R–20

B.Tech

Program Regulations

Scheme of Instruction & Syllabus for I Year

(Effective from the batch admitted in 2020-2021)

COLLEGE OF ENGINEERING
SRI VENKATESWARA UNIVERSITY
TIRUPATI-517 502

SRI VENKATESWARA UNIVERSITY COLLEGE OF ENGINEERING
REGULATIONS – 2020 (R-20)
For B.Tech – Regular / Lateral Entry / Honours / Major-Minor

Henceforth, these shall be known as Regulations **R-20** and shall be applicable from the batch admitted in the academic year 2020-2021 through the State level EAMCET and ECET. They shall be applicable to B.Tech Lateral Entry admitted in 2021-2022 at the second year level (for Second, Third and Fourth years of study).

1. System

The system is a flexible Choice Based Credit System (CBCS) permitting students

a) To choose electives from a wide range of courses offered by the Institute or on-line platforms

b) To undergo additional courses

c) To adopt an inter-disciplinary approach

2. Programs

The University offers Regular B.Tech programs in

i) Chemical Engineering (ChE)

ii) Civil Engineering (CE)

iii) Electrical & Electronics Engineering(EEE)

iv) Electronics & Communication Engineering (ECE)

v) Mechanical Engineering (ME)

vi) Computer Science & Engineering (CSE)In addition, meritorious students will have the option to choose B.Tech (Honours) or B.Tech (Major-Minor), both with extra courses and credits, in addition to those prescribed for B.Tech (Regular). Different Major-minor combinations are offered by the Institute subject to certain conditions specified herein this document.

3. Duration

ALL PROGRAMS ARE OF FOUR YEARS DURATION, each academic year consisting of two semesters, making a total of 8 semesters.

[illegible]

A. Introduction

[illegible]

a) [illegible]

b) [illegible]

c) [illegible]

d) [illegible]

5. Course Code

Each course shall be identified by an alpha-numeric course code, consisting of 2 alphabets followed by three numerals. XXxyy

XX denotes the department which offers the course.

x denotes the semester in which the course is offered

yy denotes a serial number assigned by the course offering department

CE : Civil Engineering	CO : Commerce
CH : Chemical Engineering	CY : Chemistry
CS : Computer Science and Engineering	EO : Economics
EC : Electronics and Communication Engineering	EN : English MA: Mathematics
EE : Electrical and Electronics Engineering	PH : Physics
ME : Mechanical Engineering	HU : Humanities
	BO : Biological Sciences
	MG : Management

6. [illegible]

a) i) [illegible]

ii) [illegible]

iii) [illegible]

iv) [illegible]

v) [illegible]

vi) [illegible]

vii) [illegible]

b) i) A student shall attend a minimum of 85 percent of total instruction hours conducted during that semester – Theory + Tutorial + Practical (excluding the attendance in non-credit audit courses) Attendance in Audit Courses shall not be considered for calculation of attendance requirements

ii) A student shall attend a minimum of 75 percent of total instruction hours conducted during that semester – Theory + Tutorial + Practical (excluding the attendance in non-credit audit courses) Attendance in Audit Courses shall not be considered for calculation of attendance requirements

iii) However, a committee, headed by the Principal, can condone shortage of attendance, due to ill health of the student, up to 10 percent (65 – 75 %) for those students, who attend a minimum of 65 percent of total instruction hours with a minimum 50 percent in each course.

iv) A student who fails to satisfy the attendance requirements specified in clauses 7.2 (i, ii, iii) shall be detained and will have to repeat that Semester in the subsequent academic years with the written permission of the Principal subject to the clause 7.1

v) A student shall not be permitted to study any semester more than three times during the entire Programme of study

vi) A student who satisfies the attendance requirements specified in either of the clauses 7.2 (ii or iii) in any semester may be permitted to repeat that semester cancelling the previous attendance and sessional marks of that semester with the written permission of the Principal. However, this facility shall not be extended to any student more than twice during the entire Programme of study as specified in clause 7.1

8 **Credit -**

This is the unit by which the course work is measured. It determines the number of hours of instructions required per week. It is a weightage index, used in the computation of Grade Point Average, indicative of the student performance.

Theory / Tutorial .... 1 hr /week .... 1 credit

Practical .... 2 hr/week .... 1 credit

Credit requirement for the Award of Degree : Successful performance in

B.Tech (Regular)	160 credits
B.Tech (Lateral Entry)	123 credits (II, III & IV years only)
B.Tech (Honors)	160 + 20 additional credits in the same discipline
B.Tech (Major-Minor)	160 (Major discipline) + 20 credits in another (Minor) discipline

9. Examination – Evaluation

9.1. Evaluation shall be carried out through Internal Tests and Semester End Examination.

9.2. For each theory course, there shall be two sessional tests. Each test is of two hours duration carrying 40 marks. Internal Test I will be conducted around the middle of the semester, on 50 % of the course content. Internal Test II will be at the end of the semester on the second 50% of the course syllabus.

It is mandatory for a student to attend both the sessional tests in each theory course. The weighted average of the marks secured

in two tests is awarded as sessional marks. A weightage of 0.8 shall be assigned for the better performance of the two tests whereas for the other test it shall be 0.2. If a student is absent for any of the internal tests for whatsoever reason, the marks awarded for that test shall be zero.

Students are permitted to verify their internal test scripts after valuation. The valuation and verification of answer scripts of Sessional Tests shall be completed within fifteen days after the conduct of the respective Sessional Tests.

9.3 End-Semester Examination is of 3 hours duration carrying 60 marks. It shall be conducted after the last working day of the semester covering the entire syllabus prescribed for that course.

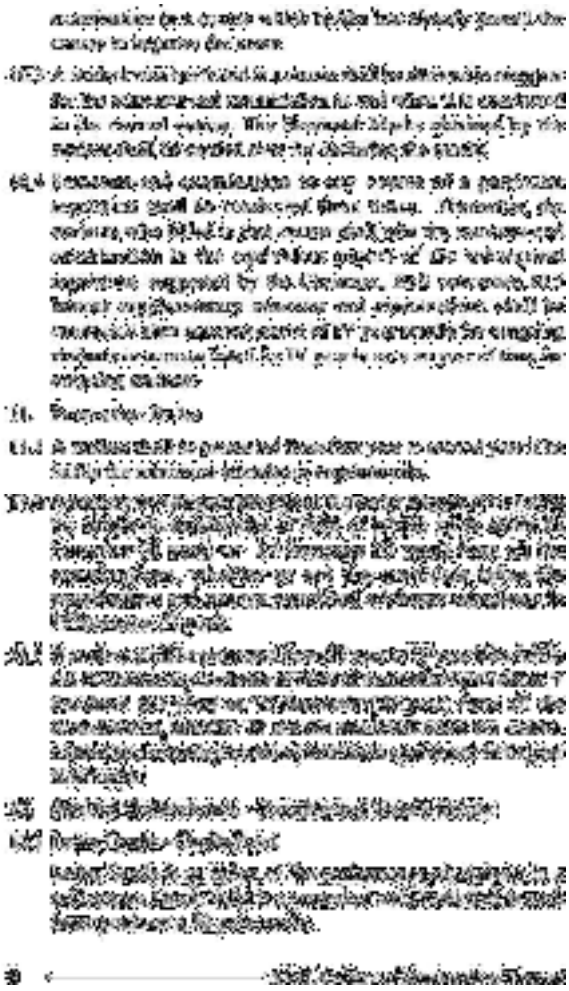
The question paper for end-semester examination shall be set by an external paper setter. The Chairman, BoS shall recommend a panel comprising at least six external paper setters for each theory course to the University. The University shall arrange for setting the question paper by appointing one external paper setter from that panel.

Model Question Paper for each theory course shall be prepared by the concerned teacher within 30 days from the commencement of the Semester and the same shall be forwarded to the Controller of Examinations through the Chairman, BOS concerned.

Two questions shall be set from each unit of the syllabus, out of which one question shall be answered by the student. Each question of the unit carries a maximum of 12 marks.

However, the Chairman, BoS shall accord exception in question paper format, if necessary. The question papers shall assess the understanding of the concepts and their applications in solving problems and at least 50% of the questions shall be numerical. Further, the question papers of design-oriented courses shall assess the abilities of analysing and evaluating design alternatives

The valuation of End-Semester Examination answer scripts shall be arranged by the Controller of Examinations as per the University procedures in vogue.



Letter Grade	Range of Marks (Internal+End-Sem)	Grade Point
O (Outstanding)	91 - 100	10
A+ (Excellent)	81 – 90	9
A (Very Good)	71 – 80	8
B+ (Good)	61 - 70	7
B (Above Average)	51 - 60	6
C (Average)	41 - 50	5
P (Pass)	40	4
F (Fail)	< 40	0
Ab (Absent)	-	0

A student obtaining Grade F or Absent for a semester end examination shall be considered failed in that course and he / she shall have to reappear in the Semester- end examination as and when it is conducted in the normal course.

In the Grade sheet, against an audit course, satisfactory (> 40 marks) or unsatisfactory (less than 40 marks) will be indicated. No [illegible]

[illegible]

$$\text{CGPA} = \sum_{i=1}^{M} (C_i \times S_i) / \sum_{i=1}^{M} C_i$$

where S_i is the SGPA of the i^{th} semester, C_i is the total number of credits in that semester and M is the number of semesters.

SGPA and CGPA shall be rounded off to two decimal points and reported in the transcripts.

12.3 Award of Class:

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B.Tech degree, he/she shall be placed in one of the following:

Class Awarded	CGPA Secured
First Class with Distinctione	≥ 7.5
First Classe	≥ 6.5 < 7.5
Second Classe	≥ 5.5 < 6.5
Pass Classe	≥ 4.0 < 5.5

Equivalent percentage is (CGPA – 0.5) multiplied by 10.

[illegible]

[illegible]

SRI VENKATESWARA UNIVERSITY

COLLEGE OF ENGINEERING : TIRUPATI 517 502

R-20 – Scheme of Instruction effective from the academic year 2020-2021

SCHEME OF INSTRUCTION (1 Year)

Mandatory Induction program

- For All disciplines of Engineering
- Right at the start of the first year.
- 3 weeks duration
- This includes
  - ✓ Physical activity
  - ✓ Creative Arts
  - ✓ Universal Human Values
  - ✓ Literary
  - ✓ Proficiency Modules
  - ✓ Lectures by Eminent People
  - ✓ Visits to local Areas and
  - ✓ Familiarization to Dept./ Branch & Innovations

SRI VENKATESWARA UNIVERSITY

COLLEGE OF ENGINEERING : TIRUPATI 517 502

B.Tech. (Chemical Engineering)

I Semester

Code	Category	Course Title	Scheme of Instruction (h/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA101	Basic Sc.	Mathematics – I	3	1	-	4	4
CY 11C	Basic Sc.	Chemistry for Chemical Engg.-I	3	1	-	4	4
EN100	Humanities	English	2	-	-	2	2
EE104	Basic Engg.	Basic Electrical and Electronics Engineering	3	1	-	4	4
ME105	Basic Engg.	Engineering Graphics and Design	2	-	3	5	3.5
EN 106	Humanities Lab	English Communication Lab	-	-	3	3	1.5
		TOTAL	13	3	6	22	19

II Semester

Code	Category	Course Title	Scheme of Instruction (h/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA201	Basic Sc.	Mathematics – II	3	1	-	4	4
PY 21C	Basic Sc.	Engineering Physics	3	1	-	4	4
CS 210	Basic Engg.	Programming for Problem Solving	3	1	-	4	3
CY 20C	Basic Sc.	Chemistry of Chemical Engineering II	3	1	-	4	4
ME 22C	Basic Engg. Lab	Workshop / Manufacturing Practices	-	-	3	3	1.5
CS 21C	Basic Engg. Lab	Programming for Problem Solving Lab	-	-	3	3	1.5
CE 23C	Audit	Environmental Sciences	4	-	-	4	0
		TOTAL	16	3	6	22	18

- AL courses – 40 marks (Internal) + 60 marks (Univ. Semester End)
- Audit Course – 100 marks (Internal) – Zero Credits

SRI VENKATESWARA UNIVERSITY

COLLEGE OF ENGINEERING : TIRUPATI - 517 502

R-20 – Scheme of Instruction Effective from Academic year 2020-2021

B.Tech. (Civil Engineering)

I Semester

Code	Category	Course Title	Scheme of Instruction (hr/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA 101	Basic Sc.	Mathematics – I	3	1	–	4	4
CY 101	Basic Sc.	Engg. Chemistry	3	1	–	4	4
EN107	Humanities	English	2	–	–	2	2
EE104	Basic Engg	Basic Electrical & Electronics Engineering	3	1	–	4	4
ME105	Basic Engg	Engineering Graphics and Design	1	–	3	5	3.5
EN108	Humanities Lab	English Communication Lab	–	–	3	3	1.5
		TOTAL	12	3	6	22	19

II Semester

Code	Category	Course Title	Scheme of Instruction (hr/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA 201	Basic Sc.	Mathematics – II	3	1	–	4	4
PY 202	Basic Sc.	Engineering Physics	3	1	–	4	4
CS 203	Basic Engg	Programming for Problem Solving	2	1	–	3	3
CE 204	Basic Engg	Engineering Mechanics	3	1	–	4	4
ME 205	Basic Engg Lab	Workshop/ Manufacturing Practices	–	–	3	3	1.5
CS 206	Basic Engg Lab	Programming for Problem Solving Lab	–	–	3	3	1.5
CE 207	Audit	Environmental Science	4	–	–	4	0
		TOTAL	15	3	6	22	18

- All courses – 40 marks (Internal) + 60 marks (Univ. Semester End)
- Audit Course – 100 marks (Internal) – Zero Credits

SRI VENKATESWARA UNIVERSITY

COLLEGE OF ENGINEERING : TIRUPATI - 517 502

R-20 – Scheme of Instruction Effective from Academic year 2020-2021

B.Tech. (Mechanical Engineering)

I Semester

Code	Category	Course Title	Scheme of Instruction (hr/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA101	Basic Sci.	Mathematics – I	3	1	–	4	4
CY 101	Basic Sci.	Engg Chemistry	3	1		4	4
EN101	Humanities	English	2	–	–	2	2
EE104	Basic Engg	Basic Electrical and Electronics Engineering	3	1	–	4	4
ME105	Basic Engg	Engineering Graphics and Design	1		3	5	3.5
EN108	Humanities	English Communication Lab	–	–	3	3	1.5
		TOTAL	12	3	6	22	19

II Semester

Code	Category	Course Title	Scheme of Instruction (hr/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA201	Basic Sci	Mathematics – II	3	1	–	4	4
PY 202	Basic Sci	Engineering Physics	3	1	–	4	4
CS 203	Basic Engg	Programming for Problem Solving	2	1	–	3	3
CE 204	Basic Engg	Engineering Mechanics	3	1		4	4
ME 205	Basic Engg Lab	Workshop/ Manufacturing Practices	–	–	3	3	1.5
CS 206	Basic Engg Lab	Programming for Problem Solving Lab	–	–	3	3	1.5
CE 207	Audit	Environmental Science	4	–	–	4	0
		TOTAL	15	3	6	22	18

- All courses – 40 marks (Internal) + 60 marks (Univ. Semester End)
- Audit Course – 100 marks (Internal) – Zero Credits

SRI VENKATESWARA UNIVERSITY

COLLEGE OF ENGINEERING : TIRUPATI : 517 502

R-21 – Scheme of Instruction (Elective) w.e.f. the academic year 2021-2022

B.Tech. (Electrical and Electronics Engineering)

I Semester

Code	Category	Course Title	Scheme of Instruction (hrs/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA101	Basic Sc.	Mathematics – I	3	1	-	4	4
PY 102	Basic Sc.	Modern Physics	3	1	-	4	4
CS 103	Basic Eng.	Programming for Problem Solving	2	1	-	3	3
CE 104	Basic Eng.	Engineering Mechanics	3	1	-	4	4
ME 105	Basic Engg. Lab	Workshop / Manufacturing Practices	-	-	3	3	1.5
CS 106	Basic Engg. Lab	Programming for Problem Solving Lab	-	-	3	3	1.5
CE 107	Audit Course	Environmental Science	4	-	-	4	0
		TOTAL	15	4	6	25	18

II Semester

Code	Category	Course Title	Scheme of Instruction (hrs/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA201	Basic Sci.	Mathematics – II	3	1	-	4	4
CY 202	Basic Sci.	Engineering Chemistry	3	1	-	4	4
EN 203	Humanities	English	2			2	2
EE 204	Basic Eng.	Basic Electrical Engineering	3	1		4	4
ME 205	Basic Engg. Lab	Engineering Graphics and design	2	-	3	5	3.5
EN 206	Humanities Lab	English Communication Lab	-	-	3	3	1.5
		TOTAL	15	3	6	22	19

- All courses – 40 marks (Internal) + 60 marks (Univ. Semester End)
- Audit Course – 100 marks (Internal) Zero Credits

SRI VENKATESWARA UNIVERSITY

COLLEGE OF ENGINEERING : TIRUPATI : 517 502

R-21 – Scheme of Instruction (Elective) w.e.f. the academic year 2021-2022

B.Tech. (Electronics & Communication Engineering)

I Semester

Code	Category	Course Title	Scheme of Instruction (hrs/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA101	Basic Sc.	Mathematics – I	3	1	-	4	4
PY 102	Basic Sc.	Modern Physics	3	1	-	4	4
CS 103	Basic Eng.	Programming for Problem Solving	2	1		3	3
EC 104	Basic Eng.	Electronic Devices	3	1		4	4
ME 105	Basic Engg. Lab	Workshop / Manufacturing Practices	-	-	3	3	1.5
CS 106	Basic Engg. Lab	Programming for Problem Solving Lab	-	-	3	3	1.5
CE 107	Audit Course	Environmental Science	4	-	-	4	0
		TOTAL	15	3	6	25	18

II Semester

Code	Category	Course Title	Scheme of Instruction (hrs/Week) Lecture	Tutorial	Practical	Total Instruction	Credits
MA201	Basic Sc.	Mathematics – II	3	1	-	4	4
CY 202	Basic Sc.	Engineering Chemistry	3	1	-	4	4
EN 203	Humanities	English	2			2	2
EE 204	Basic Eng.	Basic Electrical Engineering	3	1	-	4	4
ME 205	Basic Engg. Lab	Engineering Graphics and design	2	-	3	5	3.5
EN 206	Humanities lab	English Communication Lab	-	-	3	3	1.5
		TOTAL	13	3	6	22	19

- All courses – 40 marks (Internal) + 60 marks (Univ. Semester End)
- Audit Course – 100 marks (Internal) Zero Credits

R-20 – Scheme of Instruction effective from the academic year 2020-2021
B.Tech. (Computer Science & Engineering)

I Semester

Code	Category	Course Title	Scheme of Instruction (in Weeks) Lectures	Tutorial	Practical	Total Instruction	Credits
MA101	Basic Sc.	Mathematics - I	3	1	-	4	4
PY 102	Basic Sc.	Modern Physics	3	1	-	4	4
CS 103	Basic Engg.	Programming for Problem Solving	3	1	-	4	3
MA 104	Basic Sc.	Probability & Statistics	3	1	-	4	4
ME 105	Basic Engg.	Workshop / Manufacturing Practices	-	-	3	3	1.5
CS 106	Basic Engg.	Programming for Problem Solving Lab	-	-	3	3	1.5
EE 107	Audit Course	Environmental Science	4	-	-	4	0
			16	4	6	26	18

[illegible]

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SRI VENKATESWARA UNIVERSITY
COLLEGE OF ENGINEERING : TIRUPATI 517 502

SYLLABUS – I & II Semesters B.Tech

I Semester
MA 101 MATHEMATICS – I
(I Semester - Common for all branches)

Instruction: 3(L)+1(T)/week Credits:4 Assessment:40 + 60

UNIT I

Differential Equations: Linear differential equations of second and higher order with constant coefficients-particular integrals-homogeneous differential equations with variable coefficients-method of parameters-simulation equations.

UNIT II

Laplace Transforms I : Laplace transforms of standard functions-inverse transforms-transforms of derivatives and integrals-derivatives of transforms-integrals of transforms.

[illegible]

[illegible]

[illegible]

Text / Reference Books:

1. B. S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, 2015.
2. N. P. Bali and Manish Goyal, Engineering Mathematics, Reprint, Laxmi Publications, 2010.
3. B. V. Ramana, Higher Engineering Mathematics, 11th Reprint, Tata McGraw Hill, 2010.
4. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley India, 2011.

Course Outcomes:

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

1. Analyze different types of signals and systems.
2. Apply differential equations to engineering problems.
3. Use appropriate transform (Fourier or Laplace) to solve given practical problems.
4. Use basic knowledge to analyze the different control systems. Logical reasoning and the analysis of control system, design problems with creative solutions.
5. Solve an initial value problem for an n^{th} order linear differential equation using the Laplace transform.
6. Apply Numerical methods to solve algebraic and transcendental equations.
7. Apply the concepts learned in Calculus of Complex variable, Probability and Statistics.
8. Show an appreciation of the role of mathematics in engineering problems such as engineering, physical, and the underlying mathematical principles and analytical, computational skills.

Mapping of Course Outcomes with Program Outcomes:

(First Year) Civil and Environmental Engineering
(Semester - I/II Common to All Branches of Engineering)
(I Scheme - 2021 Revised Course, w.e.f. A.Y. 2021-22)

Instructional Hours / Week: Theory: 4 Tutorial: 0 Assessment: 40+60

Unit I

Matrix and Vector Calculus (12 Hours)

Real and complex matrices, Elementary transformations, Rank of a matrix, Inverse of a matrix, Solution of system of linear equations, Eigenvalues and eigenvectors, Cayley-Hamilton theorem, Diagonalization of matrices, Quadratic forms, Vector differentiation, Gradient, Divergence and Curl, Vector integration, Green's theorem, Stoke's theorem, Gauss divergence theorem (without proofs) and their applications.

Unit II

Ordinary differential equations and their applications (12 Hours)

Solution of first order and first degree differential equations, Exact differential equations, Equations reducible to exact form, Linear differential equations of second and higher order with constant coefficients, Cauchy's and Legendre's differential equations, Method of variation of parameters, Simple harmonic motion, Damped and forced oscillations, Electrical circuits.

Unit III

Laplace transform and its applications (12 Hours)

Laplace transform, Inverse Laplace transform, Linearity property, First shifting theorem, Laplace transform of derivatives and integrals, Unit step function, Second shifting theorem, Dirac delta function, Periodic function, Convolution theorem, Evaluation of integrals by Laplace transform, Solution of linear ordinary differential equations using Laplace transform.

Unit IV

Probability and Statistics (12 Hours)

Measures of central tendency, Moments, Skewness and Kurtosis - Probability, Conditional probability, Independent events, Baye's theorem, Discrete and continuous probability distributions, Binomial distribution, Poisson distribution, Exponential distribution, Normal distribution, Correlation and regression - Rank correlation, Curve fitting by the method of least squares, Fitting of straight lines, Second degree parabolas and more general curves.

affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries, Born- Haber cycle, The use of reduction potentials, Properties of ionic and covalent compounds.

UNIT V

Stereochemistry, Organic reactions and synthesis of a drug molecule

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

Reference / Textbooks

1. University chemistry, by B. H. Mahan
2. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
3. Fundamentals of Molecular Spectroscopy, by C. N. Banwell
4. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
5. Physical Chemistryby P. W. Atkins
6. Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Ed.
7. Principles of physical chemistry, Puri, Sharma and Pattania

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

1. analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. rationalize bulk properties and processes using thermodynamic considerations.
3. distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques

4. rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
5. list major chemical reactions that are used in the synthesis of molecules.

I Semester

CH 102 CHEMISTRY FOR CHEMICAL ENGINEERING – I
(I Semester –For Chemical Engineering)

Instruction:3(L)+1(T)/week Credits:4 Assessment:40+60

UNIT I

Introduction to quantum theory for chemical systems : Schrodinger equation, Applications to Hydrogen atom, Atomic orbitals, many electron atoms

UNIT II

Chemical bonding in molecules : MO theory, Structure, bonding and energy levels of bonding and shapes of many atom molecules, Coordination Chemistry, Electronic spectru and magnetic properties of complexes with relevance to bio-inorganic chemistry, organ metallic chemistry

UNIT III

Introduction to Stereochemistry : Stereo descriptors – R,S, E, Z. Enantiomers and Diastereomers. Racemates and their resolution. Conformations of cyclic and acyclic systems.

UNIT IV

Reactivity of organic molecules : Factors influencing acidity, basicity, and nucleophilicity of molecules, kinetic vs. thermodynamic control of reactions

UNIT V

Strategies for synthesis of organic compounds : Reactive intermediates substitution, elimination, rearrangement, kinetic and thermodynamic aspects, role of solvents.

Text / Reference Books:

1. Physical Chemistry: G.W.Castellan, Narosa

2. Organic Chemistry : Finar; I.L.-Vol - I&II,Pearson Education
3. Organic Chemistry : Morrison & Boyd; PHI/Pearson Education.
4. Physical Chemistry: P. W. Atkins: Oxford.
5. A Text book of Physical Chemistry: K. L. Kapoor: Macmillan
6. A guide Book to Mechanism in Organic Chemistry: Peter Sykes
7. Organic Chemistry: Loudon: Oxford

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

1. appreciate quantum theory of chemical systems
2. appreciate aliphatic chemistry and stereochemistry
3. write simple mechanisms

I & II Semesters

EN 103/EN 203 ENGLISH

(I Semester - EN 103 forChE,CE & ME)

(II Semester - EN 203 for EEE, ECE & CSE)

Instruction: 2(L) Credits: 2 Assessment: 40 + 60

UNIT I

Vocabulary Building : The concept of Word Formation- Root words from foreign languages and their use in English- Acquaintance with prefixes and suffixes from foreign languages in English form derivatives- Synonyms, antonyms, and standard abbreviations.

UNIT II

Basic Writing Skills : Sentence Structures – Use of phrases and clauses in sentences –Importance of proper punctuation - Creating coherence – Organizing principles of paragraphs in documents - Techniques for writing precisely

UNIT III

Identifying Common Errors in Writing : Subject-verb agreement -Noun-pronoun agreement -Misplaced modifiers -Article -Prepositions -Redundancies -Clichés

UNIT IV

Nature and Style of sensible Writing : Describing - Defining - Classifying –Providingexamples or evidence –Writing introduction and conclusion

UNIT V

Writing Practices : Comprehension - Précis Writing –Essay Writing

Reference / Textbooks:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007
3. On Writing Well. William Zinsser. Harper ResourceBook. 2001
4. Study Writing. LizHamp- Lyonsand Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay KumarandPushpalata. Oxford University Press. 2011.
6. Exercises in Spoken English. Parts.I-III. CIEFL, Hyderabad. Oxford University Press

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

1. learn the elements of grammar and composition of English Language.
2. Learn literary texts such as Short stories and prose passages.
3. maintain linguistic competence through training in vocabulary, sentence structures and pronunciation.
4. develop communication skills by cultivating the habit of reading comprehension passages.
5. develop the language skills like listening, speaking, reading and writing.
6. Make use of self-instructed learner friendly modes of language learning through competence.

I Semester

EE104 BASIC ELECTRICAL AND ELECTRONICS ENGG.

(I Semester - for ChE, CE & ME)

Instruction: 3(L)+1(T)/week Credits: 4 Assessment: 40+60

UNIT-I

Electric DC Circuits : Kirchhoff's Voltage & Current laws, Superposition Theorem, Star – Delta Transformations.

AC Circuits : Complex representation of Impedance, Phasor diagrams, Power & Power Factor, Solution of Single Phase Series & Parallel Circuits, Solution of Three Phase circuits and Measurement of Power in Three Phase circuits.

UNIT-II

Single Phase Transformer : Principle of Operation of a Single phase Transformer, EMF equation, regulation and Efficiency of a single phase transformer.

DC Machines : Principle of Operation, Classification, EMF and Torque equations, Characteristics of Generators and Motors

UNIT-III

Three Phase Induction Motor : Principle of Rotating Magnetic Field, Principle of Operation of 3-ϕ I.M., Torque-Speed Characteristics of 3-ϕ I.M.

UNIT-IV

p-n junction operation, diode applications, Zener diode as regulator. Transistor and applications: Introduction to transistors, BJT Characteristics, biasing and applications

UNIT-V

Integrated Circuits : Operational amplifiers, Applications : adder, subtractor, Integrator and Differentiator.

Digital Circuits : logic gates, Combinational Logic circuits, Flip-Flops, counters and shift registers, Laboratory measuring instruments : digital multi-meters and Cathode Ray Oscilloscopes (CRO's).

Text Books :

1. Electrical Technology by Edward Hughes
2. Basic Electrical Engineering by Nagrath and Kothari

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

1. understand the basic concepts of D.C. single phase and 3-phase supply and circuits and solve basic electrical circuit problems
2. understand the basic concepts of transformers and machines used in various industrial drives.
3. understand the concept of power factor improvement for industrial installations and [illegible] power factor
4. understand the operation and characteristics of diodes, transistors, integrated circuits and digital circuits.

I & II Semesters

ME 105 / ME 205ENGINEERING GRAPHICS AND DESIGN

(I Semester - ME105 for ChE, CE & ME)

(II Semester - ME205 for EEE,ECE & CSE)

Instruction: 2(L)+3(Drg)/week Credits:3.5 Assessment:40+60

UNIT I

Introduction to Engineering Drawing : Principles of Engineering Graphics and their significance, usage of Drawing instruments,lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epi-cycloid, Hypo-cycloid and Involutes.

UNIT II

Scales - Scales – construction of Plain & Diagonal Scales.

Projections of points, lines - Projections of Points and lines inclined to both planes, including traces;

UNIT III

Projections (Syllabus : Question Paper Modeled – 4 questions from Units I to IV, 15 marks each.

Projections of planes (Regular surfaces only) inclined Planes-Auxiliary Planes.

Projections of Regular Solids (Simple solids – cylinder, cone, prism & pyramid) inclined to both the Planes-Auxiliary Views

UNIT IV

Isometric Projections & Orthographic projections : Principles of Orthographic Projections-Conventions. Draw simple objects, dimensioning and scale. Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.

UNIT V

Introduction to CAD : CAD workstation and peripherals. Demonstrating knowledge of the theory of CAD software [such [illegible]

[illegible]

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

1. make a distinction between first angle projection and third angle projection of drawing.
2. draw hyperbola, parabola, involutes and Cycloidal curves.
3. draw sections of solids including cylinders, cones, prisms and pyramids.
4. draw projections of lines, planes, solids and sections of solids.
5. draw orthographic projections of lines, planes, and solids.

I B. Tech Semester

EN 1161 / EN 216 ENGLISH COMMUNICATION LAB

(I Semester - [illegible] CSE, CE & ME)

(II Semester - [illegible])

Instruction: [illegible] Credits: [illegible]

[illegible]

I Semester

[illegible]

[illegible] I Semester – EEE, ECE & CSE)

[illegible] Credits: 3 [illegible]

UNIT I

Quantum Mechanics : Wave – Particle duality – de Broglie Concept of Matter Waves – Properties of Matter Waves – Davisson and Germer Experiment – G.P. Thomson Experiment – Heisenberg's Uncertainty Principle – Schrödinger's Time Independent and Time Dependent Wave equation – Significance of Wave Function – Electron in an Infinite Square Potential Well – Probability Densities and Energy Levels.

UNIT II

Band Theory of Solids : Classical Free Electron Theory of Metals – Success and Failure – Quantum Free Electron Theory – Fermi Energy – Electron in Periodic Potential – Bloch Theorem – Kronig – Penney Model – Distinction between Metals, Insulators and Semiconductors. Energy Band Diagrams.

UNIT III

[illegible]

UNIT IV

[illegible]

UNIT V

Nano Physics and Nanotechnology : Introduction to Nanomaterials – Properties, Optical Properties – Quantum Confinement – Electrical properties. Synthesis of Nanomaterials: Ball milling, Sol-gel method – Chemical Vapour Deposition, Pulsed laser deposition. Characterization of C^{60} (Zero dimensional), Carbon Nanotubes (One Dimensional) and Graphene (Two Dimensional). Applications of Nanomaterials. [illegible]

Text Books / Reference Books :

1. R.K.Gaur and S.L.Gupta "Engineering Physics" Dhanpat Rai Publications, New Delhi

2. [illegible] "A Detailed Text Book of Engineering Physics" [illegible]

3. [illegible] and A.K. Singh "Engineering Physics" [illegible] Pvt. Ltd., New Delhi

4. M.N. Avadhanulu and P.G.Kshirsagar "A Textbook of Engineering Physics" S.Chand and Company Pvt.Ltd., New Delhi

5. [illegible]

6. [illegible]

7. [illegible]

8. [illegible]

[illegible]

1. [illegible]

2. [illegible]

3. identify and apply appropriate analytical and mathematical tools of Physics in solving Engineering problems
4. apply knowledge of band theory in the area of electronics and understanding the busic electron transportation phenomenon in microdevices.
5. understand the principles in electrostatics and electromagnetics and magnetic properties of materials.
6. understand size depended properties of nano-dimensional materials and their effective utilization in making nano- and micro-devices for further microminiaturization of electronic devices.
7. think and participate deeply, creatively, and analytically in emerging areas of engineering technology.
8. learn the basics of instrumentation, design of laboratory techniques, measurement, data acquisition, interpretation, and analysis.
9. provide multidisciplinary experiences throughout the curriculum.

I & II Semesters

CS 103 / CS203 PROGRAMMING FOR PROBLEM SOLVING

(I Semester – CS 103 for EEE, ECE & CSE)

(II Semester – CS 203 for ChE, CE & ME)

Instruction:3(L)+1(T)/week Credits:4 Assessment: 40 + 60

Course Objectives:

1. To acquire problem solving skills
2. To be able to develop flowcharts and algorithms for the given problem
3. To learn how to write modular programs in C
4. To enable to use arrays, pointers, strings and structures in solving problems.
5. To explain the difference between object-oriented programming and procedural programming.

6. To understand principles of object-oriented programming.

UNIT-I

Problem Solving : Problem solving techniques, Computer as a problem solving tool, Programming Languages – Machine Language, Assembly Language, Low and High-Level Languages, Procedural and Object-Oriented Languages. Algorithm definition, Features, Criteria, Flowchart definition, Basic symbols, Sample flowcharts, Problem solving aspects, Efficiency of algorithms.

Basics of C : Structure of a C program, C tokens, Keywords, Identifiers, Basic data types and sizes, Constants, Variables, Operators in C, Operator Precedence and Associativity, Expressions, Type conversions, Basic input/output statement, Sample programs.

UNIT-II

Conditional Statements : Selection statements, Decision making within a program, Simple if statement, if-else statement, Nested if-else, if-else ladder and switch-case. Iterative statements: while-loop, do-while loop, for loop, Nested loops, Infinite loops, goto, break and continue statements, Sample programs.

Functions: Introduction to modular programming and functions, Basics, Standard Library of C functions, Prototype of a function, Parameter passing, User defined functions, Recursive functions, Passing arguments to a function: Call by reference, Call by value, Storage Classes in a single source file, Scope rules, Header files, C Pre-processor.

UNIT-III

Arrays: Introduction to arrays, Definition, Declaration, Storing elements, Accessing elements, One dimensional arrays: Array manipulation; Searching, Insertion, Deletion of an element from an array, Two dimensional arrays, Addition/Multiplication of two matrices, Transpose of a square matrix, Passing array to functions, String fundamentals, String manipulations, Standard library string functions.

Pointers: Definition of pointer, pointer type declaration, pointer assignment, pointer initialization, Pointer arithmetic, Functions and

Pointers, Dangling memory, Character pointers and functions, Pointers to pointers, Arrays and Pointers, Pointer arrays, Pointers and structures, Dynamic memory management functions.

UNIT IV

Structures : Structure definition, Structure variables, Initialization of structures, Accessing structures, Nested structures, Arrays of structures, Structures containing arrays, Structures and functions, Pointers to structures, Self referential structures, Unions, Typedef, Bit-fields.

File Processing : Concept of Files, Text files and binary files, File opening in various modes and closing of a file, Reading from a file, Writing onto a file.

UNIT V

Introduction to Object Oriented Programming: OOP's Need for OOP, Principles of OOP, Basics of C++ Programming, Operator Overloading, Function Overloading, Inheritance, [illegible]

[illegible]

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]

[illegible]

Text Books:

1. Ashok N Kamthane, Amit Ashok Kamthane, Programming in C, 3rd Edition, Pearson Education, 2015.
2. Schildt H, C : The Complete Reference, 4th Edition, Tata McGraw-Hill, 2002.
3. R G Dromey, How to solve it by Computer, Pearson Education, 2008.
4. Hanly J R, Koffman E.B, "Problem Solving and Program design in C", Pearson Education, 2009.
5. Herbert Schildt, The Complete Reference C++, 4th Edition, Tata McGraw-Hill.

Reference Books:

1. C Programming: A Problem Solving Approach, Forouzan, Gilberg, Cengage.
2. Programming with C, Bichkar, Universities Press.
3. [illegible]
4. [illegible]
5. [illegible]
6. [illegible]

[illegible]

[illegible]

characteristics, Typical junction voltages and maximum ratings, Determination of h-parameters from I-V characteristics, Ebers Moll Model, Multi Emitter transistor.

UNIT IV

Bipolar Junction Transistor Biasing : Operating point, stabilization, thermal runaway.

Field Effect Transistors: Construction and parameters of JFET, Pinch off and saturation regions, MOS capacitor, Depletion and Enhancement type of MOSFET, I-V characteristics, and small signal models of MOS transistor, UJT and its I-V characteristics, Metal Semiconductor FET, FET biasing schemes.

UNIT V

Optoelectronic Devices: Principle of operation and characteristics of LED, LCD, LDR, Photoconductor, Photodiode, Phototransistor, Solar cell, PIN photodiode, Charge Coupled Devices, APD (avalanche photodiode) and their applications.

Power Semiconductor Devices: Device structure, equivalent circuit and characteristics of Power Diode, SCR, DIAC and TRIAC.

Text/Reference Books:

1. [illegible]
2. [illegible]
3. [illegible]
4. [illegible]
5. [illegible] 2006.
6. [illegible]
7. Y. Tsividis and M. Colin, "Operation and Modeling of the MOS Transistor," Oxford University Press, 2011.

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

1. understand the principles of semiconductor physics, of the intrinsic, p and n type materials.
2. understand the characteristics of the diode and some special function diodes and their application in electronic circuits.
3. use semiconductor devices typical of those in switching and control circuits.
4. understand and utilise the mathematical models of semiconductor junctions and transistors for circuits and systems.
5. understand the characteristics of the Transistors and opto-electronic devices and their application in electronic circuits.
6. Apply Thyristors in power switching and control circuits.

3 Semester:

[illegible]

[illegible]

[illegible]

UNIT I

[illegible]

UNIT II

[illegible]

UNIT III

[illegible]

UNIT IV

Correlation : Curve fitting by method of least squares-Linear, Quadratic and Exponential.

Fitting-Correlation coefficient, correlation-Regression analysis - Multiple correlation.

UNIT V

Quality Control: Concept of quality of a manufactured product-Causes of variation, Principle

of Shewart Control charts-X-Chart, R-Chart, p-Chart, np-chart and C-Chart.

Text Books :

1. S P Gupta, Statistical Methods, 38th Edition, Sultan Chand & Sons Educational Publishers, 2008.
2. T. K. V. Iyengar, et al, Probability and Statistics 2nd Edition S. Chand & Company Ltd, 2009.
3. S C Gupta and V K Kapoor, Fundamentals of Applied Statistics, 3rd Edition, Sultan Chand & Sons Educational Publishers.

I & II Semester

ES-ME191/192 WORKSHOP / MANUFACTURING PRACTICES

([illegible])

([illegible])

[illegible]

Workshop Practice : [illegible]

1. Machine shop 2. Fitting shop 3. Carpentry 4. Electrical & Electronics 5. Welding shop 6. Casting 7. Smithy 8. Plastic moulding 9. Glass Cutting.

Examinations could involve the actual fabrication of simple components, utilizing one or more of the techniques covered above.

Detailed Contents

1. Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods

2. CNC machining, Additive manufacturing
3. Fitting operations & power tools
4. Electrical & Electronics
5. Carpentry
6. Plastic moulding, Glass cutting
7. Metal casting
8. Welding (arc welding & gas welding), brazing

[illegible]

Text / Reference Books :

1. Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K., "Elements of Workshop Technology", Vol. I 2008 and Vol. II 2010, Media promoters and publishers private limited, Mumbai.
2. Kalpakjian S. and Steven S. Schmid, "Manufacturing Engineering and Technology", 4th edition, Pearson Education India Edition, 2002.
3. Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008.
4. Roy A. Lindberg, "Processes and Materials of Manufacture", 4th edition, Prentice Hall India, 1998.
5. Rao P.N., "Manufacturing Technology", Vol. I & II, Tata McGraw Hill House, 2017.

Laboratory Outcomes

- Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
- They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- By assembling different components, they will be able to produce small devices of their interest.

Course Outcomes: Upon completion of this course, the students will gain knowledge of the different manufacturing

[illegible]

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3. [illegible]
4. [illegible]

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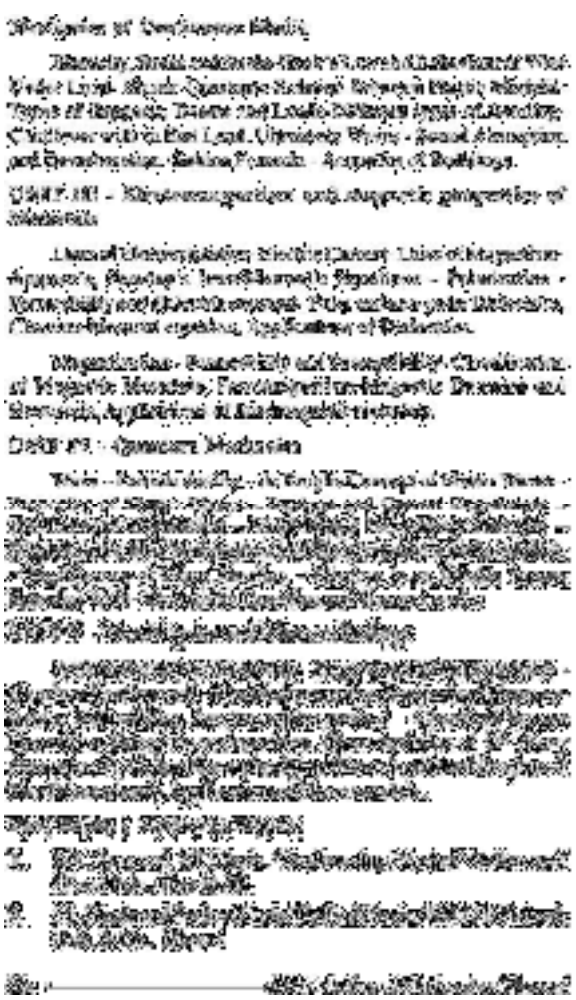

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Unit V

[illegible]

Text Books

1. [illegible]
2. [illegible]
3. [illegible]

Reference Books

1. [illegible]

[illegible]

2. [illegible]
3. [illegible]

V Semester

[illegible]

Elective I [illegible]

Course Objectives:

1. [illegible]
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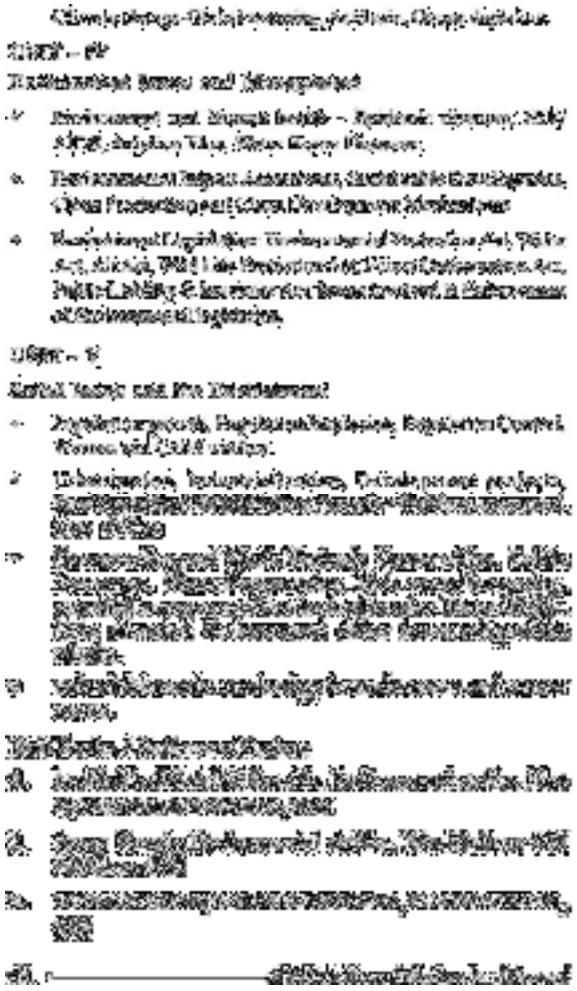

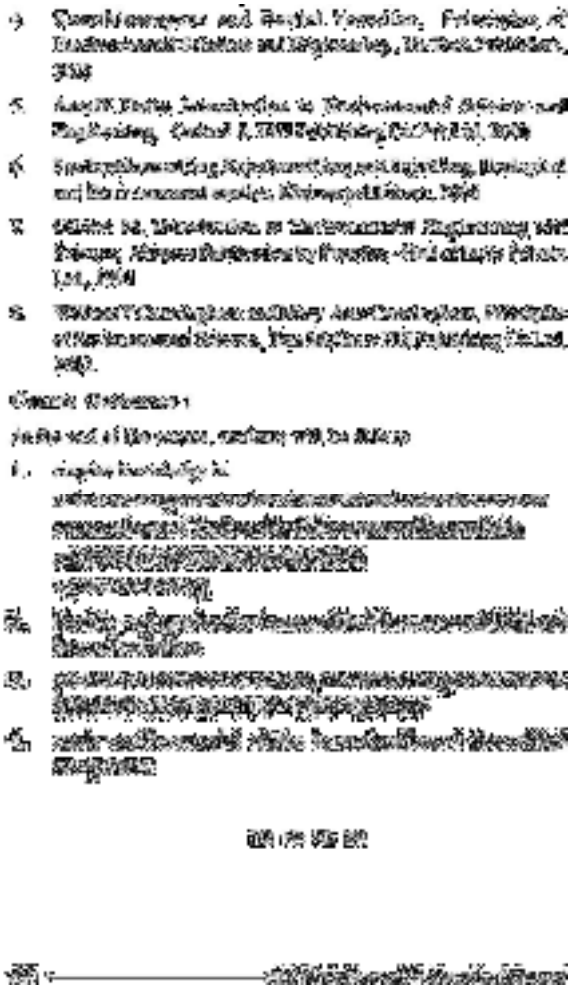

SRI VENKATESWARA UNIVERSITY COLLEGE OF ENGINEERING :: TIRUPATI – 517 502

Department of Computer Science and Engineering

III Semester

Course Code	Course Title	Scheme of Instruction (Hours/Week)				No. of Credits
		L	T	P	Total	
MA301C	Mathematics III	3			3	3
CS302C	Database Management Systems	3	1		4	4
CS303C	Discrete Mathematical Structures	3			3	3
CS304C	Basic Electrical Engineering	3			3	3
CS305C	Elements of Electronics and Communication Engineering	3			3	3
CS306L	Database Management Systems Laboratory			3	3	1.5
CS307L	Electronics and Communication Engineering Laboratory			3	3	1.5
CS309S	Skill Oriented Course - Basic Python Programming	1		2	3	2
PA310A	Audit Course - Constitution of India	2			2	0
Total		18	1	8	27	21

- All Courses - 40 marks (Internal) + 60 Marks (Univ. Semester End)

Audit Course - 100 marks (Internal) - Zero Credits

SRI VENKATESWARA UNIVERSITY COLLEGE OF ENGINEERING :: TIRUPATI – 517 502

Department of Computer Science and Engineering

IV Semester

Course Code	Course Title	Scheme of Instruction (Hours/Week)				No. of Credits
		L	T	P	Total	
CS401C	Digital Electronics and Logic Design	3			3	3
CS402C	Simulation and Modeling	3			3	3
HS403C	Managerial Economics and Accountancy	3			3	3
CS404C	Computer Oriented Numerical Methods	3			3	3
CS405C	Computer Organization	3			3	3
CS406C	Design and Analysis of Algorithms	3			3	3
CS407L	Assembly Language Programming and VHDL Laboratory			3	3	1.5
CS408L	Algorithms Laboratory			3	3	1.5
CS409S	Skill Oriented Course - Basic Web Designing	1		2	3	2
Total		19		8	27	23
Internship for 4 to 6 Weeks (Mandatory) during summer vacation.						

- All Courses - 40 marks (Internal) + 60 Marks (Univ. Semester End)

SRI VENKATESWARA UNIVERSITY COLLEGE OF ENGINEERING :: TIRUPATI – 517 502

Department of Computer Science and Engineering

Choice Based Credit System – 2020 Regulations

Scheme of Instruction and Examinations

List of subjects for B.Tech (Honors) in Computer Science and Engineering**

Course Code	Course Title	Scheme of Instruction (Hours/Week)				No. of Credits
		L	T	P	Total	
CSHN01	Distributed Databases	3	1		4	4
CSHN02	Advanced Operating Systems	3	1		4	4
CSHN03	Multicore Computing	3	1		4	4
CSHN04	Natural Language Processing	3	1		4	4
CSHN05	Software Architecture and Design Patterns	3	1		4	4
CSHN06	Multi Agent Systems	3	1		4	4
CSHN07	Deep Learning	3	1		4	4

- All Courses - 40 marks (Internal) + 60 Marks (Univ. Semester End)

** Students shall register for any 4 subjects (4*4 = 16 credits) from the above listed subjects, choosingone subject each in IV, V, VI and VII semester. Further, they shall acquire 4 credits through two MOOCs (each of 2 credits), which shall be discipline-specific.

B.Tech (CSE) – Choice Based Credit System – 2020 Regulations Scheme of Instruction and Examinations

List of subjects for B.Tech (Minor) in Computer Science and Engineering**

Course Code	Course Title	Scheme of Instruction (Hours/Week)				No. o Credit
		L	T	P	Total	
CSMN01	Data Structures	3	1		4	4
CSMN02	Computer Organization	3	1		4	4
CSMN03	Database Management Systems	3	1		4	4
CSMN04	Computer Networks	3	1		4	4
CSMN05	Software Engineering	3	1		4	4
CSMN06	Java and Web Technology	3	1		4	4

- All Courses - 40 marks (Internal) + 60 Marks (Univ. Semester End)

** Students shall register for any 4 subjects (4*4 = 16 credits) from the above listed subjects, choosingone subject each in IV, V, VI and VII semester. Further, they shall acquire 4 credits through two MOOCs (each of 2 credits), which shall be discipline-specific.

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
III Semester B.Tech (CSE) – CBCS Regulations-2020(With effect from the academic year 2021-22)

MATHEMATICS III

No.of Credits: 3 Instruction
Hours/Week: 3

Course Objectives:

- This course aims at providing the student to acquire the knowledge on the calculus of functions of complex variables.
- To understand power series and expansion of analytic function.
- To understand Laurent Series, poles, singular points, Residue theorem and its applications.
- The aim is to analyze the solutions of partial differential equations.
- To discuss the boundary value problems, one dimensional wave equation, heat equation and Laplace Equation.

UNIT I

Complex analysis - I: Analytical functions - Cauchy- Reimann equations – Construction of Analytic functions- Complex integration - Cauchy's theorem - Integral formula - Evaluationof integrals.

UNIT II

Complex analysis - II**:** Taylor's and Laurents' series - Transformations - Conformal mapping
- Bilinear transformations - Transformation of 1/z, z^2, sin z and cos z.

UNIT III

Complex analysis - III: Singularities - Poles - Residues - Residue theorem – Contourintegration- Evaluation of real integrals.

UNIT IV

Partial differential equations - I : Formation of differential equations - Classification - Firstorder linear partial differential equations – Legranges' linear equation - Method of multipliers
- first order non-linear partial differential equations - Charpits method.

UNIT V

Partial differential equations - II: Method of separation of variables - One dimensional waveequation - Heat equation – Laplace's equation.

Course Outcomes:

Upon successful completion of this course, the student should be able to

- Understand the analyticity of complex functions and conformal mappings.
- Apply Cauchy's integral formula and Cauchy's integral theorem to evaluate improper integrals along contours.
- Describe basic properties of complex integration and having the ability to compute such integrals.
- Describe conformal mappings between various plane regions.

- Apply the concepts of Complex Analysis in many branches of Engineering, including the branches of hydrodynamics, thermodynamics, and particularly quantum mechanics.
- Compute the residue of a function and use the Residue Theory to evaluate a contour integral or an integral over the real line.
- Formulate/solve/classify the solutions of Partial differential equations.
- Identify linear and nonlinear PDE and solve nonlinear PDE by Charpit's method.
- Apply Variables separable methods to solve boundary value problems.
- Find the solution of one dimensional wave equation, heat equation and Laplace equation.

Text/Reference Books:

1. Grewal B S, Higher Engineering Mathematics, 40th Edition, Khanna Publications, 2007.
2. Venkataraman M K, Engineering Mathematics, Vol. I & II, National Publishing Company, 1993.
3. Venkataraman M K, Engineering Mathematics, National Publishing Company, 1995.
4. Grewal B S, Engineering Mathematics, 13th Edition, Khanna Publications.
5. Kreyszig E, Advanced Engineering Mathematics, 8th edition, Wiley, 1998.

CS302
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
III Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

DATABASE MANAGEMENT SYSTEMS

No.of Credits: 4 Instruction Hours/Week: 3L+1T

Course Objectives:

- To learn data models, conceptualize and depict a database system using ER diagram
- To understand the internal storage structures in a physical DB design
- To demonstrate the fundamental concepts, operation and function of different components of database systems.
- To describe the roles of transaction processing and concurrency control in a modern DBMS.
- To demonstrate key issues in the operation of a DBMS including query processing, security and integrity.
- To design and implement a database application.

UNIT-I

Introduction: Managing Data, File Systems versus a DBMS, Advantages of a DBMS, Storingdata in a DBMS, Queries in a DBMS, Transactions, Structure of a DBMS.

Introduction to Data base design: ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model, Conceptual Design for Large enterprises.

Relational Model: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views Destroying/ altering Tables and Views.

UNIT-II

Relational Algebra and Calculus: Relational Algebra , Relational calculus, Expressive Power of Algebra and calculus.

SQL: Form of Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, NULL values , Complex Integrity Constraints in SQL, Triggers and Active Databases, Designing Active Databases

UNIT-III

Schema Refinement and Normal Forms: Introduction, Functional Dependencies, Reasoning about FDS, Normal Forms - FIRST, SECOND, THIRD Normal forms, BCNF, Properties of Decompositions, Normalization, Schema Refinement in Data base Design, Multi valued Dependencies , FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies.

Database Application Development: Accessing Databases from Applications, Introduction to JDBC, JDBC Classes and Interfaces, SQLJ, Stored Procedures.

UNIT-IV

Overview of Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock-based Concurrency Control, Performance Locking, Transaction Support in SQL, Introduction to Crash Recovery.
Concurrency Control: 2PL, Serializability and Recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Deadlocks, Specialized Locking Techniques, Concurrency Control without Locking

Crash Recovery: Introduction to ARIES, Log, Recovery related Structures, Write-Ahead Log Protocols, Checkpointing, Recovering from a System Crash, Media Recovery, Interaction with Concurrency Control

UNIT-V

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing, Index data Structures, Comparison of File Organizations, Indexes and Performance Tuning.

Indexing and Hashing: Intuitions for tree indexes, Indexed Sequential Access Method, B+ Trees: A Dynamic Index Structure, Search, Insert, Delete, Duplicates, B+ Trees in Practice, Static Hashing, Extendable Hashing, Linear Hashing, Extendible vs. Linear Hashing.

Parallel and Distributed Databases: Introduction, Architectures for Parallel Databases, Parallel Query Evaluation, Parallelizing Individual Operations, Introduction to Distributed Databases, Distributed DBMS Architectures, Storing Data in Distributed DBMS, Distributed Catalog Management, Distributed Query Processing

Course Outcomes:

Upon successful completion of this course, the student should be able to

- Use relational algebra and relational calculus, to express database queries.
- Use SQL to interact with database management systems.
- Design appropriate database tables, using functional dependencies and normal forms.
- Implement a disk-oriented database storage manager with heap table and indexes.
- Understand, compare, and implement the major concurrency control algorithms.
- Implement database recovery algorithms and verify their correctness.
- Identify trade-offs among database systems techniques and contrast distributed/parallel alternatives for both on-line transaction processing and on-line analytical workloads.

Text Books:

1. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill, 2014.
2. C. J. Date, A. Kannan and S. Swamynathan, An Introduction to Database Systems, 8th edition, Pearson Education, 2006.

Reference Books:

1. Silberschatz A, Korth H F, and Sudarshan S, Database System Concepts, 6th edition, McGraw-Hill, 2011.

2. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, Fourth Edition, Pearson/Addision wesley, 2007.
3. J D Ullman, H. Garcia-Molina and J. Widom, Database Systems: The Complete Book, Prentice-Hall, 2009.
4. Jeffrey A. Hoffer, Ramesh Venkataraman, Heikki Topi, Modern Database Management, 12th edition, Pearson, 2015.

CS303
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSE) – CBCS Regulations-2020

(With effect from the academic year 2021-22)

DISCRETE MATHEMATICAL STRUCTURES

No.of Credits: 3 Instruction
Hours/Week: 3

Course Objectives:

This course is designed to

- Use mathematical reasoning in order to read, comprehend, and construct mathematical arguments and theorem proving techniques.
- Familiarize students with the basic concept of functions, basic set theory, countability and counting arguments.
- Present basic concepts of number theory and teach students how to apply the same to cryptography.
- Reinforce the method of recursion and use of structural induction.
- Introduce fundamental concepts of graph theory and present different graph models.
- Familiarize students with minimum spanning trees and shortest-path problems.

UNIT I

Logic, Prepositional Equivalences, Predicates and Quantifiers, Nested Quantifiers, Rules ofInference, Introduction to Proofs, Methods of Proof and Strategy.

UNIT II

Sets, Set Operations, Functions, Sequences and Summations, Introduction to Semigroups,Groups, Subgroups, Normal subgroups.
Relations and their properties, n-ary relations and their applications, Representing relations,Closures of relations, Equivalence relations, Partial orderings, Lattices.

UNIT III

Counting: Basics of Counting, Pigeonhole principle, Permutations and Combinations,Binomial Coefficients, Generalized Permutations and Combinations, Generating Permutations and Combinations.
Advanced Counting Techniques: Recurrence Relations, Solving Recurrence Relations, Divide-and-Conquer Algorithms and Recurrence Relations, Generating Functions, Inclusion-and-Exclusion and its Applications.
Number Theory and its Applications.

UNIT IV

Introduction to graphs, Graph terminology, Applications of some special graphs,Representation of graphs, Graph isomorphism.
Connectivity: Connectedness in undirected and directed graphs, Paths and Isomorphism,Construction of reliable communication networks, Euler path, Hamilton path, Chinese postman problem, Shortest path problems, Traveling salesman problem.

UNIT V

Planar graphs, Kuratowski's theorem, Graph coloring and applications.

Introduction to trees, Application of trees, Spanning trees, Applications of backtracking,Minimum spanning trees, Flows, Cuts, Max-flow Min-cut problem.

Course Outcomes

On successful completion of this course the students will be able to:

- Verify the correctness of an argument using propositional and predicate logic
- Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
- Solve problems involving recurrence relations and generating functions.
- Construct and analyze graph models for problems in different areas.
- Design and develop real time application using graph theory

Text Books:

1. Kenneth H Rosen, Discrete Mathematics and its Applications, 6th edition, McGraw-Hill Companies.
2. Mott J L, Kandel A, and Baker T P, Discrete Mathematics for Computer Scientists and Mathematicians, 2nd edition, PHI, 2004.

Reference Books:

1. Malik D S, Sen M K, Discrete Mathematical Structures: Theory and Applications, Thomson Course Technology, 2004.
2. Mott J L, Kandel A, and Baker T P, Discrete Mathematics for Computer Scientists and Mathematicians, 2nd edition, PHI, 2004.
3. Kolman B, Busby R C, Ross S C, and Rehman N, Discrete Mathematical Structures, 5th edition, Pearson Education, 2006.
4. Lipschutz S, Lipson M, Discrete Mathematics, 2nd edition, TMH, 2006.

CS304
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
III Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

BASIC ELECTRICAL ENGINEERING

No.of Credits: 3 Instruction
Hours/Week: 3

UNIT I

Basic Circuit Concepts: Electrical circuit elements (R, L and C), Classification of Circuitelements, Voltage and Current sources, Source transformation Techniques – Kirchhoff's laws
– Star-delta transformation – Network reduction techniques – Mesh and Nodal Analysis for
D.C. Circuits – Concept of mutual inductance – Dot convention.

UNIT II

Network Topology: Graph, tree, incidence matrix, and tie set and cut set matrices –Formulation of equilibrium equations based on graph theory. Duality and dual circuits.
A.C. Fundamentals: Periodic wave forms – Average and effective values of differentwaveforms – Form factor and crest factor.

UNIT III

A.C. Circuits: Phase and phase difference – Phasor notation – Concept of reactance, impedance, susceptance and admittance – Power factor – Active and reactive power – Impedance Triangle – Power triangle – Steady State analysis of single-phase A.C. circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel) – Phasor diagrams. Mesh and Nodal Analysis for A.C. Circuits.

UNIT IV

D.C. Machines: Construction of a D.C. Machine, D.C. Generator: Operation, Classification and EMF equation. D.C. Motor: Operation, Back E.M.F, Types and Applications.
Single Phase Transformers: Principle of Operation, Types, EMF equation.

UNIT V

Three Phase Induction Motor: Production of Rotating Magnetic Field, Construction andoperation of 3-Phase Induction Motor.
Alternators: Construction and working of Alternators.

Course Outcomes

Having successfully completed this course the students will be able to:

- understand and analyze basic electric and magnetic circuits.
- study the working principles of electrical machines and power converters.
- introduce the components of low-voltage electrical installations.

Text/Reference Books:

1. Sudhakar and Shyammohan, Circuits and Networks: Analysis and Synthesis, 5th Edition, Tata McGraw-Hill.

2. Ravish R. Singh, Network Analysis and Synthesis, Tata McGraw-Hill.
3. Nagrath and Kothari, Basic Electrical Engineering, 4th Edition, Tata McGraw-Hill.
4. D.C.Kulshreshtha, Basic Electrical Engineering, McGraw-Hill.

CS305
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSE) – CBCS Regulations-2020

(With effect from the academic year 2021-22)

ELEMENTS OF ELECTRONICS AND COMMUNICATION ENGINEERING

No.of Credits: 3 Instruction Hours/Week: 3

UNIT I

Basic Electronic Devices: Semiconductor fundamentals, Principle of operation and V-I Characteristics of Diodes (PN, Zener, Photo, LED, Laser Diode), Transistors (BJT, JFET, MOSFET).

Microelectronics: Concept of miniaturization of electronic systems, Basic principles of monolithic integrated circuit technology, IC fabrication of simple circuit elements.

UNIT II

Transistor Amplifiers: Concept of an amplifier -Gain, Input and Output impedance, Frequency response, Biasing of a transistor, CB, CE and CC Configurations and their characteristics, Multi stage Amplifiers.

Concept of feedback: Negative and Positive feedback, Advantages and limitations, Oscillator Operation, RC phase shift oscillator and Crystal oscillator.

UNIT III

Analog ICs: Concept of differential amplifier, Operational Amplifier (OPAMP), Characteristics of an OP AMP and its applications - Inverting and non-inverting amplifiers, Summer, Integrator, Differentiator.

555 timer, and its application as multi-vibrator, Phase Locked Loop (PLL), and its applicationas frequency multiplier.

UNIT IV

Basics of Communication Engineering: Introduction, Signal Spectrum, Bandwidth, Noise; Concept of Communication - Source, Channel, Sink; Types of channels; Concept of information and entropy, Shannon's law, Bit rate; Analog Modulation Schemes - AM, FM; Pulse Modulation Schemes - Sampling, PAM, PWM, PPM, PCM, DM; Multiplexing -FDM,TDM.

UNIT V

A/D and D/A Converters: D to A converters- Basic principle, Weighted

resistor and laddertypes; A to D Converters - Basic principle, Ramp, Successive approximation types.
Basic Electronics Instruments: Block diagram and principle of operation of - Digital Multi-meter, Function generator, Cathode Ray Oscilloscope (CRO).

Text Books:

1. Bogart Jr. T F, Beasley J S, and Rico G, Electronic Devices and Circuits, 6th edition, Pearson Education, 2006.

2. Malvino A, and Bates D J, Electronic Principles, 7th edition, Tata McGraw-Hill, 2007.

Reference Books:

1. Deshpande N P, Electronic Devices and Circuits - Principles and Applications, Tata McGraw-Hill, 2007.
2. Muthusubramanian R, Salivahanan S, and Muraleedharan K A, Basic Electrical, Electronics, and Computer Engineering, 2nd edition, Tata McGraw-Hill, 2001. (Part II - Electronics Engineering only)
3. Stanley W D, Hackworth J R, and Jones R L, Fundamentals of Electrical Engineering and Technology, Thomson Delmar Learning, 2007. (Part III - Electronic Devices and Linear Electronics only)
4. Gates E D, Introduction to Electronics, 5th edition, Thomson Delmar Learning, 2007. (Sections 3 and 4 only)
5. Storey N, Electronics - A Systems Approach, 2nd edition, Pearson Education Asia, 2001.

CS306L

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSE) – CBCS Regulations-2020

(With effect from the academic year 2021-22)

DATABASE MANAGEMENT SYSTEMS LABORATORY

No.of Credits: 1.5 Instruction Hours/Week: 3

At least 10 assignments are to be given covering the topics of the course, "DatabaseManagement Systems".

CS307L

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

III Semester B.Tech (CSE) – CBCS Regulations-2020

(With effect from the academic year 2021-22)

ELECTRONICS AND COMMUNICATION ENGINEERING LABORATORY

No.of Credits: 1.5 Instruction Hours/Week: 3

At least 10 assignments are to be given covering the topics of the courses, "Elements ofElectronics and Communication Engineering".

CS309
S

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
III Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

BASIC PYTHON PROGRAMMING

No.of Credits: 2 Instruction Hours/Week: 1T+2P

Course Objectives:

The course is designed to:

- Python syntax and semantics and be fluent in the use of Python flow control and functions.
- the concepts of Object-Oriented Programming as used in Python.
- various problems solving approaches of computer science in various Domains.
- various data structures like lists and dictionaries using python.
- introduce Python third- Party Tools for various domains.

UNIT I

Introduction to Python Programming: Features and History of Python, The Future of Python, Writing and Executing First Python Program, Literal Constants, Variables and Identifiers, Data Types, Input Operation, Comments, Reserved Words, Indentation, Operators and Expressions, Expressions in Python, Operations on Strings, Other Data Types, Type Conversion.

Decision Control Statements: Introduction to Decision Control Statements, Selection/ Conditional Branching Statements, Basic Loop Structures/Iterative Statements, Nested Loops, The break, continue and pass Statement, The else Statement used with Loops.

UNIT II

Functions and Modules: Introduction, Function Definition, Function Call, Variable Scope and Lifetime, The return statement, More on Defining Functions, Lambda Functions or Anonymous Functions, Documentation Strings, Good Programming Practices, Recursive Functions, Modules, Packages in Python, Standard Library modules, Globals(), Locals(), and Reload(), Function Redefinition.

Python Strings Revisited: Introduction, Concatenating, Appending, and Multiplying Strings, Strings are Immutable, String Formatting Operator, Built-in String Methods and Functions, Slice Operation, ord() and chr() Functions, in and not in operators, Comparing Strings, Iterating String, The String Module, Regular Expressions, Metacharacters in Regular Expression.

UNIT III

File Handling: Introduction, File Path, Types of Files, Opening and Closing Files, Readingand Writing Files, File Positions, Renaming and Deleting Files, Directory Methods.

Data Structures: Sequence, Lists, Functional Programming, Tuple, Sets, Dictionaries. **Classes and Objects:** Introduction, Defining Classes, Creating Objects, Data Abstraction,Class Method and self Argument, The _init_() Method, Class Variables and Object Variables,The _del_() Method, Other Special Methods, Public and Private Data Members, PrivateMethods, Calling a Class Method from Another Class Method, Built-in Functions to Check,Get, Set, and Delete Class Attributes, Built-in Class Attributes, Garbage Collection, ClassMethods, Static Methods.

UNIT IV

Inheritance: Introduction, Inheriting Classes in Python, Types of Inheritance, Composition or Containership or Complex Objects, Abstract Classes and Interfaces, Metaclass.

Operator Overloading: Introduction, Implementing Operator Overloading, Reverse Adding, Overriding _getitem_() and _setitem_() Methods, Overriding the in Operator, Overloading Miscellaneous Functions, Overriding the _call_() Method.

Error and Exception Handling: Introduction to Errors and Exceptions, Handling Exceptions, Multiple Except Blocks, Multiple Exceptions in a Single Block, Except Block Without Exception, The else Clause, Raising Exceptions, Instantiating Exceptions, Handling Exceptions in Invoked Functions, Built-in and User-defined Exceptions, The finally Block, Pre-defined Clean–up Action, Re-raising Exception, Assertions in Python, Multi-threading.

UNIT V

Survey of The Most Common 3rd Party Packages: Requests, Numpy/Scipy, Matplotlib/ Pyplot, Pandas, Pillow, Flask/Django/Twisted, Pep8, Scikit-Learn/Nltk, Stanford-Corenlp, Bcrypt, Beautiful Soup, and More.

GUI Design with Tkinter: Button, Canvas, Check Button, Entry, Frame, Label, List Box, Menu, Menu Button, Message, Radio Button, Scale, Scrollbar, Text Graphics with Turtle: Motion Control, Pen, Colour, Fill, Multiple Turtles, Reset and Clear.

Course Outcomes

Having successfully completed this course the students will be able to:

- understand the structure, syntax, and semantics of the Python language.
- interpret the concepts of Object-Oriented Programming as used in Python.
- demonstrate proficiency in handling Strings and File Systems.
- implement desktop/Web-based applications using the Python programming language.

Text Books:

1. Reema Thareja, Python Programming using problem solving approach, First Edition, Oxford University Press, 2017.
2. Mark Lutz, Learning Python, Fifth Edition, O'Rielly, 2016.

Reference Books:

1. Mark Lutz, Programming Python, Fourth Edition, O'Reilly, 2010.
2. John V.Guttag, Introduction to Computation and Programming Using Python with Application to Understanding, PHI.
3. Allen Downey, Think Python: How to think like a Computer Scientist, Green Tea Press.
4. Paul Barry, Head First Python: A Brain-Friendly Guide, Second Edition, O'Reilly.
5. The Python Standard Library, Python 3.6.5 documentation (Web Resource)

https://docs.python.org/3/library/.

PA310
A

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
III Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

CONSTITUTION OF INDIA

No.of Credits: Nil Instruction
Hours/Week: 2

Course Objectives:

The objective of the course is to impart to the students

- understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
- address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT I

History and philosophy of the Indian Constitution:
History -Drafting Committee, (Composition & Working) - Preamble - Salient Features

UNIT II

Contours of Constitutional Rights & Duties: Fundamental Rights, Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy, Fundamental Duties.

UNIT III

Organs of Governance: Parliament – Composition - Qualifications and Disqualifications - Powers and Functions, Executive President – Governor - Council of Ministers - Judiciary, Appointment and Transfer of Judges, Qualifications - Powers and Functions.

UNIT IV

Local Administration:
District's Administration Head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation. Pachayati raj: Introduction, PRI: ZilaPachayat. Elected officials and their roles, CEO ZilaPachayat: Positionand role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

UNIT V

Election Commission: Election Commission: Role and Functioning - Chief ElectionCommissioner and Election Commissioners. State Election Commission: Role and Functioning.

Institute and Bodies for the welfare of SC/ST/OBC and women.

Course Outcomes

Having successfully completed this course the students will be able to know:

- the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- the passage of the Hindu Code Bill of 1956.

Text/Reference Books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, Lexis Nexis, 7th Edition, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

CS401
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
IV Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

DIGITAL ELECTRONICS AND LOGIC DESIGN

No.of Credits: 3 Instruction
Hours/Week: 3

Course Objectives

- To understand the essential knowledge on the fundamental of digital circuits
- To understand the overview on the design principles of digital computing systems

UNIT I

Number Representation, Signed and Unsigned, Code Conversion, Review of Boolean Algebra and DeMorgan's Theorem, Sum-of-Product and Product-of-Sum forms, Canonical forms, Karnaugh maps up to 6 variables.

UNIT II

MSI devices like Comparators, Multiplexers, Encoder, Decoder, Driver & Multiplexed Display, Half andFull Adders, Subtractors, Serial and Parallel Adders, BCD Adder, Barrel shifter and ALU

UNIT III

Sequential Logic Design: Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Finite state machines, Design of synchronous FSM, Algorithmic State Machines charts. Designing synchronous circuits like Pulse train generator, PseudoRandom Binary Sequence generator, Clock generation

UNIT IV

Logic Families and Semiconductor Memories: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing, Memory elements, Conceptof Programmable logic devices like FPGA. Logic implementation using Programmable Devices.

UNIT V

VLSI Design flow: Design entry: Schematic, FSM & HDL, different modeling styles in VHDL, Data typesand objects, Dataflow, Behavioral and Structural Modeling, Synthesis and Simulation VHDL constructs and codes for combinational and sequential circuits.

Course outcomes:

At the end of this course students will demonstrate the ability to

- Design and analyze combinational logic circuits
- Design and analyze synchronous sequential logic circuits
- Design and implement complicated digital systems using Verilog
- Design a VLSI circuit for an application

Text/Reference Books:

1. R.P. Jain, “Modern digital Electronics”, Tata McGraw Hill, 4th edition, 2010.
2. Douglas Perry, “VHDL: Programming by Example”, Tata McGraw Hill, 4th edition.
3. Brown S, and Vranesic Z, Fundamentals of Digital Logic with VHDL Design, 3rd edition, McGraw Hill, 2012.
4. Kinney L L, and Roth Jr. C H, Fundamentals of Logic Design, 7th edition, Cengage Learning, 2015.

CS402
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
IV Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

SIMULATION AND MODELING

No.of Credits: 3 Instruction
Hours/Week: 3

Course Objectives

- To introduce various system modeling and simulation techniques, and highlight their applications in different areas.
- To provide an overview of modeling, through the basic concepts of systems analysis.
- To provide the elements needed to understand how the models can be used in simulation, forecasting, planning and management, and how they can be integrated to support decision-making

UNIT -I

Introduction to Simulation, Definitions, Types of Simulation Models, Applications, Systemand Environment, Components of System, Scope, Advantages and Limitations of Simulation.

UNIT- II

Introduction to Sampling, Statistical Distributions – Discrete and Continuous, Generation ofRandom Numbers and Random Variates.

UNIT- III

Introduction to Mathematical Modeling and Types, Applications, Simulations of Queuing,Inventory and Manufacturing Systems.

UNIT- IV

Introduction to Input data and output Analysis for single Model, Comparing AlternativeSystem Configurations.

UNIT- V

Simulation of computer system, Introduction, Simulation Tools – Process and EventOrientation, CPU and Memory simulation, Simulation of Complex Systems.

Course Outcomes

After successful completion of the course the students would be able to

- describe the components of continuous and discrete systems and simulate the same.
- model any system from different fields.
- discuss the simulation methods and select the suitable technique on the problems.
- implement the model on the computer and from the results, check for the validity of

the model and correctness of the assumptions present in the model.

- understand the limitations of their model and nuances in computer modeling of systems.

Text Books:

1. Banks J, Carson II J S, Nelson B L, Nicole D M and Shahabudeen P, Discrete-Event System Simulation, Pearson Education, 2007.
2. Geoffrey Gordon, System Simulation, 2nd edition, Pearson Education, 2015.

Reference Book:

1. Seila A F, Ceric V, and Tadimalla P, Applied Simulation Modeling, Thomson Brooks/Cole, 2003.

HS403
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

MANAGERIAL ECONOMICS AND ACCOUNTANCY

No.of Credits: 3 Instruction
Hours/Week: 3

UNIT I

Introduction to Engineering Economics, Fundamental concepts, Time value of money, Cashflow and Time Diagrams, choosing between alternative investment proposals, Methods of Economic analysis (pay back, ARR, NPV, IRR and B/C ratio), The effect of borrowing on investment, Equity vs Debt Financing, concept of leverage, Income tax leverage.

UNIT II

Depreciation and methods of calculating depreciation (straight line, sum of the years digit method, Declining balance method, Annuity method, Sinking fund method), National incomeaccounting Methods of estimation, Various concepts of National Income, Significance of National income Estimation and its limitations.

UNIT III

Inflation: Definition, Process and Theories of inflation and Measure of control. New Economic Policy 1991(Industrial Policy, Trade Policy, Fiscal Policy), Impact on Industry.

UNIT IV

Accounting Principles, procedure, Double entry system, Journal, ledger, Trial balance,Cashbook, preparation of Trading and Profit and Loss account, Balance sheet.

UNIT V

Cost Accounting: Introduction, Classification of costs, Methods of costing, Techniques ofcosting, Cost sheet and preparation of cost sheet, Break-even Analysis, Meaning and its application, Limitation.

Course Outcomes:

On successful completion of this course the students will be able to

- Understand Macro Economic environment of the business and its impact on

enterprise.

- Identify various cost elements of the product and its effect on decision making.
- Understand the concepts of financial management and smart investment.
- Prepare the Accounting records and interpret the data for Managerial Decisions.

Text/Reference Books:

1. Henry Malcom Steiner, Engineering Economics Principles, 2nd Edition, McGraw Hill Education, 1996.
2. Dewett. K.K., Modern Economic Theory, Sultan Chand and Co., 2006.
3. A.N. Agarwal, Indian Economy, Wiley Eastern Limited, New Delhi.
4. Jain and Narang, Accounting Part-I, Kalyani Publishers, 2011.
5. Arora, M.N. Cost Accounting: Principles and Practice, 12th Edition, Vikas Publication, 2012.

CS404
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
IV Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

COMPUTER ORIENTED NUMERICAL METHODS

No.of Credits: 3 Instruction
Hours/Week: 3

UNIT I

Errors in Numerical Calculations: Truncation and Round-off errors, Effect of errors in data; Closed form solution versus Iterative methods.
Roots of Nonlinear Equations: Bisection, False position and, Newton-Raphson methods.

UNIT II

Iterative Solution of Liner Equations - Jacobi iteration, Gauss-Seidel and Relaxation methods; Convergence of iteration methods.

UNIT III

Interpolation - Lagrange polynomials, Newton's difference formula, Cubic splines, and Two dimensional interpolation.

UNIT IV

Numerical Differentiation - Differentiating continuous and tabulated functions, Difference tables and Richardson extrapolation. Numerical integration - Trapezoidal, Simpson's 1/3 and Simpson's 3/8 Rules.

UNIT V

Numerical Solution of Ordinary Differential Equations - Taylor's Series, Euler's, Runge- Kutta methods.

Text Books:

1. Schilling R J, and Harries S L, Applied Numerical Methods for Engineers UsingMATLAB and C, Thomson Brooks/Cole, 2006.

Reference Books:

1. Chapra S C, Applied Numerical Methods with MATLAB for Engineers and Scientists, 2nd edition, Tata McGraw-Hill, 2007.
2. Gerald C F, and Wheatley P O, Applied Numerical Analysis, 6th edition, Pearson Education Asia, 2002.
3. Niyogi P, Numerical Analysis and Algorithms, Tata McGraw Hill, 2003.

4. Heath M T, Scientific Computing: An Introductory Survey, McGraw-Hill, 1997.

CS405
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
IV Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

COMPUTER ORGANIZATION

No.of Credits: 3 Instruction
Hours/Week: 3

Course Objectives

The course is designed to

- make the students understand the basic structure and operations of various functional units of a digital computer.
- familiarize the students with arithmetic and logic unit and implementation of fixed point and floating-point arithmetic operations.
- Make the stdents understand how to design processing unit using hardwired control and microprogrammed control approaches.
- familiarize the students with hierarchical memory system.
- expose the students with different ways of communicating with I/O devices and standard I/O interfaces.

UNIT I

Structure of Computers: Introduction, Performance, Memory addressing and Operations, Instructions and Instruction sequencing, Addressing modes, Basic l/0 operations, Pushdown stacks, Subroutines, Encoding of machine instructions, Brief description and functional classification of IA-32 Pentium instruction set

UNIT II

Basic Processing Unit: Fundamental concepts, Single and Multiple bus organization, Hardwired control, Multiprogrammed control – Microinstructions, Microprogram sequencing, Wide-branch addressing, Microinstructions with next-address field, Prefetching microinstructions.

Arithmetic: Multiplication – Booth algorithm; Integer division, Floating-Point Addition and Subtraction.

UNIT III

The memory System: Basic concepts, RAM and ROM Memories and their internal organization, Cache Memories - Mapping functions, Replacement algorithms; Performance Considerations, Virtual Memories, Secondary Storage.

UNIT IV

Input/ Output Organization: Accessing l/O devices; Interrupts –Enabling and disabling, Handling multiple devices; Direct Memory Access - Bus Arbitration; Buses – Synchronous and Asynchronous; Interface circuits –

Parallel port, Serial port

UNIT V

Pipelining: Basic concepts, Data hazards, Instruction hazards, Influence on instruction sets, Data path and control considerations, Superscalar operation.
Processor Families: The ARM family, The Motorola 680x0 and Coldfire families, The IA-32 family.

Course Outcomes:

On successful completion of this course the students will be able to

- Identify the basic structure and functional units of a digital computer.
- Analyze the effect of addressing modes on the execution time of a program.
- Design processing unit using the concepts of hardwired control or microprogrammed control.
- Select appropriate interfacing standards for I/O devices.
- Identify the roles of various functional units of a computer in instruction execution.
- Understand memory hierarchy and its impact on computer cost/performance.
- Understand the advantage of instruction level parallelism and pipelining for high performance processor design.

Text Books

1. Hamacher C, Vranesic Z, and Zaky S, Computer Organization, 5th edition, McGraw-Hill.

Reference Books

1. Heuring V P, and Jordan H F, Computer systems Design and Architecture Addison-Wesley.
2. Carpinelli J D, Computer System Organization and Architecture. Addison-Wesley 2001.
3. Mano M M, Computer system Architecture, 4th edition, Pearson Education Asian 2002.

CS406
C

SRI VENKATESWARA UNIVERSITY :: TIRUPATI
IV Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

DESIGN AND ANALYSIS OF ALGORITHMS

No.of Credits: 3 Instruction
Hours/Week: 3

Course Objectives:

- To understand how to design an algorithm for the given problem.
- To analyze the complexity of an algorithm in terms of time and space.
- To get better insight on different strategies of algorithm design.

UNIT-I

Introduction: What is an Algorithm?, Algorithm Specification, Performance Analysis - Space Complexity, Time Complexity, Amortized Complexity, Asymptotic Notation (O, Ω, Θ), Practical Complexities, Performance Measurement, Randomized Algorithms: An Informal Description, Identifying the Repeated Element, Primality Testing, Advantages and Disadvantages.

Sets and Disjoint Set Union: Introduction, Union and Find Operations.

UNIT-II

Divide-and-Conquer: General Method, Defective Chess Board, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quicksort, Selection, Strassen's Matrix Multiplication, Convex Hull.

UNIT-III

The Greedy Method: The General Method, Container Loading, Knapsack Problem, Tree Vertex Splitting, Job Sequencing with Deadlines, Minimum-Cost Spanning Trees, Optimal Storage on Tapes, Optimal Merge Patterns, Single-Source Shortest Paths.

Basic Traversal and Search Techniques: Techniques for Binary Trees, Techniques for Graphs, Connected Components and Spanning Trees, Biconnected Components and DFS.

UNIT-IV

Dynamic Programming: The General Method, Multistage Graphs, All Pairs Shortest Paths, Single-Source Shortest Paths: General Weights, Optimal Binary Search Trees, String Editing, 0/1-Knapsack, Reliability Design, The Traveling Salesperson Problem, Flow Shop Scheduling.

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Coloring, Hamiltonian Cycles, Knapsack Problem.

UNIT-V

Branch-and-Bound: The Method, 0/1 Knapsack Problem, Traveling Salesperson, EfficiencyConsiderations.

NP-Hard and NP-Complete Problems: Basic Concepts, Cook's Theorem, NP-Hard GraphProblems, NP-Hard Scheduling Problems.

PRAM Algorithms: Introduction, Computational Model, Fundamental Techniques andAlgorithms, Selection.

Course Outcomes:

Upon successful completion of this course, the student should be able to

- Develop systematically an algorithm for solving a problem
- Analyze the time and space complexity of the given algorithm
- Identify algorithm design methodology to solve problems.
- Distinguish between P and NP classes of problems

Text Books:

1. Ellis Horowitz, Sartaj Sahni, and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, 2nd edition, Universities Press, 2008.
2. Cormen T H, Leiserson C E, Rivest R L, and Stein C, Introduction to Algorithms, 3rd edition, Prentice-Hall of India, 2009.

Reference Books:

1. Levitin A, Introduction to the Design and Analysis of Algorithms, 3rd edition, Pearson Education, 2012.
2. Goodrich M T, Tamassia R, Algorithm Design, Wiley, 2008.
3. Skiena S S, The Algorithm Design Manual, 2nd edition, Springer, 2012.
4. Heineman G T, Pollice G, Selkow S, Algorithms in a Nutshell, 2nd edition, O'Reilly, 2016.
5. Dave P H, and Dave H B, Design and Analysis of Algorithms, 2nd edition, Pearson Education, 2008.

CS407L

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSE) – CBCS Regulations-2020

(With effect from the academic year 2021-22)

ALP AND VHDL LABORATORY

No.of Credits: 1.5 Instruction Hours/Week: 3

At least 10 assignments are to be given covering the topics of the course, "AssemblyLanguage Programming and VHDL".

CS408L

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

IV Semester B.Tech (CSE) – CBCS Regulations-2020(With effect from the academic year 2021-22) ALGORITHMS LABORATORY

No.of Credits: 1.5 Instruction Hours/Week: 3

At least 10 assignments are to be given covering the topics of the courses, "Design andAnalysis of Algorithms".

CS409
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SRI VENKATESWARA UNIVERSITY :: TIRUPATI
IV Semester B.Tech (CSE) – CBCS Regulations-2020
(With effect from the academic year 2021-22)

BASIC WEB DESIGNING

No.of Credits: 2 Instruction Hours/Week: 1T+2P

Course Objectives:

The objectives of this course is to acquire knowledge on the

- Web related terminology and how does a website work.
- Web standards and W3C elements
- Responsive Web Designing
- Client-side Scripting Languages (Front End)
- Domains and Hosting

UNIT I

Introduction to Web and Web Design Principles:

Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards, Web pages, Website, Web browsers and Web servers and Web protocols. Basic principles involved in developing a web site, Planning process, Five Golden rules of web designing, Designing navigation bar, Page design, Home Page Layout, Design concept.

UNIT II

Introduction to HTML:

What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, Line Breaks, HTML Tags. Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

UNIT III

Introduction to Cascading Style Sheets:

Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables, CSS Id and Class, Box Model (Introduction, Border properties, Padding Properties, Margin properties), CSS Advanced (Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute sector), CSS Color, Creating page Layout and Site Designs.

UNIT IV

Introduction to Java Script:

What is Java Script? Basics of Java Script: Variables, functions, and Operators, select HTML elements with Java Script, Java Script Events and Event Handlers, Regular expressions and pattern matching in Java Script. Form validation using Java Script.

UNIT V

Introduction to Web Publishing or Hosting:

Creating the Web Site, Saving the site, Working on the web site, Creating web site structure, Creating Titles for web pages, Themes-Publishing web sites. Case study: Web publishing and hosting using Heroku cloud platform (https://www.heroku.com/).

Course Outcomes

Having successfully completed this course the students will be able to:

- describe and explain the relationship among HTML, XHTML, CSS, JavaScript, XML and other web technologies.
- create and publish advanced web pages with the help of HTML frames, scripting languages, and CSS.
- design forms for thick clients using JavaScript with interactive responsiveness and validations.
- design, host and publish websites in various domains.

Text Books:

1. Kogent Learning Solutions Inc., HTML 5 in simple steps, Dreamtech Press.
2. A beginner's guide to HTML, NCSA, 14th May 2003.
3. Murray, Tom/Lynchburg, Creating a Web Page and Web Site, College, 2002.

Reference Books:

1. Web Designing and Architecture-Educational Technology Centre, University of Buffalo.
2. Steven M Schafer, HTML, XHTML, CSS and JavaScript, Wiley India.
3. Ian Pouncey, Richard York, Beginning CSS: Cascading Style Sheets for Web Design, Wiley India.
4. Kogent Learning, Web Technologies: HTML, JavaScript, Wiley India.

CSHN 01

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

B.Tech (Honors in CSE) – CBCS Regulations-2020

DISTRIBUTED DATABASES

No.of Credits: 4 Instruction Hours/Week: 3L+1T

Course Objectives:

- To expose the need for distributed database technology to confront with the deficiencies of the centralized database systems.
- To introduce basic principles and implementation techniques of distributed database systems.
- To familiarize students with the principles and knowledge of parallel databases.

UNIT I

Introduction: What Is a Distributed Database System?, History of Distributed DBMS, Data Delivery Alternatives, Promises of Distributed DBMSs, Design Issues, Distributed DBMS Architectures.

Distributed and Parallel Database Design: Data Fragmentation, Allocation, Combined Approaches, Adaptive Approaches, Data Directory.

Distributed Data Control: View Management, Access Control, Semantic Integrity Control.

UNIT II

Distributed Query Processing: Overview, Data Localization, Join Ordering in DistributedQueries, Distributed Cost Model, Distributed Query Optimization, Adaptive Query Processing.

Distributed Transaction Processing: Background and Terminology, Distributed Concurrency Control, Distributed Concurrency Control Using Snapshot Isolation, DistributedDBMS Reliability, Modern Approaches to Scaling Out Transaction Management.

UNIT III

Data Replication: Consistency of Replicated Databases, Update Management Strategies,Replication Protocols, Group Communication, Replication and Failures.

Database Integration - Multidatabase Systems: Database Integration, Multidatabase Query Processing.

Parallel Database Systems: Objectives, Parallel Architectures, Data Placement, ParallelQuery Processing, Load Balancing, Fault-Tolerance, Database Clusters.

UNIT IV

Peer-to-Peer Data Management: Infrastructure, Schema Mapping in P2P Systems, Querying Over P2P Systems, Replica Consistency, Blockchain.

Big Data Processing: Distributed Storage Systems, Big Data Processing Frameworks,Stream Data Management, Graph Analytics Platforms, Data Lakes.

UNIT V

NoSQL, NewSQL, and Polystores: Motivations for NoSQL, Key-Value Stores, Document Stores, Wide Column Stores, Graph DBMSs, Hybrid Data Stores, Polystores.

Web Data Management: Web Graph Management, Web Search, Web Querying, QuestionAnswering Systems, Searching and Querying the Hidden Web, Web Data Integration.

Course Outcomes:

After completion of the course the students will be able to

- Design and implement distributed databases.
- Handle query processing in a distributed database system.
- Comprehend transaction management and analyze various approaches to concurrency control in distributed databases.
- Design and implement various algorithms and techniques for deadlock and recovery in distributed databases.

Text Books:

1. M. Tamer Ozsu and Patrick Valduriez, "Principles of Distributed Database Systems",Fourth Edition, Springer, 2020.

Reference Books:

1. Stefano Ceri and Giuseppe Pelagatti, Distributed Databases: Principles and Systems, McGraw Hill Education, 2017.
2. Saeed K. Rahimi and Frank S. Haug, Distributed Database Management Systems: A Practical Approach, Wiley.
3. Chhanda Ray, Distributed Database Systems, First Edition, Pearson Education India.
4. Sachin Deshpande, Distributed Databases, Dreamtech Press.
5. David Bell and Jane Grimson, Distributed Database Systems, First Edition, Addison-Wesley, 1992.
6. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: Database Systems: The Complete Book, Second Edition, Pearson Education.

CSMN 01

SRI VENKATESWARA UNIVERSITY :: TIRUPATI

B.Tech (Minor in CSE) – CBCS Regulations-2020

(With effect from the academic year 2021-22)

DATA STRUCTURES

No.of Credits: 4 Instruction Hours/Week: 3L+1T

Course Objectives:

- Develop skills to design and analyze linear and nonlinear data structures.
- Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
- Develop recursive algorithms as they apply to trees and graphs.
- Strengthen the ability to identify and apply the suitable data structure for the given real world problem.
- Understand the various techniques of sorting and searching.

UNIT I

Introduction: Data types/Objects/Structures, Abstract definition of Data Structures, Overview of linear and nonlinear data structures, Analysis of algorithms, Algorithm specification, Asymptotic notation, Time-Space trade-off, Searching: Linear, Binary and Fibonacci search and their complexity analysis.

Arrays: Definition, Multidimensional arrays, Pointer arrays, Representation of arrays – Row major and Column major orders, Application of arrays – Polynomials, Sparse matrices representation.

UNIT II

Stacks and Queues: Introduction, ADT, Array Representation, Operations and Applications of Stacks - Evaluation of expressions, Code generation for stack machines, Implementation of recursion, Factorial calculation and Towers of Hanoi; Circular Queue, Priority Queue, Double ended queue, Applications of Queues - Simulation, CPU Scheduling; Multiple stacks and queues.

UNIT III

Linked Lists: Single linked lists and chains, Circular linked list, Doubly linked list, Circular doubly linked list, Complexity analysis of the same, Linked representation of Stacks and Queues, Applications of linked lists - Polynomial representation, Sparse matrix multiplication, Dynamic storage management; Generalized list representation, Recursive algorithms for lists, Recursive lists.

UNIT IV

Trees: Basic tree terminologies, Binary Trees – Definition, Properties, ADT, Representations, Operations and Applications; Binary Search Trees, Heap Trees, Threaded binary trees, Height balanced trees – AVL Trees, Red black tree, Splay tree Their operations and complexity analysis.

UNIT V

Sorting Techniques: Insertion sort, Selection sort, Bubble sort, Quick Sort, Radix sort, Merge sort, External sort – Introduction, K-way Merge sort.

Graphs: Basic terminologies, Representations, ADT, Operations on graphs – DFS, BFS,Spanning Trees, Biconnected components, Minimum cost spanning trees.

Course Outcomes:

After completion of the course the students will be able to

- Choose appropriate data structure for the specified problem definition.
- Implement linear and non-linear data structures viz. stacks, queues, linked list, trees,graphs.
- Apply the concept of trees and graph data structures for the real world problems.
- Comprehend the implementation of sorting and searching algorithms.

Text Books:

1. Ellis Horowitz and Sartaj Sahni, “Fundamentals of Data Structures”, ComputerScience Press.
2. Ellis Horowitz, Sartaj Sahni, Dinesh Mehta, Fundamentals of Data Structures in C++, Universities Press, Second Edition.
3. Debasis Samanta, Classic Data Structures, Second Edition, Prentice Hall of India.

REFERENCES:

1. Aaron M. Tenenbaum Yedidyah Langsam. Moshe J. Augenstein, “Data Structuresusing C and C++”, PHI Learning Private Limited.
2. Jean Paul Tremblay and Paul G Sorenson, “An Introduction to Data Structures with Applications”, McGraw Hill.
3. R. Kruse et.al, “Data Structures and Program Design in C”, Pearson Education.