realize the fundamental rights.
- Understand the execution powers of union and states.
- Be aware of the Constitutional powers.
- acquaint with other Constitutional Functionaries.

UNIT I : INTRODUCTION

Meaning of the constitution law and constitutionalism – Historical perspective of the Constitution of India – Preamble – Salient features and characteristics of the Constitution of India – Citizenship.

UNIT II : FUNDAMENTAL RIGHTS

Scheme of the fundamental rights – The scheme of the Fundamental Duties and its legal status – The Directive Principles of State Policy – Its importance and implementation.

UNIT III : UNION AND STATE EXECUTIVE

Federal structure and distribution of legislative and financial powers between the Union and the States – Parliamentary Form of Government in India – The constitution powers and status of the President of India – Governor – Appointment, Powers and Functions.

UNIT IV : CONSTITUTIONAL POWERS

Amendment of the Constitutional Powers and Procedure – The historical perspectives of the constitutional amendments in India – Emergency Provisions : National Emergency, President Rule, Financial Emergency.

UNIT V : OTHER CONSTITUIONAL FUNCTIONARIES

Election Commission of India: Organization, Powers and Functions, Union Public Service Commission, State Public Service Commission – Local Self Government.

OUTCOMES

At the end of the course, the students will be able to,

- Understand the Salient features and characteristics of the Constitution of India.
- Analyze the scheme of the Fundamental rights and Duties.
- Evaluate in detail the powers between the Union and the States.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

- Know the concept of Constitutional Powers.

- Recognize other constitutional functionaries.

TEXT BOOKS

1. Durga Das Basu, "Introduction to the Constitution of India**"**,24th Edition,Lexis Nexis Publishers,2019**.**

2. Subhash by C. Kashyap**,"** Our Constitution",National Book Trust,2019.

REFERENCES

1. M.Laxmikanth,"Indian Polity", 5th Edition, Spectrum Publishers,2016.

2. Granville Austin, "The Indian Constitution: Cornerstone of a Nation", Classic Reissue,Oxford India Publishers,1999.

E – RESOURCES

1. https://www.youtube.com/watch?v=vq2Q1_v6TNU (Constitution)

2. https://www.india.gov.in/my–government/constitution–india/constitution–india–full–text (Fundamental Rights)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

SEMESTER VII

19CST701　　　　**SOFTWARE ARCHITECTURE AND DESIGN**　　　**L T P C**
3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand the concept of Architectural structures and patterns.
- Discuss the quality attributes.
- Understand the various stages of Architecture Life Cycle.
- Learn the role of design concepts.
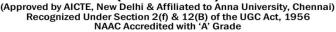- Study the design knowledge and representations and strategies.

UNIT I : INTRODUCTION　　　　　　　　　　　　　　　　　　　**9**

What is Software Architecture – Architectural Structures and Views – Architectural Paterns – Inhibiting and Enabling a System's Quality Attributes – Predicting System Qualities – Defining Constraints on an implementation – Influencing the Organizational Structure.

UNIT II : QUALITY ATTRIBUTES　　　　　　　　　　　　　　　**9**

Understanding Quality Attributes – Availability – Interoperability – Modifiability – Performance – Security – Testability – Other Quality Attributes – Architectural Tactics and Patterns.

UNIT III : ARCHITECTURE IN THE LIFE CYLE　　　　　　　　　**9**

Architecture in Agile Projects – Architecture and Requirements – Designing an Architecture – Documenting Software Architectures – Architecture implementation and Testing – Architecture Reconstruction – Architecture Evaluation.

UNIT IV : THE ROLE OF SOFTWARE DESIGN　　　　　　　　　**9**

The Nature of the Design Process – The Software Design Process – Design in the Software Development Process – Design Qualities.

UNIT V : TRANSFERRING DESIGN KNOWLEDGE　　　　　　　**9**

Describing a Design Solution – Transferring Design Knowledge – Some Design Representations – The Rationale for Method Reading – Design Processes and Design Strategies – Design Patterns.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Study the software architecture and its quality attributes.

- Discuss the different quality attributes.

- Understand the various stages of architecture and apply these for designing any software.

- Learn the importance of design process.

- Apply the acquired knowledge for different designs.

TEXT BOOKS

1. Len Bass, Paul Clements & Rick Kazman,"Software Architecture in Practice", 2nd Edition, Pearson Education, 2011.

2. David Budgen,"Software Design", 2nd Edition, Pearson Education, 2003.

REFERENCES

1. David M. Dikel, David Kane and James R. Wilson, "Software Architecture", Prentice Hall PTR, 2001

2. Erich Gamma," Design Patterns", 1st Edition, Pearson Education, 2015.

E – RESOURCES

1. http://nptel.vtu.ac.in/econtent/courses/CSE/06IS72/6.php (Architectural Structures)

2. http://nptel.vtu.ac.in/econtent/courses/CSE/06IS72/20.php (Quality Attributes)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSE701   **CRYPTOGRAPHY AND NETWORK SECURITY**   **L T P C**
3 0 2 4

OBJECTIVES

The main objective of the course is to,

- Learn about various encryption techniques.
- Understand the concept of Public key cryptography and number theory.
- Study about message authentication and hash functions.
- Impart knowledge on Network security and web security.
- Impart knowledge on System level security.
- Apply and analyze the various algorithms for encryption and decryption.

UNIT I : INTRODUCTION   9

Security attacks, services and mechanisms – OSI Security Architecture – Classical Encryption Techniques – transposition techniques, steganography, Cipher Principles – Data Encryption Standard – Cipher Design Principles and Modes of Operation – Double DES – Triple DES – AES – Blowfish – RC5 algorithm.

UNIT II : NUMBER THEORY AND PUBLIC KEY CRYPTOGRAPHY   9

Finite Fields and Number Theory – Groups, Rings, Fields – Modular arithmetic – Euclid's algorithm – Finite fields – Polynomial Arithmetic – Prime numbers – Fermat's and Euler's theorem – Testing for primality – The Chinese remainder theorem – Discrete logarithms – Key management – Diffie-hellman key exchange – Elliptic Curve Arithmetic and Cryptography – Key distribution – Public Key Cryptography and RSA.

UNIT III : AUTHENTICATION AND HASH FUNCTION   9

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – MD5 – SHA – HMAC – CMAC – Authentication applications – Kerberos, X.509 – Digital signature and authentication protocols – DSS – EI-Gamal – Schnorr.

UNIT IV : NETWORK SECURITY   9

E-mail Security – Pretty Good Privacy – S/MIME – IP Security – Web Security.

UNIT V : SYSTEM LEVEL SECURITY   9

Intrusion Detection System – Virus and related threats – Counter measures – Firewalls and types – design principles – Practical implementation of cryptography and security.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF EXPERIMENTS

(Any Eight Experiments to be conducted)

1. Perform encryption, decryption using the following substitution techniques

    i. Ceaser cipher

    ii. Playfair cipher

    iii. Hill Cipher

    iv. Vigenere cipher

2. Perform encryption and decryption using following transposition techniques

    i. Rail fence

    ii. Row & Column Transformation

3. Apply DES algorithm for practical applications.

4. Apply AES algorithm for practical applications.

5. Implement RSA Algorithm using HTML and JavaScript

6. Implement the Diffie-Hellman Key Exchange algorithm for a given problem.

7. Calculate the message digest of a text using the SHA-1 algorithm.

8. Implement the SIGNATURE SCHEME – Digital Signature Standard.

9. Demonstrate intrusion detection system (ids) using any tool eg. Snort or any other s/w.

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

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

- Understand the concept of classical and modern encryption techniques.

- Explore the concept of public key cryptography by understanding various concept of number theory.

- Recognize the various authentication and hash functions.

- Analyze the E-mail, Web and IP Security principles.

- Managing the intrusion detection, attacks of viruses by applying the principles of firewalls and performing the practical implementation of cryptography and network security.

- Apply and analyze the various algorithms for encryption and decryption.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

TEXT BOOKS

1. William Stallings, "Cryptography And Network Security – Principles and Practices", Pearson, 7th Edition, 2016.

2. Bruce Schneier," Applied Cryptography" John Wiley & Sons Inc. 2nd Edition,1996.

REFERENCES

1. Behrouz A.Foruzan, Cryptography and Network Security, Tata McGraw Hill, 2007.

2. Niels Ferguson, "Cryptography Engineering:Design Principles and Practical Applications", Wiley, 1st Edition, 2010.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105162/ (Introduction to Cryptography)

2. https://nptel.ac.in/courses/106/105/106105031/ (Overview on Modern Cryptography)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSE702	CLOUD COMPUTING	L T P C
		3 0 2 4

OBJECTIVES

The students should be able to,

- Provide the overview of cloud computing.
- Understand the services provided by Cloud.
- Understand the events maintaining inside the Cloud.
- Explain the concept of service oriented architecture.
- Describe some of the tools available for the creating Cloud.
- Apply and analyze the various tools for creating a cloud environment.

UNIT I : CLOUD FUNDAMENTALS   9

Defining cloud computing – cloud types – characteristics – assessing the role of open standards – measuring the cloud's value – computing total cost of ownership – specifying service level agreements – defining licensing models – understanding cloud architecture – cloud computing stack – connecting to the cloud.

UNIT II : CLOUD SERVICES   9

Defining IaaS – PaaS – SaaS – IdaaS – CaaS – Platforms – using virtualization techniques – load balancing and virtualization – understanding hypervisors – machine imaging – porting applications – capacity planning – exploring platform as a service.

UNIT III : CLOUD INFRASTRUCTURE AND MOBILE CLOUD   9

Managing the cloud – administering – cloud management products – emerging cloud management standards – understanding cloud security – securing the cloud – securing data – establishing identity and presence – working with mobile devices – mobile web services.

UNIT IV : SERVICES AND APPLICATIONS   9

Service oriented architecture – introduction – SOA communications – managing and monitoring – relation between SOA and cloud computing moving applications to the cloud – productivity software – using webmail services – communicating with the cloud – using media and streaming.

UNIT V : CASE STUDIES AND TOOLS   9

Amazon Web Services (AWS) – Google web services – Microsoft cloud services – cloudBees – creating and deploying real time application – Eucalyptus cloud.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

LIST OF EXPERIMENTS

1. Installation and Configuration of Hadoop.

2. Hadoop Implementation of file management tasks, such as Adding files and directories, Retrieving files and Deleting files.

3. Create an application (Ex: Word Count) using Hadoop Map/Reduce.

4. Implementation of Para-Virtualization using VM Ware's Workstation/ Oracle's Virtual Box and Guest O.S.

5. Installation of Google App Engine Launcher.

6. Create an application to run on compiler in virtualized OS.

7. Case Study: Amazon Web Services.

TOTAL: 45+15 = 60 PERIODS

OUTCOMES

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

- Describe the concepts and technologies of big data analytics.

- Apply the techniques in storing, handling and analyzing big data.

- Discuss the concepts and terminologies of cloud computing.

- Demonstrate cloud frameworks and technologies.

- Describe and apply fine data intensive computing.

- Apply and analyze the various tools for creating a cloud environment.

TEXT BOOKS

1. Barrie Sosinsky, "Cloud Computing Bible", Wiley, 2011.

2. Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi," Mastering Cloud Computing" McGraw Hill Education,2015.

REFERENCES

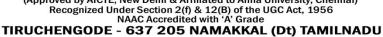1. Anthony T.Velte, Toby J.Velte Robert Elsenpeter, "Cloud Computing: A Practical Approach", Tata McGraw – Hill Education Private Limited, New Delhi 2010.

2. Timothy Chou, "Introduction to Cloud Computing", Kindle Edition, 2010.

E – RESOURCES

1. https://onlinecourses.nptel.ac.in/noc20_cs20/preview (Cloud Computing)

2. https://nptel.ac.in/courses/106/105/106105223/ (Introduction to Cloud)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSJ701	PROJECT WORK(PHASE – I)	L T P C
		0 0 2 1

OBJECTIVES

The main objective of the course is to,

- Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of articles.
- Develop the skills to formulate a technical project.
- Analyze the problem statement with respect to the solutions.
- Design a methodology to resolve the identified problem.

GUIDELINES

The students in a group of 3 to 4 works on a topic approved by the Head of the Department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor.The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester.The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

TOTAL: 30 PERIODS

OUTCOMES

On Completion of the project work students will be able to,

- Identify a specific problem for the current need of the society and collecting information related to the same through detailed review of articles.
- Develop the skills to formulate a technical project.
- Analyze the problem statement with respect to the solutions.
- Design the methodology to resolve the identified problem.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

SEMESTER VIII

19CSJ801   **PROJECT WORK(PHASE – II)**   **L T P C**
                                                           0 0 20 10

OBJECTIVES

The main objective of the course is to,

- Develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same.
- Utilize new tools,algorithms and mechanisms that contribute to obtain the solution.
- Test and validate the results obtained through conformance.
- Prepare project report and to face reviews and viva voce examination.
- Develop the ability to take up the challenging practical problems.

GUIDELINES

The students in a group of 3 to 4 works on a topic approved by the Head of the Department under the guidance of a faculty member and prepares a comprehensive project report after completing the work to the satisfaction of the supervisor.The progress of the project is evaluated based on a minimum of three reviews. The review committee may be constituted by the Head of the Department. A project report is required at the end of the semester.The project work is evaluated based on oral presentation and the project report jointly by external and internal examiners constituted by the Head of the Department.

          TOTAL: 300 PERIODS

OUTCOMES

On Completion of the project work students will be able to,

- Develop the ability to solve a specific problem till the successful solution of the same.
- Utilize new tools,algorithms and mechanisms that contribute to obtain the solution.
- Test and validate the results obtained through conformance.
- Prepare project report and to face reviews and viva voce examination.
- Take up any challenging practical problems and find the solution by formulating proper methodology.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

PROFESSIONAL ELECTIVE - I

| 19CSPX01 | DATA WAREHOUSING AND MINING | L T P C |
| | | 3 0 0 3 |

OBJECTIVES

The main objective of the course is to,

* Learn the basics of data mining, data preprocessing and data visualization techniques.
* Understand data warehouse concepts, architecture and business analysis tools.
* Study algorithm for finding hidden patterns and associations in data.
* Know the various classification methods.
* Understand the different clustering and outlier detection methods.

UNIT I : INTRODUCTION   9

Introduction to Data Mining Systems – Knowledge Discovery Process – Technologies – Applications – Major issues in Data Mining – Data Objects and Attribute Types – Basic Statistical Descriptions of Data – Data Visualization – Measuring Data Similarity and Dissimilarity – Data Preprocessing.

UNIT II : DATA WAREHOUSING AND ONLINE ANALYTICAL PROCESSING   9

Data warehouse: Basic Concepts – Data Cube and OLAP – Data Warehouse Design and Usage – Data Warehouse Implementation – Data Generalization by Attribute – Oriented Induction.

UNIT III : FREQUENT PATTERN ANALYSIS   9

Mining Frequent patterns, Associations and Correlations: Basic Concepts – Frequent Item set Mining Methods – Pattern Evaluation Methods – Pattern Mining in Multilevel, Multidimensional Spaces – Constraint-Based Frequent Pattern Mining.

UNIT IV : CLASSIFICATION   9

Basic Concepts – Decision Tree Induction – Bayes Classification Methods – Rule-Based Classification – Bayesian Belief Networks – Support Vector Machines – Other Classification Methods.

UNIT V : CLUSTER ANALYSIS AND OUTLIER DETECTION   9

Cluster Analysis – Partitioning Methods – Hierarchical Methods – Density-based Methods – Grid-Based Methods – Clustering in High Dimensional Data – Outliers and Outlier Analysis – Outlier Detection Methods.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Acquire the knowledge of data mining, data preprocessing and visualization.
- Model and design data warehouse architecture and perform analysis with tools.
- Apply Frequent pattern and association rules mining techniques for data analysis.
- Apply Proper Classification techniques for data analysis.
- Apply suitable Clustering methods for data analysis.

TEXT BOOKS

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", 3rd Edition, Elsevier, 2012.
2. Alex Berson and Stephen J.Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw – Hill Edition, 13th Reprint, 2008.

REFERENCES

1. Pang Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2014.
2. Daniel T.Larose, "Data Mining Methods and Models", Wiley – Inderscience, 2006.

E – RESOURCES

1. https://nptel.ac.in/courses/110/107/110107092 (Data Mining)
2. https://nptel.ac.in/courses/106/106/106106046 (Classification)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX02	DIGITAL SIGNAL PROCESSING	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Learn discrete fourier transform, properties of DFT.
- Understand the characteristics of digital filters, design digital IIR and FIR filters.
- Understand the effects of finite precision representation on digital filters.
- Understand the fundamental concepts of multi rate signal processing and its applications.
- Introduce the concepts of adaptive filters and its application to communication engineering.

UNIT I : DISCRETE FOURIER TRANSFORM   **9**

Discrete Fourier transform (DFT) – deriving DFT from DTFT, properties of DFT – periodicity, symmetry, circular convolution. Linear filtering using DFT. Filtering long data sequences – overlap save and overlap add method. Fast computation of DFT – Radix-2 Decimation-in-time (DIT) Fast Fourier transform (FFT), Decimation-in-frequency (DIF) Fast Fourier transform (FFT). Linear filtering using FFT.

UNIT II : INFINITE IMPULSE RESPONSE FILTERS   **9**

Characteristics of practical frequency selective filters. characteristics of commonly used analog filters – Butterworth filters, Chebyshev filters. Design of IIR filters from analog filters (LPF, HPF, BPF, BRF) – Approximation of derivatives, Impulse invariance method, Bilinear transformation. Frequency transformation in the analog domain. Structure of IIR filter – direct form I, direct form II, Cascade, parallel realizations.

UNIT III : FINITE IMPULSE RESPONSE FILTERS   **9**

Design of FIR filters – symmetric and Anti-symmetric FIR filters – design of linear phase FIR filters using Fourier series method – FIR filter design using windows (Rectangular, Hamming and Hanning window), Frequency sampling method. FIR filter structures – linear phase structure, direct form realizations.

UNIT IV : FINITE WORD LENGTH EFFECTS   **9**

Fixed point and floating point number representation – ADC – quantization – truncation and rounding – quantization noise – input / output quantization – coefficient quantization error –

product quantization error – overflow error – limit cycle oscillations due to product quantization and summation – scaling to prevent overflow.

.**UNIT V : INTRODUCTION TO DIGITAL SIGNAL PROCESSORS**   **9**

DSP functionalities – circular buffering – DSP architecture – Fixed and Floating point architecture principles – Programming – Application examples.

TOTAL: 45 PERIODS

OUTCOMES

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

- Apply DFT for the analysis of digital signals and systems.
- Design IIR and FIR filters.
- Characterize the effects of finite precision representation on digital filters.
- Design multirate filters.
- Apply adaptive filters appropriately in communication systems.

TEXT BOOKS

1. John G. Proakis & Dimitris G.Manolakis, "Digital Signal Processing – Principles, Algorithms & Applications", 4th Edition, Pearson Education / Prentice Hall, 2007.
2. Emmanuel C. Ifeachor & Barrie. W. Jervis, "Digital Signal Processing", 2nd Edition, Pearson Education / Prentice Hall, 2002.

REFERENCES

1. A. V. Oppenheim, R.W. Schafer and J.R. Buck, "Discrete–Time Signal Processing", 8th Indian Reprint, Pearson, 2004.
2. Andreas Antoniou, "Digital Signal Processing", Tata Mc Graw Hill, 2006.

E–RESOURCES

1. https://nptel.ac.in/courses/117/102/117102060/ (Digital Signal Processing)
2. https://nptel.ac.in/courses/108/106/108106151/ (Digital Signal Processing)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX03	SOFTWARE TESTING	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Explain the basics of software testing.

- Highlight the strategies for software testing.

- Stress the need and conduct of testing levels. To identify the issues in testing management.

- Bring out the ways and means of controlling and monitoring testing activity.

- Study about Automation testing and tools.

UNIT I : INTRODUCTION TO TESTING   9

Software Testing – Definition of Software Testing – Objective and Limits of Testing – Software Testing Life Cycle – Testing Strategy – Roles and Responsibilities of a Software Tester in Organizations – Origins of Defects – Cost of Defects – Independent Verification and Validation.

UNIT II : SOFTWARE TESTING REQUIREMENT   9

Software Testing Requirements – Analyzing the requirements – Classifying the Functional and Non Functional Requirements. Software Testing Review Process – Objective of Software Testing Review – Types of Reviews – Peer Review, Walkthrough, Inspection – Checklists of Review Process – Review Log.

UNIT III : TESTING TECHNIQUES   9

White Box Testing Techniques – Static and Dynamic Testing – Statement Coverage – Decision Coverage – Basic Path Testing – Control Flow Graph Coverage – Branch Coverage – Conditional Coverage – McCabe's Cyclomatic Complexity – Mutation Testing. Black Box Test Techniques – Boundary Value Analysis – Equivalent Class Partition – Error Guessing – Decision Table – State Transition Table – Pair Wise Testing – Use Case Testing.

UNIT IV : TESTING TYPES   9

Unit Testing – Smoke Testing – Functional Testing and its Types – Integration, System Testing, User Acceptance Testing (Alpha and Beta) – Non Functional Testing and its Types – Performance Testing (Load, Volume and Stress) – Recovery Testing, Browser Compatibility Testing – Security Testing – Scalability Testing – Usability Testing – Ad Hoc Testing – Internationalization Testing – Configuration Testing – Data warehouse Testing and Business Intelligence Testing – Mobile Testing.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : AUTOMATION TOOLS AND TEST CASES   **9**

Software Test Automation – Scope of Automation – Design and Architecture for Automation – Automation Testing using Cucumber and Selenium Tool – Definition of Test Case –Traceability Matrix – Test Case Review Process – Test Execution – Test Log – Reporting of Test Execution – Risk Based Testing Approach. Testing Web Applications: Testing Concepts for Web Apps – the Testing Process – Content Testing – User Interface Testing – Component Level Testing Navigation Testing – Configuration Testing – Security Testing – Performance Testing.

TOTAL: 45 PERIODS

OUTCOMES

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

- Interpret the basic concepts of Software testing, defects .Verification and Validation
- Analyze the functional requirements of the system and the use of conducting the review
- Infer the need of testing techniques for White box, Basis path, Black box and Control structure testing.
- Classify different strategic approaches and types in software testing.
- Learn about Automation Testing and tools
- Implement the guidelines to generate test cases design.

TEXT BOOKS

1. Mauro pezze,Michal young, "Software Testing and Analysis: Process, Principles, and Techniques",Wiley,2008 Edition.
2. Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black , "Foundations of software testing", ISTQB Certification.

REFERENCES

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", 3rd Edition, Artech House Publishers, 2007.
2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004.

E–RESOURCES

1. https://nptel.ac.in/courses/106/105/106105150/ (Software Testing)
2. https://nptel.ac.in/courses/106/101/106101163/ (Software Testing – Motivation)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

19CSPX04	EMBEDDED SYSTEMS	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Introduce case studies, simulations, contributions of scientist, national/international policies with a futuristic vision along with socio-economic impact and issues
- Study the architecture and programming of ARM processors.
- Introduce the basic concepts of hard real time multiprocessing.
- Introduce the analytical concepts for effective programming.
- Introduce the basic concepts of Communication protocol.

UNIT I : INTRODUCTION TO EMBEDDED COMPUTING AND ARM PROCESSORS   9

Complex systems and microprocessors – Embedded system design process – Formalism for system design – Design example: Model train controller – ARM Processor Fundamentals – Instruction Set and Programming using ARM Processor.

UNIT II : COMPUTING PLATFORM   9

CPU: Programming input and output – Supervisor mode, exception and traps – Coprocessor – Memory system mechanism – CPU performance – CPU power consumption – CPU buses – Memory devices – I/O devices – Component interfacing – System Level Performance Analysis – Parallelism. Design Example: Data Compressor.

UNIT III : PROGRAM DESIGN AND ANALYSIS   9

Program design – Model of programs – Assembly and Linking – Basic compilation techniques – Program Optimization – Analysis and optimization of execution time, power, energy, program size – Program validation and testing – Example: Software Modem.

UNIT IV : PROCESS AND OPERATING SYSTEMS   9

Multiple tasks and Multi processes – Processes – Context Switching – Operating Systems – Priority based Scheduling – RMS and EDF – Inter Process Communication mechanisms – Evaluating operating system performance – Power optimization strategies for processes.

UNIT V : HARDWARE ACCELERATORS & NETWORKS   9

Multiprocessors – CPUs and Accelerators – Performance Analysis – Distributed Embedded Architecture – Networks for Embedded Systems: I2C, CAN Bus, Ethernet, Myrinet – Network based design – Internet enabled systems. Design Example: Elevator Controller.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Comprehend and appreciate the significance and role of microcontrollers in embedded systems.
- Analyze and demonstrate program design and optimization and proper scheduling of the process.
- Apply the concept of process, multiprocesses and operating systems in embedded system design.
- Implement various communication protocols in distributed embedded computing platform.
- Design and develop ARM Processor based Programming.

TEXT BOOKS

1. Wayne Wolf, "Computers as Components – Principles of Embedded Computing System Design", Morgan Kaufmann Publisher (An imprint of Elsevier), 3rd Edition, 2008.
2. Andrew N Sloss, Dominic Symes, Chris Wright, "ARM System Developer's Guide– Designing and Optimizing System Software", Elsevier/Morgan Kaufmann Publisher, 2008.

REFERENCES

1. David E–Simon, "An Embedded Software Prime", Pearson Education, 2010.
2. K.V.K.K.Prasad, "Embedded Real–Time Systems: Concepts, Design & Programming", Dreamtech press, 2005.

E – RESOURCES

1. https://nptel.ac.in/courses/108/102/108102045/ (Embedded Systems)
2. https://nptel.ac.in/courses/106/105/106105193/ (Embedded System Design with ARM)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX05	NETWORK ANALYSIS AND MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

* Learn network devices functions and configurations hub, switch, tap and routers.

* Be familiar with network Security Devices.

* Be exposed to network services.

* Understand and analyze application performance.

* Learn to analyze network traffic and protocols.

* Be aware of network–troubleshooting concepts.

UNIT I : A SYSTEM APPROACH TO NETWORK DESIGN   9

Introduction – Network Service and Service based networks – Systems and services – characterizing the services. Requirement Analysis: Concepts – Background – User Requirements – Application Requirements – Host Requirements – Network Requirements.

UNIT II : REQUIREMENT ANALYSIS   9

Requirement Analysis: Guidelines – Requirements gathering and listing – Developing service metrics to measure performance – Characterizing behavior – developing performance threshold – Distinguish between service performance levels. Requirement Analysis: Practice – Template, table and maps – simplifying the requirement analysis process – case study.

UNIT III : FLOW ANALYSIS: CONCEPTS,GUIDE LINES AND PRACTICE   9

Background – Flows – Data sources and sinks – Flow models – Flow boundaries – Flow distributions – Flow specifications – Applying the flow model – Establishing flow boundaries – Applying flow distributions – Combining flow models, boundaries and distributions – Developing flow specifications – prioritizing flow simplifying flow analysis process – examples of applying flow specs – case study.

UNIT IV : NETWORK MANAGEMENT AND SECURITY, NETWORK DESIGN   9

Integrating Network management and security into the Design – Defining Network Management – Designing with manageable resources – Network Management Architecture – Security – Security mechanism – Examples – Network Management and security plans – Case study – Evaluating cable plant design options – Network equipment placement – diagramming the physical design – diagramming the worksheet – case study.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : NETWORK MANAGEMENT AND SNMP PROTOCOL MODEL   9

Network and System management, Network management system platform; Current SNMP Broadband and TMN management, Network management standards. SNMPV1, SNMPV2 system architecture, SNMPV2, structure of management information. SNMPV2 – MIB – SNMPV2 protocol, SNMPV3 – Architecture, Application, MIB, security user based security model, access control RMON.

TOTAL: 45 PERIODS

OUTCOMES

At the end of this course the students should be able to,

- Explain the key concepts and algorithms in complex network analysis.
- Apply a range of techniques for characterizing network structure.
- Discuss methodologies for analyzing networks of different fields.
- Demonstrate knowledge of recent research in the area and exhibit technical writing and presentation skills.
- Understand network security concepts.

TEXT BOOKS

1. James.D.McCabe, "Practical Computer Network Analysis and Design", 1st Edition, Morgan Kaufaman, 1997.
2. Mani Subramanian, "Network Management – Principles & Practice", 2nd Edition, Prentice Hall, 2012.

REFERENCES

1. Mark Newman, "Networks: An Introduction",Kindle Edition,2010.
2. Laura Chappel and Gerald Combs,"Wireshark 101: Essential Skills for Network Analysis",Kindle Edition,2013.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105154/   (Complex Network: Theory and Application)
2. https://nptel.ac.in/courses/106/105/106105183/ (Computer Networks and Internet Protocol)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX06   **TOTAL QUALITY MANAGEMENT**   **L T P C**
                                                                                                          3 0 0 3

OBJECTIVES

The main objective of this course is to,

- Acquire various concepts of quality management.
- Implement various principles of quality management.
- Impart quality using statistical process.
- Use the various tools to maintain quality.
- Implement the quality system for ISO certification.

UNIT I : INTRODUCTION   **9**

Introduction – Need for quality – Evolution of quality – Definitions of quality – Dimensions of product and service quality – Basic concepts of TQM – TQM framework – Contributions of Deming, Juran and Crosby – Barriers to TQM – Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention.

UNIT II : TQM PRINCIPLES   **9**

Leadership – Quality statements – Strategic quality planning – Quality councils – Employee involvement – Motivation, empowerment, team and teamwork, recognition, reward and performance appraisal – Continuous process improvement – PDCA cycle, 5S, Kaizen – Supplier partnership, partnering, supplier selection, supplier rating.

UNIT III : TQM TOOLS AND TECHNIQUES – I   **9**

The seven traditional tools of quality – New management tools – Six sigma: Concepts, methodology, applications to manufacturing, service sector including IT – Bench marking, reason to bench mark, bench marking process – FMEA – Stages, types.

UNIT IV : TQM TOOLS AND TECHNIQUES – II   **9**

Quality circles – Cost of quality – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Performance measures.

UNIT V : QUALITY MANAGEMENT SYSTEM   **9**

Introduction – Benefits of ISO registration – ISO 9000 series of standards – Specific standards – AS 9100, TS16949 and TL 9000 – ISO 9001 requirements – Implementation – Documentation – Internal audits – Registration – Environmental Management System:

Introduction – ISO 14000 series standards – Concepts of ISO 14001 – Requirements of ISO 14001 – Benefits of EMS.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

ESTD 2001

OUTCOMES

At the end of the course, the students will be able to,

- Acquire various concepts of quality management.

- Implement various principles of quality management.

- Impart quality using statistical process.

- Use the various tools to maintain quality.

- Implement the quality system for ISO certification.

TEXT BOOKS

1. Dale H.Besterfiled, "Total Quality Management", Pearson Education Asia, Revised Indian Reprint, Sixth Impression, 3rd Edition, 2013.

2. Suganthi.L and Anand Samuel, "Total Quality Management", Prentice Hall (India) Pvt. Ltd., 2011.

REFERENCES

1. James R. Evans and William M. Lindsay, "The Management and Control of Quality", 1st Indian Edition, Cengage Learning, 2012.

2. Subburaj ramasamy, "Total Quality Management", McGraw Hill Education, Noiad,2011.

E– RESOURCES

1. https://nptel.ac.in/courses/110/104/110104080/ (Introduction to Total Quality Management–I)

2. https://nptel.ac.in/courses/110/104/110104085/ (Introduction to Total Quality Management–II)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU
ESTD 2001

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

19CSPX07   **C# AND .NET PROGRAMMING**   **L T P C**
                                                                               3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Learn introduction to C#.

- Learn object oriented programming concepts and basic programming in C# .

- Enhance skills in writing Windows applications, ADO.NET and ASP .NET.

- Study the advanced concepts in data connectivity, WPF, WCF and WWF with C# and .NET 4.5.

- Implement mobile applications using .Net compact framework.

UNIT I : INTRODUCTION TO C#   **9**

Introducing C# – .Net Architecture – Core C# – Literals – Variables – Data Types – Operators, Expressions – Branching – Looping – Methods – Arrays – Strings – Structures – Enumerations.

UNIT II : OBJECT ORIENTED ASPECTS OF C#   **9**

Classes – Objects – Inheritance – Polymorphism – Interfaces – Operator Overloading – Delegates – Events – Generics – Collections – Memory Management and Pointers – Errors and Exceptions – Reflection.

UNIT III : BASE CLASS LIBRARIES AND DATA MANIPULATION   **9**

Diagnostics – Tasks, Threads and Synchronization – .Net Security – Localization – Manipulating XML– SAX and DOM – Manipulating files and the Registry – Transactions – ADO.NET– Peer-to-Peer Networking – PNRP – Building P2P Applications – Windows Presentation Foundation (WPF).

UNIT IV : WINDOW BASED APPLICATIONS, WCF AND WWF   **9**

Window based applications – Core ASP.NET – ASP.NET Web forms – Windows Communication Foundation (WCF) – Introduction to Web Services – .Net Remoting – Windows Service – Windows Workflow Foundation (WWF) – Activities – Workflows.

UNIT V : .NET FRAMEWORK AND COMPACT FRAMEWORK   **9**

Assemblies – Shared assemblies – Custom Hosting with CLR Objects – Appdomains – Core XAML – Bubbling and Tunneling Events– Reading and Writing XAML – .Net Compact Framework – Compact Edition Data Stores – Errors, Testing and Debugging – Optimizing performance – Packaging and Deployment – Networking and Mobile Devices.

                                                          TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Write various applications using C# Language in the .NET Framework.
- Develop distributed applications using .NET Framework.
- Create mobile applications using .NET compact Framework.
- Working of base class libraries, their operations and manipulation of data using XML.
- Improve writing skills to express thoughts freely.

TEXT BOOKS

1. Christian Nagel, Jay Glynn, Morgan Skinner. "Professional C# 5.0 and .NET 4.5.1", Wiley, 2014.
2. Harsh Bhasin, "Programming in C#", Oxford University Press, 2014.

REFERENCES

1. Ian Gariffiths, Mathew Adams, Jesse Liberty, "Programming C# 4.0", O_Reilly, 4th Edition, 2010.
2. Andrew Troelsen, Pro C# 5.0 and the .NET 4.5 Framework, Apress publication,2012.

E – RESOURCES

1. https**://**www**.**udemy**.**com/course/c–net–for–beginners/ (.NET)
2. https://www.4shared.com/postDownload/xcp4t2awba/Professional_C_50_and_NET_451.html (.NET Programming)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

ESTD 2001

19CSPX08	NATURAL LANGUAGE PROCESSING	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

* Learn the basics of natural Language processing.

* Introduce the fundamental concepts and techniques of Natural language Processing for analyzing words based on Morphology.

* Understand the use of language models in NLP.

* Understand approaches to syntax and semantics in NLP.

* Acquaint algorithmic description of the main language levels that includes morphology, syntax, and semantics for machine translation applications.

UNIT I : INTRODUCTION 9

Introduction to various levels of natural language processing – Ambiguities and computational challenges in processing various natural languages – Introduction to Real life applications of NLP such as spell and grammar checkers, information extraction, question answering, and machine translation.

UNIT II : TEXT PROCESSING AND MOROPOLOGY 9

Character Encoding – Word Segmentation – Sentence Segmentation – Introduction to Corpora, Corpora Analysis – Inflectional and Derivation Morphology – Morphological Analysis and Generation using finite state transducers.

UNIT III : LEXICAL SYNTAX AND LANGUAGE MODELING 9

Introduction to Word Types – POS Tagging – Maximum Entropy Models for POS tagging – Multi–Word Expressions – The Role of Language Models – Simple N-gram Models – Estimating Parameters and Smoothing – Evaluating Language Models.

UNIT IV : SYNTAX AND SEMANTICS 9

Introduction to Phrases – Clauses and Sentence Structure – Shallow Parsing and Chunking – Shallow Parsing with Conditional Random Fields (CRF) – Lexical Semantics – Word Sense Disambiguation – WordNet – Thematic Roles – Semantic Role Labelling with CRFs.

UNIT V : APPLICATIONS OF NLP 9

NL Interfaces – Text Summarization – Sentiment Analysis – Machine Translation – Question answering – Recent Trends in NLP.
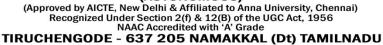
TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Understand the principles and Process the Human Languages Such as English and other Indian Languages using computers.
- Demonstrate understanding of algorithms and techniques for text-based processing of natural language with respect to morphology.
- Perform POS tagging for a given natural language.
- Check the syntactic and semantic correctness of sentences using grammars and labeling.
- Develop computational methods for real world applications.

TEXT BOOKS

1. Daniel Jurafsky and James H. Martin "Speech and Language Processing", 3rd Edition, Prentice Hall, 2009.
2. NitinIndurkhya, Fred J. Damerau, "Handbook of Natural Language Processing", 2nd Edition, CRC Press, 2010.

REFERENCES

1. James Allen, "Natural Language Understanding", Pearson Publication, 8th Edition, 2012.
2. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.
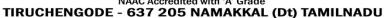
E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105158.html (Text Processing)
2. https://nptel.ac.in/courses/106/101/106101007.html (Part of Speech Tagging)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

PROFESSIONAL ELECTIVE - II

19CSPX09   **AD HOC AND SENSOR NETWORKS**   **L T P C**
                                                              3 0 0 3
OBJECTIVES

The main objective of the course is to,

- Learn about the MAC issues and challenges in the design of wireless ad hoc networks.
- Understand the working Routing and Transport Protocols for ad hoc networks.
- Learn about the MAC and Routing protocols for sensor networks.
- Learn the QoS solutions in wireless sensor networks.
- Understand various security issues in ad hoc and sensor networks and the corresponding solutions.

UNIT I : INTRODUCTION AND MAC PROTOCOLS   **9**

Mobile Ad Hoc Networks (MANETS) : Introduction – concepts and architectures. Applications – Issues and challenges in ad hoc networks – MAC Layer Protocols for wireless ad hoc networks – Contention-Based MAC protocols – MAC Protocols Using Directional Antennas – Multiple-Channel MAC Protocols – Power – Aware MAC Protocols.

UNIT II : NETWORK, TRANSPORT AND QOS IN AD HOC NETWORKS   **9**

Routing in Ad hoc Networks – Design Issues – Proactive, Reactive and Hybrid Routing Protocols TCP"s challenges and Design Issues in Ad Hoc Networks – Transport protocols for ad hoc networks – Issues and Challenges in providing QoS – Network Layer QoS solutions.

UNIT III : MAC & ROUTING IN WIRELESS SENSORNETWORKS   **9**

Introduction – Applications – Challenges – Sensor network architecture – MAC Protocols for wireless sensor networks – Low duty cycle protocols and wakeup concepts – Contention-Based protocols – Schedule-Based protocols – IEEE 802.15.4 Zigbee – Routing Protocols.

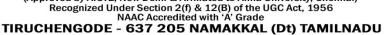**UNIT IV : TRANSPORT & QOS IN WIRELESS SENSOR NETWORKS**   **9**

Data-Centric and Contention-Based Networking – Transport Layer and QoS in Wireless Sensor Networks – Congestion Control in network processing – Operating systems for wireless sensor networks.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : SECURITY IN AD HOC ANDSENSOR NETWORKS   **9**

Security Attacks – Key Distribution and Management – Intrusion Detection – Software based Anti-tamper techniques – Water marking techniques – Defense against routing attacks – Secure Ad hoc routing protocols – Broadcast authentication WSN protocols – TESLA – Biba – Sensor Network Security Protocols – SPINS.

TOTAL: 45 PERIODS

OUTCOMES

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

- Identify different issues in wireless ad hoc and sensor networks.
- Understand and analyze Routing and Transport protocols for ad hoc networks.
- Understand the medium access and routing protocols of Wireless Sensor Networks.
- Understand the QoS solutions of Wireless Sensor Networks.
- Identify and understand security issues in ad hoc and sensor networks.

TEXT BOOKS

1. C. Siva Ram Murthy, and B. S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols ", Prentice Hall Professional Technical Reference, 2008.
2. Holger Karl, Andreas Willing, "Protocols and Architectures for Wireless Sensor Networks", John Wiley & Sons, 2005.

.REFERENCES

1. Carlos De MoraisCordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks:Theory and Applications", World Scientific Publishing Company, 2006.
2. Waltenegus Dargie, Christian Poellabauer,"Fundamentals of Wireless Sensor Networks Theory and Practice", John Wiley and Sons,2010.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105160/ (Mobile Adhoc Networks)
2. https://nptel.ac.in/noc/courses/noc18/SEM1/noc18–cs09/ (Adhoc and Sensor Networks)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX10 **BIG DATA ANALYTICS** L T P C
3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Provide an overview of an exciting growing field of big data analytics.
- Understand the Hadoop framework and MapReduce.
- Introduce the tools required to manage and analyze big data like NoSQL.
- Solve complex real-world problems for decision support using frequent itemsets and clustering.
- Learn stream computing.

UNIT I : INTRODUCTION TO BIG DATA 9

Introduction to Big Data – Big Data Characteristics – Types of Big Data – Big Data Vs Traditional Data – Drivers for Big data – Big Data Applications – Big Data Usecases.

UNIT II : HADOOP FRAMEWORK AND MAPREDUCE 9

What is Hadoop – Hadoop Core Components – Hadoop Ecosystems – Physical Architecture – Hadoop Limitations – Distributed File Systems – MapReduce – Algorithm Using MapReduce – Matrix-Vector Multiplication by MapReduce.

UNIT III : NoSQL 9

What is NoSQL – NoSQL Business Drivers – NoSQL Case Studeies – NoSQL Data Architecture Patterns: Key-value Stores, Document Stores,Graph Stores, Column Stores, Variations of NoSQL Architectural Patterns – Using NoSQL to Manage Big Data: What is a Big Data NoSQL Solution – Understanding the types of Big Data Problems; Analyzing Big Data with a Shared-nothing Architecture – Choosing Distribution Models.

UNIT IV : FREQUENT ITEMSETS AND CLUSTERING 9

Handling Large Data Sets in main Memory : Algorithm of Park, Chen and Yu, The Multistage Algorithm, The Multihash Algorithm – Counting Frequent Items in a Stream – Sampling Methods for Streams – Frequent Itemsets in Decaying Windows – Clustering – CURE Algorithm – Stream Computing – A Stream Clustering Algorithm.

UNIT V : MINING DATA STREAMS 9

The Stream Data Model – Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Counting Ones in a Window.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Understand the key issues in big data management and its associated applications.
- Acquire fundamental enabling techniques and scalable algorithms like Hadoop and MapReduce in data analytics.
- Understand the various NoSQL alternative database models.
- Analyze data by utilizing various data mining approaches.
- Perform analytics on real–time streaming data.

TEXT BOOKS

1. Anand Rajaraman and Jeff Ullman, "Mining of Massive Datasets", Cambridge University Press, 3rd Edition,2014.
2. Alex Holmes, "Hadoop in Practice", Manning Press, Dreamtech Press, 2nd Edition,2010.

REFERENCES

1. Dan McCreary and Ann Kelly, "Making Sense of NoSQL – A guide for managers and the rest of us", Manning Press,1st Edition,2013.
2. Paul Zikopoulos, Chris Eaton, "Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data", McGraw Hill Education,1st Edition,2017.

E–RESOURCES

1. https://nptel.ac.in/courses/106/104/106104189 (Hadoop Framework and MapReduce)
2. https://nptel.ac.in/courses/106/105/106105186 (Clustering)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX11	GREEN COMPUTING	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Learn the fundamentals of Green Computing.
- Analyze the Green computing Grid Framework.
- Understand the issues related with Green compliance.
- Study and develop various case studies.
- Understand the Business Strategies.

UNIT I : FUNDAMENTALS 9

Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics.

UNIT II : GREEN ASSETS AND MODELLING 9

Green Assets: Buildings, Data Centers, Networks, and Devices – Green Business Process Management: Modeling, Optimization, and Collaboration – Green Enterprise Architecture – Environmental Intelligence – Green Supply Chains – Green Information Systems: Design and Development Models.

UNIT III : GRID FRAMEWORK 9

Virtualization of IT systems – Role of electric utilities, Telecommuting, teleconferencing and teleporting – Materials recycling – Best ways for Green PC – Green Data center – Green Grid framework.

UNIT IV : GREEN COMPLIANCE 9

Socio-cultural aspects of Green IT – Green Enterprise Transformation Roadmap – Green Compliance: Protocols, Standards, and Audits – Emergent Carbon Issues: Technologies and Future.

UNIT V : CASE STUDIES 9

The Environmentally Responsible Business Strategies (ERBS) – Case Study Scenarios for Trial Runs – Case Studies – Applying Green IT Strategies and Applications to a Home, Hospital, Packaging Industry and Telecom Sector.

TOTAL :45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

On Completion of the course, the students should be able to,

- Acquire knowledge to adopt green computing practices to minimize negative impacts on the environment.
- Enhance the skill in energy saving practices in their use of hardware.
- Evaluate technology tools that can reduce paper waste and carbon footprint by the stakeholders.
- Understand the ways to minimize equipment disposal requirements.
- Understand the strategies in Business.

TEXT BOOKS

1. Bhuvan Unhelkar, "Green IT Strategies and Applications - Using Environmental Intelligence", CRC Press, June 2014.
2. Woody Leonhard, Katherine Murray, "Green Home computing for dummies", August 2012.

REFERENCES

1. Alin Gales, Michael Schaefer, Mike Ebbers, "Green Data Center: steps for the Journey", Shroff/IBM rebook, 2011.
2. John Lamb, "The Greening of IT", Pearson Education, 2009.

E – RESOURCES

1. https://www.learnpick.in/prime/documents/notes/details/2500/green–computing (Introduction)
2. https://www.studocu.com/row/document/gomal–university/green–computing/lecture–notes/green–computing–lecture–notes–1–4/6350932/view (Green Compliance)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX12	AGILE METHODOLOGY	L T P C
		3 0 0 3

OBJECTIVES

The main objective of this course is to enable students,to

- Learn the basic concepts of Agile process.
- Provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high-quality software.
- Provide a detailed requirements and an examination of Agile developments.
- Know the various process of knowledge evolution cycle.
- Understand Agile development and testing.

UNIT I : INTRODUCTION 9

Introduction: Software is new product development – Iterative and Evolutionary Methods – Agile – Agile Development – Case Study: Perform a comparative Study between Traditional / Heavy weight Methodologies with Agile Methodology and give the Key features and Limitations with some sample projects.

UNIT II : AGILE METHODOLOGY 9

Theories for Agile Management – Agile Software Development – Traditional Model vs. Agile Model – Classification of Agile Methods – Agile Manifesto and Principles – Agile Project Management – Agile Team Interactions – Ethics in Agile Teams – Agility in Design, Testing – Agile Documentations – Agile Drivers, Capabilities and Values

UNIT III : AGILE PRACTICES 9

Agile Project Management – Agile Environments – Agile Requirements – Case Study – Practices : At the end of each sprint, The team Should perform the : Report weekly deliveries of completed stories about the application to your customer. Consolidated Documents from Daily scrum, Demonstrations and Reviews. Perform reporting of automated and acceptance tests. Test driven development. Continuous Integration

UNIT IV : AGILITY AND KNOWLEDGE MANAGEMENT 9

Agile Information Systems – Agile Decision Making – Earl_S Schools of KM – Institutional Knowledge Evolution Cycle – Development, Acquisition, Refinement, Distribution, Deployment , Leveraging – KM in Software Engineering – Managing Software Knowledge – Challenges of Migrating to Agile Methodologies – Agile Knowledge Sharing – Role of Story-Cards – Story-Card Maturity Model (SMM).

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : AGILITY AND QUALITY ASSURANCE   9

Agile product development – Agile Metrics – Feature Driven Development (FDD) – Agile approach to Quality Assurance – Test Driven Development – Agile approach in Global Software Development

TOTAL: 45 PERIODS

OUTCOMES

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

- Understand the basic concepts of Agile software process.
- Perform software iterative development process that how to plan and execute them.
- Apply various Agile methodologies to develop a software.
- Perform software process improvement as an outgoing task for development teams.
- Develop techniques and tools for improving team collaboration and software quality.

TEXT BOOKS

1. Craig Larman, "Agile and Iterative Development – A Manager's Guide", Pearson Education, 2006.
2. David J. Anderson, Eli Schragenheim, " Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results", Pearson Education,2003.

REFERENCES

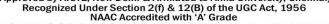1. Lisa Crispin,Janet Gregory, Mike Cohn,BrainMarick, "Agile Testing: A practical guide for Testers and Agile Teams", Addison–wesley publication, 2009.
2. Hazza and Dubinsky, "Agile Software Engineering, Series: Undergraduate Topics in Computer Science", Springer, 2009.

E – RESOURCES

1. https://nptel.ac.in/courses/110/104/110104073 (Project Management)
2. https://nptel.ac.in/courses/106/101/106101061 (Agile Development)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX13   **GAME PROGRAMMING**   **L T P C**
                                                                          3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Get subsequent understanding of game design and development.
- Understand the processes, mechanics and issues in game design.
- Learn the functions game engine development, modeling and techniques.
- Familiarize the handling situations and logic.
- Create interactive games.

UNIT I : 3D GRAPHICS FOR GAME PROGRAMMING 9

Coordinate Systems, Ray Tracing, Modeling in Game Production, Vertex Processing, Rasterization, Fragment Processing and Output Merging, Illumination and Shaders, Parametric Curves and Surfaces, Shader Models, Image Texturing, Bump Mapping, Advanced Texturing, Character Animation, Physics-based Simulation.

UNIT II : GAME DESIGN PRINCIPLES 9

Character development, Story Telling, Narration, Game Balancing, Core mechanics, Principles of level design, Genres of Games, Collision Detection, Game Logic, Game AI, Path Finding.

UNIT III : GAMING ENGINE DESIGN 9

Renderers, Software Rendering, Hardware Rendering, and Controller based animation, Spatial Sorting, Level of detail, collision detection, standard objects, and physics.

UNIT IV : GAMING PLATFORMS AND FRAMEWORKS 9

Flash, DirectX, OpenGL, Java, Python, XNA with Visual Studio, Mobile Gaming for the Android, iOS, Game engines – Adventure Game Studio, DXStudio, Unity.

UNIT V : GAME DEVELOPMENT 9

Developing 2D and 3D interactive games using OpenGL, DirectX – Isometric and Tile Based Games, Puzzle games, Single Player games, Multi Player games.

TOTAL :45 PERIODS

OUTCOMES

On Completion of the course, the students should be able to,

- Understand game design and development.
- Understand the processes, mechanics and issues in game design.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

- Learn the functions game engine development, modeling and techniques.

- Familiarize the handling situations and logic.

- Create interactive games.

TEXT BOOKS

1. David H. Eberly, "3D Game Engine Design, Second Edition: A Practical Approach to Real - Time Computer Graphics", Morgan Kaufmann, 2nd Edition, 2006.

2. JungHyun Han, "3D Graphics for Game Programming", Chapman and Hall/CRC, 1st Edition, 2011.

REFERENCES

1. Ernest Adams and Andrew Rollings, "Fundamentals of Game Design", Prentice Hall, 1st Edition, 2006.

2. Roger E. Pedersen, "Game Design Foundations", 2nd Edition , Jones & Bartlett Learning, 2009.

E – RESOURCES

1. https://onlinecourses.nptel.ac.in/noc19_ge32/preview (Introduction to Game Theory)

2. http://www.nptelvideos.in/2012/12/game–theory–and–economics.html (Introduction to Game Theory and Economics)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX14	SOFTWARE PROJECT MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand the Software Project Planning and Evaluation techniques.
- Plan and manage projects at each stage of the software development life cycle (SDLC).
- Learn about the activity planning and risk management principles.
- Manage software projects and control software deliverables.
- Develop skills to manage the various phases involved in project management and people management.

UNIT I : PROJECT EVALUATION AND PROJECT PLANNING   9

Importance of Software Project Management – Activities – Methodologies – Categorization of Software Projects – Setting objectives – Management Principles – Management Control – Project portfolio Management – Cost-benefit evaluation technology – Risk evaluation – Strategic program Management – Stepwise Project Planning.

UNIT II : PROJECT LIFE CYCLE AND EFFORT ESTIMATION   9

Software process and Process Models – Choice of Process models – Rapid Application development – Agile methods – Dynamic System Development Method – Extreme Programming – Managing interactive processes – Basics of Software estimation – Effort and Cost estimation techniques – COSMIC Full function points – COCOMO II-a Parametric Productivity Model.

UNIT III : ACTIVITY PLANNING AND RISK MANAGEMENT   9

Objectives of Activity planning – Project schedules – Activities – Sequencing and scheduling – Network Planning models – Formulating Network Model – Forward Pass & Backward Pass techniques – Critical path (CRM) method – Risk identification – Assessment – Risk Planning – Risk Management – PERT technique – Monte Carlo simulation – Resource Allocation – Creation of critical paths – Cost schedules.

UNIT IV : PROJECT MANAGEMENT AND CONTROL   9

Framework for Management and control – Collection of data – Visualizing progress – Cost monitoring – Earned Value Analysis – Prioritizing Monitoring – Project tracking – Change control – Software Configuration Management – Managing contracts – Contract Management.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : STAFFING IN SOFTWARE PROJECTS   **9**

Managing people – Organizational behavior – Best methods of staff selection – Motivation – The Oldham-Hackman job characteristic model – Stress – Health and Safety – Ethical and Professional concerns – Working in teams – Decision making – Organizational structures – Dispersed and Virtual teams – Communications genres – Communication plans – Leadership.

TOTAL: 45 PERIODS

OUTCOMES

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

- Understand Project Management principles while developing software.
- Gain extensive knowledge about the basic project management concepts, framework and the process models.
- Obtain adequate knowledge about software process models and software effort estimation techniques.
- Estimate the risks involved in various project activities.
- Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.

TEXT BOOKS

1. Gopalaswamy Ramesh, "Managing Global Software Projects", McGraw Hill Education (India), 14th Reprint 2013.
2. Bob Hughes, Mike Cotterell and Rajib Mall: "Software Project Management", 5th Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES

1. Robert K. Wysocki,"Effective Software Project Management", Wiley Publication, 2011.
2. Walker Royce,"Software Project Management", Addison–Wesley, 1998.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105218/   (Software   Project   Management– Standards)
2. https://nptel.ac.in/noc/courses/noc19/SEM2/noc19–cs70/   (Software   Project Management)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX15　　　　　**GRAPH THEORY AND ITS APPLICATIONS**　　　**L T P C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand fundamentals of graph theory.

- Study proof techniques related to various concepts in Trees, Spanning Trees and Connectivity.

- Be exposed to the techniques of proofs in planar and digraphs.

- Explore modern applications of graph theory using matrices.

- Understand the basic concepts of combinatorics which are widely used in computer science and engineering.

UNIT I : INTRODUCTION　　　　　　　　　　　　　　　　　　　　　　　　　**9**

Introduction – Graph Terminologies – Special types of Graphs – Isomorphism – Isomorphic Graphs – Subgraphs – Walk, Paths and Circuits in graphs – Connected graphs, disconnected graphs and components – Euler graphs – Hamiltonian graphs – Application of Graphs.

UNIT II : TREES, SPANNING TREES AND CONNECTIVITY　　　　　　　　　**9**

Trees – Properties of Trees – Distance and Centres in a Tree – Rooted and binary Trees – Spanning Trees – Fundamental Circuits – Spanning Trees in a weighted graph – Minimal spanning Trees – The algorithms of Kruskal and Prim – Cut-sets – Properties of a cut-set – Fundamental cut-sets – Connectivity and Separability.

UNIT III : PLANAR AND DIGRAPHS　　　　　　　　　　　　　　　　　　　**9**

Network Flows – 1-Isomorphism – 2-Isomorphism – Planar graphs – Representations of a Planar graphs – Digraphs – Types of Digraphs – Digraphs and binary relations – Euler Digraph.

UNIT IV : MATRICES, COLORING, COVERING AND PARTITIONING　　　　**9**

Matrix Representation of graphs – Adjacency matrix – Incidence matrix – Chromatic number – Chromatic partitioning – Chromatic polynomial – Matchings – Coverings – The Four color problem.

UNIT V : PERMUTATIONS, COMBINATIONS AND GENERATING FUNCTIONS　**9**

Permutations and combinations – Binomial theorem – Principle of inclusion and exclusion – Derangements – Recurrence relations – The first order linear recurrence relation – The second

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

order linear homogeneous recurrence relation with constant coefficients – The Non-homogeneous recurrence relation – The Method of generating functions – The Exponential generating function.

TOTAL: 45 PERIODS

OUTCOMES

After successfully completing the course, the student will be able to,

- Know the basic concepts of graphs, and different types of graphs.
- Acquire the knowledge about properties, theorems and be able to prove theorems.
- Apply suitable graph model and algorithm for solving applications.
- Use a combination of theoretical knowledge and independent mathematical thinking in creative investigation of questions in graph theory.
- Construct mathematical proofs.

TEXT BOOKS

1. Narsingh Deo, "Graph Theory: With Applications to Engineering and Computer Science", Prentice Hall of India Learning Private Limited, Delhi, 2016.
2. Grimaldi R.P. "Discrete and Combinatorial Mathematics: An Applied Introduction", Addison Wesley, 1994.

REFERENCES

1. John Clark and Derek Allan Holton, "A First Look at Graph Theory", World Scientific Publishing Company, 1991.
2. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", Mc Graw Hill , 2007.

E – RESOURCES

1. https://nptel.ac.in/courses/111/106/111106102/ (Graph Theory – Basic Concepts)
2. https://nptel.ac.in/courses/106/108/106108054/ (Vertex Cover and Independent Set)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX16   **SEMANTIC WEB**   **L T P C**
                                                                    3 0 0 3

OBJECTIVES

To enable the students to,

* Understand the need of semantic web in web services.
* Know the methods to discover, classify and build ontology for more reasonable results in searching.
* Build and implement a small ontology.
* Build semantically descriptive of chosen problem domain.
* Implement applications that can access use and manipulate the ontology.

UNIT I : INTRODUCTION   **9**

Introduction to the Syntactic web and Semantic Web Evolution of the Web – The visual and syntactic web Levels of Semantics – Metadata for web information – The semantic web architecture and technologies Contrasting Semantic with Conventional Technologies Semantic Modeling – Potential of semantic web solutions and challenges of adoption.

UNIT II : ONTOLOGICAL ENGINEERING   **9**

Ontologies Taxonomies Topic Maps Classifying Ontologies Terminological aspects: concepts, terms, relations between them Complex Objects Subclasses and Sub-properties definitions Upper Ontologies Quality Uses – Types of terminological resources for ontology building Methods and methodologies for building ontologies Multilingual Ontologies – Ontology Development process and Life cycle Methods for Ontology Learning Ontology Evolution Versioning.

UNIT III :STRUCTURING AND DESCRIBING WEB RESOURCES   **9**

Structured Web Documents – XML Structuring Namespaces Addressing Querying Processing – RDF RDF Data Model Serialization Formats – RDF Vocabulary Inferencing – RDFS basic Idea Classes Properties – Utility Properties RDFS Modeling for Combinations and Patterns – Transitivity.

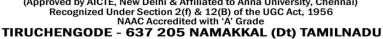**UNIT IV : WEB ONTOLOGY LANGUAGE**   **9**

OWL Sub-Languages Basic Notions – Classes – Defining and Using Properties Domain and Range Describing Properties – Data Types Counting and Sets – Negative Property Assertions Advanced Class Description Equivalence Owl Logic.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : SEMANTIC WEB TOOLS AND APPLICATIONS 9

Development Tools for Semantic Web Jena Framework SPARL Querying semantic web – Semantic Wikis – Semantic Web Services Modeling and aggregating social network data – Ontological representation of social relationships, Aggregating and reasoning with social network data.

TOTAL: 45 PERIODS

OUTCOMES

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

- Understand semantic web basics, architecture and technologies.
- Represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology.
- Understand the semantic relationships among these data elements using Resource Description Framework (RDF).
- Design and implement a web services application that discovers the data and/or other web services via the semantic web.
- Discover the capabilities and limitations of semantic web technology for social networks.

TEXT BOOKS

1. Liyang Yu, "A Developer's Guide to the Semantic Web" , Springer, 1st Edition, 2011.
2. Dean Allemang and James Hendler, "Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL", MorganKaufmann ,2nd Edition,2011.

REFERENCES

1. Grigoris Antoniou, Frank van Harmelen, "A Semantic Web Primer", 2nd Edition (Cooperative Information Systems)(Hardcover), MIT Press, 2008.
2. Robert M. Colomb,"Ontology and the Semantic Web", Volume 156 Frontiers in Artificial Intelligence and Applications (Frontier in Artificial Intelligence and Applications), IOSPress, 2007.

E – RESOURCES

1. https://www.4shared.com/postDownload/PIlc9IXb/000semantic–web programming978.html (Introduction to Semiatic Web)
2. https://www.4shared.com/postDownload/P1irZQAU/semantic_web.html (Semantic Web)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

ESTD 2001

PROFESSIONAL ELECTIVE - III

19CSPX17	INTERNET OF THINGS	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand Smart Objects and IoT Architectures.
- Learn about various IoT – related protocols.
- Build simple IoT Systems using Arduino and Raspberry Pi.
- Understand data analytics and cloud in the context of IoT.
- Develop IoT infrastructure for popular applications.

UNIT I : FUNDAMENTALS OF IoT   **9**

Evolution of Internet of Things – Enabling Technologies – IoT Architectures: oneM2M, IoT World Forum (IoTWF) and Alternative IoT models – Simplified IoT Architecture and Core IoT Functional Stack – Fog, Edge and Cloud in IoT – Functional blocks of an IoT ecosystem – Sensors, Actuators, Smart Objects and Connecting Smart Objects.

UNIT II : IoT PROTOCOLS   **9**

IoT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and LoRaWAN – Network Layer: IP versions, Constrained Nodes and Constrained Networks – Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks – Application Transport Methods: Supervisory Control and Data Acquisition – Application Layer Protocols: CoAP and MQTT.

UNIT III : DESIGN AND DEVELOPMENT   **9**

Design Methodology – Embedded computing logic – Microcontroller, System on Chips – IoT system building blocks – Arduino – Board details, IDE programming – Raspberry Pi – Interfaces and Raspberry Pi with Python Programming.

UNIT IV : DATA ANALYTICS AND SUPPORTING SERVICES   **9**

Structured Vs Unstructured Data and Data in Motion Vs Data in Rest – Role of Machine Learning – No SQL Databases – Hadoop Ecosystem – Apache Kafka, Apache Spark – Edge Streaming Analytics and Network Analytics – Xively Cloud for IoT, Python Web Application Framework – Django – AWS for IoT – System Management with NETCONF – YANG.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : CASE STUDIES/INDUSTRIAL APPLICATIONS   **9**

Cisco IoT system – IBM Watson IoT platform – Manufacturing – Converged Plant wide Ethernet Model (CPwE) – Power Utility Industry – Grid Blocks Reference Model – Smart and Connected Cities: Layered architecture, Smart Lighting, Smart Parking Architecture and Smart Traffic Control.

TOTAL : 45 PERIODS

OUTCOMES

Upon completion of the course, the student should be able to,

- Understand the concept of IoT.
- Analyze various protocols for IoT.
- Design a PoC of an IoT system using Rasperry PI/Arduino.
- Apply data analytics and use cloud offerings related to IoT.
- Analyze applications of IoT in real time scenario.

TEXT BOOKS

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things", Cisco Press, 2017.

2. ArshdeepBahga, Vijay Madisetti,"Internet of Things – A hands–on approach", Universities Press, 2015.

REFERENCES

1. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley, 2012 .

2. Jan Ho¨ ller, VlasiosTsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle,"From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence", Elsevier, 2014.

E–RESOURCES

1. https://nptel.ac.in/courses/106/105/106105166/ (Introduction to IoT)
2. https://nptel.ac.in/courses/108/108/108108098/ (IoT Protocols)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX18	INFORMATION SECURITY	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand the basics of Information Security.
- Know the legal, ethical and professional issues in Information Security.
- Know the aspects of risk management.
- Aware of various standards in this area.
- Know the technological aspects of Information Security.

UNIT I : INTRODUCTION 9

History, What is Information Security?, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC.

UNIT II : SECURITY INVESTIGATION 9

Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues – An Overview of Computer Security – Access Control Matrix, Policy – Security policies, Confidentiality policies, Integrity policies and Hybrid policies.

UNIT III : SECURITY ANALYSIS 9

Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk – Systems: Access Control Mechanisms, Information Flow and Confinement Problem.

UNIT IV : LOGICAL DESIGN 9

Blueprint for Security, Information Security Policy, Standards and Practices, ISO 17799/BS 7799, NIST Models, VISA International Security Model, Design of Security Architecture, Planning for Continuity.

UNIT V : PHYSICAL DESIGN 9

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel

TOTAL: 45 PERIODS

OUTCOMES

At the end of this course, the students should be able to,

- Understand the basics of information security.
- Illustrate the legal, ethical and professional issues in information security.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

- Demonstrate the aspects of risk management.

- Become aware of various standards in the Information Security System.

- Design and implementation of Security Techniques.

TEXT BOOKS

1. Michael Whitman, Herbert J. Mattord, "Management of Information Security", 5th Edition, Course Technology, 2017.

2. Micki Krause, Harold F.Tipton, "Handbook of Information Security Management",Vol 1–3, CRC Press LLC,2004.

REFERENCES

1. Stuart McClure, Joel Scrambray, George Kurtz, "Hacking Exposed",Tata Mc Graw–Hill, 2003.

2. Matt Bishop,"Computer Security Art and Science", Pearson/PHI, 2002.

E–RESOURCES

1. https://nptel.ac.in/courses/106/106/106106129/ (Information Security Technologies)

2. http://www.nptelvideos.com/course.php?id=427 (Information Security)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX19	SERVICE ORIENTED ARCHITECTURE	L T P C
		3 0 0 3

OBJECTIVES

To enable students to,

- Learn XML concepts and exposed to build applications based on XML.
- Gain knowledge about SAX,DOM and XML to create web services.
- Understand the SOA architecture and principles of Service Oriented Architecture.
- Learn about the role of SOAP and UDDI and web services.
- Know about the SOA design and services in J2EE.

UNIT I : INTRODUCTION TO XML 9

XML document structure – Well formed and valid documents – Namespaces – DTD – XML Schema – X-Files.

UNIT II : BUILDING XML– BASED APPLICATIONS 9

Parsing XML – using DOM, SAX – XML Transformation and XSL – XSL Formatting – Modeling Databases in XML.

UNIT III : SERVICE ORIENTED ARCHITECTURE 9

Characteristics of SOA, Comparing SOA with Client–Server and Distributed architectures – Benefits of SOA – Principles of Service orientation – Service layers.

UNIT IV : WEB SERVICES 9

Service descriptions – WSDL – Messaging with SOAP – Service discovery – UDDI – Message Exchange Patterns – Orchestration – Choreography –WS Transactions.

UNIT V : BUILDING SOA–BASED APPLICATIONS 9

Service Oriented Analysis and Design – Service Modeling – Design standards and guidelines – – Composition – WS-BPEL – WS-Coordination – WS-Policy – WS-Security – SOA support in J2EE.

TOTAL: 45 PERIODS

OUTCOMES

Upon successful completion of this course, students will be able to,

- Build applications based on XML.
- Develop web services using technology elements in databases.
- Able to apply SOA architecture and the underlying design principles for the web projects.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

- Build SOA-based applications for intra-enterprise and inter-enterprise applications.

- Able to understand the role of SOA in J2EE and .NET.

TEXT BOOKS

1. Ron Schmelzer et al. "XML and Web Services", Pearson Education, 2018.

2. Thomas Erl, "Service Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2016.

REFERENCES

1. Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services", Pearson Education, 2016.

2. Sandeep Chatterjee and James Webber, "Developing Enterprise Web Services: An Architect's Guide", Prentice Hall, 2018.
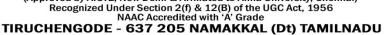
E – RESOURCES

1. http://www.digimat.in/nptel/courses/video/106105167/ (introduction to XML)

2. https://nptel.ac.in/courses/106/105/106105084/ (IP subnetting and addressing)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX20   MULTI CORE ARCHITECTURE AND PROGRAMMING   L T P C
3 0 0 3

OBJECTIVES

To enable students to,

- Understand the need for multi-core processors, and their architecture.

- Understand the Fundamental Concepts of Parallel Programming.

- Understand the Threading APIs.

- Learn about the Shared Memory Programming with APIs.

- Develop multicore programs and design parallel solutions.

UNIT I : INTRODUCTION   9

Introduction to Multi-core Architecture Motivation for Concurrency in software, Parallel Computing Platforms, Parallel Computing in Microprocessors, Differentiating Multi-core Architectures from Hyper-Threading Technology, Multi-threading on Single-Core versus Multi-Core Platforms Understanding Performance, Amdahl's Law, Growing Returns: Gustafson's Law – System Overview of Threading: Defining Threads, System View of Threads, Threading above the Operating System.

UNIT II : FUNDAMENTAL CONCEPTS OF PARALLEL PROGRAMMING   9

Designing for Threads, Task Decomposition, Data Decomposition, Data Flow Decomposition, Implications of Different Decompositions, Challenges You'll Face, Parallel Programming Patterns, A Motivating Problem: Error Diffusion, Analysis of the Error Diffusion Algorithm, An Alternate Approach: Parallel Error Diffusion, Other Alternatives. Threading and Parallel Programming Constructs: Synchronization, Critical Sections, Deadlock, Synchronization Primitives, Semaphores, Locks, Condition Variables, Messages.

UNIT III : THREADING APIs   9

Threading APIs :Threading APIs for Microsoft Windows, Win32/MFC Thread APIs, Threading APIs for Microsoft. NET Framework, Creating Threads, Managing Threads, Thread Pools, Thread Synchronization, POSIX Threads, Creating Threads, Managing Threads, Thread Synchronization, Signaling, Compilation and Linking.

UNIT IV : SHARED MEMORY PROGRAMMING WITH OpenMP   9

OpenMP Execution Model – Memory Model – OpenMP Directives – Work-sharing Constructs – Library functions – Handling Data and Functional Parallelism – Handling Loops – Performance Considerations.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

UNIT V : PARALLEL PROGRAM DEVELOPMENT   9

Case studies – n-Body solvers – Tree Search – OpenMP and MPI implementations and comparison.

TOTAL: 45 PERIODS

OUTCOMES

At the end of the course, the students should be able to,

- Describe multi core architectures and identify their characteristics and challenges.
- Identify the issues in programming Parallel Processors.
- Write programs using OpenMP and MPI.
- Design parallel programming solutions to common problems.
- Compare and contrast programming for serial processors and programming for parallel processors.

TEXT BOOKS

1. Shameem Akhter and Jason Roberts,"Multicore Programming , Increased Performance through Software Multi-threading", Intel Press , 2006.
2. Peter S. Pacheco, "An Introduction to Parallel Programming", Morgan – Kauffman/Elsevier, 2011.

REFERENCES

1. Michael J Quinn, "Parallel programming in C with MPI and OpenMP", Tata McGraw Hill,2003.
2. Victor Alessandrini, "Shared Memory Application Programming - Concepts and Strategies in Multicore Application Programming", 1st Edition, Morgan Kaufmann, 2015.

E – RESOURCES

1. https://nptel.ac.in/courses/106/104/106104025/ (Program Optimization for Multi-Core Architectures(Web))
2. https://nptel.ac.in/courses/106/103/106103183/ (Multi-Core Computer Architectures– Storage and Interconnects)

SENGUNTHAR
Shrine 2 Success

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX21	KNOWLEDGE MANAGEMENT	L T P C
		3 0 0 3

OBJECTIVES

The enable the students to,

- Learn the Evolution of Knowledge management.

- Learn about the culture of learning organization.

- Learn and be familiar with tools.

- Learn and exposed to Applications.

- Understand the concept with some case studies.

UNIT I : INTRODUCTION 9

An Introduction to Knowledge Management – The foundations of knowledge management – including cultural issues – technology applications organizational concepts and processes – management aspects – and decision support systems. The Evolution of Knowledge management**:** From Information Management to Knowledge Management – Key Challenges Facing the Evolution of Knowledge Management – Ethics for Knowledge Management.

UNIT II : CREATING THE CULTURE OF LEARNING AND KNOWLEDGE SHARING 8

Organization and Knowledge Management – Building the Learning Organization. Knowledge Markets: Cooperation among Distributed Technical Specialists – Tacit Knowledge and Quality Assurance.

UNIT III : KNOWLEDGE MANAGEMENT – THE TOOLS 10

Telecommunications and Networks in Knowledge Management – Internet Search Engines and Knowledge Management – Information Technology in Support of Knowledge Management – Knowledge Management and Vocabulary Control – Information Mapping in Information Retrieval – Information Coding in the Internet Environment – Repackaging Information.

UNIT IV : KNOWLEDGEMANAGEMENT – APPLICATION 9

Components of a Knowledge Strategy – Case Studies (From Library to Knowledge Center, Knowledge Management in the Health Sciences, Knowledge Management in Developing Countries).

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

UNIT V : FUTURE TRENDS AND CASE STUDIES 9

Advanced topics and case studies in knowledge management – Development of a knowledge management map/plan that is integrated with an organization's strategic and business plan – A case study on Corporate Memories for supporting various aspects in the process life-cycles of an organization.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, the student should be able to,

- Understand the evolution of knowledge management.
- Understand the culture of learning organization.
- Use the knowledge management tools.
- Develop knowledge management Applications.
- Design and develop enterprise applications.

TEXT BOOKS

1. Srikantaiah.T. K., Koenig, M., "Knowledge Management for the Information Professional", Information Today, Inc., 2000.
2. Nonaka, I., Takeuchi, H., "The Knowledge – Creating Company: How Japanese Companies Create the Dynamics of Innovation", Oxford University Press, 1995.

REFERENCES

1. KimizDalkir , "Knowledge Management in Theory and Practice", McGill University, Elsevier publications,2009.
2. Mertins, Kai, Heisig, Peter, Vorbeck, Jens "Knowledge Management – Concepts and Best Practices" Springer, 2003.

E – RESOURCES

1. https://nptel.ac.in/courses/110/105/110105076/ (Introduction to Knowledge Management)
2. https://www.edunotes.in/it6011–knowledge–management (Knowledge Management)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX22 **SOFTWARE QUALITY ASSURANCE** **L T P C**
3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Learn about various concepts, metrics, and models in software quality assurance.
- Study about components of software quality assurance systems before, during, and after software development.
- Impart knowledge on a framework for software quality assurance.
- Discusses about individual components in the framework such as planning, reviews, testing, configuration management, and so on.
- Learn about standards of software quality assurance.

UNIT I : FUNDAMENTALS OF SOFTWARE QUALITY ASSURANCE **9**

The Role of SQA – SQA Plan – SQA considerations – SQA people – Quality Management – Software Configuration Management.

UNIT II : MANAGING SOFTWARE QUALITY **9**

Managing Software Organizations – Managing Software Quality – Defect Prevention – Software Quality Assurance Management.

UNIT III : SOFTWARE QUALITY ASSURANCE METRICS **9**

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis.

UNIT IV : SOFTWARE QUALITY PROGRAM **9**

Software Quality Program Concepts – Establishment of a Software Quality Program – Software Quality Assurance Planning – An Overview – Purpose & Scope.

UNIT V : SOFTWARE QUALITY ASSURANCE STANDARDIZATION **9**

Software Standards – ISO 9000 Quality System Standards – Capability Maturity Model and the Role of SQA in Software Development Maturity – SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM.

TOTAL: 45 PERIODS

OUTCOMES

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

- Relate Quality Assurance Plan.
- Understand how to conduct formal inspections, record and evaluate results of inspection.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

- Apply quality tools and technique in their projects.

- Establish software development with quality plan.

- Explain about standard and certification.

TEXT BOOKS

1. Mordechai Ben - Menachem / Garry S Marliss, "Software Quality", Vikas Publishing House, Pvt, Ltd., New Delhi.

2. Watts S Humphrey, "Managing the Software Process", Pearson Education Inc.

REFERENCES

1. Gordon G Schulmeyer, "Handbook of Software Quality Assurance", 3rd Edition, Artech House Publishers, 2007.

2. Nina S Godbole, "Software Quality Assurance: Principles and Practice", Alpha Science International, Ltd, 2004.

E–RESOURCES

1. https://nptel.ac.in/courses/106/101/106101061/ (Introduction to software engineering Challenges)

2. https://nptel.ac.in/courses/106/105/106105087/ (Basic issues in Software Engineering)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSPX23	SOFT COMPUTING	L T P C
		3 0 0 3

OBJECTIVES

To enable the students to,

- Learn the basic concepts of Soft Computing.

- Become familiar with various techniques like neural networks.

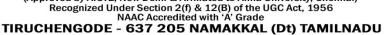- Genetic algorithms and fuzzy systems.

- Apply soft computing techniques to solve problems.

- Understand the genetic representations.

UNIT I : INTRODUCTION TO SOFT COMPUTING 9

Introduction – Artificial Intelligence – Artificial Neural Networks – Fuzzy Systems – Genetic Algorithm and Evolutionary Programming – Swarm Intelligent Systems – Classification of ANNs – McCulloch and Pitts Neuron Model – Learning Rules: Hebbian and Delta – Perceptron Network – Adaline Network – Madaline Network.

UNIT II : ARTIFICIAL NEURAL NETWORKS 9

Introduction – Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks, back propagation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting backpropagation training, applications.

UNIT III : FUZZY SYSTEMS 9

Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion – Membership functions, interference, fuzzy if–then rules, Fuzzy implications and Fuzzy algorithms.

UNIT IV : GENETIC ALGORITHMS 9

Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications.

UNIT V : HYBRID SYSTEMS 9

Hybrid Systems – Neural Networks, Fuzzy Logic and Genetic – GA Based Weight Determination – LR-Type Fuzzy Numbers – Fuzzy Neuron – Fuzzy BP Architecture – Learning in Fuzzy BP – Inference by Fuzzy BP – Fuzzy ArtMap: A Brief Introduction – Soft Computing Tools – GA in Fuzzy Logic Controller Design – Fuzzy Logic Controller.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

Upon completion of this course, the students should be able to,

- Apply suitable soft computing techniques for various applications.
- Integrate various soft computing techniques for complex problems.
- Analyze and integrate various soft computing techniques.
- Solve problems effectively and efficiently.
- Parameterize various problems to be solved.

TEXT BOOKS

1. N.P.Padhy, S.P.Simon, "Soft Computing with MATLAB Programming" , Oxford University Press, 2015.

2. S.N.Sivanandam , S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt. Ltd., 2nd Edition, 2011.

REFERENCES

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, "Neuro - Fuzzy and Soft Computing", Prentice-Hall of India, 2002.

2. Kwang H.Lee, "First course on Fuzzy Theory and Applications", Springer, 2005.

E – RESOURCES

1. https://nptel.ac.in/courses/106/105/106105173/ (Introduction to Soft computing)

2. https://www.digimat.in/nptel/courses/video/106105173/L01.html (Computing Techniques)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU
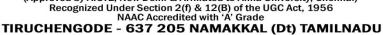
19CSPX24	INFORMATION RETRIEVAL TECHNIQUES	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Learn the information retrieval with AI.

- Understand the basics of Information Retrieval and Modeling.

- Understand various search engine system operations.

- Understand machine learning techniques for text classification and clustering.

- Gain basics of search engines.

UNIT I : INTRODUCTION   9

Introduction – History of IR – Components of IR – Issues – Open source Search engine Frameworks – The impact of the web on IR – The role of artificial intelligence (AI) in IR – IR Versus Web Search – Components of a Search engine – Characterizing the web.

UNIT II : BASICS OF INFORMATION RETRIEVAL   9

The Software Architecture of the IR System – The Retrieval and Ranking Processes – The Web – The e-Publishing Era – How the web changed Search – Practical Issues on the Web – How People Search – Search Interfaces Today – Visualization in Search Interfaces.

UNIT III : MODELING AND RETRIEVAL EVALUATION   9

Basic IR Models – Boolean Model – TF-IDF (Term Frequency/Inverse Document Frequency) Weighting – Vector Model – Probabilistic Model – Latent Semantic Indexing Model – Neural Network Model – Retrieval Evaluation – Retrieval Metrics – Precision and Recall – Reference Collection – User-based Evaluation – Relevance Feedback and Query Expansion – Explicit Relevance Feedback.

UNIT IV : WEB SEARCH ENGINE AND WEB CRAWLING   9

The Web-Search Engine Architectures – Cluster based Architecture – Distributed Architectures – Search Engine Ranking – Link based Ranking – Simple Ranking Functions – Learning to Rank – Evaluations – Search Engine Ranking – Search Engine User Interaction – Browsing – Applications of a Web Crawler – Taxonomy – Architecture and Implementation – Scheduling Algorithms – Evaluation.

UNIT V : TEXT CLASSIFICATION AND CLUSTERING   9

A Characterization of Text Classification – Unsupervised Algorithms: Clustering – Naïve Text Classification – Supervised Algorithms – Decision Tree – kNN Classifier – SVM Classifier –

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

Feature Selection or Dimensionality Reduction – Evaluation metrics – Accuracy and Error – Organizing the classes – Indexing and Searching – Inverted Indexes – Sequential Searching – Multi-dimensional Indexing.

TOTAL: 45 PERIODS

OUTCOMES

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

- Use an open source search engine framework and explore its capabilities.
- Apply appropriate method of classification or clustering.
- Design and implement innovative features in a search engine.
- Design and implement a recommender system.
- Use the classification of texts.

TEXT BOOKS

1. Ricardo Baeza-Yates and Berthier Ribeiro-Neto, "Modern Information Retrieval: The Concepts and Technology behind Search", 2nd Edition, ACM Press Books, 2011.
2. Ricci, F, Rokach, L. Shapira, B.Kantor, "Recommender Systems Handbook", 1st Edition, 2011.

REFERENCES

1. C. Manning, P. Raghavan, and H. Schütze,"Introduction to Information Retrieval", Cambridge University Press, 2008.
2. Stefan Buettcher, Charles L. A. Clarke and Gordon V. Cormack, "Information Retrieval: Implementing and Evaluating Search Engines", The MIT Press, 2010.

E – RESOURCES

1. https://nptel.ac.in/courses/106/101/106101007/ (Introduction,Retrival Evaluation)
2. https://nptel.ac.in/courses/110/107/110107129/ (Clustering, Web Crawling**)**

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

JAS-ANZ
BSCIC
ISO 9001 REGISTERED

OPEN ELECTIVE - I

19CSOX01   **HUMAN COMPUTER INTERACTION**   **L T P C**
                                                              3 0 0 3

OBJECTIVES

To enable students to,

- Learn the foundations of Human Computer Interaction.
- Be familiar with the design technologies for individuals and persons with disabilities.
- Be aware of mobile HCI.
- Learn the guidelines for user interface.
- Do interactive designs.

UNIT I : FOUNDATIONS OF HCI   9

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity– Paradigms.

UNIT II : DESIGN & SOFTWARE PROCESS   9

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT III : MODELS AND THEORIES   9

Cognitive models – Socio-Organizational issues and stake holder requirements – Communication and collaboration models – Hypertext, Multimedia and WWW.

UNIT IV : MOBILE HCI   9

Mobile Ecosystem: Platforms, Application frameworks – Types of Mobile Applications: Widgets, Applications, Games – Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

UNIT V : WEB INTERFACE DESIGN   9

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

                                         TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Design effective dialog for HCI.

- Design effective HCI for individuals and persons with disabilities.

- Assess the importance of user feedback.

- Explain the HCI implications for designing multimedia/ecommerce/ e-learning Web sites.

- Develop meaningful user interface.

TEXT BOOKS

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004 (UNIT I, II & III).

2. Brian Fling, "Mobile Design and Development", 1st Edition, O'Reilly Media Inc., 2009.

REFERENCES

1. Bill Scott and Theresa Neil, "Designing Web Interfaces", 1st Edition, O'Reilly, 2009.

2. Yvonne Rogers,Preece, Jenny, Rogers, Yvonne, "Interaction Design – Beyond Human Computer Interaction",3rd Edition, Wiley,2011.

E – RESOURCES

1. https://nptel.ac.in/courses/106/103/106103115 (Human Computer Interaction – HCI)

2. https://nptel.ac.in/courses/106/106/106106177/ (Introduction to HCI)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSOX02   **ENTERPRISE RESOURCE PLANNING**   **L T P C**
3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Know the basics of ERP.
- Understand the key implementation issues of ERP.
- Know the business modules of ERP.
- Aware of some popular products in the area of ERP.
- Know about the current and future trends in ERP.

UNIT I : INTRODUCTION   **9**

ERP: An Overview, Enterprise – An Overview, Benefits of ERP, ERP and Related Technologies, Business Process Reengineering (BPR), Data Warehousing, Data Mining, OLAP, SCM.

UNIT II : ERP IMPLEMENTATION   **9**

ERP Implementation Lifecycle, Implementation Methodology, Hidden Costs, Organizing the Implementation, Vendors, Consultants and Users, Contracts with Vendors, Consultants and Employees, Project Management and Monitoring.

UNIT III : THE BUSINESS MODULES   **9**

Business modules in an ERP Package, Finance, Manufacturing, Human Resources, Plant Maintenance, Materials Management, Quality Management, Sales and Distribution.

UNIT IV : THE ERP MARKET   **9**

ERP Market Place, SAP AG, Peoplesoft, Baan, JD Edwards, Oracle, QAD, SSA.

UNIT V : ERP – PRESENT AND FUTURE   **9**

Turbo Charge the ERP System, EIA, ERP and e–Commerce, ERP and Internet, Future Directions.

TOTAL : 45 PERIODS

OUTCOMES

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

- Understand the basics of ERP.
- Eloborate the key implementation issues of ERP.
- Know the business modules of ERP.
- Understand about the some popular products of ERP.
- Understand about the current and future trends in ERP.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

TEXT BOOKS

1. Alexis Leon, "ERP Demystified", Tata McGraw Hill, New Delhi, 2000.

2. Mary Sumner, "Enterprise Resource Planning", Pearson Education, 2007.

REFERENCES

1. Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology, USA, 2001.

2. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", PHI, New Delhi, 2003.

E–RESOURCES

1. http://akwl.org/wp–content/uploads/2016/01/ERP–Notes.pdf (Enterprise Resource Planning)

2. https://www.coursera.org/lecture/enterprise–systems/1–1b–introduction–to–enterprise–resource–planning–erp–LneSo (Introduction to Enterprise Resource Planning)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSOX03	CYBER FORENSICS	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Learn about the basics of computer forensics.
- Become familiar with forensics tools.
- Learn to analyze and validate forensics data.
- Understand about vulnerabilities in a given network infrastructure.
- Learn about real–world hacking technique.

UNIT I : INTRODUCTION TO COMPUTER FORENSICS   9

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques – Incident and incident response methodology – Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. – Forensics Technology and Systems – Understanding Computer Investigation – Data Acquisition.

UNIT II : EVIDENCE COLLECTION AND FORENSICS TOOLS   9

Processing Crime and Incident Scenes – Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/ Hardware Tools.

UNIT III : ANALYSIS AND VALIDATION   9

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics.

UNIT IV : ETHICAL HACKING   9

Introduction to Ethical Hacking – Footprinting and Reconnaissance – Scanning Networks – Enumeration – System Hacking – Malware Threats – Sniffing.

UNIT V : ETHICAL HACKING IN WEB   9

Social Engineering – Denial of Service – Session Hijacking – Hacking Web servers – Hacking Web Applications – SQL Injection – Hacking Wireless Networks – Hacking Mobile Platforms.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Understand the basics of computer forensics.

- Apply a number of different computer forensic tools to a given scenario.

- Analyze and validate forensics data.

- Identify the vulnerabilities in a given network infrastructure.

- Implement real - world hacking techniques to test system security.

TEXT BOOKS

1. Bill Nelson, Amelia Phillips, Frank Enfinger, Christopher Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2016.

2. "CEH official Certfied Ethical Hacking Review Guide", Wiley India Edition, 2015.

REFERENCES

1. Bill Nelson, Amelia Phillips, Christopher Steuart, "Guide to Computer Forensics & Investigation", Cengage Learning, 4th Edition, ISBN 13: 978–1435498839, ISBN 10: 1435498836.

2. Ivan Stojmenovic, "Handbook of Wireless Networks and Mobile Computing", Wiley India Student Edition, ISBN 978–81–265–0768–9.

E – RESOURCES

1. https://nptel.ac.in/courses/106/106/106106178 (Information Security)

2. https://nptel.ac.in/courses/106/106/106106129/ (Introduction to Information Security)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSOX04   **UNIX INTERNALS**   **L T P C**
                                                                       3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Get thorough understanding of the kernel.

- Understand the file organization and management.

- Know the various system calls.

- Acquire knowledge of socket architecture, process control & scheduling and memory management.

- Learn the basic concepts of UNIX commands.

UNIT I : INTRODUCTION   **9**

History of UNIX-Standards – The process and the kernel-space and context – Process abstraction – executing in kernel mode – synchronization by blocking interrupts – process scheduling – signals.

UNIT II : BUFFER AND INODE   **9**

The Buffer Cache – Headers – Buffer Pool –Buffer Retrieval – Reading and Writing DiskBlocks – Advantages and Disadvantages. Internal Representation of Files – Inodes – Structure – Directories – Path Name to Inode – Super Block – Inode Assignment.

UNIT III : FILE SYSTEM INTERFACE AND FRAMEWORK   **9**

The user interface to files – File systems – Special files – File system framework – The Vnode/Vfs architecture – Implementation Overview – File System dependent objects – Mounting a file system – Operations on files.

UNIT IV : INTER PROCESS COMMUNICATION   **9**

Process Tracing – System V IPC – Network Communications – Sockets – Messages – Message Data Structures – Message Passing Interface – Ports – Name Space – Swapping – Demand Paging – A Hybrid System with swapping and demand paging.

UNIT V : UNIX TOOLS AND PROGRAMMING   **9**

Shell programming – UNIX commands – Text processing –s ed and awk utilities – grep utility – Introduction to Lex, Yacc utilities – Introduction to Perl programming.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
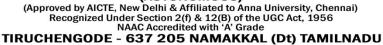**TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU**

OUTCOMES

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

- Provide the basic set of commands and utilities in Linux/UNIX systems.

- Gain an understanding of important aspects related to the files and the process.

- Linux/UNIX library functions and system calls.

- Develop the ability to formulate regular expressions and IPC for pattern matching

- Specify YACC utilities and inspecting file contents.

TEXTBOOKS

1. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education,3rd Edition,2018.

2. 2.Vahalia, "Unix Internals: The New Frontiers",4th edition, Pearson Education Inc, 2016.

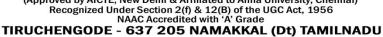## REFERENCES

1. Uresh Vahalia, "UNIX Internals: The New Frontiers", 4th edition, Prentice Hall, 2015.

2. John Lion, "Lion's Commentary on UNIX", 6th Edition, Peer-to-Peer Communications, 2016.

E–RESOURCES

1. https://nptel.ac.in/courses/106/102/106102132/ (Introduction to UNIX System Calls)

2. https://nptel.ac.in/courses/106/108/106108101/ (Introduction to Operating system Web)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSOX05	BIO INFORMATICS	L T P C
		3 0 0 3

OBJECTIVES

To enable students to,

- Acquire knowledge wth the domain of bioinformatics.

- Be familiar with mining techniques for bioinformatics.

- Learn the modeling techniques for bioinformatics applications.

- Get exposed to pattern matching and visualization techniques for bio-informatics.

- Learn the microanalysis for genome expression.

UNIT I : INTRODUCTION   9

Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics – Biological Data Integration System.

UNIT II : DATAMINING FOR BIOINFORMATICS APPLICATIONS   9

Bioinformatics data – Data ware housing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architectureApplications in bioinformatics.

UNIT III : MODELING FOR BIOINFORMATICS   9

Hidden markov modeling for biological data analysis – Sequence identification – Sequence classification – multiple alignment generation – Comparative modeling – Protein modeling – genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks – Molecular modeling – Computer programs for molecular modeling.

UNIT IV : PATTERN MATCHING AND VISUALIZATION   9

Gene regulation – motif recognition and motif detection – strategies for motif detection – Visualization – Fractal analysis – DNA walk models – one dimension – two dimension – higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences.

UNIT V : MICROARRAY ANALYSIS   9

Microarray technology for genome expression study – image analysis for data extraction – preprocessing – segmentation – gridding , spot extraction , normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model, Benchmark, Tradeoffs.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

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

- Understand the concepts of bioinformatics.
- Deploy the datamining techniques in bioinformatics.
- Develop models for biological data.
- Apply pattern matching and visualization techniques for biological sequences.
- Use the microarray technologies for genome expression.

TEXT BOOKS

1. Yi–Ping Phoebe Chen (Ed), "Bio Informatics Technologies", 1st Indian Reprint, Springer Verlag, 2007.
2. Arthur M Lesk, "Introduction to Bioinformatics", 2nd Edition, Oxford University Press, 2005.

REFERENCES

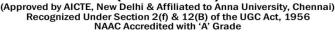1. Zoe lacroix and Terence Critchlow, "Bio Informatics – Managing Scientific data", 1st Indian Reprint, Elsevier, 2004
2. Bryan Bergeron, "Bio Informatics Computing", 2nd Edition, Pearson Education, 2003.

E–RESOURCES

1. https://nptel.ac.in/courses/102/106/102106065 (Protein Modeling)
2. https://nptel.ac.in/content/storage2/courses/102101007/downloads/PPT/LEC–32–PPT.pdf (Microarray Analysis)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

OPEN ELECTIVE - II

19CSOX06	WEB DESIGNING	L T P C
		3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Learn the basic concepts in HTML, CSS, Javascript.
- Understand the responsive design and development.
- Learn the web project management and maintenance process.
- Design a website with HTML, JS, CSS.
- Design a web project with CMS – Word press.

UNIT I : WEB DESIGN – HTML MARKUP FOR STRUCTURE   9

Working of Web – HTML Markup for Structure – Creating simple page – Marking up text – Adding Links – Adding Images – Table Markup – Forms – HTML5.

UNIT II : CSS AND JAVASCRIPT   9

CSS – Formatting text – Colours and Background – Padding, Borders and Margins – Floating and positioning – Page Layout with CSS – Transition, Transforms and Animation – Javascript – using Java Script.

UNIT III : RESPONSIVE WEB DESIGN   9

Sass for Responsive Web Design – Marking Content with HTML5 – Mobile-First or Desktop-First – CSS Grids, CSS Frameworks, UI Kits, and Flexbox for RWD – Designing small UIs by Large Finger – Images and Videos in Responsive Web Design – Meaningful Typography for Responsive Web Design.

UNIT IV : ON-LINE APPLICATIONS   9

Simple applications – On-line Databases – Monitoring user events – Plugins – Database Connectivity – Internet information Systems – EDI application in business – Internet commerce Customization of Internet commerce.

UNIT V : PROJECT CASE STUDY   9
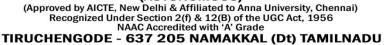
Using HTML, CSS, JS or using Open source CMS like Word Press, design and develop a Website having Aesthetics, Advanced and Minimal UI Transitions based on the project – Host and manage the project live in any public hosting.

TOTAL : 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

OUTCOMES

On Successful completion of the course ,Students will be able to,

- Design Website using HTML CSS and JS.

- Design Responsive Sites.

- Manage, Maintain and Support Web Apps.

- Design a simple Applications.

- Maintain a Database connectivities.

TEXT BOOKS

1. Jennifer Niederst Robbins, "Learning Web Design", O'REILLY, 4th Edition, 2012.

2. Ricardo Zea, "Mastering Responsive Web Design", PACKT Publishing, 2015.

REFERENCES

1. Jon Duckett, "HTML and CSS: Design and Build Websites", John Wiley and Sons,3rd Edition, 2014.

2. Uttam K. Roy, "Web Technologies", Oxford University Press, 13th Impression, 2017.

E – RESOURCES

1. https://nptel.ac.in/courses/106/106/106106156/ (Introduction to Modern Application Development)

2. https://nptel.ac.in/courses/106/105/106105084/ (Introduction to Internet)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CSOX07   **CUSTOMER RELATIONSHIP MANAGEMENT**   **L T P C**
                                                              3 0 0 3

OBJECTIVES

The student should be made to,

- Understand the need and importance of maintaining a good customer relationship.
- Understand the techniques involved in deciding upon customer relationship.
- Learn the CRM structures for better develop business application.
- Understand the CRM implementation Techniques.
- Learn the trends in CRM.

UNIT I : INTRODUCTION   **9**

Definitions – Concepts and Context of relationship Management – Evolution – Transactional Vs Relationship Approach – CRM as a strategic marketing tool – CRM significance to the stakeholders.

UNIT II : UNDERSTANDING CUSTOMERS   **9**

Customer information Database – Customer Profile Analysis – Customer perception , Expectations analysis – Customer behavior in relationship perspectives; individual and group customer's – Customer life time value – Selection of Profitable customer segments.

UNIT III : CRM STRUCTURES   **9**

Elements of CRM – CRM Process – Strategies for Customer acquisition – Retention and Prevention of defection – Models of CRM – CRM road map for business applications.

UNIT IV : CRM PLANNING AND IMPLEMENTATION   **9**

Strategic CRM planning process – Implementation issues – CRM Tools– Analytical CRM – Operational CRM – Call center management – Role of CRM Managers.

UNIT V : TRENDS IN CRM   **9**

E-CRM Solutions – Data Warehousing – Data mining for CRM – an introduction to CRM software packages.

                                                        TOTAL:45 PERIODS
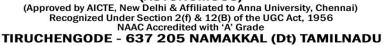
OUTCOMES

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

- Use strategic customer acquisition and retention techniques in CRM.
- Understanding the customers.
- Develop & planning the CRM structures.
- Implement a trends in CRM techniques.
- Implement the Data Mining for CRM.

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

TEXT BOOKS

1. G.Shainesh, Jagdish, N.Sheth, "Customer Relationships Management Strategic Prespective", Macmillan, 2005.
2. Alok Kumaretal, "Customer Relationship Management : Concepts and applications", Biztantra, 2008.

REFERENCES

1. Zikmund,"Customer Relationship Management", Wiley, 2012 .
2. Kumar,"Customer Relationship Management – A Database Approach", Wiley India, 2007.

E – RESOURCES

1. https://nptel.ac.in/courses/110/105/110105145/ (Customer Relationship Management)
2. https://nptel.ac.in/noc/courses/noc20/SEM2/noc20–mg57 (Customer Relationship Management)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSOX08	E – COMMERCE AND APPLICATIONS	L T P C
		3 0 0 3

OBJECTIVES

To enable the students to,

* Learn Efficient at selling through understanding complex consumer behavior.

* Learn national goals and aspirations as well as towards E-commerce infrastructure.

* Understand Maximise conversion rates in E-business.

* Learn up-sell and cross-sell products and services to maximise value over the lifetime of the customer.

* Understand technical and economical challenges doing E-Marketing.

UNIT I : INTRODUCTION 9

Introduction to Electronic Commerce – History of Electronic Commerce – Cutting edge – Electronic Commerce Framework – Evolution of E-commerce – Advantages and Disadvantage of E-commerce.

UNIT II : NETWORK INFRASTRUCTURE 9

Network Infrastructure – The Internet Hierarchy – Basic Blocks of e-commerce – Networks layers & TCP/IP protocols – The Advantages of Internet – World Wide Web – E-commerce Infrastructure.

UNIT III : E–COMMERCE INFRASTRUCTURE 9

An Overview of Hardware, Server Operating System, Software, Network Website – Managing the e-Enterprise – E-business Enterprise – Comparison between Conventional Design and E-organisation.

UNIT IV : PROCESS MODELS AND PAYMENT SYSTEMS 9

E-business Models Based on the Relationship of Transaction Parties – e-commerce Sales Life Cycle (ESLC) Model – Electronic Payment Systems – Electronic Cash – Smart Cards and Electronic Payment Systems.

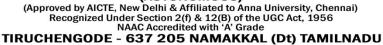**UNIT V : ELECTRONIC DATA INTERCHANGE(EDI)** 9

EDI – History of EDI – EDI Working Concept – Implementation difficulties of EDI – Financial EDI – EDI and Internet – E-Marketing – The scope of E-Marketing.

TOTAL: 45 PERIODS

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU
ESTD 2001

OUTCOMES

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

- Learn to Faster buying process and product listing creation.
- Use an affordable advertising and marketing.
- Flexibility for customers and price comparison.
- Give Faster response to buyer/market demands.
- Use an incorporate social elements.

TEXT BOOKS

1. P.T.Joseph, " E-Commerce An Indian Perspective",3rd Edition,Prentice–Hall of India, 2016.

2. J.O'Brien, "Management Information Systems",15th Edition, Tata Mcgraw–Hill, 2018.

REFERENCES

1. J. F.Rayport, & B. J. Jaworski,"Introduction to E–Commerce", 2nd Edition,New York McGraw–Hill Irwin.

2. R. M. Stair, & G. W. Reynolds,"Principles of Information Systems", 5th Edition, Singapore Thomson Learning.

E–RESOURCES

1. https://nptel.ac.in/courses/110/105/110105083/ (E–Business)

2. https://nptel.ac.in/noc/courses/noc18/SEM1/noc18–ma04/l (Calculus for Economics, Commerce and Management)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

19CSOX09   **SOCIAL NETWORK ANALYSIS**   **L T P C**
                                                                     3 0 0 3

OBJECTIVES

The main objective of the course is to,

- Understand the concept of semantic web and related applications.

- Understand the aggregation and knowledge representation.

- Learn knowledge representation using ontology.

- Understand human behaviour in social web and related communities.

- Learn visualization of social networks.

UNIT I : INTRODUCTION   **9**

Introduction to Semantic Web: Limitations of current Web – Development of Semantic Web – Emergence of the Social Web – Social Network analysis: Development of Social Network Analysis – Key concepts and measures in network analysis – Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities – Web-based networks – Applications of Social Network Analysis.

UNIT II : MODELLING, AGGREGATING AND KNOWLEDGE REPRESENTATION   **9**

Ontology and their role in the Semantic Web: Ontology–based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework – Web Ontology Language – Modelling and aggregating social network data: State-of-the-art in network data representation – Ontological representation of social individuals – Ontological representation of social relationships – Aggregating and reasoning with social network data – Advanced representations.

UNIT III : EXTRACTION AND MINING COMMUNITIES IN WEB SOCIALNETWORKS   **9**

Extracting evolution of Web Community from a Series of Web Archive – Detecting communities in social networks – Definition of community – Evaluating communities – Methods for community detection and mining – Applications of community mining algorithms – Tools for detecting communities social network infrastructures and communities – Decentralized online social networks – Multi-Relational characterization of dynamic social network communities.

UNIT IV : PREDICTING HUMAN BEHAVIOUR AND PRIVACY ISSUES   **9**

Understanding and predicting human behaviour for social communities – User data management – Inference and Distribution – Enabling new human experiences – Reality mining

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

– Context – Awareness – Privacy in online social networks – Trust in online environment – Trust models based on subjective logic – Trust network analysis – Trust transitivity analysis – Combining trust and reputation – Trust derivation based on trust comparisons – Attack spectrum and countermeasures.

UNIT V : VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS   9

Graph theory – Centrality – Clustering – Node-Edge Diagrams – Matrix representation – Visualizing online social networks, Visualizing social networks with matrix-based representations – Matrix and Node – Link Diagrams – Hybrid representations – Applications – Cover networks – Community welfare – Collaboration networks – Co-Citation networks.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, the students should be able to,

- Develop semantic web related applications.
- Understanding the aggregation and knowledge representation.
- Represent knowledge using ontology.
- Predict human behaviour in social web and related communities.
- Visualize social networks.

TEXT BOOKS

1. Peter Mika,"Social Networks and the Semantic Web", 1st Edition, Springer, 2007.
2. Borko Furht, "Handbook of Social Network Technologies and Applications", 1st Edition, Springer, 2010.

REFERENCES

1. GuandongXu ,Yanchun Zhang and Lin Li, 'Web Mining and Social Networking – Techniques and applications', 1st Edition, Springer, 2011.
2. Dion Gohand Schubert Foo,'Social information Retrieval Systems: Emerging Technologies and Applications for Searching the Web Effectively', IGI Global Snippet, 2008.

E–RESOURCES

1. https://nptel.ac.in/courses/106/106/106106169/ (Social Networks)
2. https://nptel.ac.in/noc/courses/noc17/SEM2/noc17–cs41/ (Social Networks–Introduction)

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE - 637 205 NAMAKKAL (Dt) TAMILNADU

19CS0X10	MULTIMEDIA SYSTEMS	L T P C
		3 0 0 3

OBJECTIVES

The student should be able to,

- Develop an understanding and awareness of how issues such as content, information architecture, motion, sound, design, and technology.

- Merge to form effective and compelling interactive experiences for a wide range of audiences and end users.

- Be aware of current issues relative between new emerging electronic technologies and graphic design.(i.e. social, cultural, cognitive, etc).

- Appreciate the importance of technical ability and creativity within design practice.

- To understand the planning and costing strategies.

UNIT I : INTRODUCTION OF MULTIMEDIA 9

Definitions – CD-ROM and the Multimedia Highway – where to use Multimedia – introduction to Making Multimedia: The stages of a Project – What you need – Multimedia Skills and Training : The terms – Macintosh and Windows Production Platforms:Multimedia PC platform – Networking Macintosh and Windows Computers – Hardware Peripherals Connection – Memory and Storage Devices – Input Devices – Output Hardware.

UNIT II : BASIC TOOLS 9

Text Editing and Word Processing Tools – OCR Software – Painting and Drawing Tools – 3-D Modeling and Animation Tools – Image – Editing Tools – Sound Editing Tools – Animation, Video and Digital Movies Tools – Helpful Accessories – Making Instant Multimedia: Linking Multimedia Objects – Office Suites – Word Processors – Spread sheets – Databases – Presentation Tools. Multimedia Authoring Tools.

UNIT III :TEXT IN MULTIMEDIA 9

The Power of Meaning – About Fonts and Faces – Using Text in Multimedia – Computers and Text – Font Editing and Design Tools – Hypermedia and Hypertext – Sound: The Power of Sound – Multimedia System Sounds – MIDI Versus Digital Atidid – Digital Audio – Making MIDI Audio – Audio File Formats –Notation Interchange File Format (NIFF) – Adding Sound to Your multimedia Project – Toward professional Sound.

UNIT IV : ANIMATION AND FILE FORMATS 9

Making Still Images – Color – Image File Formats. Animation: The Power of Motion – Principles of Animation – Making Animations That Work – Video: Using video – How video works –

SENGUNTHAR ENGINEERING COLLEGE
(AUTONOMOUS)
(Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai)
Recognized Under Section 2(f) & 12(B) of the UGC Act, 1956
NAAC Accredited with 'A' Grade
TIRUCHENGODE – 637 205 NAMAKKAL (Dt) TAMILNADU

Broadcast Video Standards – Integrating Computers and Television – Shooting and Editing Video – Video Tips – Recording Formats – Digital Video.

UNIT V : PLANNING AND COSTING   **9**

Project planning – Estimating – Designing and producing: Designing – Producing – Content and Talent: Acquiring Content – Using content created by others – Using Content created for a Project – Using Talent Delivering: Testing – Preparing for Delivery – Delivering on CD-ROM – Compact Disc Technology – Wrapping It Up – Delivering on the World Wide Web.

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course, the student should be able to,

- Form effective and compelling interactive experiences for a wide range of audiences.
- Effectively and Creatively solve a wide range of graphic design problems.
- Discuss issues related to emerging electronic technologies and graphic design.
- Learn the usage of multimedia.
- Develop the creative multimedia tools.

TEXT BOOKS

1. Donald Hearn and M. Pauline Baker, "Computer Graphics C Version", Pearson Education, 2003.
2. Andleigh, P. K and Kiran Thakrar, "Multimedia Systems and Design", PHI, 2003.

REFERENCES

1. Tay Vaughan ,"Multimedia : Making it work",7th Edition, Tata McGraw–Hill,2006.
2. John F Koegel Buford,"Multimedia Systems", 1st Indian Reprint, Addison Wesley,2000.

E–RESOURCES

1. https://nptel.ac.in/courses/117/105/117105083/ (Multimedia Processing web)
2. https://nptel.ac.in/courses/106/106/1061062l00 (Multimodal Interaction)