

SONA COLLEGE OF TECHNOLOGY, SALEM-5

(An Autonomous Institution)

B.Tech- Artificial Intelligence and Data Science

CURRICULUM and SYLLABI

[For students admitted in 2022-2023]

B.E / B.Tech Regulation 2019

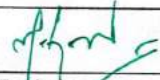
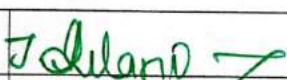
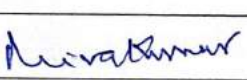

Approved by BOS and Academic Council meetings

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester I under
Regulations 2019 (CBCS)
Branch: Artificial Intelligence and Data Science

S. No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19MAT102A	Linear Algebra and Calculus	3	1	0	4	BS	60
2	U19ENG101C	Communication skills in English- I	2	0	0	2	HS	30
3	U19PHY103C	Engineering Physics	3	0	0	3	BS	45
4	U19BEE106A	Basic Electrical and Electronics Engineering	3	0	0	3	ES	45
5	U19PPR105	Problem Solving using Python Programming	3	0	0	3	ES	45
Practical								
6	U19PHL110	Engineering Physics Laboratory	0	0	3	1.5	BS	45
7	U19BEEL113A	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1	ES	30
8	U19PPL111	Python Programming Laboratory	0	0	2	1	ES	30
9	U19GE101	Basic Aptitude - I	0	0	2	0	EEC	30
Total Credits						18.5		
Optional Language Elective*								
10	U19OLE1101	French	0	0	2	1	HS	30
11	U19OLE1102	German						30
12	U19OLE1103	Japanese						30

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved By

			
Chairperson, Science and Humanities BoS	Chairperson, Information Technology BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. J. Akilandeswari	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

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HOD/ Information Technology, First Semester B.Tech. AI&DS Students and Staff, COE

Sona College of Technology, Salem – 636 005

(An Autonomous Institution)

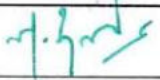
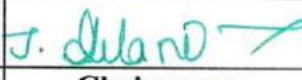

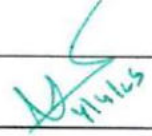
Courses of Study for BE / B Tech Semester II under Regulations 2019 (CBCS)

Branch: Artificial Intelligence and Data Science

S. No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19TAM201	தமிழர் மரபு / Heritage of Tamils	1	0	0	1	HSMC	15
2	U19MAT202F	Probability and Statistics for Data Science-I	3	1	0	4	BSC	60
3	U19ENG201C	Communication Skills in English- II	2	0	2	3	HSMC	60 (30L+30P)
4	U19ADS201	Introduction to Artificial Intelligence	3	0	0	3	PCC	45
5	U19ADS202	Data Structure and Algorithms I	3	0	0	3	PCC	45
6	U19IT201	Programming in C	3	0	0	3	PCC	45
7	U19IT202	Information Technology Essentials	2	0	0	2	ESC	30
Practical								
8	U19IT203	Programming in C Laboratory	0	0	3	1.5	PCC	45
9	U19ADS203	Data Structure and Algorithms I Lab	0	0	3	1.5	PCC	45
10	U19GE201	Basic Aptitude – II	0	0	2	0	EEC	30
Total Credits						22		
Optional Language Elective*								
11	U19OLE1201	French	0	0	2	1	HSMC	30
12	U19OLE1202	German						
13	U19OLE1203	Japanese						

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

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Dr. M. Renuga	Dr. J. Akilandeswari	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

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HOD/ Information Technology, Second Semester B.Tech ADS Students and Staff, COE

03.03.2023

B.E/B.Tech Regulations-2019

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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019 (CBCS)
Branch: Artificial Intelligence and Data Science

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19MAT301F ✓	Probability and Statistics for Data Science – II	3	1	0	4	60 ✓
2	U19ADS301 ✓	Operating Systems	3	0	2	4	75 ✓
3	U19IT303 ✓	Computer Architecture	3	0	0	3	45 ✓
4	U19ADS302 ✓	Data Structures and Algorithms - II	3	0	0	3	45 ✓
5	U19ADS303 ✓	Advanced Python Programming for Data Science	2	0	2	3	60 ✓
6	U19ADS304 ✓	Digital Logic Design	3	0	2	4	75 ✓
7	U19TAM301 ✓	தமிழரும் தொழில்நுட்பமும்/ Tamil and Technology	1	0	0	1	15 ✓
8	U19GE303	Mandatory Course- Essence of Indian Traditional Knowledge	2	0	0	0	30 ✓
Practical							
9	U19ADS305 ✓	Data Structures and Algorithms Laboratory - II	0	0	2	1	30 ✓
10	U19GE301 ✓	Soft Skills and Aptitude – I	0	0	2	1	30 ✓
Total Credits						24 ✓	

Approved By


Chairperson, Information Technology BoS
Dr. J. Akilandeswari


Member Secretary, Academic Council
Dr. R. Shivakumar


Chairperson, Academic Council & Principal
Dr. S. R. R. Senthil Kumar


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HOD/Information Technology, Third Semester BE IT Students and Staff, COE


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Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV under Regulations 2019 (CBCS)
Branch: Artificial Intelligence and Data Science

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Hours
Theory							
1	U19MAT401D	Discrete Mathematical Structures	3	1	0	4	60
2	U19ADS401	Database Management Systems	3	0	0	3	45
3	U19ADS402	Introduction to Data Science	3	0	0	3	45
4	U19ADS403	Java Programming	3	0	0	3	45
5	U19ADS404	Computer Networks	3	0	0	3	45
6	U19ADS405	Agile Software Development	3	0	2	4	75
7	U19GE402	Mandatory Course- Environment and climate science	2	0	0	0	30
Practical							
8	U19ADS406	Database Management Systems Laboratory	0	0	4	2	60
9	U19ADS407	Java Programming Laboratory	0	0	4	2	60
10	U19GE401	Soft Skills and Aptitude – II	0	0	2	1	30
Total Credits						25	

Approved By


Chairperson, Information Technology BoS
Dr.J.Akilandeswari


Member Secretary, Academic Council
Dr.R.Shivakumar 8.1.23


Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Information Technology, Fourth Semester BE IT Students and Staff, COE

22-12-2023

Regulations-2019

SONA COLLEGE OF TECHNOLOGY, SALEM- 5
DEPARTMENT OF INFORMATION TECHNOLOGY

B Tech- ADS- 2019 Regulations

List of Elective's

S. No	Course Code	COURSE TITLE	L	T	P	C
1.	U19ADS901	Virtual Reality	3	0	0	3
2.	U19ADS902	Web and Social Media Analytics	3	0	0	3
3.	U19ADS903	Numerical Methods	3	0	0	3
4.	U19ADS904	Data Mining	3	0	0	3
5.	U19ADS905	C# AND .NET	2	0	2	3
6.	U19ADS906	Advanced Java Programming	3	0	0	3
7.	U19ADS907	Embedded Systems	3	0	0	3
8.	U19ADS908	Information Security	3	0	0	3
9.	U19ADS909	Graph Theory	3	0	0	3
10.	U19ADS910	Wireless Technologies	3	0	0	3
11.	U19ADS911	Business Intelligence	3	0	0	3
12.	U19ADS912	Image Processing	3	0	0	3
13.	U19ADS913	Digital Signal Processing	3	0	0	3
14.	U19ADS914	Total Quality Management	3	0	0	3
15.	U19ADS915	Software Quality Assurance	3	0	0	3
16.	U19ADS916	Linux Internals	3	0	0	3
17.	U19ADS917	Distributed Databases	3	0	0	3
18.	U19ADS918	Cyber Security and Forensics	3	0	0	3
19.	U19ADS919	Intellectual Property Rights	3	0	0	3
20.	U19ADS920	Ethical Hacking	3	0	0	3
21.	U19ADS921	Mobile Application Development	3	0	0	3
22.	U19ADS922	Wireless Sensor Networks	3	0	0	3
23.	U19ADS923	Information Retrieval	3	0	0	3
24.	U19ADS924	Mobile Computing	3	0	0	3
25.	U19ADS925	Multi-Core Architecture	3	0	0	3
26.	U19ADS926	Robotic Process Automation	3	0	0	3
27.	U19ADS927	Human Computer Interaction	2	0	2	3
28.	U19ADS928	Predictive Analytics	3	0	0	3

SONA COLLEGE OF TECHNOLOGY (AUTONOMOUS), SALEM-5.

DEPARTMENT OF INFORMATION TECHNOLOGY

B TECH ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

LIST OF PROFESSIONAL ELECTIVES FOR HONOURS DEGREE

Vertical 1 CLOUD COMPUTING	Vertical 2 CREATIVE MEDIA	Vertical 3 CYBER SECURITY	Vertical 4 INTERNET OF THINGS
Introduction to Distributed & Grid Computing	Augmented and Virtual Reality	Fundamentals of Cyber Security	Introduction to 5G
Virtualization	Multimedia and Animation	Cyber Laws and Standards	Introduction to Cyber-Physical System
Dockerization and Kubernetes	Video Creation and Editing	Ethical Hacking	Wireless Technologies
Big Data on Cloud	UI And UX Design	Network Vulnerability Assessment	Wireless Sensor Networks
Cloud Application Development and Deployment	Digital Marketing	Cyber Forensics	Introduction to IoT
Security and Privacy in Cloud	Visual Effects	Information Security Risk Management	Software Defined Networks
Container Orchestrations and Infrastructure Automation	Game Development	Security Operations and Incident Management	Network Programming
Cloud Networking	Multimedia Data Compression and Storage	Cryptocurrency and Blockchain Technologies	Industry 4.0
Capstone Project in CLOUD COMPUTING (*Mandatory Elective Course for Earning Specialization Degree)	Capstone Project in CREATIVE MEDIA (*Mandatory Elective Course for Earning Specialization Degree)	Capstone Project in CYBER SECURITY (*Mandatory Elective Course for Earning Specialization Degree)	Capstone Project in NETWORKING (*Mandatory Elective Course for Earning Specialization Degree)

SONA COLLEGE OF TECHNOLOGY (AUTONOMOUS), SALEM-5.

DEPARTMENT OF INFORMATION TECHNOLOGY

B TECH ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Honours Degree- Verticals & Courses

(Offered to UG students admitted during AY 2021- 2022 onwards, Regulation 2019)

VERTICAL 1 – CLOUD COMPUTING

S.No	Course Code	Course Title	L	T	P	Credit
1.	U19ADS2001	Introduction to Distributed & Grid Computing	3	0	0	3
2.	U19ADS2002	Virtualization	3	0	0	3
3.	U19ADS2003	Dockerization and Kubernetes	3	0	0	3
4.	U19ADS2004	Big Data on Cloud	3	0	2	4
5.	U19ADS2005	Cloud Application Development and Deployment	3	0	2	4
6.	U19ADS2006	Security and Privacy in Cloud	3	0	2	4
7.	U19ADS2007	Container Orchestrations and Infrastructure Automation	3	0	0	3
8.	U19ADS2008	Cloud Networking	3	0	2	4
9.	U19ADS2009	Capstone Project in Artificial Intelligence and Data Science (*Mandatory for Earning Specialization Degree)	0	0	4	2
Maximum of two SWAYAM courses in CLOUD COMPUTING vertical identified by Department Consultative Committee of the department.						

VERTICAL 2 – CREATIVE MEDIA

S. No	Course Code	Course Title	L	T	P	Credit
1	U19ADS2010	Augmented and Virtual Reality	3	0	2	4
2	U19ADS2011	Multimedia and Animation	3	0	2	4
3	U19ADS2012	Video Creation And Editing	3	0	2	4
4	U19ADS2013	UI and UX Design	3	0	2	4
5	U19ADS2014	Digital Marketing	3	0	2	4
6	U19ADS2015	Visual Effects	3	0	2	4
7	U19ADS2016	Game Development	3	0	2	4
8	U19ADS2017	Multimedia Data Compression And Storage	3	0	0	3
9	U19ADS2018	Capstone Project in CREATIVE MEDIA (*Mandatory for Earning Specialization Degree)	0	0	4	2
Maximum of two SWAYAM courses in CREATIVE MEDIA vertical identified by Department Consultative Committee of the department.						

VERTICAL 3 – CYBER SECURITY

S.No	Course Code	Course Title	L	T	P	Credit
1	U19ADS2019	Fundamentals of Cyber Security	3	0	0	3
2	U19ADS2020	Cyber Laws and Standards	3	0	0	3
3	U19ADS920	Ethical Hacking	3	0	0	3
4	U19ADS2021	Network Vulnerability Assessment	3	0	2	4
5	U19ADS2022	Cyber Forensics	3	0	2	4
6	U19ADS2023	Information Security Risk Management	3	0	0	3
7	U19ADS2024	Security Operations and Incident Management	3	0	2	4
8	U19ADS2025	Cryptocurrency and Blockchain Technologies	3	0	2	4
9	U19ADS2026	Capstone Project in Cyber Security (*Mandatory for Earning Specialization Degree)	0	0	4	2
Maximum of two SWAYAM courses in CYBER SECURITY vertical identified by Department Consultative Committee of the department.						

VERTICAL 4 – INTERNET OF THINGS

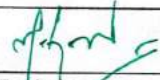
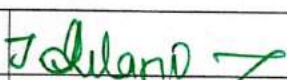
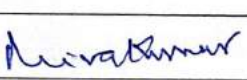

S.No	Course Code	Course Title	L	T	P	Credit
1	U19ADS2027	Introduction to 5G	3	0	0	3
2	U19ADS2028	Introduction to Cyber-Physical System	3	0	0	3
3	U19ADS910	Wireless Technologies	3	0	0	3
4	U19ADS2029	Wireless Sensor Networks	3	0	2	4
5	U19ADS2030	Introduction to IoT	3	0	2	4
6	U19ADS2031	Software Defined Networks	3	0	2	4
7	U19ADS2032	Network Programming	3	0	2	4
8	U19ADS2033	Industry 4.0	3	0	0	3
9	U19ADS2034	Capstone Project in Networking (*Mandatory for Earning Specialization Degree)	0	0	4	2
Maximum of two SWAYAM courses in INTERNET OF THINGS vertical identified by Department Consultative Committee of the department.						

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4	U19BEE106A	Basic Electrical and Electronics Engineering	3	0	0	3	ES	45
5	U19PPR105	Problem Solving using Python Programming	3	0	0	3	ES	45
Practical								
6	U19PHL110	Engineering Physics Laboratory	0	0	3	1.5	BS	45
7	U19BEEL113A	Basic Electrical and Electronics Engineering Laboratory	0	0	2	1	ES	30
8	U19PPL111	Python Programming Laboratory	0	0	2	1	ES	30
9	U19GE101	Basic Aptitude - I	0	0	2	0	EEC	30
Total Credits						18.5		
Optional Language Elective*								
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11	U19OLE1102	German						30
12	U19OLE1103	Japanese						30

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B. TECH. / ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

SEMESTER – I	LINEAR ALGEBRA AND CALCULUS	L	T	P	C
UI9MAT102A		3	1	0	4

COURSE OUTCOMES

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

1. find the rank of the matrix and solve linear system of equations by direct and indirect methods
2. apply the concepts of vector spaces and linear transformations in real world applications
3. apply the concepts of eigen values and eigen vectors of a real matrix and their properties in diagonalization and the reduction of a real symmetric matrix from quadratic form to canonical form
4. find the Taylor's series expansion, Jacobians and the maxima and minima of functions of two variables
5. apply appropriate techniques of multiple integrals to find the area and volume.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3	2							2		2
CO2	3	3		3	2							2		2
CO3	3	3		3	2							2		2
CO4	3	3		3	2							2		2
CO5	3	3		3	2							2		2

UNIT – I LINEAR SYSTEM OF EQUATIONS

12

Rank of a matrix – Solution of linear system of equations by matrix method, Gauss elimination, Gauss-Jordan, Gauss-Jacobi and Gauss-Seidel methods.

UNIT – II VECTOR SPACES

12

Vector Space – Linear independence and dependence of vectors – Basis – Dimension – Linear transformations (maps) – Matrix associated with a linear map – Range and kernel of a linear map – Rank-nullity theorem (without proof).

UNIT – III EIGEN VALUES AND EIGEN VECTORS

12

Eigen values and eigen vectors of real matrices – Properties of eigen values and eigen vectors – Cayley-Hamilton theorem – Diagonalization of real symmetric matrices – Reduction of quadratic form to canonical form.

UNIT – IV MULTIVARIABLE CALCULUS 12
Functions of several variables – Partial differentiation – Total derivative – Jacobians – Taylor's theorem for function of two variables – Maxima and minima of function of two variables without constraints – Constrained maxima and minima by Lagrange's method of undetermined multipliers.

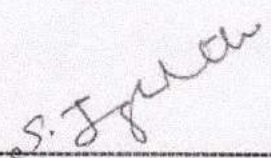
UNIT – V MULTIPLE INTEGRALS 12
Double integrals – Change of order of integration – Change of variables from Cartesian to polar coordinates – Area as double integrals in Cartesian coordinates – Triple integrals – Volume as triple integrals in Cartesian coordinates.

Theory: **45 Hours**Tutorial: **15 Hours**Total: **60 Hours****TEXT BOOKS:**

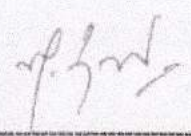
1. T. Veerarajan, "Linear Algebra and Partial Differential Equations", McGraw Hill Publishers, 1st Edition, 2018.
2. T. Veerarajan, "Engineering Mathematics for Semesters I & II", McGraw Hill Publishers, 1st Edition, 2019.

REFERENCE BOOKS:

1. S. Lipschutz and M. L. Lipson, "Linear Algebra", McGraw Hill Publishers, 6th Edition, 2018.
2. E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint, 2017.
3. C. Prasad and R. Garg, "Advanced Engineering Mathematics", Khanna Publishers, 1st Edition, 2018.
4. B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29th Reprint, 2017.
5. B. S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, 2018.



Prof. S. JAYABHARATHI
Head / Department of Mathematics
Sona College of Technology
Salem – 636 005



Dr. M. RENUGA
BoS - Chairperson
Science and Humanities
Sona College of Technology
Salem – 636 005

UIAENG101C – Communication Skills in English – I

First year I semester

Common to AI&DS

Course Outcome: At the end of course, the students will be able to

1. Use grammatical components effectively in both written and spoken communication
2. Develop speaking skills for self-introduction, delivering speeches and technical presentation.
3. Speak effectively in real time and business situations
4. Write email, formal letters and descriptions of graphics
5. Develop skills for writing reports and proposals, and for general purpose and technical writing.

	COURSE OUTCOMES	PROGRAMME OUTCOMES												Ps o1	Ps o2
		1	2	3	4	5	6	7	8	9	10	11	12		
1	Use grammatical components effectively in both written and spoken communication	2	1	1	1	1	2	3	2	2	3	3	3	3	3
2	Develop speaking skills for self-introduction, delivering speeches and technical presentation	3	2	2	3	3	3	3	3	2	3	3	3	3	3
3	Speak effectively in real time and business situations	3	3	2	3	3	3	3	3	3	3	3	3	3	3
4	Write email, formal letters and descriptions of graphics	1	1	1	2	2	1	2	2	1	3	1	1	1	1
5	Develop skills for writing reports and proposals, and for general purpose and technical writing.	2	1	1	3	2	2	3	3	3	3	2	3	3	3

UNIT –I

- Parts of speech
- Self-introduction, personal information, name, home background, study details, area of interest, hobbies, strengths and weaknesses, projects and paper presentations, likes and dislikes in food, travel, clothes, special features of home town.

- Instructions, Email, fixing an appointment, cancelling appointments, conference details, hotel accommodation, order for equipment, training programme details, paper submission for seminars and conferences
- Paragraph writing – Describing – defining – providing examples or evidences

UNIT II

- Tenses, active and passive voice
- Welcome address, Vote of Thanks, Special Address on specific topic.
- Letter Writing, Business communication, quotations, placing orders, complaints, replies to queries from business customers, inviting dignitaries, accepting and declining invitations

UNIT – III

- Prefixes and Suffixes
- Mini presentation in small groups of two or three, Office Arrangements, Facilities, Office Functions, Sales, Purchases, Training Recruitment, Advertising, Applying for financial assistance, applying for a job, team work, discussion, presentation.
- Cover letter and resume writing

UNIT - IV

- Modal verbs and probability, concord
- Situational Role Play - between examiner and candidate, teacher and student, customer and sales manager, hotel manager and organiser, team leader and team member, bank manager and candidate, interviewer and applicant, car driver and client, industrialist and candidate, receptionist and appointment seeker, new employee and manager, employee and employee, p.a. and manager, schedule for training
- Proposal: establishing a lab, introducing a subject in the curriculum, training programme for students

UNIT – V

- If conditionals
- Asking for directions, seeking help with office equipment, clarifying an error in the bill, job details, buying a product, selling a product, designing a website, cancelling and fixing appointments, hotel accommodation, training facilities, dress code, conference facilities.
- Technical report writing - feasibility report, accident report, survey report

TOTAL: 30 hours

Speaking test will be conducted for 20 marks externally and evaluated along with Communication Skills in English – I in the End Semester Valuation.

TEXT BOOK:

Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016

Extensive Reading

1. The Story of Amazon.com- Sara Gilbert, published by Jaico
2. The Story of Google – Sara Gilbert, published by Jaico

Reference

1. Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.
2. A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.



HOD

Humanities and Languages

Dr. M. RENUGA,
Professor & Head,

Department of Humanities & Languages,

Course Code: U19PHY103C
 Course Name: ENGINEERING PHYSICS

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(Common to I Semester B.E. Artificial Intelligence and Data Science, Electronics and Communication Engineering & B.Tech. Information Technology)

(ADS, ECE & IT)

COURSE OUTCOMES:

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

- CO1** Discuss the dual nature of matter and radiation and the application of wave nature of particles.
- CO2** Describe the basic components of lasers.
- CO3** Analyse the relation between arrangement of atoms and material properties.
- CO4** Differentiate the electrical and thermal conductivity of metals.
- CO5** Elucidate the classification and theory of semiconducting materials.

CO / PO, PSO Mapping														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO-1	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-2	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-3	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-4	3	2	-	-	-	-	-	-	-	-	2	2	-	3
CO-5	3	2	-	-	-	-	-	-	-	-	2	2	-	3

Unit 1 Quantum Physics

9

Origin of quantum mechanics – Limitations of classical theory - Dual nature of matter and radiation.

Particle nature of radiation - Compton effect - Explanation based on quantum theory - Expression for Compton shift (no derivation).

Wave nature of matter - de Broglie waves - Schrödinger's time independent and time dependent wave equations - Physical significance of wave function - Energy and wave function of an electron trapped in one dimensional box.

Application of wave nature of particles - Electron microscope - Comparison of optical and electron microscope - Scanning electron microscope - Limitations of electron microscope.

Unit 2 Lasers

9

Basic terms - Energy level - normal population - induced absorption (pumping) - population inversion - meta stable state - spontaneous emission - stimulated emission.

Basic components of a laser - Active medium - pumping technique - optical resonator

Einstein's theory - stimulated absorption - spontaneous emission and stimulated emission.

Types of lasers - Solid lasers (Nd:YAG) - Gas lasers (CO₂ laser) - semiconductor laser (homojunction and hetero junction laser).

Holography - Construction and reconstruction of hologram.

Unit 3 Crystal Physics

9

Importance of crystals - Types of crystals - Basic definitions in crystallography (Lattice – space lattice - unit cell - lattice parameters – basis - crystallographic formula) - Seven crystal systems and fourteen Bravais lattices – Lattice planes and Miller indices – Interplanar distance - d spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - Coordination number and Atomic Packing factor for SC, BCC, FCC and HCP Structures - Polymorphism and allotropy.

Crystal imperfections - Point, line and surface defects – burger vector.

Unit 4 Conducting materials

9

Usage of conducting materials - basic definitions (electrical resistance - conductance - resistivity - conductivity).

Classical free electron theory of metals - Postulates of classical free electron theory - microscopic form of Ohm's law - Electrical conductivity - definition and expression for electrical conductivity - Thermal conductivity - definition and expression for thermal conductivity - Wiedemann - Franz law and Lorentz number - Success and failure of classical free electron theory.

Quantum free electron theory - Drawbacks of quantum free electron theory - origin of energy bands - band theory of solids (qualitative treatment only) - Fermi energy and Fermi distribution function - Effect of temperature on Fermi function - Density of energy states - carrier concentration in metals.

Unit 5 Semiconducting Materials

9

Properties of semiconductors - Classification of semiconductors - Intrinsic and extrinsic semiconductors - Elemental and compound semiconductors.

Intrinsic semiconductor - Two types of charge carriers - Energy band diagram of intrinsic semiconductors (at $T = 0\text{ K}$ and $T > 0\text{ K}$) - Expression for number of electrons in conduction band - Expression for number of holes in valence band - Law of mass action and intrinsic carrier concentration - Fermi level - Variation of Fermi level with temperature - electrical conductivity - band gap determination.

Extrinsic semiconductors - Draw backs of intrinsic semiconductors – Types of extrinsic semiconductors – ‘n’-type and ‘p’-type semiconductors – Energy band diagram of ‘n’ type and ‘p’ type semiconductors (at $T = 0\text{ K}$ and $T > 0\text{ K}$) – Carrier concentration of extrinsic semiconductors (Qualitative Treatment only) – Hall effect – Determination of Hall coefficient – Applications.

Lecture: 45, Tutorial: 00, Total: 45 Hours

Text Book:

1. M.N.Avadhanulu, ‘Engineering Physics’ S.Chand & Company Ltd, New Delhi (2015)
2. B. K. Pandey and S. Chaturvedi, Engineering Physics , Cengage Learning India Pvt. Ltd., Delhi, 2019

References:

1. Engineering Physics, Sonaversity, Sona College of Technology, Salem (Revised Edition 2018).
2. Rajendran, V, and Marikani A, ‘Materials science’ TMH Publications, (2004) New Delhi.
3. Palanisamy P.K, ‘Materials science’, SciTech Publications (India) Pvt. Ltd., Chennai, Second Edition (2007)
4. D. K. Bhattacharya, Poonam Tandon “Engineering Physics” Oxford University Press 2017.

Dr. C. Shanthi
HOD / Science

Dr. C. SHANTHI, M.Sc., M.E., Ph.D.,
Professor of Physics
Head, Department of Sciences
Sona College of Technology (Autonomous)
SALEM-636 005

(Common to CSE, IT and AI&DS Branches)

Course Outcomes:

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

1. Analyse the various DC circuits and find the circuit parameters.
2. Describe the principles of AC fundamentals.
3. Discuss the construction and working principle of DC machines and Transformer.
4. Explain the basics of semiconductor devices and its applications.
5. Discuss the various applications of operational amplifier and working principle of UPS.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO2	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO3	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO4	2	2	1	1	1	2	1	-	2	2	2	2	1	1
CO5	2	2	1	1	1	2	1	-	2	2	2	2	1	1

UNIT I DC FUNDAMENTALS

9

Electrical components and parameters – Resistance, Conductance – Ohm's law, limitations of Ohm's law – Kirchhoff's law – Power – Energy – resistors in series and parallel – comparison of series and parallel circuits – Star-Delta transformation – simple problems.

UNIT II AC FUNDAMENTALS

9

AC waveforms – standard terminologies – RMS and average value of Sinusoidal, Triangular and Square waveforms – form factor, peak factor – Resistance, Inductance, Capacitance in AC circuits – Impedance – RL, RC, RLC series circuits – series resonance – simple problems.

UNIT III ELECTRICAL MACHINES

9

DC Generator: construction of DC Machine – working principle of DC Generator – EMF equation – Types of DC Generator.

DC Motor: Working principle of DC Motor – Types of DC Motor.

Transformer: Working principle of Transformer – EMF equation – Transformation ratio.

UNIT IV SEMICONDUCTOR DEVICES

9

BJT: Operations of NPN and PNP Transistors – Characteristics of Transistors in CE, CB and CC configuration.

Introduction to power semiconductors - SCR, MOSFET – V-I characteristics and applications.

UNIT V OPERATIONAL AMPLIFIERS AND POWER SUPPLY

9

Operational Amplifier: Ideal characteristics of Op-Amp – Inverting amplifier, Non-Inverting amplifier – voltage follower – summing amplifier.

Rectifiers: working principle of half wave rectifier, full wave rectifier, bridge rectifier.

UPS: components of UPS – working principle of UPS.

TEXT BOOKS

1. B.L. Theraja, "Fundamentals of Electrical Engineering & Electronics", S. Chand & Co Ltd, 2015.
2. Muthusubramanian R, Salivahanan S, "Basic Electrical and Electronics Engineering", 3rd Edition 2007, Tata McGraw-Hill publishing company limited.

REFERENCES

1. Mehta V.K, Rohit Mehta, "Principles of Electrical Engineering & Electronics", S.Chand& Co. Ltd., 2011.
2. S.K. Bhattacharya, "Electrical Machines", Tata MC Graw Hill Publishing company ltd., III edition, 2009.
3. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", II revised edition 2010, PHI publications.
4. D. Roy Choudhury and Shail Jain, "Linear Integrated Circuits", First edition, New age international, 2011.
5. S. Padma, "Basic Electrical and Electronics Engineering", Sonaversity, Revised edition 2016.



Dr. S. PADMA, M.E., Ph.D
Head of the Department
Department of EEE,
Sona College of Technology,
SALEM-636 005

U19BEEL113A BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

L T P C
0 0 2 1

(Common to CSE, IT and AI&DS Branches)


Course Outcomes: At the end of the course, the students will be able to,

1. Apply the basic circuit laws for calculating various parameters of DC and AC circuits
2. Design the circuit for various applications using electronic devices.
3. Analysis the performance characteristics of electronic devices such as SCR, MOSFET, BJT and op-amp.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	1	1	1	2	2	2	2	1	1
CO2	2	2	2	2	2	1	1	1	2	2	2	2	1	1
CO3	2	2	2	2	2	1	1	1	2	2	2	2	1	1

List of experiments

1. Verification of Ohm's Law.
2. Verification of Kirchhoff's Law.
3. Measurement of power and power factor for RLC circuit.
4. Frequency response of RLC resonance circuit.
5. V-I characteristics of BJT in CB configuration.
6. V-I characteristics of BJT in CE configuration.
7. V-I characteristics of BJT in CC configuration.
8. V-I characteristics of MOSFET.
9. V-I characteristics of SCR.
10. Characteristics of operational amplifier as inverting and non-inverting amplifiers.
11. Measurement of ripple factor for half wave and full wave rectifier circuits.


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 Department of EEE,
 Sona College of Technology,
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Total: 30 Hours

U19PPR105 PROBLEM SOLVING USING PYTHON PROGRAMMING 3 0 0 3
 (Common to ADS, IT, CSE, ECE, EEE, BME, MCT, AIML & CSD)

COURSE OUTCOMES

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

1. Develop algorithmic solutions to simple computational problems
2. Write simple Python programs
3. Write programs with the various control statements and handling strings in Python
4. Develop Python programs using functions and files
5. Analyze a problem and use appropriate data structures to solve it.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	3	1	1	2	2	1	3	3	3
CO2	3	3	3	3	3	2	1	1	1	1	1	3	3	3
CO3	3	3	3	3	3	3	2	1	1	1	1	3	3	3
CO4	3	3	3	3	3	2	2	1	1	2	1	3	3	3
CO5	3	3	3	3	3	3	3	1	1	1	1	3	3	3

UNIT I - ALGORITHMIC PROBLEM SOLVING 9

Need for computer languages, Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion).

UNIT II - BASICS OF PYTHON PROGRAMMING 9

Introduction-Python Interpreter-Interactive and script mode -Values and types, variables, operators, expressions, statements, precedence of operators, Multiple assignments, comments, input function, print function, Formatting numbers and strings, implicit/explicit type conversion.

UNIT III - CONTROL STATEMENTS AND STRINGS 9

Conditional (if), alternative (if-else), chained conditional (if-elif-else). Iteration-while, for, infinite loop, break, continue, pass, else. Strings-String slices, immutability, string methods and operations.

UNIT IV - FUNCTIONS AND FILES 9

Functions - Introduction, inbuilt functions, user defined functions, passing parameters - positional arguments, default arguments, keyword arguments, return values, local scope, global scope and recursion. Files -Text files, reading and writing files.


Dr. J. AKILANDESWARI
 PROFESSOR & HEAD
 Department of Information Technology
 SONA COLLEGE OF TECHNOLOGY

UNIT V - DATA STRUCTURES: LISTS, SETS, TUPLES, DICTIONARIES 9

Lists-creating lists, list operations, list methods, mutability list functions, searching and sorting, Sets-creating sets, set operations. Tuples-Tuple assignment, Operations on Tuples, lists and tuples, Tuple as return value- Dictionaries-operations and methods, Nested Dictionaries.


TOTAL: 45 HOURS

TEXT BOOK

1. Reema Thareja, "Problem Solving and Programming with Python", Oxford University Press, 2018.
2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016
(<http://greenteapress.com/wp/think-python/>)

REFERENCES

1. Ashok Namdev Kamthane, Amit Ashok Kamthane, "Programming and Problem Solving with Python", Mc-Graw Hill Education, 2018.
2. Robert Sedgewick, Kevin Wayne, Robert Dondero, "Introduction to Programming in Python: An Inter-disciplinary Approach", Pearson India Education Services Pvt. Ltd., 2016.
3. Timothy A. Budd, "Exploring Python", Mc-Graw Hill Education (India) Private Ltd., 2015.
4. Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.
5. Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem Solving Focus", Wiley India Edition, 2013.


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U19PPL111 PYTHON PROGRAMMING LABORATORY 0021
 (Common to ADS, IT, CSE, ECE, EEE, BME, MCT, AIML & CSD)

COURSE OUTCOMES

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

1. Implement the algorithms using basic control structures in Python
2. Develop Python programs to use functions, strings and data structures to solve different types of problems
3. Implement persistent storing information through file operations

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	2	1		1	2	2	1	2	3	3
CO2	3	3	3	3	2	2		1	2	2	1	2	3	3
CO3	3	3	3	3	2	2		1	2	2	1	3	3	3

LIST OF EXPERIMENTS

1. Draw flowchart using any open source software.
2. Implement programs with simple language features.
3. Implement various branching statements in python.
4. Implement various looping statements in python.
5. Develop python programs to perform various string operations like concatenation, slicing, indexing.
6. Implement user defined functions using python.
7. Implement recursion using python.
8. Develop python programs to perform operations on list and tuples
9. Implement dictionary and set in python
10. Implement python program to perform file operations.

TOTAL: 30 HOURS

J. Akilandeswari
Dr. J. AKILANDESWARI
 PROFESSOR & HEAD
 Department of Information Technology

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U19PHL110		ENGINEERING PHYSICS LABORATORY [Common to IT & ADS]										L	T	P	C
												0	0	3	1.5
Course Outcomes															
After successful completion of this course, the students should be able to															
CO1:	Apply the principles of Thermal Physics and Elasticity to determine the Engineering properties of materials.														
CO2:	Apply the principles of Optics and Electricity to determine the Engineering properties of materials.														
CO3:	Determine the thickness and resistivity of the given copper turn used for house hold applications.														
Pre-requisite: Capable of using Screw gauge, Vernier calliper, Travelling microscope and Spectrometer															
CO/PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak															
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	
CO 1	3			1		1					1			2	
CO 2	3			1		1					1			2	
CO 3	3			1		1					1			2	
Course Assessment methods															
Direct												Indirect			
Mean of 1 st half of Experiment (10)						Quiz on 2 nd half (5)						Course end survey			
Quiz on 1 st half (5)						Internal test II (10)									
Internal test I (10)						RTPS (10)									
Mean of 2 nd half of Experiment (10)						End semester Examination (40)									

List of Experiments	
1	Determination of velocity of ultrasonic waves and compressibility of the given liquid using ultrasonic interferometer.
2	Determination of Young's modulus of the material of the beam by Non-uniform bending method.
3	Determination of the thermal conductivity of a bad conductor using Lee's Disc apparatus.
4	Determination of specific resistance of a given wire using Carey Foster's bridge.
5	Determination of Rigidity Modulus of given wire using Torsion Pendulum.
6	Determination of coefficient of viscosity of liquid by Poiseuille's method.
7	Determination of Young's modulus of the material of the beam by uniform bending method.
8	Determination of laser wavelength using diode laser.
9	Determination of particle size of lycopodium powder using diode laser.
10	Determination of acceptance angle and numerical aperture of an optical fibre using diode laser.
11	Determination of the thickness of a thin wire by forming interference fringes using air wedge apparatus.
12	Determination of dispersive power of the prism for various pairs of colors in the mercury spectrum using a spectrometer.
13	Determination of Wavelength of Mercury spectrum using spectrometer.
14	Determination of band gap of the given semiconductor diode.
Total Hours: 45 Hrs	

CS-11

Dr. C. Shanthi
HOD / Sciences
Dr. C. SHANTHI, M.Sc., M.E., Ph.D.
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2.10.20
30/10/20

Semester-I U19GE101	Basic Aptitude – I (Common to All Departments)	L	T	P	C	Marks
		0	0	2	0	100
Course Outcomes U19GE101						
At the end of the course the student will be able to:						
1. Solve fundamental problems in specific areas of quantitative aptitude						
2. Solve basic problems in stated areas of logical reasoning						
3. Demonstrate rudimentary verbal aptitude skills in English with regard to specific topics						
1. Quantitative Aptitude and Logical Reasoning	Solving simple problems with reference to the following topics: <ol style="list-style-type: none"> Numbers – HCF & LCM Decimal fractions Simplification Square roots & cube roots Surds & indices Ratio and proportion Averages Area and volume Coding and decoding & artificial language 					
2. Verbal Aptitude	Demonstrating plain English language skills with reference to the following topics: <ol style="list-style-type: none"> Synonyms Antonyms Verbal analogy Editing passages Sentence filler words 					

30 hours

S. Anita
Dr.S.Anita

Head/Training

Department of Placement Training
Sona College of Technology,
Salem-636 005.

Sona College of Technology, Salem – 636 005

(An Autonomous Institution)

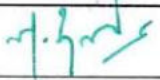
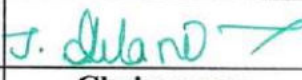

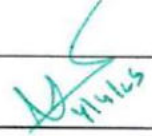
Courses of Study for BE / B Tech Semester II under Regulations 2019 (CBCS)

Branch: Artificial Intelligence and Data Science

S. No	Course Code	Course Title	L	T	P	C	Category	Total Contact Hours
Theory								
1	U19TAM201	தமிழர் மரபு / Heritage of Tamils	1	0	0	1	HSMC	15
2	U19MAT202F	Probability and Statistics for Data Science-I	3	1	0	4	BSC	60
3	U19ENG201C	Communication Skills in English- II	2	0	2	3	HSMC	60 (30L+30P)
4	U19ADS201	Introduction to Artificial Intelligence	3	0	0	3	PCC	45
5	U19ADS202	Data Structure and Algorithms I	3	0	0	3	PCC	45
6	U19IT201	Programming in C	3	0	0	3	PCC	45
7	U19IT202	Information Technology Essentials	2	0	0	2	ESC	30
Practical								
8	U19IT203	Programming in C Laboratory	0	0	3	1.5	PCC	45
9	U19ADS203	Data Structure and Algorithms I Lab	0	0	3	1.5	PCC	45
10	U19GE201	Basic Aptitude – II	0	0	2	0	EEC	30
Total Credits						22		
Optional Language Elective*								
11	U19OLE1201	French	0	0	2	1	HSMC	30
12	U19OLE1202	German						
13	U19OLE1203	Japanese						

*Students may opt for foreign languages viz., German/French/Japanese with additional one credit (Not accounted for CGPA calculation)

Approved By

			
Chairperson, Science and Humanities BoS	Chairperson, Information Technology BoS	Member Secretary, Academic Council	Chairperson, Academic Council & Principal
Dr. M. Renuga	Dr. J. Akilandeswari	Dr. R. Shivakumar	Dr. S. R. R. Senthil Kumar

Copy to:-

HOD/ Information Technology, Second Semester B.Tech ADS Students and Staff, COE

03.03.2023

B.E/B.Tech Regulations-2019

UNIT I LANGUAGE AND LITERATURE

3

Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan.

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

3

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils.

UNIT III FOLK AND MARTIAL ARTS

3

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leather puppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

UNIT IV THINAI CONCEPT OF TAMILS

3

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas.

UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT AND INDIAN CULTURE

3

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL : 15 PERIODS**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies).
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.

HOD

Dr. M.RENUGA,
Professor & Head,

Department of Humanities & Languages
Sona College of Technology,
SALEM - 636 005.

அலகு I மொழி மற்றும் இலக்கியம்:

3

இந்திய மொழிக் குடும்பங்கள் - திராவிட மொழிகள் - தமிழ் ஒரு செம்மொழி - தமிழ் செவ்விலக்கியங்கள் - சங்க இலக்கியத்தின் சமயச் சார்பற்ற தன்மை - சங்க இலக்கியத்தில் பகிர்தல் அறம் - திருக்குறளில் மேலாண்மைக் கருத்துக்கள் - தமிழ்க் காப்பியங்கள், தமிழகத்தில் சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இலக்கிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு.

அலகு II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள் வரை - சிற்பக் கலை:

3

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள்- பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்மைகள் - தேர் செய்யும் கலை - சுடுமண் சிற்பங்கள் - நாட்டுப்புறத் தெய்வங்கள் - குமரிமுனையில் திருவள்ளூர் சிலை - இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாத்தஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு.

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள்:

3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஓயிலாட்டம், தோல்பாவைக் கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்.

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள்:

3

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல்கடந்த நாடுகளில் சோழர்களின் வெற்றி.

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு:

3

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறப்பகுதிகளில் தமிழ்ப் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிக்கள் - தமிழ்ப் புத்தகங்களின் அச்ச வரலாறு.

TOTAL : 15 PERIODS

TEXT-CUM-REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருளை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.



HOD

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B. TECH. / ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

SEMESTER – II	PROBABILITY AND STATISTICS FOR DATA SCIENCE – I	L	T	P	C
U19MAT202F		3	1	0	4

COURSE OUTCOMES

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

1. represent the data in the form of graph and analyse the characteristics of the data using the concepts of measures of central tendency.
2. apply the concepts of measure of dispersion, skewness and kurtosis to a set of data and analyze the results.
3. compute simple and partial correlation coefficients and analyse regression equations for estimation and prediction purposes.
4. apply the concepts of probability, Baye's theorem, random variable, moments, moment generating function and their properties to solve the problems.
5. fit a suitable distribution and its properties to the real world problems and interpret the results.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3	2							2		2
CO2	3	3		3	2							2		2
CO3	3	3		3	2							2		2
CO4	3	3		3	2							2		2
CO5	3	3		3	2							2		2

UNIT – I BASIC STATISTICS**12**

Collection of data – primary and secondary data – graphical representation of frequency distribution – histogram – frequency polygon – frequency curve – cumulative frequency curve - measure of central tendency (Simple arithmetic mean, median, mode, geometric mean, harmonic mean) – Quartile's.

UNIT – II MEASURES OF DISPERSION, SKEWNESS AND KURTOSIS**12**

Measure of dispersion – absolute and relative measures (range, inter-quartile range, quartile deviation, mean deviation and standard deviation) – skewness – Karl Pearson's and Bowley's coefficient of skewness - kurtosis.

UNIT – III CORRELATION AND REGRESSION**12**

Simple and rank correlations – multiple and partial correlations – linear regression – multiple and partial regressions.

UNIT – IV BASIC PROBABILITY

12

Baye's theorem – random variable – probability mass function, probability density function, moment generating function and their properties.

UNIT – V THEORETICAL DISTRIBUTIONS

12

Binomial, Poisson, geometric, uniform, exponential and normal distributions and their properties – applications.

Theory: **45 Hours**

Tutorial: **15 Hours**

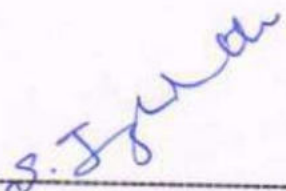
Total: **60 Hours**

TEXT BOOKS:

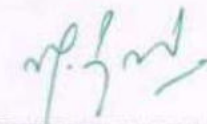
1. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition, Reprint, 2019.
2. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.

REFERENCE BOOKS:

1. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
2. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
3. J. L. Devore, "Probability and Statistics for Engineering and the Sciences", Thomson and Duxbury Publishers, 9th Edition, 2015.
4. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018.



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BoS - Chairperson
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U19ENG201C - Communication Skills in English - II

First year II semester

ADS

Course Outcomes: At the end of course, the students will be able to

1. Frame sentences correctly, both in written and spoken forms of language with accuracy and fluency.
2. Develop and demonstrate listening skills for academic and professional purposes.
3. Draw conclusions on explicit and implicit oral information.
4. Develop effective reading skills and reinforce language skills required for using grammar and building vocabulary.
5. Read for gathering and understanding information, following directions and giving responses.

	COURSE OUTCOMES	PROGRAMME OUTCOMES												Ps o1	Ps o2
		1	2	3	4	5	6	7	8	9	10	11	12		
1	Frame sentences correctly, both in written and spoken forms of language with accuracy and fluency.	1	1	3	3	3	3	2	3	3	3	3	3	3	3
2	Develop and demonstrate listening skills for academic and professional purposes	1	2	2	3	3	2	2	2	3	3	2	3	3	3
3	Draw conclusions on explicit and implicit oral information	2	2	2	1	2	2	3	3	3	3	2	3	3	3
4	Develop effective reading skills and reinforce language skills required for using grammar and building vocabulary	2	2	3	3	2	3	3	3	3	3	3	3	3	3
5	Read for gathering and understanding information, following directions and giving responses	2	2	2	3	2	3	3	3	3	3	3	3	3	3

UNIT -I

12

- Cause and effect expressions, adjectives, comparative adjectives
- Listening to conversations, welcome speeches, lectures and description of equipment
- Listening to different kinds of interviews (face-to-face, radio, TV and telephone interviews)
- Understanding notices, messages, timetables, advertisements, graphs, etc.
- Reading passages for specific information transfer

UNIT – II

12

- Prepositions and dependent prepositions
- Understanding short conversations or monologues,
- Taking down phone messages, orders, notes etc
- Listening for gist, identifying topic, context or function
- Reading documents for business and general contexts and interpreting graphical representations

UNIT – III

12

- Collocations
- Listening comprehension, entering information in tabular form
- Error correction, editing mistakes in grammar, vocabulary, spelling, etc.
- Reading passage with multiple choice questions, reading for gist and reading for specific information, skimming for comprehending the general idea and meaning and contents of the whole text

UNIT – IV

12

- Articles, adverbs
- Intensive listening exercises and completing the steps of a process.
- Listening exercises to categorise data in tables.
- Short reading passage: gap-filling exercise related to grammar, testing the understanding of prepositions, articles, auxiliary verbs, modal verbs, pronouns, relative pronouns and adverbs, short reading passage with multiple choice questions.

UNIT – V

12

- Pronouns
- Listening to extended speech for detail and inference
- Listening and developing hints
- gap-filling exercise testing the knowledge of vocabulary, collocations, dependent prepositions, grammatical structures
- Short reading passages for sentence matching exercises, picking out specific information in a short text

(Theory: 30 hours: Practical: 30 hours) TOTAL: 60 hours

The listening test will be conducted for 20 marks and reading for 20 marks internally and evaluated along with Communication Skills in English –II in the End Semester Valuation.

Textbook:

1. Technical English I & II, Dr. M. Renuga et al. Sonaversity, 2016

Extensive Reading

1. Who Moved my Cheese? – Spencer Johnson-G. P. Putnam's Sons
2. Discover the Diamond in You – Arindham Chaudhari – Vikas Publishing House Pvt. Ltd.

Reference

1. Norman Whitby, Business Benchmark – Pre-Intermediate to Intermediate, Students Book, Cambridge University Press, 2006.
2. A Course in Communication Skills, P. Kiranmai Dutt, Geetha Rajeevan, C. L. N. Prakash, published by Cambridge University Press India Pvt. Ltd.


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COURSE OUTCOMES

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

1. Explain the characteristics of intelligent agents and types of problem solving methods
2. Apply uninformed search technique to solve search problems.
3. Write knowledge representation in solving AI problems
4. Design of software agent to solve problems
5. Explain the various applications of AI.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	2								2	2	2
CO2	3	3	3	3	2				2		2	2	3	3
CO3	3	3	3	2	2							1	1	2
CO4	3	3	3	3	3	1	1	2	2	2	2	2	3	3
CO5	3	2	2	1						1		2	1	1

UNIT I INTRODUCTION TO AI 9

Introduction-Definition -State of the Art- Agents and Environments- Good Behaviour: The Concept of Rationality- The Nature of Environments- The Structure of Agents – Problem Solving Method- Uninformed Search – General Search Paradigms ,Depth-First Search, Depth-Limited Search, Iterative Deepening Search, Breadth-First Search ,Bidirectional Search, Uniform-Cost Search

UNIT II INFORMED SEARCH 9

Problem solving Methods –Informed – Heuristics – Local Search Algorithms and Optimization Problems -Searching with Partial Observations – Constraint Satisfaction Problems – Constraint Propagation – Backtracking Search – Game Playing – Optimal Decisions in Games – Alpha – Beta Pruning – Stochastic Games

UNIT III KNOWLEDGE REPRESENTATION 9

First Order Logic – Unification – Forward Chaining-Backward Chaining – Resolution – Knowledge Representation – Ontological Engineering-Categories and Objects – Events – Mental Events and Mental Objects – Reasoning Systems for Categories -Reasoning with Default Information

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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- Information Extraction – Natural Language Processing – Machine Translation – Speech Recognition – Robot – Hardware – Perception – Planning – Moving

TOTAL: 45 PERIODS**TEXT BOOKS**

1. S.Russell and P.Norvig,"Artificial Intelligence: A Modern Approach", Prentice Hall, 3rd Edition 2010.
2. Gerhard Weiss, "Multi Agent Systems", 2nd Edition ,MIT Press,2013

REFERENCES

1. M. Tim Jones,"Artificial Intelligence: A Systems Approach(Computer Science)",Jones and Bartlett Publishers, Inc, 1st Edition,2008
2. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", Mc Graw Hill-2018.
3. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2017.
4. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007.
5. Stuart Russel and Peter Norvig "AI – A Modern Approach", 2nd Edition, Pearson Education 2007.
6. Deepak Khemani "Artificial Intelligence", Tata Mc Graw Hill Education 2013.



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COURSE OUTCOMES

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

1. Explain the basis of algorithms and analyse the complexity of algorithms
2. Implement abstract data types for linear data structures – list
3. Apply the linear data structure stack for solving problems
4. Apply the linear data structure queue for solving problems
5. Write programs for sorting list of items and searching an item in a given list

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1						1			3	2
CO2	3	2	1	2						1			2	2
CO3	3	2	1	2						1			3	3
CO4	3	2	1	2						1			2	2
CO5	3	2	1	2						1			3	3

UNIT I BASIC CONCEPTS OF ALGORITHMS 9

Introduction – Notion of Algorithm – Fundamentals of Algorithmic Solving – Important Problem types – Analysis Framework – Asymptotic Notations and Basic Efficiency Classes.

UNIT II 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 III LINEAR DATA STRUCTURES – STACKS 9

Stack ADT – implementation – applications.

UNIT IV LINEAR DATA STRUCTURES – QUEUES 9

Queue ADT – circular queue implementation - Double ended Queues – applications of queues.

UNIT V SORTING AND SEARCHING TECHNIQUES 8

Sorting algorithms: Insertion sort – Selection sort – Bubble sort – Merge sort – Quick Sort – Shell sort – Bucket sort – Searching: Linear Search and Binary Search.

TOTAL:45 HOURS

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TEXT BOOKS

1. Brain W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Person Education, 1988.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", 2nd Edition, Pearson Education, 1977.

REFERENCE BOOKS

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, "Introduction to Algorithms", Second Edition, Megraw Hill, 2002.
2. ReemaThareja, "Data Structures Using C", Oxford University Press, 2011.
3. Aho, Hopcroft and Ullman, "Data Structures and Algorithms", Pearson Education, 1983.
4. Byron S Gottfried, "Programming with C", Schaum"s Outlines, Second Edition. Tata McGraw-Hill, 2006.
5. Yashavant P. Kanetkar. "Let Us C", BpBPublicatons, 2013, Ed 13 th Edition.
6. Deitel and Deitel, "C How to Program", Pearson Education, New Delhi, 2011

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COURSE OUTCOMES

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

1. Write simple C programs
2. Apply the concepts such as arrays, decision making and looping statements to solve real-time problems
3. Develop C programs using functions and pointers
4. Write a C programs to define own data types using the concept of structures and union
5. Write a C program to store the information persistently using file concepts

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2					3		3	1				3
CO2	3	2					3		3	1		1		3
CO3	3	2	1				3		3	2	2	1		3
CO4	3	2	1				3		3	2	2	1		3
CO5	3	2	1				3		3	2	2	1		3

UNIT I C PROGRAMMING BASICS

9

Structure of a C program – Compiling and Debugging a C program - C Character set, Identifiers and Keywords, Data Types, Declarations, Expressions, Statements and Symbolic constants, Operators – Arithmetic Operators – Unary operators – Relational and Logical Operators – Assignment operators – Conditional operators. Managing Input and Output operations, pre-processor directives and storage classes.

UNIT II CONTROL STATEMENTS, ARRAYS AND STRINGS

9

Unconditional statements, conditional statements, branching and looping statements - Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String operations – String Arrays. Simple programs- sorting- searching – matrix operations.

UNIT III FUNCTIONS AND POINTERS

9

Function – Library functions and user-defined functions – Function prototypes and function definitions – Call by value – Call by reference – Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays- Example Problems – Pointers and Functions

UNIT IV STRUCTURES AND UNIONS

9


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PO

Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure – Passing structures to functions – Array of structures – Pointers to structures – Union - Programs using structures and Unions – Dynamic Memory Allocation: malloc and calloc

UNIT V – FILE MANIPULATIONS

9

File Manipulations- File operations – Open, Read, Write and Close, Binary files and text files, Input and outout file redirection – Stdin and Stdout and Command line arguments.

Theory : 45 Hours

Tutorial: -

Practical: -

TOTAL: 45 Hours

TEXT

1. Deitel P and Deitel H, “C How to Program”, Pearson Education, New Delhi, 2016.
2. Venugopal KR and Sudeep R Prasad, “Mastering C”, McGraw Hill, Second edition, 2017.

REFERENCES

1. Byron S Gottfried, “Programming with C”, Schaums Outlines, Second Edition, Tata McGraw-Hill, 2017.
2. Yashavant P. Kanetkar, “Let Us C”, 15th Edition, BPB Publications, 2016.
3. Balagurusamy E, “Programming in ANSI C”, sixth edition, Tata McGraw-Hill, 2012.
4. Kernighan, B.W and Ritchie, D.M, “The C Programming language”, Second Edition, Pearson Education, 2006.


Dr. J. AKILANDESWARI
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COURSE OUTCOMES

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

1. Create a web pages using HTML and CSS
2. Explain the basics of networking and its working principles in real world
3. Explain the working principles of mobile communication
4. Perform installation and configuration of operating system, and drivers
5. Explain the basics of Machine Learning, Cloud Computing and IoT

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	3	3									3	2
CO2	2	2	2	2	2							1	2	2
CO3	2	2	2	2	2							1	2	2
CO4		2	2	2	2							1	2	
CO5	2	2	2	2	2								2	2

UNIT I WEB ESSENTIALS

6

Creating a Website - Working principle of a Website - Browser fundamentals - Authoring tools - Types of servers: Application Server - Web Server - Database Server.

UNIT II NETWORKING ESSENTIALS

6

Fundamental computer network concepts - Types of computer networks - - Network layers - TCP/IP model - Wireless Local Area Network - Ethernet - WiFi - Network Routing - Switching - Network components.

UNIT III MOBILE COMMUNICATION ESSENTIALS

6

Cell phone working fundamentals - Cell phone frequencies & channels - Digital cell phone components - Generations of cellular networks - Cell phone network technologies / architecture - Voice calls & SMS

UNIT IV INSTALLATION AND CONFIGURATION OF PC

6

Configuration of BIOS - Installing Operating System (Open Source and Proprietary) – Driver installation – Network Configuration – Disk Configuration

UNIT V RECENT TRENDS IN IT

6

Introduction to Machine Learning - Application of Machine Learning – Introduction to Cloud Computing – Types of Cloud services – IoT and its applications


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Theory: 30 Hours

Tutorial: -

Practical: -

TOTAL: 30 Hours

TEXTBOOK

1. Laura Lemay, Rafe Colburn, Jennifer Kyrnin, "Mastering HTML, CSS and Java Script", BPB Publications, 2017.
2. James F. Kurose, —Computer Networking: A Top-Down Approach, Sixth Edition, Pearson, 2017.

REFERENCES

1. GottapuSasibhushana Rao, "Mobile Cellular Communication", Pearson, 2012.
2. Nathan Clark," Linux: installation, configuration and command line basics", Independent Publisher,2018.
3. R. Kelly Rainer , Casey G. Cegielski , Brad Prince, Introduction to Information Systems, Fifth Edition, Wiley Publication, 2014.



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COURSE OUTCOMES

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

1. Develop programs in C using basic constructs.
2. Develop applications in C using strings, pointers, functions, structures
3. Develop applications in C using file processing

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2				3		3	2	2	1	1	3
CO2	3	3	2				3		2	2	2	1	1	3
CO3	3	3	2				3		3	2	1	1	1	3

LIST OF EXPERIMENTS

- 1 Programs using Input, Output and assignment statements
2. Programs using Branching statements
3. Programs using Looping statements
4. Programs using Functions
5. Programs using one dimensional and two dimensional arrays
6. Programs using Structures and Unions.
7. Programs using Strings
8. Programs using Pointers (both data pointers and function pointers)
9. Programs using Recursion
10. Programs using Command line arguments
11. Programs using Files concepts
12. Programs using Dynamic Memory Allocation

THEORY :- TUTORIAL: - PRACTICAL: 45 TOTAL: 45 HOURS


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COURSE OUTCOMES

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

1. Develop applications in C using list
2. Develop applications in C using Stack and queue
3. Develop applications in C using Sorting and Searching techniques

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Cos	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1						1	3	1	3	3
CO2	3	1	1	1						1	3	1	3	3
CO3	3	1	1	1						1	3	1	3	3

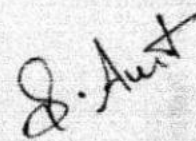
LIST OF EXPERIMENTS

1. Implementation of List ADT
2. Implementation of Stack ADT
3. Implementation of stack ADT in balancing the parenthesis
4. Implementation of stack ADT in postfix evaluation
5. Implementation of Queue ADT – array implementation
6. Implementation of Queue ADT – linked list implementation
7. Implementation of circular Queue
8. Implementation of double ended Queue
9. Implementation of SORTING
10. Implementation of SEARCHING TECHNIQUES

THEORY :-**TUTORIAL: -****PRACTICAL: 45****TOTAL: 45 HOURS**


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Semester-II	Basic Aptitude – II - U19GE201 (Common to All Departments)	L	T	P	C	Marks
		0	0	2	0	100
Course Outcomes						
At the end of the course the student will be able to:						
1. Solve more elaborate problems than those in BA-I* in specific areas of quantitative aptitude						
2. Solve problems of greater intricacy than those in BA-I in stated areas of logical reasoning						
3. Demonstrate higher than BA-I level verbal aptitude skills in English with regard to specific topics						
1. Quantitative Aptitude and Logical Reasoning	Solving quantitative aptitude and logical reasoning problems with reference to the following topics: <ol style="list-style-type: none"> Profit & loss Partnership Chain rule Numbers Ages Percentages Logarithms Geometry Direction sense Symbols and series 					
2.. Verbal Aptitude	Demonstrating verbal aptitude skills in English with reference to the following topics: <ol style="list-style-type: none"> Jumbled sentences Reconstructions of sentences (PQRS) Sentence fillers two words Idioms and phrases Spotting errors Writing captions for given pictures 					



Dr.S.Anita

Head/Training

Dr. S. ANITA

*Professor and Head
Department of Training,*

**SONA COLLEGE OF TECHNOLOGY,
SALEM - 636 005.**

French Language A1 Level 2/A2
First year II semester

Course code: U19OLE1201

0 0 2 1

Course Outcomes : At the end of completion of this course, students will be able to,

1. Accept and refuse of an invitation, give some instruction of do's and don'ts, converse in commercial centres, write an invitation
2. Describe a city, locate a place in a city, ask further details, describe one's hometown
3. Talk about things around us, recite a past event, identify sign boards, express agree and disagree, express obligation and prohibition, sell an object in online
4. Talk about one's goals, express one's feelings, write a list of things to do, express an opinion, talk about weather, draft a mail response
5. Express one's interest and wish, describe a pet animal, express one's aversions, encourage others, write to ask for a help, narrate a past event, write a biography

Unit-I Gouter à la campagne

6 hours

Hr 2: City shopping and services, conjugation: payer, manger and acheter, negative sentence

Hr 4: Imperative sentence, food and beverages, utensils, cutleries, corckeries

Hr 6: Quantitative articles, quantities, pronoun 'en', express appreciation, write an invitation

Unit-II Voyager dans sa ville

6 hours

Hr 8: City and localities, Conjugation: prendre, adjectives of place, pronoun 'y'

Hr 10: Transport, leisure activities, preposition of place, degrees of comparison

Hr 12: Asking information about a new place, describe a city

Unit-III Faire du neuf avec du vieux

6 hours

Hr 14: Things in a store, conjugation : faire, imparfait 2, passé composé

Hr 16: Things in a repairing shop, computer, relative pronouns: que and qui

Hr 18: Imperative negative, express obligation and interdiction, online sale and response

Unit-IV Changer d'air

6 hours

Hr 20: Professions, conjugation: croire, voir, recent past tense

Hr 22: Traveling formalities, expressing about health condition, future tense

Hr 24: Pronoun COD, talk about weather condition, write about one's plans and projections

Unit-V Devenir éco-citoyen

6 hours

Hr 26: Citizenship and solidarity, conjugation: connaitre and savoir, depuis vs pendant

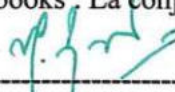
Hr 28: Imparfait vs passé composé, nature and environment, indirect pronouns COI

Hr 30: Animals, conditional, talk on supporting others, write a biography

Total : 30 hours

Text Books

1. The course faculty will provide relevant audios, videos, handouts and notes.
2. Books : Saison (Méthode de français, cahier d'activités)
3. Reference books : La conjugaison, Dondon, Echo



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BoS – Chairperson,
Science & Humanities
HOD / H&L

Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Sona College of Technology,
SALEM - 636 001.

German Language Course

First year II semester

Course Code: U19OLE1202

L T P C
0 0 2 1

Course Outcomes: At the end of the course, students should be able to,

1. Use grammatical expressions appropriately in day-to-day conversation.
2. Make them frame simple sentences /questions.
3. Accentuate to start and sustain basic conversation
4. Helps them articulate thoughts in German
5. Identify the different forms of the verb.

UNIT – I **6**
• Nominative/accusative case, adjectives

UNIT – II **6**
• Modes of transportation, orientation, giving/understanding simple directions


UNIT – III **6**
• Food and beverages, Modal verbs, Separable verbs

UNIT – IV **6**
• Simple sentences using modal / separable verbs

UNIT – V **6**
• Articles of clothing

Total : 30 hours

Text Book
Netzwerk A1



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BoS – Chairperson,
Science & Humanities
HOD / H&L

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ADS
111

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019 (CBCS)
Branch: Artificial Intelligence and Data Science

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Contact Hours
Theory							
1	U19MAT301F ✓	Probability and Statistics for Data Science – II	3	1	0	4	60 ✓
2	U19ADS301 ✓	Operating Systems	3	0	2	4	75 ✓
3	U19IT303 ✓	Computer Architecture	3	0	0	3	45 ✓
4	U19ADS302 ✓	Data Structures and Algorithms - II	3	0	0	3	45 ✓
5	U19ADS303 ✓	Advanced Python Programming for Data Science	2	0	2	3	60 ✓
6	U19ADS304 ✓	Digital Logic Design	3	0	2	4	75 ✓
7	U19TAM301 ✓	தமிழரும் தொழில்நுட்பமும்/ Tamil and Technology	1	0	0	1	15 ✓
8	U19GE303	Mandatory Course- Essence of Indian Traditional Knowledge	2	0	0	0	30 ✓
Practical							
9	U19ADS305 ✓	Data Structures and Algorithms Laboratory - II	0	0	2	1	30 ✓
10	U19GE301 ✓	Soft Skills and Aptitude – I	0	0	2	1	30 ✓
Total Credits						24 ✓	

Approved By


Chairperson, Information Technology BoS
Dr. J. Akilandeswari


Member Secretary, Academic Council
Dr. R. Shivakumar


Chairperson, Academic Council & Principal
Dr. S. R. R. Senthil Kumar

Copy to:-
HOD/Information Technology, Third Semester BE IT Students and Staff, COE

B. TECH. / ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

SEMESTER – III	PROBABILITY AND STATISTICS FOR DATA SCIENCE – II	L	T	P	C
U19MAT301F		3	1	0	4

COURSE OUTCOMES

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

1. apply the concepts of joint probability distribution and its properties in finding the covariance.
2. analyse the characteristics of the estimators, find the estimate of the parameters using maximum likelihood estimation and method of moments.
3. test the hypothesis for proportions, mean and standard deviation using Z – test.
4. test the significance of the hypothesis using t , χ^2 and F distributions.
5. analyse the variances of several variables using standard designs.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)												PSO1	PSO2
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12		
CO1	3	3		3	2							2		2
CO2	3	3		3	2							2		2
CO3	3	3		3	2							2		2
CO4	3	3		3	2							2		2
CO5	3	3		3	2							2		2

UNIT – I TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions, marginal and conditional distributions – covariance – correlation – central limit theorem.

UNIT – II ESTIMATION THEORY 12

Estimators – unbiasedness, consistency, efficiency and sufficiency (definitions and simple problems only) – maximum likelihood estimation – method of moments.

UNIT – III TESTING OF HYPOTHESIS FOR LARGE SAMPLES 12

Parameter and statistic – null and alternative hypothesis – errors in sampling, critical region and level of significance – one tailed and two tailed tests – large sample tests for proportions, mean, difference between means and standard deviation.

UNIT – IV EXACT SAMPLING DISTRIBUTIONS 12

t -test for single mean, difference between means – paired t -test – χ^2 -test for independence of attributes, goodness of fit – F -test for equality of two variances.

UNIT – V DESIGN OF EXPERIMENTS**12**

Analysis of variance – one way classification– two way classification – completely randomised design– randomised block design – Latin square design.

Theory: **45 Hours**Tutorial: **15 Hours**Total: **60 Hours****TEXT BOOKS:**

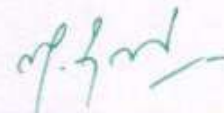
1. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition, Reprint, 2019.
2. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.

REFERENCE BOOKS:

1. R. E. Walpole, R. H. Myers, S. L. Myers and K. E. Ye, "Probability and Statistics for Engineers and Scientists", Pearson Publishers, 9th Edition, 2010.
2. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
3. J. L. Devore, "Probability and Statistics for Engineering and the Sciences", Thomson and Duxbury Publishers, 9th Edition, 2015.
4. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.
5. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018.
6. S. C. Gupta and V. K. Kapoor, "Fundamentals of Applied Statistics", Sultan Chand and Sons Publishers, 4th Edition, Reprint, 2019.



Prof. S. JAYABHARATHI
Head / Department of Mathematics
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Dr. M. RENUGA
BoS - Chairperson
Science and Humanities
Sona College of Technology
Salem – 636 005

COURSE OUTCOMES

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

1. Explain structures of Operating System.
2. Apply fundamental Operating System abstractions such as processes, process scheduling, Semaphores, IPC abstractions, shared memory regions, deadlock and threads.
3. Explain the principles of concurrency and synchronization, and apply them to write concurrent programs/software.
4. Implement basic resource management techniques and principles.
5. Describe the types of disk scheduling, disk management and learn the basics of Linux.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2	3	1		1							3
CO2	3		3	3	3	2	3				2			3
CO3	3		2	2	1		1							3
CO4	3		2	2	1	3	3							3
CO5	3	1	1	1						1			3	2

UNIT I INTRODUCTION 9

Introduction – What Operating System Do – Operating System Structure – Operating system Operations – Operating System Components: Process Management – Memory Management – Storage Management – I/O Management – Network Management - Protection and Security.

Operating System Structures: Operating System Services – User and Operating System Interface – System Calls – Types of System Calls.

UNIT II PROCESS MANAGEMENT AND THREADING 9

Processes: Process concept – Process scheduling – Operation on Processes - Inter-process Communication: Shared Memory Systems - Message Passing Systems.

Process Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms: First-Come, First-Served – Priority – Round-Robin – Multilevel Queue – Multilevel Feedback Queue.

UNIT III PROCESS SYNCHRONIZATION AND DEADLOCKS 9

Process Synchronization: Background - The critical-section problem (Software based solution and hardware based solution) – Semaphores – Classic Problems of Synchronization – Monitors.

Deadlocks: System model - Deadlock Characterization – Methods for Handling Deadlocks - Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlocks.

UNIT IV MEMORY MANAGEMENT 9

Memory Management Strategies: Background – Swapping – Memory allocation: Contiguous Memory Allocation – Non-contiguous Memory Allocation: Segmentation - Paging – Segmentation with Paging - Structure of the Page Table.

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UNIT V STORAGE MANAGEMENT AND CASE STUDY 9

Mass Storage Structure: Overview of Mass Storage Structure – Disk Structure - Disk Scheduling – Disk Management - Swap Space Management.

Case Study: Linux System –Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File System, Inter-process communication

THEORY: 45HRS PRACTICAL: 30 HOURS TOTAL: 75 HOURS

TEXT BOOK

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, Ninth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2018.

REFERENCES

1. Harvey M. Deitel, “Operating Systems”, Pearson Education, 3rd edition 2018
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Prentice Hall of India, 3rd edition 2015
3. William Stallings, “Operating Systems: Internals and Design Principles”, Prentice Hall of India, 7th edition, 2015.
4. D M Dhamdhare, “Operating Systems: A Concept-Based Approach”, Tata Mc-graw Hill Publishing, 3rd edition, 2017.

LIST OF EXPERIMENTS

1. Program to report the behaviour of the OS to get the CPU type and model, kernel version.
2. Program to get the amount of memory configured into the computer, amount of memory currently available.
3. Simulate the principles of process management algorithms
4. Implement various memory allocation methods
5. Implement Banker’s Algorithm
6. Implement various page replacement algorithms
7. Implement various disk scheduling algorithms
8. Implement threads and fork
9. Simulate Inter process communications

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COURSE OUTCOMES:

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

1. Analyse the performance of the Computer System and understand difference instruction formats.
2. Apply the concepts to design the basic processing unit and control unit.
3. Apply the concepts of pipelining to solve performance related problems.
4. Explain the hierarchical memory system including cache memory and virtual memory.
5. Choose appropriate I/O devices for embedded system applications.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1						1			2	2
CO2	3	1	1	1						1			1	1
CO3	3	1	1	1						1			3	3
CO4	3	1	1	1						1			3	3
CO5	3	1	1	1						1			3	1

UNIT I BASIC STRUCTURE OF COMPUTERS

9

Functional units – Basic operational concepts – Bus structures – Software – Performance and metrics – Multiprocessors and Multicomputer – Memory Locations and Addresses– Instructions and instruction sequencing – Addressing modes – Fixed point and Floating point representations.

UNIT II BASIC PROCESSING UNIT

9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control: Micro Instructions- Micro Instructions with next address field.

UNIT III PIPELINING

9

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

UNIT IV MEMORY SYSTEM

9

Basic concepts – Semiconductor RAM – ROM – Speed Size and cost – Cache memories – performance consideration – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.

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I/O devices - Accessing I/O devices –Interrupts – Direct Memory Access –Interface circuits – Standard I/O Interfaces (USB, Fire wire, SCSI Bus, SATA) – Examples of Embedded Systems - Microcontroller Chips for Embedded Applications – Introduction to SoC.

TOTAL: 45 HOURS

TEXT BOOK

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian “Computer Organization and Embedded Systems”, 6th edition, McGraw Hill Education, 2017.

REFERENCES

1. William Stallings, “Computer Organization and Architecture – Designing for Performance”, 10th edition, Pearson Education, 2015.
2. David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software interface”, 5th edition, Elsevier, 2013.
3. B. Govindarajalu, “Computer Architecture and Organization: Design Principles and Applications”, 2nd edition, McGraw Hill Education, 2010.

30-08-2023

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COURSE OUTCOMES

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

1. Implement Binary Search Tree ADT and its variants of different tree data structure.
2. Design and implement a binary heap and appropriate hashing function for an application
3. Develop and apply algorithms for real applications using graphs.
4. Represent the algorithmic time complexity for recursive and non-recursive algorithms using different asymptotic notations.
5. Apply the algorithmic techniques - Brute Force, Divide and conquer, Decrease and Conquer, Transform and Conquer and Dynamic Programming to different problems and analyze the time complexity.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1						1			3	2
CO2	3	2	1	2						1			2	2
CO3	3	2	1	2						1			3	3
CO4	3	2	1	2						1			2	2
CO5	3	2	1	2						1			3	3

UNIT I TREE STRUCTURES 9

Preliminaries of Trees - Implementation of Trees – Tree Traversals with an Application - Binary Trees –Expression trees -Binary Search Tree ADT –AVL trees- Splaying- Red black Trees - B+ trees

UNIT II BINARY HEAP AND HASHING 9

Priority Queue- Model -Simple Implementations –Binary Heap – Basic Heap Operations – Other Heap Operations - Applications of Priority Queues.Hashing –General idea - Hash Function-Separate Chaining – Open Addressing – Linear Probing - Quadratic Probing- Double Hashing - Rehashing – Extendible Hashing

UNIT III GRAPHS 9

Definitions – Representation of Graphs – Traversals – Breadth First Search - Depth-first Search - Topological Sort – Greedy Techniques - Shortest-path Algorithms – Unweighted Shortest Paths - Dijkstra's Algorithm- Minimum Spanning Tree – Prim's and Kruskal's Algorithms

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UNIT IV ANALYSIS OF ALGORITHMS

9

Mathematical analysis of Non-recursive algorithms – Mathematical Analysis of recursive algorithms – Example: Fibonacci numbers – Empirical analysis of algorithms – Algorithm Visualization.

UNIT V ALGORITHM DESIGN TECHNIQUES

9

Brute Force – Divide and Conquer – Quick Sort – Decrease and Conquer – Algorithms for generating combinatorial objects – Transform and Conquer – Presorting – Heap Sort – Dynamic Programming – Warshall's and Floyd's algorithm – Backtracking – Subset Sum Problem – Hamiltonian Circuit Problem – Branch and Bound – Assignment Problem.

TOTAL :45 HOURS

TEXT BOOK


1. M. A. Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education, 2002. (Unit – 1, 2, 3)
2. Anany Levitin, "Introduction to the Design and Analysis of Algorithm", Pearson Education Asia, Third edition, 2011. (Unit – 4, 5)

REFERENCES

1. Jean-Paul Tremblay, Paul Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill Publishing company, NewDelhi , Second Edition ,2017.
2. Horwitz E., S. Sahni and S. Anderson, "Fundamentals of Data Structures in C", University Press (India), Second Edition, 2008.
3. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", PHI Pvt. Ltd., 2001
4. Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2003.
5. Robert Sedgewick and Kevin Wayne , "Algorithms", Addison-Wesley Professional, 4th edition, 2011

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COURSE OUTCOMES

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

1. Develop programs using object, module, and package.
2. Analyse and manipulate data using NumPy library.
3. Write programs using Pandas library.
4. Create programs to read and write different file formats.
5. Develop programs for data visualization.

CO / PO, PSO Mapping														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3									3	3
CO2	2	3	3	3	3								3	2
CO3	2	3	3	3	3								3	2
CO4	2	3	3	3	3								3	2
CO5	2	3	3	3	3								3	2

UNIT I OBJECT, MODULE AND PACKAGE

6

Objects in Python – Creating Objects – Attributes – Methods - Self keyword – Polymorphism – Inheritance – Modules And Namespaces – Importing Module – User Defined Module – Random Module – Data And Time Module

UNIT II AN INTRODUCTION TO DATA ANALYSIS AND NUMPY LIBRARY

6

Knowledge Domain Of The Data Analyst - Understanding The Nature Of Data - Data Analysis Process - Quantitative and Qualitative Data - Open Data - Python And Data Analysis

Numpy Installation - Nddarray - Basic Operation - Indexing, Slicing and Iterating - Shape Manipulation - Array Manipulation - General Concepts - Structured Arrays - Reading Writing Array Data on Files

UNIT III THE PANDAS LIBRARY - AN INTRODUCTION

6

Installation - Introduction to Pandas Data Structure - Functionalities on Indexes - Operation Between Data Structure - Function Application and Mapping - Sorting and Ranking - Correlation and Covariance - Nan Data - Hierarchical Indexing and Levelling

UNIT IV PANDAS READING AND WRITING DATA

6

Pandas : Reading and Writing Data - Reading Data in CSV or Text Files - Reading and Writing Html Files - Reading from Xml - Reading Writing Excel File - JSON Data - Pickle - Loading and Writing Data With Sqlite3

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Installation - Architecture - Pyplot - Plotting Windows - kwargs - Adding Elements to Chart - Saving Charts - Handling Data Values - Chart Topology - Line Chart - Histogram - Bar Chart - Pie Chart

THEORY:30 HRS**PRACTICALS:30 HRS****TOTAL: 60 HOURS****TEXT BOOK**

1. Fabio Nelli, "Python Data Analytics with Pandas, NumPy, and Matplotlib", Apress, 2nd Edition, 2018

REFERENCES

1. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly Media, 2nd Edition, 2017.
2. Daniel Chen, "Pandas for Everyone: Python Data Analysis (Addison-Wesley Data & Analytics Series)", Addison-Wesley Professional, 2016.
3. Jake VanderPlas, "Python Data Science Handbook: Essential Tools for Working with Data", O'Reilly Media, 2nd Edition, 2017.

LIST OF EXPERIMENTS

1. Implement OOP concepts using python.
2. Write python program using random and date time module.
3. Implement various functionalities available in numPy library using python.
4. Implement various functionalities available in pandas library using python.
5. Write python programs to read and write data using different file format using pandas.
6. Demonstrate various charts using matplotlib.

COURSE OUTCOMES

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

1. Simplify the Boolean expression using K-Map and tabulation techniques.
2. Use Boolean simplification techniques to design a combinational circuit.
3. Analysis and Design of a given combinational digital/logic circuits.
4. Analysis and Design of a given sequential digital/logic circuits.
5. Design of Hazard free Combinational and sequential circuits.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	1					1			1	1
CO2	3	3	3	2	1					1			1	1
CO3	3	3	3	2	1					1			1	1
CO4	3	3	3	2	1					1			1	1
CO5	3	3	3	2	1					1			1	1

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES

9

Review of Number systems – Complements - Digital Logic gates - Basic theorems and properties of Boolean algebra - Boolean functions – Canonical and Standard forms - Simplifications of Boolean functions using Karnaugh map – three variable, Four variable and Five variable – Product of sum simplification- Don't care conditions – Quine McCluskey(QM) method.

UNIT II COMBINATIONAL LOGIC

9

Combinational circuits – Analysis and design procedures - Code conversion – Binary to Gray, Gray to Binary – BCD to Excess - 3, Excess - 3 to BCD- Circuits for arithmetic operations –Half Adder – Full Adder - Binary Adder– Half subtractor – Full subtractor – Binary subtractor- BCD adder- Binary Multiplier – Magnitude comparator.

UNIT III MSI LOGIC CIRCUITS AND PROGRAMMABLE LOGIC

9

Decoders – combinational logic implementation using decoder – Encoders- Priority encoder- Multiplexers-Boolean function Implementation using multiplexer – Demultiplexer - Programmable logic Array –Implementation of Boolean functions with PLA - Programmable Array logic. Implementation of Boolean functions with PAL.

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UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC**9**

Sequential circuits – Flip flops – RS, JK, D, T - Analysis of clocked sequential circuits – State equations, State Table, State diagram - Analysis with D, JK and T Flip flops – State reduction and state assignment - Design procedures – Synthesis using D, JK and T – Binary Ripple Counters – Binary Synchronous Counters.

UNIT V HAZARDS AND FPGA LOGIC**9**

Introduction- Hazards – Hazards in Combinational Circuits - Hazards in Sequential Circuits – FPGA – Basics – FPGA Vs CPLD – FPGA Architecture – Configurable Logic Block – Basic Architecture of Xilinx XC 4000 series – Design flow – Design entry – Logic Synthesis – Design implementation – Design Verification – Types of FPGA based on Application.

PRACTICAL: 30 HOURS**THEORY : 45 HOURS****TOTAL: 75 HOURS****TEXT BOOK**

1. M.Morris Mano, Michel D. Ciletti, and John F.Walerly “Digital Design”, 5th edition, Pearson Education, 2019.

REFERENCES


1. Larry L Kinney and Charles H.Roth Jr, “Fundamentals of Logic Design”, 5th edition, Jaico Publishing House, 2018.
2. Ananda Natarajan, “Digital Design”, PHI learning private Ltd, 2017.
3. Donald P.Leach, Albert Paul Malvino and Saha, “Digital Principles and Applications”, 8th edition, TMH, 2018.
4. G.K.Kharate, “Digital Electronics”, Oxford University press, 2016.
5. John F.Wakerly, “Digital Principles and practices”, 4th edition, Pearson Education, 2018.

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions.
3. Design and implementation of Binary to Gray and Gray to Binary code converters.
4. Design and implementation of Half adder / Half subtractor, Full adder / Full subtractor using basic gates.
5. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices.
6. Design and implementation of magnitude comparator.
7. Design and implementation of Decoders and encoders.
8. Design and implementation of Multiplexers/Demultiplexers.
9. Design and implementation of Shift registers.
10. Design and implementation of Synchronous and Asynchronous counters.

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COURSE OUTCOMES

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

1. Implement expression tree, BST, AVL tree and Priority Queue.
2. Implement Hashing concepts and different graph concepts.
3. Write program to implement quick sort and heap sort.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Cos	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1						1	3	1	3	3
CO2	3	1	1	1						1	3	1	3	3
CO3	3	1	1	1						1	3	1	3	3

LIST OF EXPERIMENTS

1. Implementation of an expression tree. Produce its prefix, infix and postfix expressions.
2. Implement Binary Search Tree.
3. Implementation of Search in AVL trees
4. Implementation of Priority Queue.
5. Implementation of Hashing Techniques.
6. Implementation of Depth first traversal and Breadth first traversal.
7. Implementation of Kruskal’s Algorithm
8. Implementation of Quick sort Algorithm
9. Implementation of Heap sort
10. Implementation of Floyd’s algorithm

TOTAL: 30 HOURS

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COURSE OUTCOMES

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

1. Explain the relevance and underlying infrastructure of the multimedia systems.
2. Comprehend core multimedia audio and video compression techniques
3. Apply the concepts of compression in different methods.
4. Explain the voice over IP architecture and Quality of services.
5. Explain the concepts of Multimedia networking applications.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	2									3	3
CO2	3	3	2	3	3								3	3
CO3	3	3	3	3	3								3	2
CO4	3	3	3	3	3								3	2
CO5	3	3	3	3	3								3	3

UNIT I MULTIMEDIA COMPONENTS 9

Introduction - Multimedia skills - Multimedia components and their characteristics - Text, sound, images, graphics, animation, video, hardware.

UNIT II AUDIO AND VIDEO COMPRESSION 9

Audio compression-DPCM-Adaptive PCM-adaptive predictive coding-linear Predictive coding-code excited LPC-perpetual coding, MP3; Video compression – principles-H.261-H.263-MPEG 1, 2, 4.

UNIT III LOSSLESS COMPRESSION 9

Compression principles-source encoders and destination encoders--entropy encoding –source encoding -text compression –static Huffman coding dynamic coding –arithmetic coding –Lempel Ziv-Welch Compression.

UNIT IV VoIP TECHNOLOGY 9

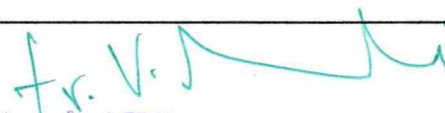
Basics of IP transport, VoIP challenges, H.323/ SIP –Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of ServiceCODEC Methods-VOIP applicability

UNIT V MULTIMEDIA NETWORKING 9

Multimedia networking -Applications-streamed stored and audio-making the best Effort service-protocols for real time interactive Applications-distributing multimedia beyond best effort service-secluding and policing Mechanisms-integrated services differentiated Services-RSVP.

28-07-2023

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REFERENCES BOOKS;

1. Tay Vaughan, "Multimedia: Making It Work", Seventh Edition, Tata Mc- Graw hill, New Delhi, Ninth edition,2019.
2. Kurose and W.Ross, "Computer Networking –A top down approach" ,Pearson education, Seventh edition, 2017.
3. Fred Halshall, "Multimedia communication - applications, networks, protocols and standards", Pearson education, 2008.
4. Marcus Gonzalves, "Voice over IP Networks", McGraw Hill,1998.
5. KR. Rao,Z S Bojkovic, D A Milovanovic, "Multimedia Communication Systems: Techniques, Standards, and Networks", Pearson Education 2017
6. R. Steimnetz, K. Nahrstedt, "Multimedia Computing, Communications and Applications", Pearson Education, First ed, 1995.

28-07-2023

MTech Regulations 2019


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அலகு I நெசவு மற்றும் பானைத் தொழில்நுட்பம்:

சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள்.

அலகு II வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்:

சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு- சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரம் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்நோ-சாரோசெனிக் கட்டிடக் கலை.

அலகு III உற்பத்தித் தொழில் நுட்பம்:

கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்.

அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்:

அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுவித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம்.

அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ்:

அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்.

TOTAL : 15 PERIODS**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணிணித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL - (in print)
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies.
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, TamilNadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference Book.

HOD

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UNIT I WEAVING AND CERAMIC TECHNOLOGY

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

UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY

3

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

UNIT III MANUFACTURING TECHNOLOGY

3

Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads - Shell beads/ bone beads - Archeological evidences - Gem stone types described inSilappathikaram.

UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY

3

Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoempu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conche diving - Ancient Knowledge of Ocean - Knowledge Specific Society.


UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING

3

Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries –Sorkuvai Project.

TOTAL : 15 PERIODS**TEXT-CUM-REFERENCE BOOKS**

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே.கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்).
2. கணிணித் தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்).
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)
4. பொருநை - ஆற்றங்கரை நாகரிகம். (தொல்லியல் துறை வெளியீடு)
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)
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7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies).
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.)
9. Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, TamilNadu)
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)
12. Journey of Civilization Indus to Vaigai (R.Ramakrishna) (Published by: RMRL) – Reference Book.


HOD 19/12/23

Dr. M. RENUGA,
Professor & Head,
Department of Humanities & Languages,
Anna College of Technology,
SALEM - 631

U19GE303 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

2000

Course Outcomes

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

1. Analyze the basics of Indian traditional knowledge in modern scientific perspectives.
2. Explain the basics of Vedic science and its applications in modern days.
3. Discuss the introduction and objectives of modern science.
4. Describe the contribution of Noble laureates for India's achievements in Science and Technology.
5. Analyze the various traditional practices for holistic health care of human beings.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	-	-	2	-	-	-	-	-	-	-	2
CO2	2	2	2	-	-	2	-	-	-	-	-	-	-	2
CO3	3	2	2	-	-	2	-	-	-	-	-	-	-	2
CO4	3	2	2	-	-	2	-	-	-	-	-	-	-	2
CO5	2	2	2	-	-	2	-	-	-	-	-	-	-	2

Unit I

- Introduction to Vedas 6
- Traditional methodology of Veda – Sat Angas
- Types of Vedas and their application
- Sub Veda – Ayurveda - their modern day application

Unit II

- Basics of Applied Vedic Science 6
- Modern day application of Vedas and procedure
- Ancient Indian Scientific thoughts
- Introduction to the Vedic language “Sanskrit”

UNIT – III- Modern Science

- Introduction – modern science 6
- Objectives – modern science
- Architecture in ancient India

UNIT – IV Technology

- India's contribution to science and technology (from ancient to modern) 6
- Nobel laureates of Indian origin and their contribution
- India in space
- Latest achievement from Jan – 2017

UNIT – V- Yoga and Holistic Health Care


6


- Fundamentals of yoga and holistic health
- Human biology
- Diet and nutrition
- Life management
- Contemporary yogic models – case study


Reference Books

1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016.
4. Roshan Dalal The Vedas: An Introduction to Hinduism's Sacred Texts, Penguin Books 2014. ISBN13: 9780143066385
5. Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN : 9781988207049

Total: 30 hours


M. Raja
Course Coordinator / Sciences


Dr. C. Shanthi
HOD / Sciences


Dr. M. Renuga
Chairperson BOS,
Science and Humanities

Semester-III	U19GE301-SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes At the end of the course the student will be able to:		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate good vocabulary skills, analyse comprehension and critical reasoning passages, spot errors and utilize language skills to describe pictures effectively.		
1.Soft Skills	Demonstrating soft-skill capabilities with reference to the following topics: <ol style="list-style-type: none"> Attitude building Dealing with criticism Innovation and creativity Problem solving and decision making Public speaking Group discussions 	
2. Quantitative Aptitude and Logical Reasoning	Solving problems with reference to the following topics: <ol style="list-style-type: none"> Vedic Maths: Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. Numbers: Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, Tens digit, highest power. Averages: Basics of averages and weighted average. Percentages: Basics of percentage and Successive percentages. Ratio and proportion: Basics of R & P, Alligations, Mixture and Partnership. Profit, Loss and Discount: Basic & Advanced PLD Data Interpretation: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Case lets, Mixed varieties, Network diagram and other forms of data interpretation. Syllogism: Six set syllogism using Venn diagram and tick and cross method 	
3. Verbal Aptitude	Demonstrating English language skills with reference to the following topics: <ol style="list-style-type: none"> Verbal analogy Tenses Prepositions Reading comprehension Choosing correct / incorrect sentences Describing pictures Error spotting 	

S. Anita
31/4/2023

Dr.S.Anita

Head/Training

Dr. S. ANITA

Professor and Head

Department of Training,

**SONA COLLEGE OF TECHNOLOGY,
SALEM-636 005.**


ADS
TV

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester IV under Regulations 2019 (CBCS)
Branch: Artificial Intelligence and Data Science

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit	Total Hours
Theory							
1	U19MAT401D	Discrete Mathematical Structures	3	1	0	4	60
2	U19ADS401	Database Management Systems	3	0	0	3	45
3	U19ADS402	Introduction to Data Science	3	0	0	3	45
4	U19ADS403	Java Programming	3	0	0	3	45
5	U19ADS404	Computer Networks	3	0	0	3	45
6	U19ADS405	Agile Software Development	3	0	2	4	75
7	U19GE402	Mandatory Course- Environment and climate science	2	0	0	0	30
Practical							
8	U19ADS406	Database Management Systems Laboratory	0	0	4	2	60
9	U19ADS407	Java Programming Laboratory	0	0	4	2	60
10	U19GE401	Soft Skills and Aptitude – II	0	0	2	1	30
Total Credits						25	

Approved By


Chairperson, Information Technology BoS
Dr.J.Akilandeswari


Member Secretary, Academic Council
Dr.R.Shivakumar 8.1.23


Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Information Technology, Fourth Semester BE IT Students and Staff, COE

22-12-2023

Regulations-2019

B. TECH. / ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

SEMESTER – IV	DISCRETE MATHEMATICAL STRUCTURES	L	T	P	C
U19MAT401D		3	1	0	4

COURSE OUTCOMES

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

1. check the validity of the arguments in the field of data base and artificial intelligence using the rules of logic.
2. apply the concept of logical theory to validate the correctness of software specifications.
3. apply the combinatorics techniques to count, enumerate, or represent possible solutions in the process of solving application problems in the field of communication networks and string searching algorithm.
4. analyze and simplify the digital (logic) circuits using the concept of lattices.
5. produce an output for each input in computer programming and Turing machine.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3	2							2		2
CO2	3	3		3	2							2		2
CO3	3	3		3	2							2		2
CO4	3	3		3	2							2		2
CO5	3	3		3	2							2		2

UNIT – I PROPOSITIONAL CALCULUS

12

Propositions – Logical connectives – Compound propositions – Conditional and bi conditional propositions – Truth tables – Tautologies and contradictions – Contra positive – Logical equivalences and implications – DeMorgan's laws – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments – Validity of arguments.

UNIT – II PREDICATE CALCULUS

12

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – Rules of universal specification and generalization – Validity of arguments.

UNIT – III COMBINATORICS

12

Counting principle – Sum and product rule – Pigeonhole principle – Permutations and combinations – Mathematical induction – Recurrence relation – Solution of recurrence relation using generating functions.

UNIT – IV RELATIONS AND LATTICES

12

Relations - Types of relations and their properties – Equivalence relations – Partial order relation – Equivalence Classes – Partition of a set – Matrix representation of a relation – Representation of relations by graphs – Poset – Hasse diagram – Lattices and their properties.

UNIT – V FUNCTIONS**12**

Functions – Classification – Types of functions and examples – Composition of functions – Inverse functions – Characteristic function of a set - Permutation functions.

Theory: **45 Hours**Tutorial: **15 Hours**Total: **60 Hours****TEXT BOOKS:**

1. K. H. Rosen, "Discrete Mathematics and its Applications", McGraw Hill Publishers, 8th Edition, 2019.
2. J. P. Trembly and R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill Publishers, 1st Edition, 2017.

REFERENCES:

1. T. Veerarajan, "Discrete Mathematics with Graph Theory and Combinatorics", McGraw Hill Publishers, 19th Reprint, 2014.
2. R. P. Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", Pearson Publishers, 5th Edition, 2006.
3. <https://nptel.ac.in/courses/106/106/106106094/>



Prof. S. JAYABHARATHI
Head / Department of Mathematics
Sona College of Technology
Salem – 636 005



Dr. M. RENUGA
BoS - Chairperson
Science and Humanities
Sona College of Technology
Salem – 636 005

COURSE OUTCOMES

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

1. Realize the need, background, architecture and evolution of database management system and design ER diagram for database design
2. State the characteristics of relational model with an emphasis on how to organize, maintain, retrieve and secure information efficiently and effectively from a RDBMS and write queries to retrieve and manipulate databases
3. Apply the principles of normalization to evaluate the normality of a logical data model and correct any anomalies, and design normalized schemas.
4. Demonstrate the general idea of data storage, indexing techniques and query processing.
5. Illustrate the transaction management concurrency control and recovery management techniques adopted in database management systems

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3						1	1		1	2	3
CO2	3	3	2	1	1				1	1		1	2	2
CO3	3	3	3	1	1				1	1		1	2	2
CO4	3	3	3	1	1				1	1		1	2	2
CO5	3	1							1	1		1		

UNIT I INTRODUCTION

9

Database and Database Users: Characteristics of database approach, Advantages of DBMS Approach, Database Applications.

Database system concepts and architecture: Data models, Schemas, Instance, Three schema architecture and data independence, DBMS languages, DBMS interfaces, database system Environment, ER model, EER data model.

UNIT II RELATIONAL MODEL

9

Relational data model, relational constraints and relational Algebra: Relational model concepts, Relational constraints and Relational data base schema, update operations, basic Relational algebra operations, additional relational operations.

SQL: Data definition and constraints, Basic queries, insert, delete, update, complex queries, views, assertions and triggers, embedded SQL, dynamic SQL.

Database security and Authorization: security issues, grant/revoke privileges, SQL injections.

Date: 10-01-2024

UNIT III RELATIONAL DATABASE DESIGN

9

Functional dependencies: Design Issues, Definition, functional-dependency theory, dependency preservation property of a decomposition, Lossless decomposition

Normalization: Normal forms: 1NF, 2NF, 3NF, Boyce Codd NF, decomposition, multivalued dependencies and 4NF, join dependencies and 5NF.

UNIT IV DATA STORAGE AND QUERY PROCESSING

9

Disk Storage, Basic File Structures, and Hashing: Secondary Storage Devices, RAID, Operations on Files, Heap Files, Sorted Files, Hashing Techniques.

Indexing Structures for Files: Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+-Trees.

Query Processing: Translating SQL Queries into Relational Algebra, Algorithms for External Sorting, Algorithms for SELECT and JOIN Operations, Algorithms for PROJECT and Set Operations.

UNIT V TRANSACTION MANAGEMENT

9

Transaction Processing: Introduction, Transaction and System Concepts, desirable Properties of Transactions, Schedules based on Recoverability, Schedules based on Serializability.

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control, Timestamp Ordering.

Database Recovery Techniques: Recovery Concepts, Deferred Update, Immediate Update, Shadow Paging, ARIES recovery algorithm.

TOTAL: 45 HOURS

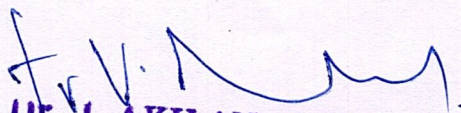
TEXT BOOK

1. Ramez Elmasri and Shamkant Navathe, "Fundamentals of Database Systems", 7th Edition, Addison-Wesley, 2016

REFERENCES

1. Abraham Silberschatz, Henry F. Korth and Sudarshan. S, "Database System Concepts", 7th Edition, McGraw-Hill, 2016
2. Raghu Ramakrishnan Johannes Gehrke , "Database Management Systems", 3rd Edition, McGraw-Hill Education, 2014
3. Date. C. J, Kannan. A, Swamynathan. S, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2012
4. Rajesh Narang, "Database Management systems", Second Edition, PHI Learning pvt. Ltd, New Delhi, 2018.

Date: 10-01-2024


DR. J. AKILANDESWARI
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SALEM - 636 006

B Tech- Artificial Intelligence and Data Science

Regulations 2019

PS
10/1/24

COURSE OUTCOMES

At the end of the course, student will able to

1. Explain the life cycle of data analytics project
2. Apply Exploratory Data Analysis over the dataset
3. Apply data pre-processing and feature selection techniques over the dataset
4. Apply association rule mining to find the frequent item set in business data repository
5. Built the different type of regression model for different business use cases

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2				2	2				2
CO2	3	2	2	2	2									3
CO3	3	2	2	2	2									3
CO4	3	3	3	3	3								2	3
CO5	3	3	3	3	3								2	3

UNIT I INTRODUCTION

9

Need for data science – benefits and uses – facets of data – Data Analytics Lifecycle: Data Analytics Lifecycle Overview - Discovery – Data Preparation – Model Planning –Model Building – Communicate Results

UNIT II EXPLORATORY DATA ANALYTICS

9

Introduction to R – Exploratory Data Analysis: Visualization before Analysis, Dirty Data, Examining Single and Multiple Variable, Data Exploration- Statistical Methods for Evaluation: Hypothesis Testing, Difference of Means, Wilcoxon Rank-Sum Test, Type I and Type II errors, Powers and Sample Size, ANOVA

UNIT III DATA PRE-PROCESSING AND FEATURE SELECTION

9

Data cleaning - Data integration - Data Reduction - Data Transformation and Data Discretization, Feature Generation and Feature Selection, Feature Selection algorithms: Filters- Wrappers, and Embedded

UNIT IV DATA ANALYTICS METHOD – ASSOCIATION RULE MINING

9

Association Rules: Apriori Algorithm, Evaluation of Candidate rules, Application of Association Rules, Frequent Pattern Growth Algorithm, Validation and Testing, Rule based Classifiers – Use case: Grocery Stores, Recommendation System

Date: 10-01-2024

UNIT V REGRESSION MODELS

9

Regression Models – Use of Regression Analysis – Types of Regressions: Linear Regression, Logistic Regression, Polynomial Regression, Stepwise Regression, Ridge Regression, Lasso Regression, and ElasticNet Regression- Selection of Right Regression Model –Use Case: Sales Forecasting, Credit Card industry


TOTAL:45 Hrs

TEXT BOOKS

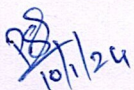
1. David Dietrich, Barry Heller, Beibei Yang, “Data Science and Big data Analytics: Discovering, Analysing, Visualizing, and Presenting Data ”, Wiely 2015

REFERENCES

1. David Cielen, Arno D. B. Meysman, and Mohamed Ali, “Introducing Data Science”, Manning Publications, 2016.
2. Jiawei Han, Micheline Kamber and Jian Pei ,”Data Mining: Concepts and Techniques”, 3rd Edition , Morgan Kaufmann,2011
3. Jay Liebowitz, “Big Data and Business Analytics”, CRC Press, 2013
4. Cathy O’Neil and Rachel Schutt, “Doing Data Science”. O’Reilly, 2014.


Dr. J. AKILANDESWARI
PROFESSOR & HEAD
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SALEM - 636 005

Date: 10-01-2024


10/1/24

COURSE OUTCOMES

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

1. Apply basic features of Java to write programs
2. Write programs to read and write files using stream classes
3. Apply generics and collection framework for writing efficient programs for real time applications and handle different type of exceptions
4. Apply event handling techniques for interaction with GUI based application.
5. Write multithreaded and data driven application using JDBC.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3						1	1		2	2	3
CO2	3	3	2	2					1	1		1	2	2
CO3	3	3	3	2	2				1	1		1	2	2
CO4	3	3	3	2	2				1	1		2	2	2
CO5	3	1							1	1		1		

UNIT I CLASS, INHERITANCE, PACKAGE AND INTERFACE 9

History and Evolution of Java - An Overview of Java – Data types, variables, and Arrays- Operators – Control Statement – Introducing Class- Methods – Inheritance – Packages and Interfaces – java.lang package: String, StringBuffer, StringBuilder, Primitive Type Wrappers, Object, Class and Reflect

UNIT II INPUT/OUTPUT(I/O): EXPLORING java.io 9

- I/O Basics – Exploring java.io: Stream Class, Byte Streams and Character Streams – Predefined Streams – Reading Console input – writing Console output – PrintWriter Class – Reading and Writing Files – Serialization – Stream Benefits

UNIT III EXCEPTION HANDLING ,ENUMERATIONS, GENERICS AND COLLECTION 9

Exception Handling Fundamentals – Exception Types – Uncaught Exception – Using try and catch – Multiple catch Clauses – Nested try statement – throw – throws – finally – Built-in Exception- Creating our own Exception class – Chained Exception- Enumerations – Auto boxing – Generics – Lambda expressions – The Collections Framework – The Collection Interface- The Collection Classes – Accessing a Collection via an Iterator

Date: 10-01-2024

UNIT IV GUI AND EVENT HANDLING

9

Event Handling – Introducing Swing – Exploring Swing: JLabel and ImageIcon, JTextField, Swing Buttons, JTabbedPane, JList, JComboBox, Trees, JTable, JMenuBar, JMenu and JMenuItem - GUI Programming using JavaFX – Exploring events and controls – JavaFX Menus

UNIT V THREADS AND DATABASE CONNECTIVITY

9

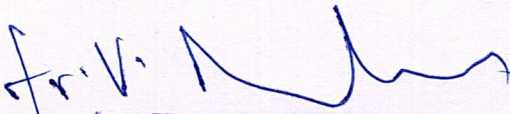
What Are Threads? - Interrupting Threads - Thread States - Thread Properties – Synchronization – Inter thread communication - JDBC Programming concept – Executing Queries – Scrollable and Updatable Resultset.

Total: 45 Hours**TEXT BOOK**

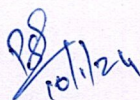
1. Herbert Schildt, “Java™ : The Complete Reference”, 9th edition, Oracle Press, 2014.

REFERENCES

1. Cay S. Horstmann and Gary Cornell, “Core Java: Volume I – Fundamentals”, 9th edition, Prentice Hall, 2013.
2. K. Arnold, D. Holmes and J. Gosling, “The JAVA programming language”, 4th edition, Addison Wesley Professional, 2005.
3. Timothy Budd, “Understanding Object-oriented programming with Java”, 3rd edition, Addison Wesley, 2000.
4. C. Thomas Wu, “An introduction to Object-oriented programming with Java”, 5th edition, Tata McGraw-Hill Publishing company Ltd., 2009.


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SALEM - 636 005

Date: 10-01-2024


10/1/24

COURSE OUTCOMES

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

1. Describe the structure and organization of computer networks; including the division into network layers, role of each layer, and relationships between the layers.
2. Analyze the link layer concepts of error-detection and correction techniques, multiple access protocols, point-to-point protocols and characteristics of link layer media (including wireless links).
3. Explain the transport layer concepts and protocol design including connection oriented and connection-less models, techniques to provide reliable data delivery and algorithms for congestion control and flow control.
4. Apply subnetting and supernetting concepts to maintain networks and explain the network layer concepts and protocol design including datagram forwarding, routing algorithms, and network interconnections.
5. Analyse the functions and components of the SDN architecture.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3	3	3							3	3	2
CO2	2	2	3	3	3							3	3	2
CO3	2	2	3	3	3							3	3	2
CO4	2	2	3	3	3							3	3	2
CO5	2	2	3	3	3							3	3	2

UNIT I INTRODUCTION**9**

Data Communications Networks, Network Types- Standards and administration- OSI Model- TCP/IP Protocol Suite.

Physical layer: Performance - Transmission Media: Guided and Unguided media –Switching: Circuit switched networks and Packet Switched Networks.

UNIT II DATA LINK LAYER**9**

Introduction – Link Layer addressing - Error Detection: Types of Errors, Redundancy, Cyclic Codes - Cyclic Redundancy Check- Check Sum.

DLC Services – Data Link Layer Protocols, Media Access Control – Random Access, Controlled Access - Ethernet protocol – Standard Ethernet.

UNIT III NETWORK LAYER**9**

Services, Packet Switching – Internet Protocol-Datagram Format – Fragmentation – Options - Routing Algorithms – Distance Vector Routing – Link-state Routing - Unicast Routing

Date: 10-01-2024

Protocols – Autonomous Systems – Routing Information Protocol– Open Shortest Path First Protocol.

UNIT IV TRANSPORT LAYER & APPLICATION LAYER 10

Introduction - User Datagram Protocol (UDP) - User Datagram, UDP Services, UDP applications Transmission Control Protocol (TCP) - Services-Features-segment - TCP connection - Windows in TCP - Flow Control - Error Control - TCP Congestion Control – Introduction to DNS – HTTP – WWW.

UNIT V INTRODUCTION TO SOFTWARE DEFINED NETWORKING 8

Introduction – Network Limitations – Network Control Plane – Applications – SDN Implementation – SDN design – Separation of the control and data planes –Edge Oriented Networking - SDN Operations.

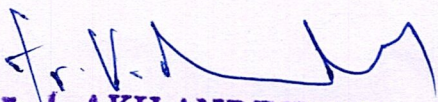
TOTAL: 45 HOURS

TEXT BOOK

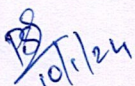
1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 5th Edition 2018. (Unit-1 to Unit-4).
2. Patricia A Morreale, James M Anderson “Software Define Networking Design and Deployment”, CRC Press, 2018. (Unit-5).

REFERENCES

1. James F. Kurose and Keith W. Ross, “Computer Networking: A Top-Down Approach Featuring the Internet”, Pearson Education, 6th edition 2017.
2. Larry L.Peterson and Peter S. Davie, “Computer Networks: A Systems Approach”, Harcourt Asia Pvt. Ltd., 5th edition, 2015.
3. Andrew S. Tanenbaum, “Computer Networks”, Prentice Hall PTR, 5th Edition, 2013
4. Halsall, Fred, “Computer Networking and Internet”, Pearson Education, 5th edition, 2015.


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Date: 10-01-2024


10/1/24

COURSE OUTCOMES

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

1. Explain the genesis of Agile and driving forces for choosing Agile techniques.
2. Comprehend the Agile Scrum framework and development practices.
3. Assess the software product using Agile testing methodologies and perform testing activities within an agile project.
4. Apply software design principles and refactoring techniques to achieve agility.
5. Evaluate the agile approach impact on cutting-edge technologies and realize the business value for adopting agile software development.

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2	3	2	2	2	2									
CO3	3	2	2	2	2									
CO4	3	2	2	2	2								2	3
CO5													2	3

UNIT I FUNDAMENTALS OF AGILE

9

The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Extreme Programming, Feature Driven development, Lean Software Development, Adaptive Software development, Dynamic System Development Method, Crystal, Agile Modeling, Agile Unified Process, Kanban, Agile project management, Continuous Integration, Pair Programming, Simple Design.

UNIT II AGILE SCRUM FRAMEWORK

9

Introduction to Scrum, Project phases, Agile Estimation, Planning game in XP, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Burn up chart, Sprint planning and retrospective, Daily scrum, Scrum roles – Product Owner, Scrum Master, Scrum Team.

UNIT III AGILE TESTING

9

The Agile lifecycle and its impact on testing, Agile Testing Methodologies – Test Driven development, Acceptance Test Driven development, Behavior Driven development, Role of Tester in Agile Team, Tracking Testing

Date: 10-01-2024

activities, Agile Testing in Scrum, Agile Testing in Kanban, Agile Testing Techniques- Exploratory testing, Risk based testing, Regression tests, Agile Testing Work products.

UNIT IV AGILE SOFTWARE DESIGN AND DEVELOPMENT

10

Agile design practices, Design Principles - Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles and Dependency Inversion Principle, Need and significance of Refactoring, Refactoring Techniques.

UNIT V INDUSTRY TRENDS

8

Agile Application Lifecycle Management (ALM), Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile rapid development technologies.

LECTURE: 45 Hrs PRACTICAL:-30 Hrs Total : 75 hours

REFERENCES

1. Ken Schwaber, Mike Beedle, "Agile Software Development with Scrum", Pearson, 2014.
2. Robert C. Martin, "Agile Software Development, Principles, Patterns and Practices" Pearson, 2003.
3. Lisa Crispin, Janet Gregory, "Agile Testing: A Practical Guide for Testers and Agile Teams" Addison Wesley, 2008.
4. Alistair Cockburn, "Agile Software Development: The Cooperative Game" Addison Wesley, Second Edition, 2006.
5. Mike Cohn, "User Stories Applied: For Agile Software" Addison Wesley, 2004.

Date: 10-01-2024

LAB EXERCISES

1. Agile Project Setup and exploration of ALM Tool
 - a. Setup of ALM Tool
 - b. Creation of Scrum Team setup in ALM Tool
 - c. Creation of KANBAN Team setup for ALM Tool
2. Agile Backlog Management
 - a. For a given Requirement, breakdown to EPIC, Features, User Stories with clear Definition of Ready and Definition of Done.
 - b. Prioritize the backlog based on dependency across the stories.
 - c. Estimate the stories and do a Sprint planning
3. Agile Reporting and Dashboards
 - a. Configure a Task Board in ALM Tool
 - b. Breakdown the user stories to Tasks
 - c. Create a Task Burn down chart
 - d. Create Project Dashboard to list number of EPICs, number of Features and User stories
4. Agile Testing
 - a. Create Test cases for the requirements given with clear test steps and expected results, document same in ALM Tool
 - b. Write a BDD for creation of KANBAN Board in the ALM Tool to visualize the tasks

TOTAL : 30 HOURS


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Date: 10-01-2024

COURSE OUTCOMES

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

1. Build tables, construct relationships among them and retrieve data with simple and complex queries in Oracle
2. Build various constraints, triggers and indexes on the tables
3. Design and implement a database in Oracle and to integrate into a simple application

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3							3	3	2
CO2	3	3	3	3	3							3	3	2
CO3	3	3	3	3	3							3	3	2

LIST OF EXPERIMENTS

1. Create a relational database system in Oracle using DDL commands with constraints.
2. Update the database system using DML commands.
3. Query the database using simple and complex queries.
4. Create and update views.
5. High level programming language extensions (Control structures, Procedures and Functions in PL/SQL).
6. Create triggers.
7. Create assertions and indexes.
8. Execute queries working on transaction control, locking rows for update and creating password and security features.
9. Use of front end tools to manipulate the database.
10. Generate reports using a reporting tool.

TOTAL: 60 HOURS

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10/1/24

COURSE OUTCOMES

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

1. Apply the basic features of JAVA such as Control statements, Arrays, Classes, Inheritance, Interface and Packages in solving a problem
2. Apply appropriate IO stream and collection framework for solving real time problem
3. Write multithreaded and GUI based data driven application using JDBC concepts

CO / PO, PSO Mapping (3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3							3	3	2
CO2	3	3	3	3	3							3	3	2
CO3	3	3	3	3	3							3	3	2

LIST OF EXPERIMENTS

1. Write the programs using the concept of nested loops, recursion, arrays, String and StringBuffer class.
2. Write the programs using the concept of Class, Inheritance, Interface and Packages
3. Write a program that uses the I/O package for reading and writing a text file.
4. Write a program that uses the different exception handling mechanism.
5. Write a program that persistently stores the current state of the object.
6. Write a program that uses generic concept for writing efficient program.
7. Write a program that uses different collection class for managing data of different applications.
8. Implement GUI programming with events and controls using JavaFX.
9. Write the programs that uses the concept of Threads.
10. Write a program that uses JDBC API for interacting with the database.

Total: 60 Hrs

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Date: 10-01-2024

B Tech- Artificial Intelligence and Data Science

Regulations 2019

COURSE CODE U19GE402

L T P C

COURSE NAME MANDATORY COURSE:

ENVIRONMENT AND CLIMATE SCIENCE

2 0 0 0

Course outcome:

Upon completion of this course the students will be able to

- CO1** Describe the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.
- CO2** Illustrate the concepts of an ecosystem and provide an overview of biodiversity and its conservation.
- CO3** Analyze the causes, effects of various environmental pollution and their appropriate remedial measures.
- CO4** Provide solutions to combat environmental issues like global warming, acid Rain, ozone layer depletion.
- CO5** Analyze the effect of climate change in various sectors and their remedial measures.

CO / PO, PSO Mapping														
(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
Programme Outcomes (POs) and Programme Specific Outcome (PSOs)														
COs, POs PSOs Mapping	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO - 1	3	2				2	2							-
CO - 2	2	-												-
CO - 3	3	2				2	2							2
CO - 4	3	2				2	2							2
CO - 5	3	2				2	2							2

Unit I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES L 6

Definition, Scope and Importance Forest Resources: - Use and over - exploitation, deforestation, Case Studies, Water Resources: - Use and Over-Utilization of Surface and ground water, Floods, Drought, Food Resources- Effects of Modern Agriculture, Fertilizer- Pesticide Problems--Role of an Individual in Conservation of Natural Resources.

Unit II ECOSYSTEMS AND BIODIVERSITY L 6

Structure and Function of an Ecosystem- Energy Flow in the Ecosystem -Food Chains, Food Webs and Ecological Pyramids. Introduction to Biodiversity -Value of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values -India as a Mega-Diversity Nation -- Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts - Endangered and Endemic Species of India - Conservation of Biodiversity: In-Situ and Ex-Situ conservation of Biodiversity.

Unit III ENVIRONMENTAL POLLUTION

L 6

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, Solid Waste Management- Effects and Control Measures of Acid Rain,- Role of an Individual in Prevention of Pollution.

Unit IV FUNDAMENTALS OF CLIMATE CHANGE

L 6

Sustainable Development- - Climate Change-Causes and effects of Global Warming - Effect of global warming in food supply, plants, sea, coral reef, forest, agriculture, economy- Kyoto Protocol in reduction of greenhouse gases - Ozone Layer Depletion-mechanism, effects and control measures Montreal Protocol to protect ozone layer depletion -Rain Water Harvesting - .Effect of climate change due to air pollution Case study - CNG vehicles in Delhi.

Unit V EFFECT OF CLIMATE CHANGE

L 6

Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments, buildings, consumption of energy, agriculture and in electric power sector - Carbon credit - carbon footprint - disaster management -Role of an individual to reduce climate change.

Total Number of hours: 30

Learning Resources

Text Book:

1. Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018
2. Anubha Kaushik and Kaushik,
"Environmental Science and Engineering" New Age International Publication, 4th Multicolour Edition, New Delhi, 2014.

Reference Books:

1. S. Radjarejesri et al., "Environmental Science" Sonaversity, Sona College of Technology, Salem, 2018.
2. Masters, G.M., "Introduction to Environmental Engineering and Science", Pearson Education Pvt., Ltd., 2nd Edition, 2004.
3. Erach, B., "The Biodiversity of India", Mapin Publishing P.Ltd., Ahmedabad, India.
4. Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad - 500029.

Shanthi
22/12/23
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22/12/23
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Semester – IV	U19GE401 - SOFT SKILLS AND APTITUDE – II	L	T	P	C	Marks
		0	0	2	1	100
Course Outcomes						
At the end of the course the student will be able to:						
1. Demonstrate capabilities in additional soft-skill areas using hands-on and/or case-study approaches						
2. Solve problems of increasing difficulty than those in SSA-I in given areas of quantitative aptitude and logical reasoning and score 65-70% marks in company-specific internal tests						
3. Demonstrate greater than SSA-I level of verbal aptitude skills in English with regard to given topics and score 65-70% marks in company-specific internal tests						
1.Soft Skills	Demonstrating soft-skill capabilities with reference to the following topics: <ol style="list-style-type: none"> SWOT Goal setting Time management Stress management Interpersonal skills and Intrapersonal skills Presentation skills Group discussions 					
2. Quantitative Aptitude and Logical Reasoning	Solving problems with reference to the following topics: <ol style="list-style-type: none"> Equations: Basics of equations , Linear, Quadratic Equations of Higher Degree and Problem on ages. Logarithms, Inequalities and Modulus Sequence and Series: Arithmetic Progression, Geometric Progression, Harmonic Progression, and Special Series. Time and Work: Pipes & Cistern and Work Equivalence. Time, Speed and Distance: Average Speed, Relative Speed, Boats & Streams, Races and Circular tracks and Escalators. Arithmetic and Critical Reasoning: Arrangement, Sequencing, Scheduling, Network Diagram, Binary Logic, and Logical Connection. Binary Number System.- Binary to decimal, Octal, Hexadecimal 					
3. Verbal Aptitude	Demonstrating English language skills with reference to the following topics: <ol style="list-style-type: none"> Critical reasoning Theme detection Verbal analogy Prepositions Articles Cloze test Company specific aptitude questions 					

Total: 30 Hours

S. Anita
18/12/2023

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