GUJARAT TECHNOLOGICAL UNIVERSITY
BE 1ST YEAR
TEACHING SCHEME AND SYLLABUS

Computer Engineering

SEM - I

Subject code	Subject name	Teaching Scheme (Hours)			Credits
		Theory	Tutorial	Practical	
2110014	Calculus	3	2	0	5
2110002	Communication Skills	2	0	2	4
2110005	Elements of Electrical Engineering	4	0	2	6
2110006	Elements of Mechanical Engineering	4	0	2	6
2110013	Engineering Graphics	2	0	4	6
2110007	Environmental Studies	3	0	0	3
	Total	**18**	**2**	**10**	**30**

SEM - II

Subject code	Subject name	Teaching Scheme (Hours)			Credits
		Theory	Tutorial	Practical	
2110015	Vector Calculus & Linear Algebra	3	2	0	5
2110003	Computer Programming and Utilization	3	1	2	6
2110011	Physics	3	0	2	5
2110001	Chemistry				
2110004	Elements of Civil Engineering	4	0	2	6
2110012	Workshop	0	0	4	4
2990001	Contributor Personality Development	4	0	0	4
	Total	**17**	**3**	**10**	**30**

GUJARAT TECHNOLOGICAL UNIVERSITY

CALCULUS

SUBJECT CODE: 2110014

B.E. 1ST YEAR

Type of course: Engineering Mathematics

Prerequisite: Student should be able to graph elementary functions and solve both linear equations and inequalities. Students entering in Calculus should have a firm grasp of algebra and trigonometry, trigonometric functions, inverse trigonometric functions and their properties, exponential and logarithmic function. Continuity and Differentiability of functions, Derivatives of Functions in Parametric Forms, Mean Value Theorem, Rate of Change of Quantities, Increasing and Decreasing Functions, Tangent, Normal and Maxima and Minima of single variable function. Integrals, Integration as an Inverse Process of Differentiation, Integrals of some Particular Functions, Integration by Partial Fractions, Integration by Parts, Definite Integral, Fundamental Theorem of Calculus, Evaluation of Definite Integrals by Substitution, Properties of Definite Integrals, Area under Simple Curves and Area between Two Curves by integration.

Rationale: Mathematics is a language of Science and Engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Tutorial Work/ Practical Marks		
				ESE (E)	PA (M)	ESE /Viva (V)	PA (I)	
3	2	0	5	70	30*	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Infinite Sequences and Series** • Introduction of Convergence, Divergence of Sequences and Infinite Series • The nth term test for Divergence, Integral Test • Comparison Test, Ratio Test, Root Test • Alternating Series, Absolute convergence, Conditional convergence • Power Series & Radius of convergence • Taylor's series • Maclaurin's series	7	20-22%

2	**Curve Sketching** • Concavity • Curve sketching • Polar co-ordinates, Relation between Polar and Cartesian	4	10-12%

	Co-ordinates • Graphs in Polar co-ordinates		
3	**Indeterminate Forms** • Indeterminate form $\left(0\,0,\ \infty\,\infty,\ \infty\cdot\,0,\ \infty-\infty\right)$ • Indeterminate form $\left(0^{0}, \infty^{0},\ 1^{\infty}\right)$ **Improper Integral** • Improper integrals of Type- I and Type - II • Convergence and divergence of improper integrals	4	10-12%
4	**Applications of Integration** • Volume by slicing • Volume of solids of revolution by disk method • Volume of solids of revolutions by washer method • Volume by cylindrical shell.	4	10-12%
5	**Partial Derivatives** • Function of 2-variables, graphs, level curves • Limit, continuity of function of several variables • Partial derivatives and Clairauts' theorem • Tangent plane, Normal line • Linear approximation, Total differential • Chain rule, implicit differentiation • Euler's theorem for homogeneous function • Maximum and minimum values by second derivative test • Lagrange multipliers • Taylor's formula for two variables	10	30-32%
6	**Multiple Integrals** • Double integrals over rectangles and Fubini's theorem, Properties of double integrals • Double integrals over general region • Double integrals in polar co-ordinates • Triple Integrals, Triple integrals in cylindrical co-ordinates • Triple integrals in spherical co-ordinates • Change of Order of Integration • Jacobian of several variables, Change of variable in multiple integrals	7	20-22%

Note: Teachers are advised to encourage students to perform the projects in group of 4 students for conceptual understanding by geometrically, numerically and algebraically.

Reference Books:

1. Calculus with Early Transcendental Functions, James Stewart, Cengage Learning
2. Thomas' Calculus, Maurice D. Weir, Joel Hass, Frank R. Giordano, Pearson Education
3. Calculus – Single and Multivariable, Hughes – Hallett et al., John-Wiley and Sons.
4. Calculus, Robert T. Smith & Ronald B. Minton, McGraw-Hill
5. Calculus, Volumes 1 and 2, T. M. Apostol, Wiley Eastern.
6. Engineering Mathematics, A Programmed Approach, C. W. Evans, Stanley ThornesPublishers Ltd.

Course Outcome:

1. Add together infinitely many numbers.
2. Represent a differentiable function f(x) as an infinite sum of powers of x.
3. Decide on convergence or divergence of a wide class of series.
4. See concavity of graph and find out points of inflection.
5. Observe behaviour of function f(x) as x goes to infinity/ negative infinity.
6. Able to evaluate indeterminate forms using L'Hospital's Rule.
7. To answer at least about the convergence or divergence of integral when integral is not easily evaluated using techniques known.
8. Able to evaluate the volume of solids such as pyramid, sphere, etc. by slicing method.
9. Generate the solid by rotating region about an axis in its plane and hence calculating the volume of solid, by disk method.
10. If the solid of revolution has a hole in it, then determine the volume by washer method.
11. Evaluate partial derivatives.
12. Apply the knowledge to solve some practical problems, such as constrained optimization problems and other problems involving Partial differentiation
13. Evaluate a double integral in polar coordinates.
14. Reverse the order of integration for a double integral.
15. Evaluate a triple integral to find volume in rectangular coordinates, cylindrical coordinates, and spherical coordinates.

List of Open Source Software/learning website:

The above mentioned contents can be referred through:

- NPTEL – Mathematics I: Calculus by Prof. Swagato K. Ray, Department of Mathematics, Indian Institute of Technology Kanpur.
  Link: http://utubersity.com/?page_id=735&tubepress_page=1

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding the applications of Calculus to engineering applications – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Calculus is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

GUJARAT TECHNOLOGICAL UNIVERSITY
COMMUNICATION SKILLS
SUBJECT CODE: 2110002
B.E. 1ST YEAR

Type of course: Communication skills

Prerequisite: Zeal to learn the subject

Rationale: The rationale of Technical Communication Skills in English is to help students understand the process of communication in link with Non – verbal Communication. The curriculum also targets the understanding of different barriers that creep into communication process. Moreover Units covered on LSRW skills development will help students acquire competence over linguistic skills. This would be developed through balanced and integrated tasks.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Pr/Viva (V)	PA (I)	
2	0	2	4	70	30*	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Basics of Communication** • Definition and Process of Communication • Kinesics • Paralinguistics • Proxemics • Chronemics	4	15%

2	**Presentation Strategie**
	• Defining the Purpose of Presentation
	• How to Make an Effective Presentation:
	    i) Analyzing audience and locale
	    ii) Organizing content and preparing an outline
		2	10%

3	**Listening Ability** • Hearing and Listening • Types of Listening • Barriers to Effective Listening • Traits of a Good Listener	2	10%

4	**Reading Fluency** • Introduction • Reading Strategies • Techniques of reading • Developing Reading Comprehension	4	15%
5	**Writing : Mastering the Final Skill** • Paragraph writing (Application Que) • Business Letters (Application Que) • Report Writing (Application Que) • Completion of a Given Story (Application Que) • E-mail etiquettes **Note: Only Practical/Application Questions of writing skills should be asked in ESE, the theory of the above mentioned topics can be explained in the class.**	6	25%
6	**Enriching Language through Literature** *Poems* • ***The Road Not Taken*** by Robert Frost • ***Goodbye Party for Miss Pushpa T S*** by Nissim Ezekiel *Short Stories* • ***The Eyes Are Not Here*** by Ruskin Bond • ***The Romance of a Busy Broker*** by O. Henry	6	25%

Language Laboratory Activities:

Sr.No	Activity	Hour
1.	Comprehension Practical	02
2.	Picture Description and completion of a story	02
3	Book Review List of Books Suggested for the Book Review *The Secret* by Rhonda Byrne *My Experiments with Truth* by M K Gandhi *Hind Swaraj* by M K Gandhi *Wings of Fire* by A P J Abdul Kalam *History of Everything* by Stephen Hawking *The Old man and the Sea* by Ernest Hemingway *Haroun and the sea of stories* by Salman Rushdie *Abhigyan Shakutalam* by Kalidasa *Who Moved My Cheese* by Robin Sharma *You Can Win* by Shiv Khera *Stay Hungry Stay Foolish* by Rashmi Bansal *The Monk Who Sold His Ferrari* by Robin Sharma *I am Ok You are Ok* by Thomas Harris *The Eighth Habit* by Stephen Covey *Bhagvat Gita on Effective Leadership I* by Poojan Roka *The Kalam Effect* By Nair *Tough Times Never Last But Tough People Do* by Dr.Robert Schuller *What Employers Want But Business Schools Don't Teach*	

	What Employers Want But Business Schools Don't Teach by Yasmin D'sousa and Amitabh Singh *Freedom is not Free* by Shiv Khera *Be an Exraordinary Person in an Extaordinary World* by Robert Schuller *Making Miracles* by Arnold Fox and Barry Fox *My Experiments with Truth* by M K Gandhi *Hind Swaraj* by M K Gandhi *Wings of Fire* by A P J Abdul Kalam *History of Everything* by Stephen Hawking *The Old man and the Sea* by Ernest Hemingway *Haroun and the sea of stories* by Salman Rushdie *Abhigyan Shakutalam* by Kalidasa *Who Moved My Cheese* by Robin Sharma *You Can Win* by Shiv Khera *Stay Hungry Stay Foolish* by Rashmi Bansal *The Monk Who Sold His Ferrari* by Robin Sharma *I am Ok You are Ok* by Thomas Harris *The Eighth Habit* by Stephen Covey *Bhagvat Gita on Effective Leadership I* by Poojan Roka *The Kalam Effect* By Nair *Tough Times Never Last But Tough People Do* by Dr.Robert Schuller *What Employers Want But Business Schools Don't Teach* by Yasmin D'sousa and Amitabh Singh *Freedom is not Free* by Shiv Khera *Be an Exraordinary Person in an Extaordinary World* by Robert Schuller *Making Miracles* by Arnold Fox and Barry Fox *The Road Less Travelled* by M.Scott Peck to name a few……	04
4.	Presentations	03
5.	GD Practical	02
6.	Telephonic Conversation	01
7.	Role Play	03
8.	Phonetics –Spoken Practice	02
9.	Listening practice and negotiation skills	03
10.	Phonetics - Transcription / Dictionary Reading	02

Reference Books:

1. Vibrant English. Hyderabad: Orient BlackSwan, 2013
2. Lesikar R V, Flatley M E ,Rentz K and Pandey Business Communication: Making Connections in a Digital World 2009: New Delhi, Tata Mcgrow Hill
3. Kumar S and Lata P Communication Skills 2011: New Delhi Oxford University Press
4. Leech, Geoffrey and Jan Svartvik. A Communicative Grammar of English. New Delhi: Pearson, 2009.

Course Outcome:

After learning the course the students should be able to

1. To know the process of communication and its components.
2. To improve the language skills i.e. Listening Skills, Speaking Skills, Reading Skills and Writing Skills (LSRW).
3. Construct basic and intermediate skills in English language.
4. To enhance phonetic competence, comprehension skills, presentation skills, group discussion skills etc.
5. To create literature sensibility and learn life skills through it.
6. To build confidence for communicating in English and create interest for the life-long learning of English language.

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Communication Skills is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

GUJARAT TECHNOLOGICAL UNIVERSITY
ELEMENTS OF ELECTRICAL ENGINEERING(Modified on 4th Feb 2014)
SUBJECT CODE: 2110005
B.E. 1st YEAR

Type of course: Engineering

Prerequisite: N.A.

Rationale: The course provides introductory treatment of the field of *Electrical Engineering* to the students of various branches of engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total
L	T	P	C	Theory Marks		Practical Marks		Marks
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
4	0	2	6	70	30*	30#	20**	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**D. C. Circuits:**	20	40%
a)	**Elementary Concepts:** Introduction of Electrical Current, Voltage, Power and Energy; Sources of Electrical Energy – Independent and Dependent Source, Source conversion; Ideal electrical circuit elements - Resistor, Inductor and Capacitor; Fundamental laws of electric circuits - Ohm's Law and Kirchhoff"s Laws; Analysis of series, parallel and series-parallel circuits; Star – Delta conversion; Node and Mesh analysis.	08	15%
b)	**Electrostatics:** Electric charge and Laws of electrostatics; Definitions - Electric field, lines of force, electric field intensity, electric flux and flux density; Electrostatic induction; Gauss's law and its application; Dielectric strength; Capacitor; Capacitor in series and parallel, Energy stored in a capacitor.	04	10%
c)	**Electromagnetism:** Faradays Laws; Lenz's Law; Fleming's Rules; Effect of magnetic field on current carrying conductor; Magnetic circuits; Statically and dynamically induced EMF; Concepts of self inductance, mutual inductance and coefficient of coupling; Inductance in series and parallel; Hysteresis and Eddy current losses; Energy stored in magnetic fields.	08	15%
2	**A. C. Circuits :**	20	40%

a)	**Single Phase A.C. Circuits:** Generation of sinusoidal voltage, Definition of average value, root mean square value, form factor and peak factor; Phasor representation of alternating quantities; Analysis with phasor diagrams of R, L, C, R-L, R-C and R-L-C circuits; Concepts of Real power, Reactive power, Apparent power and Power factor, Series, Parallel and Series - Parallel circuits; Power in AC circuit, Power factor improvement; Resonance in series and parallel circuits, Q-factor, Bandwidth and Selectivity.	12	25%
b)	**Three Phase A.C. Circuits:** Necessity and Advantages of three phase systems, Generation of three phase power, Phase sequence, Balanced supply and Balanced load; Relationship between line and phase values of balanced three phase circuit; Power Measurement in balanced three phase circuits.	08	15%
3	**Batteries, wiring, illumination & electrical safety:**	**08**	**20%**
a)	**Batteries and Fuel Cell:** Introduction of Batteries; The Simple cell, E.M.F and internal resistance of a cell; Primary and Secondary cells, Cell capacity; Types & Specifications of Batteries; Charging & Discharging of Battery; Safe disposal of Batteries; Fuel cell: Principle & Types of fuel cell.	02	05%
b)	**Electrical Wiring:** Types of wires and cables; Types of Connectors & Switches; System of wiring, domestic and industrial wiring; Simple control circuit in domestic installation.	02	05%
c)	**Illumination:** Types of lamps, fixtures & reflectors; Illumination schemes for domestic, industrial & commercial premises;Lumen requirements for different categories.	02	05%
d)	**Safety & protection:** Safety precautions in handling electrical appliances; Electric shock, First aid for electric shock other hazards of electrical laboratories & safety rules; Grounding & Earthing - Importance of grounding and earthing, equipment for grounding, Methods of earthing; Circuit protection devices: Fuses, MCB, ELCB & Relays.	02	05%

Reference Books:

1. B.L. Theraja (2012), Electrical Technology,Vol – 1,S. Chand.
2. D.P. Kothari and I.J. Nagrath (2013), Theory and Problems in Basic Electrical Engineering,Prentice Hall, India.
3. John Bird (2012), Electrical Circuit Theory and Technology, Forth edition, Routledge, Taylor and Francis Group.
4. Parker Smith (2003), Problems in Electrical Engineering, CBS Publishers.
5. Surinder P Bali (2013), Electrical Technology, Vol – I, Pearson
6. V. N. Mittal and A. Mittal (2012), Basic Electrical Engineering, Tata McGraw Hill.
7. Vincent Del. Toro (2012), Principles of Electrical Engineering, Prentice Hall, India
8. Surjit Singh, Electrical Estimating & costing, Dhanpat Rai & Co.
9. S.G. Tarnekar, A Textbook of Laboratory Course in Electrical Engineering, S. Chand Publications.

Cource outcome:

After learning the course the students should be able to:

1. Understand electrical current, potential difference, power and energy, sources of electrical energy, resistance and its behavior with temperature.
2. Use the Ohm's Law and the Kirchhoff's Law and star delta transformation for solving resistive series, parallel and series-parallel circuits.
3. Define Electric field, lines of force, electric field intensity, electric flux, flux density and permittivity. Capacitor, charging and discharging phenomena of capacitors and calculations of capacitance for capacitors connected in series and parallel circuits.
4. Describe the magnetic field, Faradays Laws; Lenz's Law; Fleming's Rules. Flux density, permeability, the Effect of magnetic field on current carrying conductor. Perform calculation of Magnetic circuits. Concept of statically and dynamically induced EMF, self-inductance, mutual inductance and coefficient of coupling.
5. Understand the B-H curve, Hysteresis loop and Eddy current losses. Calculate the Energy stored in magnetic fields.
6. Understand AC Quantities, the mathematical operation on AC waveforms, Draw phasor diagram and waveforms for purely resistive, purely inductive and purely capacitive as well as series and parallel R-L-C circuits and also circuit Resonance and Q-factor and derive resonance frequency for such circuits.
7. Understand Concepts of Real power, Reactive power, apparent power and Power factor and perform calculations of these quantities for series and parallel R-L-C circuits.
8. Describe three phase supply and its advantages. Understand the star and delta connection and their relationships. Draw phasor diagram for balanced and unbalanced three phase circuit. Calculate power and it's measurement by wattmeter.
9. Understand the principle of battery, construction of simple cell. Define the terms internal resistance of a cell, different types of batteries with specifications and its applications. The charging and discharging of the batteries. Fuel cell and their likely future applications.
10. Understand the different types of wires, cables, connectors & switches used for wiring Different types of domestic and industrial wiring.
11. Identify and use of different type of lamps, fixtures & reflectors, Understand the different types of illumination schemes and lumen requirements for different categories.
12. Understand the importance of safety and the precaution to be taken while working with electrical equipments and accessories. Understand the working principle, usage and construction of circuit protection devices such as fuse, MCB, ELCB & Relays.
13. Understand importance of electrical earthing and grounding.

List of Experiments:

General introduction to Electrical Engineering Laboratory, experimental set-ups, instruments etc…
and to study the standard symbols used for electrical diagram representation.

Based on Module (1)

1. To observe the effect of temperature on Resistance of metal.
   Problem may be given to students:
   - To DESIGN a bimetallic strip based Room temperature indicator.
2. To study the Capacitors in series and parallel DC circuit.
   Problem may be given to student:
   - To DESIGN/DEVELOP a TOY using the charging and discharging phenomena of capacitor in the workshop.
3. To plot the magnetizing characteristic and study the hysteresis loop for a magnetic material on CRO.
   Problems may be given to students:
   - To DESIGN a small transformer with core made of Magnetic fluid.
   - To DESIGN a device to measure Steady State (non-varying) Magnetic Field.
   - To DESIGN or principal for a Magnetic Fluid Speaker.

Based on Module (2)

4. To obtain inductance, power and power factor of the Series R-L circuit with AC supply using Phasor diagram.
   Problem may be given to students:
   - To DESIGN a contactless A.C Supply Frequency Measurement
5. To obtain capacitance, power and power factor of the Series R-C circuit with AC supply using Phasor diagram.
6. To obtain inductance, capacitance, power and power factor of the Series R-L-C circuit with AC supply using Phasor diagram.
   Problem may be given to students
   - To DEVELOP a TOY using RLC and Electronics components in the workshop in the workshop
7. Determination of Resonant frequency, Bandwidth and Q factor for RLC network in Series and Parallel resonance.
8. Verification of current and voltage relations in three phase balanced Star and Delta connected loads.
9. Measurement of active and reactive power in balanced 3-phase circuit using two-watt meter method.

Hands on Practice for Electrical Workshop
Based on Module (3)

1. Wiring Exercise
   I. Study of various wiring components i.e. wires, switches, fuses. sockets, plugs lamp holders etc…
      their uses and ratings.
   II. Control of two lamps from two switches (looping in system).
   III. Staircase wiring.
   IV. Study of fluorescent tube circuit, compact fluorescent lamp (CFL) and light emitting diode (LED).
   V. Study of HID lamps such as mercury-vapour lamp/sodium- vapour lamp circuit.
2. Study of safety precaution while working on electric installations.
3. To study the basic methods of Earthing

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS:

(i) Preparation of videos for showing real life applications, Preparation of animations for understanding the concepts, Preparation of Pictures with annotations to explain the concepts.

(ii) Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Elements of Electrical Engineering is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

** PA (I): 10 marks for a case study of Systems, 10 marks for other methods of PA.

The case study of Systems: The case study should be of a working EE system, which shows the working of the concepts, included in the Syllabus.

 # ESE Pr (V):10 marks for Open Ended Problems, 20 marks for VIVA.

Note: Passing marks for PA (M) will be 12 out of 30.

     Passing marks for ESE Pract (V) will be 15 out of 30.

     Passing marks for PA (I) will be 10 out of 20

GUJARAT TECHNOLOGICAL UNIVERSITY

ELEMENTS OF MECHANICAL ENGINEERING (Modified on 4th Feb 2014)
SUBJECT CODE: 2110006
B.E. 1st YEAR

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Understanding of basic principles of Mechanical Engineering is required in various field of engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
4	0	2	6	70	30*	30#	20**	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr #	Topic	Teaching Hrs.	Module Weightage
1	**Introduction:**Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat capacity, Change of state, Path, Process, Cycle, Internal energy, Enthalpy, Statements of Zeroth Law and First law	4	25%
2	**Energy:** Introduction and applications of Energy sources like Fossil fuels, Nuclear fuels, Hydel, Solar, wind, and bio-fuels, Environmental issues like Global warming and Ozone depletion	3	
3	**Properties of gases:**Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, Relation between Cp and Cv, Various non-flow processes like constant volume process, constant pressure process, Isothermal process, Adiabatic process, Poly-tropic process	5	
4	**Properties of Steam:**Steam formation, Types of Steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of Steam tables, steam calorimeters	6	30%
5	**Heat Engines:**Heat Engine cycle and Heat Engine, working substances, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles	5	

6	**Steam Boilers:**Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox boiler, Functioning of different mountings and accessories	-	
7	**Internal Combustion Engines:**Introduction, Classification, Engine details, four-stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, Efficiencies	4	20%
8	**Pumps:** Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming	3	
9	**Air Compressors:**Types and operation of Reciprocating and Rotary air compressors, significance of Multistaging	3	
10	**Refrigeration & Air Conditioning:**Refrigerant, Vapor compression refrigeration system, vapor absorption refrigeration system, Domestic Refrigerator, Window and split air conditioners	4	25%
11	**Couplings, Clutches and Brakes:** Construction and applications of Couplings (Box; Flange; Pin type flexible; Universal and Oldham), Clutches (Disc and Centrifugal), and Brakes (Block; Shoe; Band and Disc)	3	
12	**Transmission of Motion and Power:** Shaft and axle, Belt drive, Chain drive, Friction drive, Gear drive	4	
13	**Engineering Materials:**Types and applications of Ferrous & Nonferrous metals, Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer	4	

Note: Topic No. 6 of the above syllabus to be covered in Practical Hours.

Reference Books:

1. Basic Mechanical Engineering by Pravin Kumar, Pearson
2. Thermal Science and Engineering by Dr. D.S. Kumar, S.K. Kataria & sons, Publication New Delhi
3. Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publication New Delhi
4. Elements of Mechanical Engineering by Sadhu Singh S. Chand Publication
5. Introduction to Engineering Materials by B.K. Agrawal Tata McgraHill Publication, New Delhi

Course Outcome:

After learning the course the students should be able to

1. To understand the fundamentals of mechanical systems
2. To understand and appreciate significance of mechanical engineering in different fields of engineering

List of Experiments:

1. To understand construction and working of various types of boilers.
2. To understand construction and working of different boiler mountings and accessories.
3. To determine brake thermal efficiency of an I. C. Engine.
4. To understand construction and working of different types of air compressors.
5. To demonstrate vapor compression refrigeration cycle of domestic refrigerator OR window air conditioner OR split air conditioner.

Open Ended Problems: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.
1. Develop a prototype of gear train/drive for certain velocity ratios.
2. Develop a small boiler with different mountings.
3. Develop a hot air engine

Major Equipments: Models of Cochran, Lancashire and Babcock and Wilcox boilers, models of various mountings and accessories, Models of various types of IC engines, Single cylinder two stroke /four stroke petrol/ diesel engine, models of pumps, compressors, refrigerator/air conditioner, models of various types of brakes, coupling, clutches, drives

List of Open Source Software/learning website: http://nptel.iitm.ac.in, http://vlab.co.in/
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ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Elements of Mechanical Engineering is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

** PA (I): 10 marks for a case study of Systems, 10 marks for other methods of PA.

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Note: Passing marks for PA (M) will be 12 out of 30.
      Passing marks for ESE Pract(V) will be 15 out of 30.
      Passing marks for PA (I) will be 10 out of 20

GUJARAT TECHNOLOGICAL UNIVERSITY

ENGINEERING GRAPHICS (Modified on 4th Feb2014)

SUBJECT CODE: 2110013
B.E. 1st YEAR

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Engineering Drawing is an effective language of engineers. It is the foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realization.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
2	0	4	6	70	30*	30#	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Introduction to Engineering Graphics:** Drawing instruments and accessories, BIS – SP 46. Use of plane scales, Diagonal Scales and Representative Fraction	-	20%
2	**Engineering Curves:** Classification and application of Engineering Curves, Construction of Conics, Cycloidal Curves, Involutes and Spirals along with normal and tangent to each curve	6	
3	**Projections of Points and Lines:** Introduction to principal planes of projections, Projections of the points located in same quadrant and different quadrants, Projections of line with its inclination to one reference plane and with two reference planes. True length and inclination with the reference planes	6	30%
4	**Projections of Planes:** Projections of planes (polygons, circle and ellipse) with its inclination to one reference plane and with two reference planes, Concept of auxiliary plane method for projections of the plane	6	

5	**Projections of Solids and Section of Solids:** Classification of solids. Projections of solids (Cylinder, Cone, Pyramid and Prism) along with frustum with its inclination to one reference plane and with two reference planes. Section of such solids and the true shape of the section	6	15%
6	**Orthographic Projections:** Fundamental of projection along with classification, Projections from the pictorial view of the object on the principal planes for view from front, top and sides using first angle projection method and third angle projection method, full sectional view	-	35%
7	**Isometric Projections and Isometric View or Drawing:** Isometric Scale, Conversion of orthographic views into isometric projection, isometric view or drawing	-	

Note: Topic No. 1, 6 and 7 of the above syllabus to be covered in Practical Hours.

Reference Books:
1. A Text Book of Engineering Graphics by P.J.Shah S.Chand & Company Ltd., New Delhi
2. Elementary Engineering Drawing by N.D.Bhatt Charotar Publishing House, Anand
3. A text book of Engineering Drawing by R.K.Dhawan, S.Chand & Company Ltd., New Delhi
4. A text book of Engineering Drawing by P.S.Gill, S.K.Kataria & sons, Delhi
5. Engineering Drawing by B. Agrawal and C M Agrawal, Tata McGraw Hill, New Delhi

Course Outcome:
After learning the course the students should be able to
1. To know and understand the conventions and the methods of engineering drawing.
2. Interpret engineering drawings using fundamental technical mathematics.
3. Construct basic and intermediate geometry.
4. To improve their visualization skills so that they can apply these skills in developing new products.
5. To improve their technical communication skill in the form of communicative drawings.
6. Comprehend the theory of projection.

List of Practical:

Students are required to prepare drawing sheets on the following topics. **Minimum three problems must be given for sheet number 3 to 8.**
1. Practice sheet (which includes dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts, use of stencil,)
2. Plane scale and diagonal scale
3. Engineering curves
4. Projection of line and Projection of plane (minimum two problems on each)
5. Projection and section of solid
6. Orthographic projection
7. Isometric projection

Open Ended Problems: Apart from above experiments a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.

1. Draw the few problems of above sheets in Google sketch up.
2. Draw the few problems of above sheets in Auto CAD.
3. Prepare the orthographic / isometric views of the working model/toy/game prepared by the students in the subject of workshop practice using Google sketch up/Auto CAD.

Major Equipments: models and charts on the topics of curriculum

List of Open Source Software/learning website: http://nptel.iitm.ac.in/courses.php

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Engineering Graphics is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

ESE Pr (V):10 marks for Open Ended Problems, 20 marks for VIVA.

Note: Passing marks for PA (M) will be 12 out of 30.
        Passing marks for ESE Pract(V) will be 15 out of 30.

GUJARAT TECHNOLOGICAL UNIVERSITY

ENVIRONMENTAL STUDIES
SUBJECT CODE: 2110007
B.E. 1ST YEAR

Type of course: Applied Science

Prerequisite: Interest in natural systems sustaining the life on the earth.

Rationale: To inculcate the environmental values translating into pro-conservation actions. Honorable Supreme Court of India has made it 'mandatory' to introduce a basic course on environment at the undergraduate level.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Pr/Viva (V)	PA (I)	
3	0	0	3	70	30*	0	0	100

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
	UNIT I: ENVIRONMENT AND NATURAL SYSTEMS		
1	**Introduction to Environment and Environmental Studies**: Definition and Components of Environment, Relationship between the different components of Environment, Man and Environment relationship, Impact of technology on Environment, Environmental Degradation, Multidisciplinary nature of the Environment studies, its scope and importance in the present day Education System	02	6%
2	**Ecology and Ecosystems:** Introduction: Ecology- Objectives and Classification , Concept of an ecosystem- structure and functions of ecosystem Components of ecosystem- Producers, Consumers, Decomposers Bio-Geo- Chemical Cycles- Hydrologic Cycle, Carbon cycle, Energy Flow in Ecosystem, Food Chains, Food webs ,Ecological Pyramids Major Ecosystems: Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic Ecosystem, Estuarine Ecosystem.	04	11%
3	**Natural Resources:** **a.** Renewable and Nonrenewable resources, exploitation and conservation, Role of individual in conservation of natural resources. **b.** Water resources: Water sources- Surface and Ground water	05	14%

	sources, Indian and Global scenario. c. Land as a resource, social issues d. Forest resources: Definition and Classification of Forests Ecological and Economic importance and benefits of forest, Indian scenario, Deforestation: causes and effects, remedial measures. e. Food resources: Sources of food, Global and Indian food demand scenario, Limits of food production, Environmental effects of Agriculture.		
UNIT II: HUMAN POPULATION AND ENVIRONMENTAL POLLUTION			
4	**Human Population and Environment:** Population Growth, World and Indian scenario, Population and Environmental Degradation, Malthusian theory, Optimum theory, Population explosion – Causes, Effects and Control. **Urbanization**: Urban population growth and Environmental problems	03	8%

5	**Environmental pollution:**
	Types of Environmental Pollution:
	    a) **Water Pollution:** Introduction – Water Quality Standards, Sources of Water Pollution: Industrial ,Agricultural, Municipal; Classification of water pollutants, Effects of water pollutants, Eutrophication
	    b) Marine pollution-
	    c) **Air Pollution:** Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO_2, NO_X, Natural & Anthropogenic Sources, Effects of common air pollutants
	    d) Land Pollution: Land uses ,Land degradation: causes, effects and control, soil erosion
	    e) Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects
	    f) Thermal Pollution: Causes and effects
	    g) Role of individual in the prevention of pollution
		08	22 %

UNIT III: ENERGY AND GLOBAL ENVIRONMENTAL ISSUES			
6	**Energy Resources and Global Environmental Issues** **Energy resources**: Global and Indian energy demand scenario, Future Projections, Conventional and Non-conventional sources of energy, Advantages and Limitations, Utilization, Exploitation and related Environmental problems, Environmental implications of Non conventional Energy Sources. **Global Environmental Issues:** Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer	06	17 %
UNIT IV: ENVIRONMENTAL LEGISLATION AND GUJARAT'S INITIATIVES FOR ENVIRONMENTAL PROTECTION:			
7	**Environmental Acts and Regulations:** List of prevalent Environmental Acts, Brief description related to the purpose with at least five important provisions Water (Prevention and control	04	11%

	of pollution) Act 1974, Air (Prevention and control of pollution) Act 1981, Environmental Protection Act, 1986 Organization and Role of Institutions of Gujarat like Gujarat Pollution Control Board, Gujarat Environmental Management Institute, Gujarat Ecology Commission, Gujarat Institute of Desert Ecology, Department of Environment and Forest, Department of Climate Change, Gujarat State Disaster Management Authority. Environmental Awareness: Role of Non-Government Organizations. Environmental Ethics: Environmental Ethics, Objectives of ethics, Ethical theories, Code of Ethics, Importance and limitations of ethics, Environmental Ethics in India.		
UNIT : V Environment education videos to supplement the class-room teaching	04	11%	

Reference Books:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha Second edition,2013 Publisher: Universities Press (India) Private Ltd, Hyderabad.
2. Basics of Environmental Studies by Prof Dr N S Varandani ,2013 Publisher: LAP -Lambert Academic Publishing , Germany
3. Environmental Studies by Anindita Basak ,2009 Publisher: Drling Kindersley(India)Pvt. Ltd Pearson
4. Textbook of Environmental Studies by Deeksha Dave & S S Kateva , Cengage Publishers.
5. Environmental Sciences by Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons.
6. Environmental Studies by R. Rajagopalan, Oxford University Press
7. Environmental Studies by Benny Joseph, TMH publishers
8. Environmental Studies by Dr. Suresh K Dhameja, 2007 Published by : S K Kataria & Sons New Delhi
9. Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill

Course Outcome:
1. After learning the course the students should be able to
2. Understand and realize the multi-disciplinary nature of the environment, its components, and inter-relationship between man and environment.
3. Understand the relevance and importance of the natural resources in the sustenance of life on earth and living standard.
4. Comprehend the importance of ecosystem, biodiversity and natural bio geo chemical cycle.
5. To correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention.
6. Identify different types of environmental pollution and control measures.
7. To correlate the exploitation and utilization of conventional and non-conventional resources.

Major Equipments: Multi media projector with computer

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding of environmental issues – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Environmental Studies is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

GUJARAT TECHNOLOGICAL UNIVERSITY

LINEAR ALGEBRA AND VECTOR CALCULUS

SUBJECT CODE: 2110015
B.E. 1ST YEAR

Type of course: Engineering Mathematics

Prerequisite: Determinants and their Properties. Matrices, Types of Matrices, Algebraic Operations on Matrices, Transpose of a Matrix, Symmetric and Skew Symmetric Matrices, Elementary Operation (Transformation) of a Matrix, Minors and Cofactors of matrices, Adjoint and Inverse of a Matrix. Vector Algebra, Types of Vectors, Addition of Vectors, Multiplication of a Vector by a Scalar, Scalar and Vector Products of Vectors, Three Dimensional Geometry, Equation of a Line in Space, Angle between Two Lines, Shortest Distance between Two Lines, Plane, Co planarity of Two Lines, Angle between Two Planes, Distance of a Point from a Plane, Angle between a Line and a Plane.

Rationale: Mathematics is a language of Science and Engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE /Viva (V)	PA (I)	
3	2	0	5	70	30*	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Systems of Linear Equations and Matrices** • Systems of Linear Equations • Matrices and Elementary Row Operations • The Inverse of a Square Matrix • Matrix Equations • Applications of Systems of Linear Equations	5	14-16%
2	**Linear Combinations and Linear Independence** • Vectors in R^n. • Linear Combinations • Linear Independence **Vector Spaces** • Definition of a Vector Space • Subspaces • Basis and Dimension • Coordinates and Change of Basis	7	20-22%
3	**Linear Transformations**	7	20-22%

	• Linear Transformations • The Null Space and Range • Isomorphisms • Matrix Representation of Linear Transformations • Similarity **Eigenvalues and Eigenvectors** • Eigen values and Eigen vectors • Diagonalization		
4	**Inner Product Spaces** • The Dot Product on R^n and Inner Product Spaces • Orthonormal Bases • Orthogonal Complements • Application: Least Squares Approximation • Diagonalization of Symmetric Matrices • Application: Quadratic Forms	6	18-20%
5	**Vector Functions** • Vector & Scalar Functions and Fields, Derivatives • Curve, Arc length, Curvature & Torsion • Gradient of Scalar Field, Directional Derivative • Divergence of a Vector Field • Curl of a Vector Field	5	14-16%
6	**Vector Calculus** • Line Integrals • Path Independence of Line Integrals • Green`s Theorem in the plane • Surface Integrals • Divergence Theorem of Gauss • Stokes`s Theorem	6	18-20%

Note: Teachers are advised to encourage students to perform the projects in group of 4 students for conceptual understanding by geometrically, numerically and algebraically.

Reference Books:
1. Introduction to Linear Algebra with Application, Jim Defranza, Daniel Gagliardi, Tata McGraw-Hill
2. Elementary Linear Algebra, Applications version, Anton and Rorres, Wiley India Edition.
3. Advanced Engineering Mathematics, Erwin Kreysig, Wiley Publication.
4. Elementary Linear Algebra, Ron Larson, Cengage Learning
5. Calculus, Volumes 2, T. M. Apostol, Wiley Eastern.
6. Linear Algebra and its Applications, David C. Lay, Pearson Education

Course Outcome:

On successful completion of the course, students will be able following points:

1. System of linear equations in solving the problems of electrical engineering, mechanical engineering, applied mechanics etc.
2. Use of matrix in graph theory, linear combinations of quantum state in physics, computer graphics and cryptography etc.
3. Students will be able to apply vectors in higher dimensional space in experimental data, storage and warehousing, electrical circuits, graphical images, economics, mechanical systems and in physics.
4. Students will able to use eigen values and eigen vector in Control theory, vibration analysis, electric circuits, advanced dynamics and quantum mechanics.
5. Students will be able to apply linear transformation in computer graphics, cryptography, thermodynamics etc.
6. Students will able to use the techniques and theory of linear algebra to model various real world problems. (Possible applications include: curve fitting, computer graphics, networks, discrete dynamical systems, systems of differential equations, and least squares solutions.
7. Modeling of heat flow, heat equation.
8. Understand fluid mechanics problem such as conservation of momentum, conservation of mass etc.

List of Open Source Software/learning website:

The syllabus is roughly covered by:
Massachusetts Institute of Technology, MIT Open Course Ware

1. **Instructor(s) Prof**. Gilbert Strang **MIT Course Number 18.06**
   Link:http://ocw.mit.edu/courses/mathematics/18-06-linear-algebraspring2010/videolectures/

2. **Instructor(s)** Prof. Denis Auroux **MIT Course Number 18.02**
   Link:http://ocw.mit.edu/courses/mathematics/18-02-multivariable-calculus-fall- 2007/video-lectures/

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding the applications of Linear Algebra and Vector Calculus to engineering applications – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Linear Algebra and Vector Calculus is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER PROGRAMMING AND UTILIZATION (Modified on 4ᵗʰ Feb 2014)
SUBJECT CODE: 2110003
B.E. 1ˢᵗ YEAR

Type of course: Basic

Prerequisite: N.A.

Rationale: N.A.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
3	1	2	6	70	30*	30#	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr No	Topic	Teaching Hrs.	Module Weightage
1	Introduction to computer and programming: Introduction ,Basic block diagram and functions of various components of computer,Concepts of Hardware and software,Types of softwares,Compiler and interpreter, Concepts of Machine level, Assembly level and high level programming ,Flow charts and Algorithms.	05	10%
2	Fundamentals of_C' Features of C language, structure of C Program, comments, header files,data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, I/O functions	05	15%
3	Control structure in _c' Simple statements, Decision making statements, Looping statements, Nesting of control structures, break and continue , goto statement	06	15%
4	Array & String Concepts of array , one and two dimensional arrays,declaration and initialization of arrays ,string , string storage , Built-in-string functions	05	15%
5	Functions Concepts of user defined functions, prototypes, definition of function , prarameters, parameter passing , calling a function, recursive function ,Macros , Pre-processing	05	15%
6	Pointers Basics of pointers, pointer to pointer , pointer and array , pointer	03	10%

	to array, array of pointers , functions returning a pointer		
7	Structure Basics of structure , structure members, accessing structure members ,nested structures , array of structures, structure and functions, structures and pointers	02	10%
8	Dynamic memory allocation Introduction to Dynamic memory allocation, malloac, Calloc,	02	5%
9	File management Introduction to file management and its functions	03	5%

Reference Books:
1. Programming in ANSI C by Balaguruswamy
2. C Programming: Test Your Skills, 1/e by Ashok Kamthane
3. Programming With Ansi And Turbo C book : Ashok Kamthane ...
4. Programming in C Ansi standard, by Yashwant Kanetkar
5. Programming with C, Gottfried, McGraw-Hill.

Course Outcome:
At the end of this subject, students should be able to:

1. Apply fundamental principles of problem solving in software engineering.
2. Apply basic programming principles using C language.
3. Apply basic C program structure in software development
4. Prepare graduates for professional careers in roles including, but not limited to, the following: computer programmer, software engineer, software systems designer, software applications developer, technical software project lead, computer systems analyst, computer systems programmer, software applications tester and maintainer.
5. To prepare graduates with the knowledge and skills to do advanced studies and research in computer science and related engineering and scientific disciplines
6. To equip graduates with the communication skills, both oral and written, to become an effective team-oriented problem solver as well as an effective communicator with non- technical stakeholders in computer and software systems development, maintenance and administration.

List of Experiments:
PRACTICAL-SET—1

   a. Write a program to print ‒HELLO FRIENDS‖ .
   b. Write a program that reads two nos. from key board and gives their addition, subtraction, multiplication, division and modulo.
   c. Write a program to convert days into months and days.
   d. Write a program to solve Quadratic Equation.
   e. Write a program to select & print the largest of the three nos. using Nested-If-Else statement.

PRACTICAL-SET—2

1. Write a program to display multiplication table.
2. Write a program to print 1+1/2+1/3+1/4+………+1/N series.
3. Write a program to find sum of all integers greater than 100 & less than 200 and are divisible by 5.
4. The distance between two cities (In KM) is input through key board. Write a program to convert and print this distance in meters, feet, inches & centimeters.
5. Write a program to find sum of first N odd numbers.
   Ex. 1+3+5+7+………..+N.

PRACTICAL-SET-3

1. Write a program for use of putchar( ) and getchar( ) function.
2. Program to print Patterns.
   ```
   *
   * *
   * * *
     * * * *
   ```
3.
   ```
   1 2 3 4 5
     2 3 4 5
       3 4 5
         4 5
           5
   ```
4.
   ```
   AAAAA
   BBBB
   CCC
   DD
   E
   ```
5.
   ```
   1
   0 1
   1 0 1
   0 1 0 1
   ```

PRACTICAL-SET-4

1. Write a program to print Fibonacci series. 1,1,2,3,5,……N
2. Write a program to reverse the digit.
3. Add, subtract and multiply two nos. using switch statement.
4. Write a program to add two matrixes.
5. Write a program to given no in ascending order.
6. W.A.P to read array of integers and print it in reverse order

PRACTICAL-SET-5

1. Write a program to count total words in text.
2. Find length of string using strlen( ) function,
3. Write a program to copy one string to another string.
4. Write a program to join two strings.
5. Write a program convert character into TOggLe character.
6. Find given string is palingrom or not using string library function.

PRACTICAL-SET-6

1. Write a function program to add first N numbers.
2. Write a function find out maximum out of three numbers.
3. Write a function power that computes x raised to the power y for integer x and y and returns double type value.
4. Write a program to find factorial of a number using recursion.
5. Write a program that used user defined function Swap ( ) and interchange the value of two variable.
6. Write a function prime that return 1 if it's argument is prime and return 0 otherwise.
7. Write a calculator program(add,subtract,multiply,divide). Prepare user defined function for each functionality.

PRACTICAL-SET-7

1. Define a structure type, personal, that would contain person name, date of joining and salary. Using this structure, write a program to read this information for one person from the key board and print the same on the screen.
2. Define a structure called cricket that will describe the following information:
   a. Player name
   b. Team name
   c. Batting average
3. Write a function to enter rollno, marks of the three subject for 3 student and find total obtained by each student

PRACTICAL-SET-8

f. Write a program using pointer and function to determine the length of string.
g. Write a program using pointer to compare two strings.
h. Write a program using pointer to concate two strings.
i. Write a program using pointer to copy one string to another string.
j. Write a program using pointer to read an array if integer and print element in reverse order.

PRACTICAL-SET-9

1. Write a program that uses a table of integers whose size will be specified interactively at run time.
2. Write a program to store a character string in block of memory space created by malloc and then modify the same to store a large string.

PRACTICAL-SET-10

1. A program to illustrate reading files contents.
2. A program to illustrate the use of fgets( ).
3. A program to illustrate the use of fputc ( ) and fputs( ).

Open Ended Problems: Apart from above experiments a group of students has to undertake open ended problem/design problem. Few examples of the same are given below.

Part-I   Computer Programming & Utilization Basic Programming Fundamental Developments
   A. Design Basic Algorithm and Flow Chart Diagrams for Various Computer based Calculation Operations and show the Elementary Operational Blocks in Pseudo terms and Visual Blocks
   B. Develop Small CPU subject's Practical Instruction Manual for Each Chapter which can be helpful for Laboratory for at least 5 Experiments
   C. Develop the Basic Debugging plan using any of IDE you have learnt during CPU practical's and Open-ended Experiments You are going to perform in Part-II

Part-II Open Ended Programming Problems (For each Programming Problem Student has to define his Minor Project Definition in details.

   i.   Develop module you should be able to manipulate character strings in C programs which should have all String Operations usually available in standard ‒strings.h‖ . student has to develop all string manipulation operation library in his ―my**own-strings.h‖** file. And all string manipulation operations are in mode of subroutine form such as combine-strings, merge-strings, search-string like etc.
   ii. Develop simple character-based Chess-game supporting standard partial chess moves. Chess board should be 8x8 Cell Board having each Cell of 4 characters. Basic chess board with empty shell should have W... Cell and B... For Black Cell. Wherever any players Game elements such as Rook or Camel or King or Queen is on board Cell then it. Then it should be displayed such as BQN2 or WQN1 which indicated such as Queen of player-2 on black cell or queen of player-1 on white cell. Or Student can use his own conventions. Student should be able to demonstrate 5 moves for each player minimum.
   iii. Develop simple Pointer simulation minor C programming explaining the pointer explanation in C such as while declaring pointer how memory look in simple memory table showing and while allocating memory by pointing pointer pointing to any basic primitive data type variable.
   iv. Develop C program for simulating the demonstration of Explaining the differences between analog and digital systems and show examples of each type of system
   v.   Generate one SUDOKU game for 8 * 8 squares.
        a. Conditions: a number in a one square should not be repeated in its vertical line, horizontal line and diagonal line.
        b. When all the squares are fill-up by numbers and there is no repeating number as describe above the SUDOKU is done.
   vi. Develop a small editor which has utilities for alignment of content. User can select left alignment, right alignment or central alignment.
        a. Condition: while trying to align the content in a page, a word should not be broken into two lines.
        b. While selecting the above given options, content of a page should
   vii. Develop small simulated C Programming demonstrating the basic Binary math fundamentals using fundamental union and structure basics and show binary operations such as binary addition, binary multiplications

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Computer Programming and Utilization is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty,

GUJARAT TECHNOLOGICAL UNIVERSITY

PHYSICS (Modified on 4ᵗʰ Feb 2014)
SUBJECT CODE: 2110011
B.E. 1ˢᵗ YEAR

Type of course: Engineering Science

Prerequisite: Engineering physics majors are expected to have a basic understanding of calculus, physics and chemistry or computer science

Rationale: The Engineering Physics program is to prepare students for careers in engineering where physics principles can be applied to the advancement of technology. This education at the intersection of engineering and physics will enable students to seek employment in engineering upon graduation while, at the same time, provide a firm foundation for the pursuit of graduate studies in engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
3	0	2	5	70	30*	30#	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr No	Topic	Teaching Hrs.	Module Weightage
1	**DIELECTRICS:** • Definitions : Electric field intensity, Electric flux, Dielectric parameters • Types of Dielectric materials : Solid, Liquid and Gaseous • Classification of electrical insulating materials • Claussius-Mosotti equation • Uses of Dielectric Materials; **Capacitors: Single and multilayer, Polymeric Film, Electrolytic; Power and Distribution transformers, other applications**	5	15%
2	**MAGNETIC MATERIALS:** • Definitions : **Magnetic moment, Magnetic dipole, Magnetic Filed strength, Magnetic flux density, Intensity of magnetization, Magnetic dipole moment, Magnetic Field intensity, Magnetic permeability, magnetic susceptibility, Bohr magnetron** • Classification of Magnetic Materials on the basis of magnetic moment • Soft and Hard Magnetic Materials • Anti-ferromagnetic materials • Ferrites	5	15%

	• Magnetic Recording and Readout Storage of magnetic data		
3	**ACOUSTIC AND ULTRASONIC:** • Introduction, Classification and Characteristics of sound • Sabine's formula for reverberation (Without Derivations) • Introduction of Absorption co-efficient • Sound absorbing materials • Factors affecting the acoustics of building and their remedies • Sound Insulation • Noise Pollutions • Noise Control in machines • Properties of ultrasound • Generation of ultrasound by (1) piezoelectric method and (2) magnetostriction method • Methods for Ultrasound Velocity measurement • Applications of ultrasound: **Industry, Medicine** • NDT through Ultrasonic	5	15%
4	**SUPERCONDUCTIVITY:** • Superconductivity • General Properties of superconductors • Types of Superconductors • High Temperature superconductors • Applications: **Magnets, Josephson effect, SQUID, Maglev, other**	4	10%
5	**NON LINEAR OPTICS:** <u>**LASER**</u> • Introduction • Characteristics of laser radiation • Spontaneous and stimulated emission • Working of LASER with basic idea about Population Inversion, Pumping mechanism, Optical Resonators • Nd:YAG LASER • Applications of LASER: **Medical, Industrial, Communication and other** <u>**FIBER OPTICS**</u> • Introduction of Optical Fiber • Advantages of Optical Fiber • Total Internal Reflection • Numerical Aperture and Acceptance angle • Modes of Propagation • Types of Optical Fiber • Applications of optical fiber	7	15%
6	**NANOPHYSICS:** • Nanoscale • Surface to volume ratio • Surface effects on Nanomaterials	5	15%

	• Quantum size effects • Electron confinement • Nanomaterials and Nanotechnology • Unusal properties of Nanomaterials • Disadvantages of Nanomaterials • Synthesis of Nanomaterials • Carbon Nanotubes: **Introduction, Structure, Synthesis, Properties and applications** • Applications of Nanomaterials		
7	**ADVANCED ENGINEERING MATERIALS:** **SHAPE MEMORY ALLOYS** • Introduction, Synthesis, Properties and Applications **METALLIC GLASSES** • Introduction, Synthesis, Properties and Applications **BIO MATERIALS** • Introduction, Properties and Applications **ENERGY MATERIALS** • Solar cells • Fuel cells (H_2O_2, Lithium cell) • Ultra capacitors	5	15%

Reference Books:
1. Engineering Physics by V Rajendran, Tata McGraw Hill Education
2. Engineering Physics John Wiley Publication
3. Engineering Physics by Naidu, Pearson Education India
4. Non-Conventional Energy Resources", Mechanical Engineering Series, Khan B. H., Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006
5. Engineering Physics by H Aruldhas, PHI India
6. Engineering Physics by B K Pandey , S. Chaturvedi, Cengage Learning
7. Resnick, Halliday and Krane, Physics part I and II, 5th Edition John Wiely (2002)
8. Physics for scientists and engineers with modern physics by Jewett &Serwey, Cengage publications
9. The Feynman Lectures on Physics Vol 2, Pearson Education India

Course Outcome:
1. The student will demonstrate the ability to think in core concept of their engineering application by studying various topics involved in branch specific applications.
2. The student will demonstrate the ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
3. In courses involving laboratory, the student will demonstrate the ability to collect and analyze data and to prepare coherent reports of his or her findings.
4. In a design module project, the student will demonstrate the ability to perform a literature search, to make use of appropriate computational or laboratory skills, and to make an effective written or oral presentation of the results of the project.

List of Experiments:

Important Note

☞ Total 18 experiments are listed in the design module.

☞ Key goals of these experiments are :

    (1) To enhance the understanding of student towards the errors present in the real time measurement and the ways to take care of them.

    (2) To create visualization of various phenomena covered in the syllabus.

    (3) To induce the skill of student in handling different measuring instruments.

☞ Subject teacher is advised to setup any 8 experiments from the following list.

☞   In the session student should perform **minimum 4 set of experiments** and complete **one small project** based on engineering applications. This project along with any performed experiment should be **EVALUATED BY EXTERNAL EXAMINER.**

1. To understand some basic aspects of error analysis and graph drawing.
2. To measure the dielectric constant of a material
3. To measure the Hysteresis loss in a Ferromagnetic material.
4. To study the Hall-Effect.
5. To determine Young's Modulus of Elasticity of the given samples by bending.
6. Measurement of the Distance using Ultrasonic Sensors.
7. Study of Object Detection using Ultrasonic Sensors.
8. Determination of the Velocity of Ultrasonic Waves in a non-electrolytic Liquid by Ultrasonic Interferometer.
9. Determination of the Compressibility of a non-electrolytic Liquid by Ultrasonic Interferometer.
10. To study the I-V Characteristic of Silicon diode.
11. To study the I-V Characteristic of Zener diode.
12. To study the I-V Characteristic of LED.
13. To determine the efficiency of given solar cell.
14. To study basic wind power set up.
15. To measure the Resistivity & Band gap of Germanium Crystal (N-type) by Four Probe Method.
16. To measure the numerical aperture of optical fiber.
17. To Study of propagation & bending loss in optical fiber.
18. To determine the frequency of given laser source.

Open ended Projects in Science and technology study :-

Aims:

1. To provide experience in laboratory based experimentation, data recording and analysis and drawing of conclusions.
2. To develop the ability to undertake investigations where, as part of the exercise, the goals and methods have to be defined by the investigator.
3. To develop skills in literature searches and reviews.
4. To Develop report Writing Skills for scientific material

In the beginning of the academic term, faculties will have to allot their students at least one (Students are free to select any area of science and technology)
- Open ended design based small project **or**
- Computer based simulation/ web based application/ analysis presentations of applied science field which may help them in their branches especially in their UDP/IDP projects.

1. These can be done in a group containing maximum three students in each.
2. Open ended design based small project   OR UDP based study will be evaluated by external examiner with appropriate marks allotment given by GTU time to time.
3. Faculties should cultivate problem based project to enhance the basic mental and technical level of students.
4. Evaluation should be done on **approach of the student on his/her efforts** (not on completion) to study the design module of given task.

Open Ended Project fields:-

Students are free to select any area of science and technology may be based on their branches to define projects.

Some suggested projects are listed below:

1. Design: A working electric motor.
   Area: Electricity and Magnetism
   Using:1 meter of bendable, insulated wire, a size "D" battery, a disk magnet, two paper clips, sandpaper, wire strippers, masking tape.

2. Design: Computer based simulation/ small calculation with help basic programming language based on Physics
   Area: Computational physics
3. Design: A Hydraulic Jack works on the principle of Pascal's law that states Area: Fluid Dynamics
   Using : poker and scissors ,syringes, M-seal ,inlet pipes

Major Equipments:

Sr. No.	Name	Technical Specification
1	Universal training kit – electronics	
2	Rectifier Kit (Half wave, full wave, bridge)	Consisting of 0-30 V variable power supply, Diodes (IN 4007), Module of 10k resistors, Included Filter Circuit.
3	LDR, LED characteristic kit	0-30 V variable power supply
4	Diode - Zener Diode Characteristic Kit	0-30 V regulated tunnable power supply, milliammeter (0-50mA), Microammeter (0-100µA), Digital multimeter, Resistances module 10K, Facility of Silicon Diode (IN4001), Germanium Diode (DR 25) and Zener Diode with reverse bias voltage Max. up to 8-9 V
5	dB meter, Sound generator, speaker	dB meter with the range of 0-200 dB

6	Hall effect trainer	Power supply of (220 V, 50Hz), constant current source of (30 mA, DC) variable through port Digital Gauss Meter,
		Digital multimeter
7	Semiconductor energy gap set up	Four Probe experimental Set up (consisting constant current source, Dual range miliVoltmeter, power supply for oven and miliammeter Thermometer (Mercury) Temperature range up to 200-250 °C
8	Young's Modulus set up	Stand, weight box (up to 1kg), Samples (iron, Al, Cu etc), DC adapter, Spherometer stand with buzzer, weight holder
9	Resistivity and Band Gap measurement	
10	solar energy trainer	Fundamental of photovoltaic cell should be studied, application and Characteristics features should be measured by a kit
11	Plank's constant determination with using LED	Plank's constant apparatus, oven, LED Red, LED Yellow
12	Ultrasonic measurement kit	Quartz Crystal (Frequency: 2 MHz), Ultrasonic Transducer approx 25 cm to 1.2 m, Clock Generator 40 kHz, Amplifier 40 dB - 70dB
13	X ray powder pattern kit	Powder patterns slides, travelling microscope 10x, X ray diffraction pattern
14	Fiber Optic Kit	LED source 950 nm/660 nm compatible APV or Photo diode Detector with Numerical Aperture Measurement Facility
15	Laser Source	He- Ne Laser and 1350 nm I-R Laser
16	Introductory Nano Kit	
17	Hysteresis loop set up	Voltage Sensor range ± 0.5 V to ± 1V, current Sensor ±0.5 A to ±1 A, coil 250 to400 turns (pair), Resistance Module 10 ohm ,10 watt
18	Ruben's Tube (Sound)	
19	Optical Power meter	(-50 dB to 0dB) measurement range
20	CRO (20MHz)-(5MHz) dual channel	Dual channel,0-200 V, four probe, with power probe

21	Digital Multimeters	
22	Analog Voltmeters (mV, V)	
23	Analog Ammeter (micro, mA, A)	
24	Wires	
25	Tool Kit with tester	
26	Bread Board	
27	Screw Dirver Kit	
28	Regulated Power Supply (0-50V)	
29	Capacitors, Resistors	
30	Diodes	
31	LEDs, LDRs	
32	Rheostat	
33	Soldering kit with wire	
34	Function Generator (5MHz)	Generation of sine, Square, Saw tooth waves required, +/- pulses frequency range up to 20 MHz, Peak to peak voltage around 20 V
35	Multiple power supply	Variable of 0-30 volt , 30V/2A, 5V/2A , 15V/1A

List of Open Source Software/learning website:
- The Flying Circus of Physics 2nd edition by Jearl Walker, Wiley India
- Six Ideas that shaped physics by Thomas A Moore, McGraw Hill education
- http://www.howstuffworks.com/ -- Tech stuff
- How things works by Louis A Bloomfeild, Wiley Publications
- Physics of Everyday Phenomena by W. Thomas Griffith, Juliet Brosing, McGraw Hill Education
- Latest journals like BBC Knowledge, How things work-everyday technology explained by National Geographics.
- http://www.sciencefairadventure.com/

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Physics is covered. The power- point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

 # ESE Pr (V):10 marks for Open Ended Problems, 20 marks for VIVA.

Note: Passing marks for PA (M) will be 12 out of 30.
Passing marks for ESE Pract(V) will be 15 out of 30.

Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

 # ESE Pr (V):10 marks for Open Ended Problems, 20 marks for VIVA.
Note: Passing marks for PA (M) will be 12 out of 30.
Passing marks for ESE Pract(V) will be 15 out of 30.

GUJARAT TECHNOLOGICAL UNIVERSITY

CHEMISTRY (Modified on 4ᵗʰ Feb 2014)

SUBJECT CODE: 2110001
B.E. 1ˢᵗ YEAR

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Chemistry is considered as basic subject for Engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
3	0	2	5	70	30*	30#	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr No	Topic	Teaching Hrs.	Module Weightage
1	**General Chemistry:** Introduction to Chemical Sciences, Development of Chemistry through ages and particularly in relevant field of Engineering, Then and Now Chemistry in Industries {Impact on nature & everyday life and further modification through Green approaches (Green Chemistry)}, Approach to Chemical Bonding, Lewis Representations of Simple Molecules and Ions, Types of Bonds, Importance of Organic Molecules, Structural Representation of Organic Molecules, Classification & Nomenclature of Organic molecules.	3	25%
2	**Water Technology:** Introduction, Sources of water Impurities, Hard and Soft Water, Degree of Hardness, Types of Hardness, Scale and Sludge Formation in boiler and its prevention. Caustic embrittlements, Softening of water, Properties of drinking water, Break-point chlorination, Desalination of Brackish water.	4	
3	**Metals, Alloys and Corrosion:** Introduction, Physical properties of metals, Definition and purpose of alloy, Classification of alloys. Alloys Steel and its applications. Non-Ferrous alloys and its industrial applications. Introduction to Corrosion, Theories of corrosion, Protection of metals from corrosion – organic and inorganic materials, Inhibitors, Cathodic protection.	6	20%
4	**Cements:** Introduction, Classification of cement and properties, chemical composition of cement, Standards, Manufacturing of Portland cement, chemical constituents of Portland cement, Setting and hardening of cement, PCC & RCC.	4	35%

5	**Polymers and Fibres** Introduction, classification based on Source, Structure, molecular forces. Polymerization and its mechanism. Definition of Rubber, Types of Rubber, Vulcanization of rubber. Application of Rubber. Biodegradable Polymers, Commercially important polymers- PVC, Polypropene, polystyrene and their uses. Types of fibres – Natural, semi synthetic, synthetic fibres. Physical properties of fibres and uses of Cellulose acetic, Viscose Rayon, Nylon, Polyesters acrylic, Glass fibres, Liquid Crystalsmechanism. Definition of Rubber, Types of Rubber, Vulcanization of rubber. Application of Rubber. Biodegradable Polymers, Commercially important polymers- PVC, Polypropene, polystyrene and their uses. Types of fibres – Natural, semi synthetic, synthetic fibres. Physical properties of fibres and uses of Cellulose acetic, Viscose Rayon, Nylon, Polyesters acrylic, Glass fibres, Liquid Crystals	6	
6	**Fuel and Combustion:** Definition, types of fuel and their advantages and disadvantages. Calorific Value, Characteristics of good fuel. Analysis of coal – ultimate and proximate analysis, LPG, Natural gas, Biogas, Refining of Petroleum by Fractional distillation.	5	
7	**Chemical aspect of Biotechnology:** Definition, Benefits through biotechnology – Agriculture, Food quality, Medicines, Fermentation processes, Enzymes and its application in industries	3	20%
8	**Refractory, Abrasives and Insulators:** Definitions of Refractory, Abrasives and Insulators. Properties of refractory. Classification of refractory. Classification, properties and uses of abrasives. Classification, properties and uses of Insulators.	3	
9	**Part of Lab Work – Analytical Techniques:** Introduction Types of analysis – Physical, Chemical and instrumentation. Physical analysis – Specific gravity, Melting point, Boiling point, Crystallization. Purification of compounds etc. Chemical analysis – Quantitative and Qualitative analysis of organic and inorganic compounds. Instrumental analysis – Spectroscopic, Chromatographic PH measurement, Conductivity, Turbidity etc.	2	

Reference Books:

1. Engineering Chemistry by Jain and Jain Publisher, DhanpatRai Publishing Co.
2. Engineering Chemistry by Dr. O.P. Agrawal, Khanna Publishers Delhi.
3. Engineering Chemistry Willey India Publisher
4. Engineering Chemistry by Marry Jane &Shult, Cencage Learning Publisher
5. Organic Chemistry by Bahl and Bahl., S Chand & Co. Ltd, New Delhi
6. Engineering Chemistry by N. Krishnamurthy, P. Vallinaygam and D. Madhavan Publisher, Prentice Hall of India Pvt. Ltd. New Delhi.
7. Engineering Chemistry by B. Sivsankar, Tata Macgrawhill Companies, New Delhi.
8. Essential of Physical Chemistry by Bahl and Tuli., S Chand & Co. Ltd, New Delhi.
9. Inorganic Chemistry by P.L. Soni and Katyal., Sultan Chand & Sons, New Delhi.
10. Laboratory Manual of Engineering Chemistry.By S K. Bhasin&Sudha Rani, Dhanpat Rai Publishing Company Ltd.

Course Outcome:

After learning the course the students should be able
1. To build a basic knowledge of the structure of chemistry.
2. To analyze scientific concepts and think critically.
3. To review the importance and relevance of chemistry in our everyday life.
4. To be able to utilize the methods of science as a logical means of problem solving.

List of Experiments and Open Ended Projects:

Minimum 5 practicals to be performed and remaining Open-ended Projects / Study Reports / Latest outcomes in technology study **:-**
1. In the beginning of the academic term, faculties will have to allot their students at least one Open-ended Projects / Study Reports / Latest outcomes in technology.
2. Literature survey including patents and research papers of basic chemistry
   - Design based small project **or**
   - Study report based on latest scientific development **or**
   - Technology study report/ modeling/ simulation/collection report **or**
   - Computer based simulation/ web based application/ analysis presentations of applied science field which may help them in their branches.
3. These can be done in a group containing maximum **Three** students in each.
4. Faculties should cultivate problem based project to enhance the basic mental and technical level of students.
5. Evaluation should be done on **approach of the student on his/her efforts** (not on completion) to study the design module of given task.
6. In the semester student should perform **minimum 5 set of experiments** and complete **one small open ended dedicated project** based on engineering applications. This project along with any performed experiment should be **EVALUATED BY EXTERNAL EXAMINER.**
   PRACTICALS(ANY FIVE):

1. Analysis of Steel Sample.
2. Analysis of Pyrolusite Ore.
3. Analysis of Brass Alloy.
4. Estimation of Hardness.
5. Gravimetric Analysis of decomposition of Na_2CO_3 & $NaHCO_3$.
6. Determination of Concentration of Unknown Solution Spectrophotometrically.
7. To study Wet Corrosion loss of Steel by weight loss method using Electrochemical Theory.
8. Stress Corrosion Cracking of Brass in NH_3 Solution.
9. To determine Alkalinity of a given Water Sample.
10. Determination of Saponification Value of Oil.
11. Study of decomposition reaction of $ZnCO_3$ by Gravimetric analysis.
12. To determine the moisture content in coal.

Major Equipments:
1. Spectrophotometer.
2. Laboratory Oven.
3. Melting Point Instrument.

Open Ended Project fields:-

Students are free to select any area of science and technology based on their branches to define projects.

Some suggested projects are listed below:

1. Laboratory set up of bench reagents.
2. Environmental related issues and concurrent methods for analysis. .
3. Product profile and its manufacturing product like soda ash, urea, ammonia etc.

List of Open Source Software/learning website:
1) Literature available in any laboratory manual of chemistry.
2) Vogel's book of chemistry.
3) NPTL
4) World Wide Web. etc.

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA
ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Chemistry is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

ESE Pr (V):10 marks for Open Ended Problems, 20 marks for VIVA.

Note: Passing marks for PA (M) will be 12 out of 30.
   Passing marks for ESE Pract(V) will be 15 out of 30.

GUJARAT TECHNOLOGICAL UNIVERSITY

ELEMENTS OF CIVIL ENGINEERING (Modified on 4th Feb 2014)
SUBJECT CODE: 2110004
B.E. 1st YEAR

Type of course: Civil Engineering

Prerequisite: Knowledge of physics and mathematics up to 12 science level.

Rationale: Basic Civil Engineering knowledge is essential for all Engineers.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
4	0	2	6	70	30*	30#	20**	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Introduction:** Branches of Civil Engineering, Scope of Civil Engineering, Role of Civil Engineer in Society. Impact of infrastructural development on economy of country.	02	6%
2	**Surveying, Leveling and Mapping:** **Introduction:** Definition of Surveying, Aims and applications, Fundamental principles of surveying, Classification of surveying, Plans and maps, Scales, Units of measurement.	05	10%
	Linear Measurement: Methods, Instruments used in chain surveying, Selection of stations, Chaining, Ranging, Offsetting, Errors in chaining and correction, Conventional symbols.	05	10%
	Angular Measurement: Instruments used, Types of compass, Types of meridians and bearings, Measurement of bearings, computation of angles. Compass traversing and correction of bearings for local attraction.for leveling, Methods of leveling, Recording	05	10%
	observations in level-book, Computing reduced levels by HI and rise & fall method, Definition of contour, Characteristics of contours of different terrains and application of contour maps, Introduction to planimeter, introduction to Global positioning system(GPS), remote sensing(RS) and Geographical information system(GIS)	06	12%

3	**Building Materials and Construction:** **Materials:** Introduction to construction materials like Stone, Bricks, Lime, Cement, Timber, Sand, Aggregates, Mortar, Concrete and bitumen.	05	10%
	Construction: Classification of buildings, Types of loads acting on buildings, Building components and their functions and nominal dimensions.	04	10%
4	**Building Planning and Drawing:** Definition and concept of plan of a simple residential building, Elementary principles and basic requirements for building planning, elevation and section of a residential building.	06	12%
5	**Water Resources:** Hydrologic cycle, water use and its conservation, Introduction to dams, weirs, barrages and check dams.	05	10%
6	**Transportation Engineering:** Role of transportation in national development, Modes of transportation, Introduction to road traffic and traffic control, Introduction to mass transportation system.	05	10%

Reference Books:

1. Title: Surveying Vol. I Author: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain16[th] Edition Publisher: Laxmi Publication Delhi
2. Title: Surveying Theory and Practice (7th Edition) Author: James M Anderson and Edward M Mikhail Publisher: McGraw Hill Education, India Pvt. Ltd.
3. Title: Surveying and Leveling Author: R. Subramanian Publisher: Oxford University
4. Title: Surveying and Leveling Author: N. N. BasakPublisher: Tata McGraw Hill Education, Pvt. Ltd. New Delhi
5. Title: Surveying Vol. I Author: S. K. DuggalPublisher: Tata McGraw Hill Publication New Delhi
6. Title: Elements of Civil Engineering Author: Dr. R.K. Jain and Dr. P.P. Lodha Publisher: McGraw Hill Education, India Pvt. Ltd.
7. Title: Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill
8. Title: Civil Engg. Drawing Author: S. C. Rangwala Publisher: Charotar Pub. House Anand
9. Title: Building ConstructionAuthor: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar JainPublisher: Laxmi Pub. Delhi
10. Title: Building Construction and Construction Material Author: G.S.Birdie and T.D. Ahuja Publisher: Dhanpat Rai Publishing Company
11. Title: Engineering Material Author: S.C. RangwalaPublisher: Charotar Pub. House, Anand
12. Title: Irrigation Engineering and Hydraulic Structures Author: SantoshkumarGarg Publisher: Khanna Publishers Delhi
13. Title: Highway Engineering Author: Khanna S. K. and Justo C. E.G. Publisher: Nemchand and Brothers

Course Outcome:

After learning the course the students shall be able to:

1. Carry out simple land survey to prepare maps with existing details.
2. Find out area of irregular shaped plane figures.
3. Understand building plan elevation and section.
4. Get acquainted with construction materials.
5. Get acquainted with hydrological cycle and hydraulic structures.
6. Get acquainted with mass transportation systems.

List of Practical:

1. Chain survey
2. Compass survey
3. Leveling

Project:

Based on practical students shall perform following projects.

1. Chain and compass survey project
2. Profile leveling and contouring

Tutorial:

I. Each student shall prepare a plan, elevation and section of a simple residential building from given data
II. Students shall draw following sketches and show typical dimensions
   - Cross sections of various types of foundations
   - Cross section of chhajja with lintel
   - Cross section of slab
   - A typical door
   - A typical window
   - Cross section of floor with typical dimensions
III. Students shall measure area of given irregular shaped figure with planimeter

Open Ended Problem (Model Making):

Each student shall prepare at least one model from the following items and label various components under the guidance of faculty members.

(i) Residential building
(ii) Any one type of component of building like stairs, foundations, roofs, sanitary fittings
(iii) Any one type from hydraulic structures like gravity dam, earthen dam, falls, canal structures
(iv) Railway points, crossings, signals.

Major Equipments:

1. Prismatic compass
2. Level
3. Metric chain
4. Prism square
5. Planimeter
6. Line ranger
7. Leveling staff

*PA (M): 10 marks for Active Learning Assignments, 20 marks for other methods of PA

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Elements of Civil Engineering is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

** PA (I): 10 marks for a case study of Systems, 10 marks for other methods of PA.
The case study of Systems: The case study should be of a working EE system, which shows the working of the concepts, included in the Syllabus.
ESE Pr (V):10 marks for Open Ended Problems, 20 marks for VIVA.
  Note: Passing marks for PA (M) will be 12 out of 30.

  Passing marks for ESE Pract (V) will be 15 out of 30.
  Passing marks for PA (I) will be 10 out of 20

GUJARAT TECHNOLOGICAL UNIVERSITY

WORKSHOP PRACTICE (Modified on 4th Feb 2014)
SUBJECT CODE: 2110012
B.E. 1st YEAR

Type of course: Engineering Science

Prerequisite: Zeal to learn the subject

Rationale: Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. Irrespective of branch, the use of workshop practices in day to day industrial as well domestic life helps to dissolve the problems.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
0	0	4	4	0	0	80#	20	100

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Contents:

Introduction to various shops / sections and workshop layouts. Safety norms to be followed in workshop should be conveyed to students.
Demonstration of hand tools, power tools, machine tools, basic measuring instruments, materials, Marking and measurement in Carpentry, Fitting, Smithy, Welding, Tin smithy, Plumbing and Machine shop.

Practice:

Students are required to prepare one job each in any three of the four shops viz. Fitting, Carpentry, Smithy and Tin smithy.
Journal is to be prepared covering the topics of demonstration and report about process / methodology / inspection for making jobs.
Open Ended Problems: Apart from above practice jobs a group of students has to undertake one open ended problem/design problem. Few examples of the same are given below.
1. Prepare a working model of a toy
2. Prepare a game/puzzle games

Reference Books:
1. Mechanical Workshop Practice by K C John, PHI Learning
2. Workshop Technology Vol. 1 and 2 by Raghuvanshi B.S. Dhanpat Rai & Sons 1998
3. Workshop Technology by Chapman W.A. J and Arnold E. Viva low priced student edition, 1998
4. Workshop Practices, H S Bawa, Tata McGraw-Hill, 2009
5. Workshop Practices and Materials, B J Black, CRC Press.

Course Outcome:

After learning the course the students should be able to

1. Understand applications of hand tools and power tools.
2. Understand the operations of machine tools.
3. Select the appropriate tools required for specific operation.
4. Comprehend the safety measures required to be taken while using the tools.

Major Equipments: Fitting, Carpentry and Plumbing vice, various types of files for fitting shop, machine and hand hacksaw, monkey spanner, die, chisels, jack plane, furnace, anvil, different types of hammers for various shops, tongs, scissors, hand shear machine, sheet cutter, arc welding machine, welding goggles, welding gloves, gas welding machine

List of Open Source Software/learning website: http://nptel.iitm.ac.in/courses.php

ESE Pr (V):30 marks for Open Ended Problems, 50 marks for VIVA.

Note: Passing marks for ESE Pract(V) will be 40 out of 80.

GUJARAT TECHNOLOGICAL UNIVERSITY

CONTRIBUTOR PERSONALITY DEVELOPMENT (Modified on 13th March 2014)

SUBJECT CODE: 2990001
B.E. 1ST YEAR

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Pr/Viva (V)	PA (I)	
4	0	0	4	70	30*	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Note: It is the responsibility of the institute heads that marks for **PA of theory** & **ESE and PA of practical** for each student are entered online into the GTU Portal at the end of each semester within the dates specified by GTU.

Note:

1. This subject is compulsory.

2. 4 Credits will be over and above the existing credit structure.

3. This subject will be taught by faculty of English. For B. Pharm., the institute will have to nominate one faculty member for the subject.

4. In Institutes, whereas the load is not managed by the lecturers of English only, please nominate the other faculty for teaching the course of Contributor Personality Development.

(A) Background

The Contributor Personality Program has been designed keeping in mind the following:

1.0 Technology students should not only be excellently trained in the technological field, they should acquire soft skills if they are to be successful. Every student must also learn about the techniques of effective participation in a group discussion. He/she must learn to prepare his/her resume and he/she should also be groomed for presenting himself/herself at an interview.

2.0 There is a great need to equip students with not only the right skill-sets but also the right mindsets.

3.0   The „mind-sets" needed in today's environment must support both (i) effective action and (ii) Values and service oriented behaviour.

Effective action without human values can lead to personal benefits for individuals but a long-term cost to both nation and society. Human values without effective action can lead to an inability on the part of the individual to perform and flourish in today" s environment.

This combination of effectiveness with human values is crystallized in the concept of "contributor ship".

4.0   Students who adopt and develop the right mindsets early in their professional career are able to bring about a positive and sustainable change in their overall personality.

They are able to grow the right approaches to their peers, seniors, industry, and their own future. They become more responsible and capable of shaping their own lives.
Therefore, the program may be rightly called a "Contributor Personality Development Program".

5.0   Any program of this sort must, in order to be effective, be inspired and guided by a   high ideal and principles/ practices flowing from that ideal.

The Contributor Personality Program is guided by the ideals and ideas of Swami Vivekananda – who represented in his leonine personality the highest ideals of human values combined with effective action.

The Contributor Personality

Contributor

- Creates value - for self, for the organization, for society
- Takes charge and makes things happen, making a positive difference
- Creates opportunities and sees possibilities everywhere
- Is 'in demand' wherever he/she goes
- Seeks long-term career success and life-fulfillment

(B) Course Outline

Topics 1-6 relate to the basic axioms or "mental models" that students carry about themselves, about success, careers, contribution, etc. The right mental models are a necessary prerequisite for developing into a Contributor.

Topics 7-12 are 6 core practices that will help a student manifest the ideal of contributor ship in one" s life.

Topics 13-15 relate to the students capability to connect into the job-market.

Topic	Course Title
1	**Who is a Contributor** Student develops an appreciation of who the Contributors are and how they fundamentally differ from Non-contributors in their overall approach to work, to other human beings, to society as a whole.
2	**The Contributor's identity** Student develops his/ her own answer to the question "who am I?" The student becomes aware of the fact that Non-contributors usually define themselves in terms of what they have acquired in life (e.g. qualifications, position, years of experience, etc.) while Contributors define themselves in terms of what they will become or accomplish (e.g. capacity to deliver, commitment and ownership of the organization" s purpose, etc.).
3	**The Contributor's vision of success** The student explores the meaning of success in his life. Through this exploration, the student is expected to recognize that Contributors have a wider definition of success than Non-contributors. While Non-contributors define success in terms of material success, achievement, external impact, etc., Contributors are able to widen this definition of success to include personal fulfillment, development of self-esteem, ongoing development of personal capabilities etc.
4	**The Contributor's vision of career** The student learns to distinguish between an "acquisitive career" and a "contributive career". An acquisitive career is one in which the career-seeker is focused on acquiring higher position, higher salary, more benefits etc. This preoccupation with selfish interests often damages the individual" s career, as well as, damages the organization and society. A contributive career is one where the career-seeker is focused on contributing, with rewards being a by-product of the contributions made.

5	**The scope of contribution**
	The student learns to perceive that in all type of work, every type of role, there is a possibility of contributing at multiple levels – contributing to self, contributing to organization, and contributing to society.
	The student also appreciates the difference between "acquisition for self" and "contribution to self" – the former being material acquisition and the latter being conscious development of oneself through the medium of one's career.
6	**Embarking on the journey to contributor ship**
	The student recognizes the fundamental "building blocks" for becoming a Contributor – the first building block being a shift from a "victim" to being a "creator of one's destiny"; the second building block being acceptance of the ideal of contributor ship; the third building block being the willingness to take full responsibility for one's own development; the fourth building block being the capacity to reflect on one's development and make appropriate modifications.
7	**Design Solutions**
	When faced with a challenge, the Contributor's first response is: "Can we find a solution?" This is unlike a Non-contributor who may respond to the challenge by trying a little and giving up, blaming others, or finding excuses to cover up the issue.
	Whereas, the Contributor finds a solution. In other words, the Contributor develops the capacity to find solutions through continuous practice and learning from other Contributors.
	In this topic, students learn the importance of willingness and ability to find solutions.
8	**Focus on value**
	What does creating value mean? It means making a positive difference, a tangible impact, a specific contribution to any situation. This positive difference or impact can be in the form of achieving a specific goal, creating a product, creating „human touch" in a particular interaction, or enhancing one's own capacity, or the capacity of one's colleagues and team- mates.
	Contributors are therefore extremely result-focused, but the result is measured in terms of value created.
	In this topic, students learn to clarify the meaning of the word "value" and how value is created in various situations.

9	**Engage deeply**
	Contributors are instantly distinguished by the way they approach work. They get involved. They are enthusiastic. They go deep into the subject. In short, Contributors love what they do.
	This is in direct contrast to Non-contributors who want to do only what they love - an approach that seems reasonable until you realize that life and workplaces have so much variety that you may very often be called upon to do tasks that seem unpleasant or boring until you get involved.
	In this topic, students learn the importance of engaging deeply with whatever work they do – at work, in study, in personal life.
10	**Think in Enlightened Self-interest**
	Contributors think in Enlightened Self-Interest. In every situation they get into, they find a way to create something good for self and for all at the same time – including team mates, bosses, customers and their organization.
	Contrasting to this is the mindset of a Non-Contributor. Such a person is only concerned with his/ her own self-interest in a situation. He/she is not concerned about the impact (positive or negative) on the other person. This leads to unpleasant situations, broken relationships, unhappy team-mates, subordinates, and bosses, and lower trust in any situation.
	Students are expected to learn to appreciate the importance of thinking win-win for all stakeholders and also in various situations.
11	**Practice Imaginative Sympathy**
	One of the unique qualities of Contributors is their ability to appreciate and understand others" life situation, others" mental condition, and others" point of view. How do they do this?
	They have consciously developed a „way of thinking" called „Imaginative Sympathy". In this way of thinking, they are able to give due importance to the human aspects of a situation, and not just the technical or commercial aspects.
	But this is not all. Imaginative Sympathy goes beyond looking at the human aspects of the situation. It also means that Contributors are able to anticipate possible interactions or reactions, they are able to take a multi-dimensional view of a situation and they are able to bring about changes or results while taking everybody along with them.
	Imaginative Sympathy translates itself into active concern for others. Students will learn the importance and consequences of Imaginative Sympathy in a workplace situation.

12	**Demonstrate Trust Behavior** Contributors recognize that they are able to achieve results and make contributions with the help of other human beings. They receive this help if and only if they are trusted and, in turn, trust. Contributors practice trust behavior from very early in their career, thereby building a huge trust balance (like a bank balance) over their career and relationships. The term Trust Behavior may be described as character-in-action. This includes keeping one"s word and commitments, staying with a task, acting with integrity in every situation, making sure that there is complete transparency in one"s actions and interactions, etc. Students are expected to learn to develop a deep appreciation of trust behavior and how it is practiced.
13	**Resume Building** In this topic, students learn to develop a resume for the job-market. Students will learn to develop both a generic resume and resumes specific to some types of jobs. Students learn about best practices and common errors in developing their resume. Most important, students learn to analyze the jobs offered and present themselves in terms of their potential / willingness to contribute to the job.
14	**Group Discussions (GDs)** In this topic, students learn (i) how to participate in a group discussion from the contributor"s view-point (i.e. how to speak) (ii) how to contribute to the development of the topic (i.e. what to speak) and (iii) to develop the Contributor"s view-point on various GD topics (i.e. how to interpret a topic of discussion from the point of view of a contributor)
15	**Interview Skills** In this topic, students learn about (i) common interview questions and how to develop answers (ii) typical challenges faced in interviews beyond the questions (such as body language, grooming, presentation) (iii) most important, the student learns the importance of trust building and creating confidence in the interview.

(C) Course Plan

The course duration is 48 hours. It can be conducted in sessions of 1 hour each or some of the sessions can be combined as 2 hours each. The course plan is as follows –

Topic 1: Who is a Contributor – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	**3 hours**
Topic 2: The Contributor's identity – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	**3 hours**
Topic 13: Resume Building – 2 hours for Concepts, Tools, and Techniques – 2 hours for Projects	**4 hours**
Topic 3: The Contributor's vision of success – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	**3 hours**
Topic 4: The Contributor's vision of career – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	**3 hours**
Topic 5: The scope of contribution – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	**3 hours**

Topic 6: Embarking on the journey to contributorship –	3 hours
– 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	
Topic 14: Group Discussions (GDs)	4 hours
– 2 hours for Concepts, Tools, and Techniques – 2 hours for Projects and Practice	
Topic 7: Design Solutions –	3 hours
– 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	
Topic 8: Focus on value –	3 hours
– 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	
Topic 9: Engage deeply –	3 hours
– 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	
Topic 10: Think in Enlightened Self-interest –	3 hours
– 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	
Topic 11: Practise Imaginative Sympathy –	3 hours
– 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	
Topic 12: Demonstrate Trust Behavior –	3 hours
– 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	
Topic 15: Interview Skills	4 hours
– 2 hours for Concepts, Tools, and Techniques – 2 hours for Projects and Practice	
TOTAL	48 hours

(D)   Examination Approach

Total marks: 150. Break-up of marks -

(i)   Final exam: 70 marks (equal weightage for topics 1-15)

(ii)   Presentations and projects for topics 1-12: 30 marks

(iii)   Projects for topics 13-15: 50 marks

(E) Instructional Strategy

1.0 The entire course will use a three-level instructional strategy

Level I:	Classroom Explorations
Level II:	Projects and Presentations
Level III:	Self-study by students

2.1 Level I: Classroom Explorations

1. The Classroom Explorations will be organized around the „Contributor Personality Program – Study Book" .

   The Study Book may be downloaded by the student from the resource site produced by GTU.

2. The Classroom Explorations involves two kinds of explorations:

   (i) Exploration of key concepts / frameworks such as "contributors vision of success" etc.

   (ii) Exploration of the examples provided in the CPP Study Book.

3. The Classroom Explorations will be supported by Session Guide Sheets available online in the CPP ActivGuide.

3.1 Level II: Projects & Presentations

1. The entire Classroom Exploration process will be supplemented by projects and presentations.

2. Session Guides will provide sample topics for projects and presentations. Individual instructors will be free to develop their own projects/ presentation topics also.

3. This will not only enhance conceptual clarity but also build presentation, public-speaking, report writing, and group discussion skills of the students.

4.1 Level III: Self Study by students

1. Students will be given extensive learning support (upto 400 learning units) in the ActivGuide website. This will include videos, presentations, tests, etc.

2. Students can refer to ActivGuide on their own time through internet.

(F)   Reference Material

Basic Study Material

SN	Author/s	Name of Reference	Publisher	Edition
1	Illumine Knowledge Resources Pvt. Ltd. (Downloadable from the internet)	Contributor Personality Program Workbook (Vols I & II)	Illumine Knowledge Resources Pvt. Ltd	Latest
2	Illumine Knowledge Resources Pvt. Ltd. (will be made available to all students on the Internet)	Contributor Personality Program ActivGuide	Illumine Knowledge Resources Pvt. Ltd	Latest

Reference Books

Topic	Course Title	Reference
1	**Who is a Contributor**	1. On Contributors, Srinivas V.; Illumine Ideas, 2011 2. Enlightened Citizenship and Democracy; Swami Ranganathananda, Bharatiya Vidya Bhavan, 1989 3. Personality Development, Swami Vivekananda; Advaita Ashrama
2	**The Contributor's identity**	1. To have or to be, Erich Fromm; Continuum International Publishing Group, 2005 2. The art of being, Erich Fromm; Continuum International Publishing Group, 1992 3. Raja Yoga, Swami Vivekananda; Advaita Ashrama
3	**The Contributor's vision of success**	1. Eternal Values for a Changing Society – Vol IV (Ch 25, 35), Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993 2. Karma Yoga, Swami Vivekananda; Advaita Ashrama
4	**The Contributor's vision of career**	1. Six Pillars of Self Esteem , Nathaniel Branden; Bantam, 1995 2. Mindset: The New Psychology of Success, Carol S. Dweck; Random House Publishing Group, 2007
5	**The scope of contribution**	1. Awakening India, Swami Vivekananda; Ramakrishna Mission, New Delhi, 2011 2. Eternal Values for a Changing Society – Vol IV

		(Ch 35), Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993
		3. Lasting Contribution: How to Think, Plan, and Act to Accomplish Meaningful Work, Tad Waddington; Agate Publishing, 2007
6	**Embarking on the journey to contributor ship**	1. Vivekananda: His Call to the Nation, Swami Vivekananda; Advaita Ashrama
		2. Eternal Values for a Changing Society – Vol IV (Ch 33), Vol III (Ch 19, 21, 30) Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993
		3. Lectures from Colombo to Almora, Swami Vivekananda; Advaita Ashrama
7	**Design Solutions**	1. Why not?: how to use everyday ingenuity to solve problems big and small, Barry Nalebuff, Ian Ayres; Harvard Business School Press, 2003
		2. How to Have a Beautiful Mind, Edward De Bono; Vermilion, 2004
8	**Focus on value**	1. The value mindset: returning to the first principles of capitalist enterprise (Ch 8 & 9); Erik Stern, Mike Hutchinson; John Wiley and Sons, 2004
		2. Managing for Results, Peter F. Drucker; HarperCollins, 2009
9	**Engage deeply**	1. The Power of Full Engagement: Managing Energy, Not Time, is the Key to High Performance and Personal Renewal, Jim Loehr, Tony Schwartz; Simon and Schuster, 2003
10	**Think in Enlightened Self-interest**	1. The 7 Habits of Highly Effective People, Stephen R. Covey; Simon and Schuster, 2004
		2. Creating Shared Value, Michael E. Porter and Mark R. Kramer; Harvard Business Review; Jan/Feb2011, Vol. 89 Issue 1/2
11	**Practice Imaginative Sympathy**	1. Eternal Values for a Changing Society – Vol IV (Ch 8, 10, 23, 35, 37), Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993
		2. Eternal Values for a Changing Society – Vol III (Ch 18), Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993
12	**Demonstrate Trust Behavior**	1. The Speed of Trust: The One Thing That Changes Everything, Stephen M. R. Covey, Rebecca R. Merrill, Stephen R. Covey; Free Press, 2008
		2. Integrity: The Courage to Meet the Demands of

1		Reality, Henry Cloud; HarperCollins, 2009
		3. Responsibility at work: how leading professionals act (or don't act) responsibly, Howard Gardner; John Wiley & Sons, 2007
13	**Resume Building**	1. What Color Is Your Parachute? 2012: A Practical Manual for Job-Hunters and Career-Changers, Richard Nelson Bolles; Ten Speed Press, 2011 2. The what color is your parachute workbook: how to create a picture of your ideal job or next career, Richard Nelson Bolles; Ten Speed Press, 2011
14	**Group Discussions (GDs)**	1. Effective Group Discussion: Theory and Practice, Gloria J. Galanes, Katherine Adams; McGraw-Hill, 2004
15	**Interview Skills**	1. What Color Is Your Parachute? 2012: A Practical Manual for Job-Hunters and Career-Changers, Richard Nelson Bolles; Ten Speed Press, 2011 2. The what color is your parachute workbook: how to create a picture of your ideal job or next career, Richard Nelson Bolles; Ten Speed Press, 2011

General References:-

SN	Author/s	Name of Book	Publisher	Edition
1	Swami Ranganathanand	Universal Message of the Bhagavad Gita (Vol 1-3)	Advaita Ashrama, Kolkata	Latest
2	Swami Ranganathananda	Eternal Values for a Changing Society (Vol 1-4)	Bharatiya Vidya Bhavan	Latest
3	Asim Chaudhuri	Vivekananda: A Born Leader	Advaita Ashrama, Kolkata	Latest
4	Swami Vivekananda	Complete Works of Swami Vivekananda (Vol 1-9)	Advaita Ashrama, Kolkata	Latest
5	Swami Vivekananda	Letters of Swami Vivekananda	Advaita Ashrama, Kolkata	Latest

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus of Engineering Graphics is covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should be sent to achievements@gtu.edu.in.

GUJARAT TECHNOLOGICAL UNIVERSITY
BE 3rd Semester
Teaching Scheme & syllabus (w.e.f. 2014-15)

Semester III

Subject code	Subject name	Teaching Scheme (Hours)			Credits
		Theory	Tutorial	Practical	
2130002	Advanced Engineering Mathematics	3	2	0	5
2130004	Engineering Economics and Management	3	0	0	3
2130702	Data Structure	4	0	4	8
2130703	Database Management Systems	4	0	4	8
2131004	Digital Electronics	4	0	2	6
2130005	Design Engineering - I A	0	0	3	3
	Total	18	2	10	33

GUJARAT TECHNOLOGICAL UNIVERSITY

ADVANCE ENGINEERING MATHS
SUBJECT CODE: 2130002
B.E. 3RD SEMESTER

Type of course: Engineering Mathematics

Prerequisite: The course follows from Calculus, Linear algebra

Rationale: Mathematics is a language of Science and Engineering

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
L	T	P	C	Theory Marks			Practical Marks		
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	2	0	5	70	20	10	30	0	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Introduction to Some Special Functions:** Gamma function, Beta function, Bessel function, Error function and complementary Error function, Heaviside's function, pulse unit height and duration function, Sinusoidal Pulse function, Rectangle function, Gate function, Dirac's Delta function, Signum function, Saw tooth wave function, Triangular wave function, Halfwave rectified sinusoidal function, Full rectified sine wave, Square wave function.	02	4
2	**Fourier Series and Fourier integral:** Periodic function, Trigonometric series, Fourier series, Functions of any period, Even and odd functions, Half-range Expansion, Forced oscillations, Fourier integral	05	10
3	**Ordinary Differential Equations and Applications:** First order differential equations: basic concepts, Geometric meaning of y' = f(x,y) Direction fields, Exact differential equations, Integrating factor, Linear differential equations, Bernoulli equations, Modeling , Orthogonal trajectories of curves.Linear differential equations of second and higher order: Homogeneous linear differential equations of second order, Modeling: Free Oscillations, Euler- Cauchy Equations, Wronskian, Non homogeneous equations, Solution by undetermined coefficients, Solution by variation of parameters, Modeling: free Oscillations resonance and Electric circuits, Higher order linear differential equations, Higher order homogeneous with constant coefficient, Higher order non homogeneous equations. Solution by [1/f(D)] r(x) method for finding particular integral.	11	20
4	**Series Solution of Differential Equations:** Power series method, Theory of power series methods, Frobenius method.	03	6
5	**Laplace Transforms and Applications:** Definition of the Laplace transform, Inverse Laplace transform, Linearity, Shifting theorem, Transforms of derivatives and integrals Differential equations, Unit step function Second shifting theorem,	09	15

	Dirac's delta function, Differentiation and integration of transforms, Convolution and integral equations, Partial fraction differential equations, Systems of differential equations		
6	**Partial Differential Equations and Applications:** Formation PDEs, Solution of Partial Differential equations f(x,y,z,p,q) = 0, Nonlinear PDEs first order, Some standard forms of nonlinear PDE, Linear PDEs with constant coefficients,Equations reducible to Homogeneous linear form, Classification of second order linear PDEs.Separation of variables use of Fourier series, D'Alembert's solution of the wave equation,Heat equation: Solution by Fourier series and Fourier integral	12	15

Reference Books:
1. Advanced Engineering Mathematics (8th Edition), by E. Kreyszig, Wiley-India (2007).
2. Engineering Mathematics Vol 2, by Baburam, Pearson
3. W. E. Boyce and R. DiPrima, Elementary Differential Equations (8th Edition), John Wiley (2005)
4. R. V. Churchill and J. W. Brown, Fourier series and boundary value problems (7th Edition), McGraw-Hill (2006).
5. T.M.Apostol, Calculus , Volume-2 (2nd Edition), Wiley Eastern , 1980

Course Outcome:

After learning the course the students should be able to

1. Fourier Series and Fourier Integral
   o Identify functions that are periodic. Determine their periods.
   o Find the Fourier series for a function defined on a closed interval.
   o Find the Fourier series for a periodic function.
   o Recall and apply the convergence theorem for Fourier series.
   o Determine whether a given function is even, odd or neither.
   o Sketch the even and odd extensions of a function defined on the interval [0,L].
   o Find the Fourier sine and cosine series for the function defined on [0,L]
2. Ordinary Differential Equations and Their Applications
   o Model physical processes using differential equations.
   o Solve basic initial value problems, obtain explicit solutions if possible.
   o Characterize the solutions of a differential equation with respect to initial values.
   o Use the solution of an initial value problem to answer questions about a physical system.
   o Determine the order of an ordinary differential equation. Classify an ordinary differential equation as linear or nonlinear.
   o Verify solutions to ordinary differential equations.
   o Identify and solve first order linear equations.
   o Analyze the behavior of solutions.
   o Analyze the models to answer questions about the physical system modeled.
   o Recall and apply the existence and uniqueness theorem for first order linear differential equations.
   o Identify whether or not a differential equation is exact.
   o Use integrating factors to convert a differential equation to an exact equation and then solve.
   o Solve second order linear differential equations with constant coefficients that have a characteristic equation with real and distinct roots.
   o Describe the behavior of solutions.
   o Recall and verify the principal of superposition for solutions of second order linear differential equations.
   o Evaluate the Wronskian of two functions.

- o Determine whether or not a pair of solutions of a second order linear differential equations constitute a fundamental set of solutions.
- o Recall and apply Abel's theorem.
- o Apply the method of reduction of order to find a second solution to a given differential equation.
- o Apply the method of undetermined coefficients to solve non-homogeneous second order linear differential equations.
- o Model undammed mechanical vibrations with second order linear differential equations, and then solve. Analyze the solution. In particular, evaluate the frequency, period, amplitude, phase shift, and the position at a given time.
- o Define critically damped and over damped. Identify when these conditions exist in a system.
- o Describe the phenomena of beats and resonance. Determine the frequency at which resonance occurs.
- o Recall the definition of linear independence for a finite set of functions. Determine whether a set of functions is linearly independent or linearly dependent.
- o Use the method of variation of parameters to solve non-homogeneous higher order linear differential equations.

3. Series Solution of Differential Equations

- o Manipulate expressions involving summation notation. Change the index of summation.
- o Find the general solution of a differential equation using power series.
- o Given an initial value problem, use the differential equation to inductively determine the terms in the power series of the solution, expanded about the initial value.

4. Laplace Transforms and Applications

- o Sketch a piecewise defined function. Determine if it is continuous, piecewise continuous or neither.
- o Evaluate Laplace transforms from the definition.
- o Determine whether an infinite integral converges or diverges.
- o Evaluate inverse Laplace transforms.
- o Use Laplace transforms to solve initial value problems.
- o Convert piecewise defined functions to functions defined in terms of step functions and vice versa.
- o Find the Laplace transform of a piecewise defined function.
- o Apply the shifting theorems to evaluate Laplace transforms and inverse Laplace transforms. o Use Laplace transforms to solve differential equations with discontinuous forcing functions. o Define an idealized unit impulse function.
- o Use Laplace transforms to solve differential equations that involve impulse functions.
- o Evaluate the Laplace transform of a convolution of functions.
- o Use the convolution theorem to evaluate inverse Laplace transforms.

5. Partial Differential Equations and Applications

- o Determine the order of a partial differential equation.
- o Classify a partial differential equation as linear or nonlinear.
- o Verify solutions to partial differential equations.
- o Apply the method of separation of variables to solve partial differential equations, if possible.
- o Find the solutions of heat conduction problems in a rod using separation of variables. o Solve steady state heat conduction problems in a rod with various boundary conditions. o Solve the wave equation that models the vibration of a string with fixed ends.
- o Describe the motion of a vibrating string.
- o   Solve Laplace's equation over a rectangular region for various boundary conditions.
- o   Solve Laplace's equation over a circular region for various boundary conditions.

List of Open Source Software/learning website:

1. NPTEL
   http://www.cdeep.iitb.ac.in/nptel/Electrical%20&%20Comm%20Engg/Signals%20and%20System/ Course_home4.30
   https://www.youtube.com/watch?v=DPg5T-YBQjU
   https://www.youtube.com/watch?v=7fJeo1fylKI
   https://www.youtube.com/watch?v=1FnBPmEWpus
   https://www.youtube.com/watch?v=dgDIQ0VA0pA https://www.youtube.com/watch?v=SoBs-YGQUdc
   https://www.youtube.com/watch?v=Fh8m6ZdFaqU

2. **Instructor(s):** Prof. Haynes Miller, Prof. Arthur Mattuck

   http://ocw.mit.edu/courses/mathematics/18-03-differential-equations-spring-2010/video-lectures/

3. **Instructor:** Prof. Haynes Miller, Prof. Arthur Mattuck, Dr. John Lewis

   http://ocw.mit.edu/courses/mathematics/18-03sc-differential-equations-fall-2011/

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GUJARAT TECHNOLOGICAL UNIVERSITY

ENGINEERING ECONOMICS AND MANAGEMENT
SUBJECT CODE: 2130004
B.E. 3rd/4th SEMESTER

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	0	3	70	20	10	0	0	0	100

Content:

Sr. No	Topics	Hrs.	Module Weighta
1.	Introduction to Economics; Definitions, Nature, Scope, Difference between Microeconomics & Macroeconomics. Theory of Demand & Supply; meaning, determinants, law of demand, law of supply, equilibrium between demand & supply. Elasticity; elasticity of demand, price elasticity, income elasticity, cross	04	10%
2.	Theory of production; production function, meaning, factors of production (meaning & characteristics of Land, Labour, capital & entrepreneur), Law of variable proportions & law of returns to scale. Cost; meaning, short run & long run cost, fixed cost, variable cost, total cost, average cost, marginal cost, opportunity cost. Break even analysis; meaning, explanation, numerical	04	10%
3.	Markets; meaning, types of markets & their characteristics (Perfect Competition, Monopoly, Monopolistic Completion, Oligopoly). National Income; meaning, stock and flow concept, NI at current price, NI at constant price, GNP, GDP, NNP,NDP, Personal income, disposal	05	10%
4.	Basic economic problems; Poverty-meaning, absolute & relative poverty, causes, measures to reduce. Unemployment: meaning, types, causes, remedies Inflation; meaning, types, causes,	04	10%
5.	Money; meaning, functions, types, Monetary policy- meaning, objectives, tools, fiscal policy-meaning, objectives, tools. Banking; meaning, types, functions, Central Bank- RBI; its functions, concepts; CRR, bank rate, repo rate, reverse repo rate, SLR.	04	10%
6.	Introduction to Management; Definitions, Nature, scope. Management & administration, skill, types and roles of managers. Management Principles; Scientific principles, Administrative	04	11%
7.	Functions of Management; Planning, Organizing, Staffing, Directing, Controlling (meaning, nature and importance). Organizational Structures; meaning, principles of organization, types- formal and informal, line, line & staff, matrix, hybrid (explanation with merits and demerits), span of control, departmentalization.	05	11%
8.	Introduction to Marketing management; Marketing Mix, concepts of marketing, demand forecasting and methods, market segmentation. Introduction to Finance Management; meaning, scope, sources, functions	05	11%
9.	Introduction to Production Management; definitions, objectives, functions, plant layout-types & factors affecting it, plant location- factors affecting it. Introduction to Human Resource Management; definitions, objectives of manpower planning, process, sources of recruitment, process of selection	05	11%
10.	Corporate Social Responsibility; meaning, importance Business Ethics; meaning,	02	6%

Reference Books:
1. Engineering Economics, R.Paneerselvam, PHI publication
2. Fundamentals of Management: Essential Concepts and Applications, Pearson Education, Robbins S.P. and Decenzo David A.
3. Economics: Principles of Economics, N Gregory Mankiw, Cengage Learning
4. Principles and Practices of Management by L.M.Prasad
5. Principles of Management by Tripathy and Reddy
6. Modern Economic Theory, By Dr. K. K. Dewett & M. H. Navalur, S. Chand Publications

Course Outcomes: The course is intended to provide basic understanding of Economics and Management to engineering students with following aspects:
- To impart knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions.
- To help the students to understand the fundamental concepts and principles of management; the basic roles, skills, functions of management, various organizational structures and basic knowledge of marketing.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory. The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07) / INFORMATION TECHNOLOGY (16) / INFORMATION & COMMUNICATION TECHNOLOGY (32)

DATA STRUCTURES

SUBJECT CODE: 2130702

B.E. 3rd Semester

Type of course: Compulsory

Prerequisite: Computer Programming & utilization

Rationale: Data structure is a subject of primary importance in Information and Communication Technology. Organizing or structuring data is important for implementation of efficient algorithms and program development. Efficient problem solving needs the application of appropriate data structure during program development.

Understanding of data structures is essential and this facilitates the understanding of the language. The practice and assimilation of data structure techniques is essential for programming. The knowledge of „C" language and data structures will be reinforced by practical exercises during the course of study. The course will help students to develop the capability of selecting a particular data structure.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	4	8	70	20	10	20	10	20	150

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	INTRODUCTION TO DATA STRUCTURE: Data Management concepts, Data types – primitive and non-primitive, Performance Analysis and Measurement (Time and space analysis of algorithms-Average, best and worst case analysis), Types of Data Structures- Linear & Non Linear Data Structures.	04	10
2	LINEAR DATA STRUCTURE Array: Representation of arrays, Applications of arrays, sparse matrix and its representation Stack: Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi Queue: Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue Linked List: Singly Linked List, Doubly Linked list,	13	30

	Circular linked list ,Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.			
3	NONLINEAR DATA STRUCTURE : Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees- Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance, Graph-Matrix Representation Of Graphs, Elementary Graph operations,(Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree)	13	30
4	HASHING AND FILE STRUCTURES : Hashing: The symbol table, Hashing Functions, Collision-Resolution Techniques, File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods.	06	15
5	Sorting & Searching: Sorting – Bubble Sort, Selection Sort, Quick Sort, Merge Sort Searching – Sequential Search and Binary Search	06	15

Reference Books:
1. An Introduction to Data Structures with Applications. by Jean-Paul Tremblay & Paul G. Sorenson Publisher-Tata McGraw Hill.
2. Data Structures using C & C++ -By Ten Baum Publisher – Prenctice-Hall International.
3. Fundamentals of Computer Algorithms by Horowitz, Sahni,Galgotia Pub. 2001 ed.
4. Fundamentals of Data Structures in C++-By Sartaj Sahani.
5. Data Structures: A Pseudo-code approach with C -By Gilberg & Forouzan Publisher-Thomson Learning.

Course Outcome:

After learning the course the students should be able:
1. Differentiate primitive and non primitive structures
2. Design and apply appropriate data structures for solving computing problems.
3. Apply sorting and searching algorithms to the small and large data sets.

List of Practical:

At least 10 practical should be performed by students using programming language.

1. Introduction to pointers. Call by Value and Call by reference.
2. Introduction to Dynamic Memory Allocation. DMA functions malloc(), calloc(), free() etc.
3. Implement a program for stack that performs following operations using array.
   (a) PUSH (b) POP (c) PEEP (d) CHANGE (e) DISPLAY

4. Implement a program to convert infix notation to postfix notation using stack.
5. Write a program to implement QUEUE using arrays that performs following operations (a) INSERT (b) DELETE (c) DISPLAY

5. Write a program to implement Circular Queue using arrays that performs following operations. (a) INSERT (b) DELETE (c) DISPLAY
6. Write a menu driven program to implement following operations on the singly linked list.
    (a) Insert a node at the front of the linked list.
    (b) Insert a node at the end of the linked list.
    (c) Insert a node such that linked list is in ascending order.(according to info. Field)
    (d) Delete a first node of the linked list.
    (e) Delete a node before specified position.
    (f) Delete a node after specified position.
7. Write a program to implement stack using linked list.
8. Write a program to implement queue using linked list.
9. Write a program to implement following operations on the doubly linked list.
    (a) Insert a node at the front of the linked list.
    (b) Insert a node at the end of the linked list.
    (c) Delete a last node of the linked list.
    (d) Delete a node before specified position.
10. Write a program to implement following operations on the circular linked list.
    (a) Insert a node at the end of the linked list.
    (b) Insert a node before specified position.
    (c) Delete a first node of the linked list.
    (d) Delete a node after specified position.
10. Write a program which create binary search tree.
11. Implement recursive and non-recursive tree traversing methods inorder, preorder and post- order traversal.
12. Write a program to implement Queue Sort
13. Write a program to implement Merge Sort
14. Write a program to implement Bubble Sort
15. Write a program to implement Binary Search.

Open Ended Problem:
1) Simulate a simple dictionary. Assume each character contains at least 10 vocabularies. Create an index page for all characters. Retrieve the word using index value. Assume that the index characters from a to z.
2) Design a simple search engine to display the possible websites upon entering a search query. Use suitable data structure for storage and retrieval.
3) Design and Develop the index for a text book of at least 100 pages using alphabets.
4) Design a Student Prerequisite Subjects Management System requires the use of linked list or tree to store different courses and their prerequisites and based on this list it will allow any student to take any course or not.
5) Write a program that uses the radix sort to sort 1000 random digits. Print the data before and after the sort. Each sort bucket should be a linked list. At the end of the sort, the data should be in the original array.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07) / INFORMATION TECHNOLOGY (16) / INFORMATION & COMMUNICATION TECHNOLOGY (32)
DATABASE MANAGEMENT SYSTEMS
SUBJECT CODE: 2130703
B.E. 3rd Semester

Type of course: Compulsory

Prerequisite:
(1) Elementary knowledge about computers including some experience using UNIX or Windows.
(2) Computer Programming & Utilization
(3) Knowledge about data structures and algorithms, corresponding to the basic course on Data Structures and Algorithms.

Rationale: A database management system (DBMS) is designed to manage a large body of information. Data management involves both defining structures for storing information and providing mechanisms for manipulating the information. In addition, the database system must provide for the safety of the stored information, despite system crashes or attempts at unauthorized access. If data are to be shared among several users, the system must avoid possible anomalous results due to multiple users concurrently accessing the same data.

Examples of the use of database systems include airline reservation systems, company payroll and employee information systems, banking systems, credit card processing systems, and sales and order tracking   systems.

A major purpose of a database system is to provide users with an abstract view of the data. That is, the system hides certain details of how the data are stored and maintained. Thereby, data can be stored in complex data structures that permit efficient retrieval, yet users see a simplified and easy-to-use view of the data. The lowest level of abstraction, the physical level, describes how the data are actually stored and details the data structures. The next-higher level of abstraction, the logical level, describes what data are stored, and what relationships exist among those data. The highest level of abstraction, the view level, describes parts of the database that are relevant to each user; application programs used to access a database form part of the view level.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		PA (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	4	8	70	20	10	20	10	20	150

Contents:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Introductory concepts of DBMS : Introduction and applications of DBMS, Purpose of data base, Data, Independence, Database System architecture- levels, Mappings, Database, users and DBA	02	05

2	Relational Model : Structure of relational databases, Domains, Relations, Relational algebra – fundamental operators and syntax, relational algebra queries, tuple relational calculus	03	10
3	Entity-Relationship model : Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema	04	10
4	Relational Database design : Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization – 1Nf, 2NF, 3NF, Decomposition using FD- dependency preservation, BCNF, Multi-valued dependency, 4NF, Join dependency and 5NF	05	15
5	Query Processing & Query Optimization : Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans, materialized views	04	10
6	Transaction Management : Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, , two-phase locking protocol, Isolation, Intent locking	09	20
7	Security: Introduction, Discretionary access control, Mandatory Access Control, Data Encryption	02	05
8	SQL Concepts : Basics of SQL, DDL,DML,DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, IN operator, Functions - aggregate functions, Built-in functions – numeric, date, string functions, set operations, sub-queries, correlated sub-queries, Use of group by, having, order by, join and its types, Exist, Any, All , view and its types. transaction control commands – Commit, Rollback, Savepoint	10	20
9	PL/SQL Concepts : Cursors, Stored Procedures, Stored Function, Database Triggers	03	05

Reference Books:
1. An introduction to Database Systems, C J Date, Addition-Wesley.
2. Database System Concepts, Abraham Silberschatz, Henry F. Korth & S. Sudarshan, McGraw Hill.
3. Understanding SQL by Martin Gruber, BPB
4. SQL- PL/SQL by Ivan bayross

5. Oracle – The complete reference – TMH /oracle press

Course Outcome:

After learning the course the students should be able:

1. Evaluate business information problem and find the requirements of a problem in terms of data.
2. Understand the uses the database schema and need for normalization.
3. Design the database schema with the use of appropriate data types for storage of data in database.
4. Use different types of physical implementation of database
5. Use database for concurrent use.
6. Backup data from database.

List of Practical:

1. To study DDL-create and DML-insert commands.

(i) Create tables according to the following definition.

CREATE TABLE DEPOSIT (ACTNO VARCHAR2(5) ,CNAME VARCHAR2(18) , BNAME VARCHAR2(18) , AMOUNT NUMBER(8,2) ,ADATE DATE);

CREATE TABLE BRANCH(BNAME VARCHAR2(18),CITY

VARCHAR2(18)); CREATE TABLE CUSTOMERS(CNAME

VARCHAR2(19) ,CITY VARCHAR2(18));

CREATE TABLE BORROW(LOANNO VARCHAR2(5), CNAME VARCHAR2(18), BNAME VARCHAR2(18), AMOUNT NUMBER (8,2));

(ii) Insert the data as shown below.

DEPOSIT

ACTNO	CNAME	BNAME	AMOUNT	ADATE
100	ANIL	VRCE	1000.00	1-MAR-95
101	SUNIL	AJNI	5000.00	4-JAN-96
102	MEHUL	KAROLBAGH	3500.00	17-NOV-95
104	MADHURI	CHANDI	1200.00	17-DEC-95
105	PRMOD	M.G.ROAD	3000.00	27-MAR-96
106	SANDIP	ANDHERI	2000.00	31-MAR-96
107	SHIVANI	VIRAR	1000.00	5-SEP-95
108	KRANTI	NEHRU PLACE	5000.00	2-JUL-95
109	MINU	POWAI	7000.00	10-AUG-95

BRANCH

VRCE	NAGPUR
AJNI	NAGPUR
KAROLBAGH	DELHI
CHANDI	DELHI
DHARAMPETH	NAGPUR
M.G.ROAD	BANGLORE
ANDHERI	BOMBAY
VIRAR	BOMBAY
NEHRU PLACE	DELHI
POWAI	BOMBAY

CUSTOMERS

ANIL	CALCUTTA
SUNIL	DELHI
MEHUL	BARODA
MANDAR	PATNA
MADHURI	NAGPUR
PRAMOD	NAGPUR
SANDIP	SURAT
SHIVANI	BOMBAY
KRANTI	BOMBAY
NAREN	BOMBAY

BORROW

LOANNO	CNAME	BNAME	AMOUNT
201	ANIL	VRCE	1000.00
206	MEHUL	AJNI	5000.00
311	SUNIL	DHARAMPETH	3000.00
321	MADHURI	ANDHERI	2000.00
375	PRMOD	VIRAR	8000.00
481	KRANTI	NEHRU PLACE	3000.00

From the above given tables perform the following queries:

(1) Describe deposit, branch.
(2) Describe borrow, customers.
(3) List all data from table DEPOSIT.
(4) List all data from table BORROW.
(5) List all data from table CUSTOMERS.
(6) List all data from table BRANCH.
(7) Give account no and amount of depositors.
(8) Give name of depositors having amount greater than 4000.
(9) Give name of customers who opened account after date '1-12-96'.

2. **Create the below given table and insert the data accordingly**.

Create Table Job (job_id, job_title, min_sal, max_sal)

COLUMN NAME	DATA TYPE
job_id	Varchar2(15)
job_title	Varchar2(30)
min_sal	Number(7,2)
max_sal	Number(7,2)

Create table Employee (emp_no, emp_name, emp_sal, emp_comm, dept_no)

COLUMN NAME	DATA TYPE
emp_no	Number(3)
emp_name	Varchar2(30)
emp_sal	Number(8,2)
emp_comm	Number(6,1)
dept_no	Number(3)

Create table deposit(a_no,cname,bname,amount,a_date).

COLUMN NAME	DATA TYPE
a_no	Varchar2(5)
cname	Varchar2(15)
bname	Varchar2(10)
amount	Number(7,2)
a_date	Date

Create table borrow(loanno,cname,bname,amount)

COLUMN NAME	DATA TYPE
loanno	Varchar2(5)
cname	Varchar2(15)
bname	Varchar2(10)
amount	Varchar2(7,2)

Insert following values in the table **Employee**.

emp_n	emp_name	emp_sal	emp_comm	dept _no
101	Smith	800		20
102	Snehal	1600	300	25
103	Adama	1100	0	20
104	Aman	3000		15
105	Anita	5000	50,000	10
106	Sneha	2450	24,500	10
107	Anamika	2975		30

Insert following values in the table **job**.

job_id	job_name	min_sal	max_sal
IT_PROG	Programmer	4000	10000
MK_MGR	Marketing manager	9000	15000
FI_MGR	Finance manager	8200	12000
FI_ACC	Account	4200	9000
LEC	Lecturer	6000	17000
COMP_OP	Computer Operator	1500	3000

Insert following values in the table **deposit**.

A_no	cname	Bname	Amount	date
101	Anil	andheri	7000	01-jan-06
102	sunil	virar	5000	15-jul-06
103	jay	villeparle	6500	12-mar-06
104	vijay	andheri	8000	17-sep-06
105	keyur	dadar	7500	19-nov-06

106	mayur	borivali	5500	21-dec-06

Perform following queries

(1) Retrieve all data from **employee, jobs and deposit.**
(2) Give details of account no. and deposited rupees of customers having account opened between dates **01-01-06 and 25-07-06**.
(3) Display all jobs with minimum salary is greater than 4000.
(4) Display name and salary of employee whose department no is 20. Give alias name to name of employee.
(5) Display employee no,name and department details of those employee whose department lies **in(10,20)**

To study various options of <u>LIKE</u> predicate

(1) Display all employee whose name start with 'A' and third character is ' 'a'.

(2) Display name, number and salary of those employees whose name is 5 characters long and first

three characters are 'Ani'.

(3) Display the non-null values of employees and also employee name second character should be 'n' and string should be 5 character long.

(4) Display the null values of employee and also employee name's third character should be 'a'.
(5) What will be output if you are giving LIKE predicate as '%_%' ESCAPE '\'

3. To Perform various data manipulation commands, aggregate functions and sorting concept on all created tables.

(1) List total deposit from deposit.
(2) List total loan from karolbagh branch
(3) Give maximum loan from branch vrce.
(4) Count total number of customers
(5) Count total number of customer's cities.
(6) Create table supplier from employee with all the columns.
(7) Create table sup1 from employee with first two columns.
(8) Create table sup2 from employee with no data
(9) Insert the data into sup2 from employee whose second character should be 'n' and string should be 5 characters long in employee name field.

(10) Delete all the rows from sup1.
(11) Delete the detail of supplier whose sup_no is 103.
(12) Rename the table sup2.
(13) Destroy table sup1 with all the data.
(14) Update the value dept_no to 10 where second character of emp. name is 'm'.
(15) Update the value of employee name whose employee number is 103.

4. To study Single-row functions.

(1) Write a query to display the current date. Label the column Date

(2) For each employee, display the employee number, job, salary, and salary increased by 15% and

expressed as a whole number. Label the column New Salary

(3) Modify your query no 4.(2) to add a column that subtracts the old salary from the new salary. Label the column Increase

(4) Write a query that displays the employee's names with the first letter capitalized and all other letters lowercase, and the length of the names, for all employees whose name starts with J, A, or M. Give each column an appropriate label. Sort the results by the employees' last names.

(5) Write a query that produces the following for each employee:
 <employee last name> earns <salary> monthly

(6) Display the name, hire date, number of months employed and day of the week on which the employee has started. Order the results by the day of the week starting with Monday.

(7) Display the hiredate of emp in a format that appears as Seventh of June 1994 12:00:00 AM.

(8) Write a query to calculate the annual compensation of all employees (sal+comm.).

5. Displaying data from Multiple Tables (join)

(1) Give details of customers ANIL.

(2) Give name of customer who are borrowers and depositors and having living city nagpur

(3) Give city as their city name of customers having same living branch.

(4) Write a query to display the last name, department number, and department name for all employees.

(5) Create a unique listing of all jobs that are in department 30. Include the location of the department in the output

(6) Write a query to display the employee name, department number, and department name for all employees who work in NEW YORK.

(7) Display the employee last name and employee number along with their manager's last name and manager number. Label the columns Employee, Emp#, Manager, and Mgr#, respectively.

(8) Create a query to display the name and hire date of any employee hired after employee SCOTT.

6. To apply the concept of Aggregating Data using Group functions.

(1) List total deposit of customer having account date after 1-jan-96.

(2) List total deposit of customers living in city Nagpur.

(3) List maximum deposit of customers living in bombay.

(4) Display the highest, lowest, sum, and average salary of all employees. Label the columns Maximum, Minimum, Sum, and Average, respectively. Round your results to the nearest whole number.

(5) Write a query that displays the difference between the highest and lowest salaries. Label the column DIFFERENCE.

(6) Create a query that will display the total number of employees and, of that total, the number of employees hired in 1995, 1996, 1997, and 1998

(7) Find the average salaries for each department without displaying the respective department numbers.

(8) Write a query to display the total salary being paid to each job title, within each department.

(9) Find the average salaries > 2000 for each department without displaying the respective department numbers.

(10) Display the job and total salary for each job with a total salary amount exceeding 3000, in which excludes president and sorts the list by the total salary.

(11) List the branches having sum of deposit more than 5000 and located in city bombay.

7. To solve queries using the concept of sub query.

(1) Write a query to display the last name and hire date of any employee in the same department as SCOTT. Exclude SCOTT

(2) Give name of customers who are depositors having same branch city of mr. sunil.

(3) Give deposit details and loan details of customer in same city where pramod is living.
(4) Create a query to display the employee numbers and last names of all employees who earn more than the average salary. Sort the results in ascending order of salary.
(5) Give names of depositors having same living city as mr. anil and having deposit amount greater than 2000
(6) Display the last name and salary of every employee who reports to ford.
(7) Display the department number, name, and job for every employee in the Accounting department**.**
(8) List the name of branch having highest number of depositors.
(9) Give the name of cities where in which the maximum numbers of branches are located.
(10)   Give name of customers living in same city where maximum depositors are located.

8. Manipulating Data

(1) Give 10% interest to all depositors.
(2) Give 10% interest to all depositors having branch vrce
(3) Give 10% interest to all depositors living in nagpur and having branch city bombay.
(4) Write a query which changes the department number of all employees with empno 7788's job to employee 7844'current department number.
(5) Transfer 10 Rs from account of anil to sunil if both are having same branch.
(6) Give 100 Rs more to all depositors if they are maximum depositors in their respective branch.
(7) Delete depositors of branches having number of customers between 1 to 3.
(8) Delete deposit of vijay.
(9) Delete borrower of branches having average loan less than 1000.

9. To apply the concept of security and privileges.

10. To study Transaction control commands

Open Ended Problem:
1) Develop a Online leave management system, Leave Management process includes defining the leave types, assigning entitlements and calculating carry over leaves, employees applying for leaves, managers approving or rejecting the leave requests, importing the leave data into payroll for calculations etc.
2) Develop a Library management system, where indexing of book according to the author or alphabetical order can be done. Issuing of books to the student can be managed and searching of books.
3) Make a SQL data base of student details and collaborate it with student semester performance and display each student performance individually.
4) Develop Inventory control and procurements for school management systems. School does have regular purchase of chalk box, chairs, benches etc.

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

ELECTRONICS (10) / ELECTRONICS & COMMUNICATION (11) /COMPUTER ENGINEERING (07) / INFORMATION TECHNOLOGY (16) / INFORMATION & COMMUNICATION TECHNOLOGY (32)

DIGITAL ELECTRONICS
SUBJECT CODE: 2131004

B.E. 3RD SEMESTER

Type of course: Analysis and Design of Digital Circuits

Prerequisite: Basic Electronics and Number Systems

Rationale: The students need to learn basic concepts of digital circuits and system which leads to design of complex digital system such as microprocessors. The students need to know combinational and sequential circuits using digital logic fundamentals. This is the first course by which students get exposure to digital electronics world.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE	PA (M)		PA (V)		PA	
				(E)	PA	ALA	ESE	OEP	(I)	
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Binary Systems and Logic Circuits: The Advantage of Binary, Number Systems, The Use of Binary in Digital Systems, Logic Gates, Logic	3	5
2	Boolean Algebra and Mapping Methods: Boolean Algebra, Karnaugh Maps, Variable Entered Maps, Realizing Logic Function with Gates, Combinational Design Examples.	7	15
3	Logic Function Realization with MSI Circuits: Combinational Logic with Multiplexers and Decoders, Standard Logic Functions with MSI Circuits, Design Problem Using MSI Circuits.	7	15
4	Flip Flops, Counters and Registers: Flip Flops and its Applications	8	15
5	Introduction to State Machines: The Need for State Machines, The State Machine, Basic Concepts in State Machine Analysis.	3	5
6	Synchronous State Machine Design: Sequential Counters, State Changes Referenced to Clock, Number of State Flip-Flops, Input Forming Logic, Output Forming Logic, Generation of a State Diagram from a Timing Chart, Redundant States, General State Machine Architecture	8	15
7	Asynchronous State Machines: The Fundamental-Mode Model, Problems of Asynchronous Circuits Basic Design Principles, An Asynchronous Design Example.	7	15
8	Logic Families: Transistor-Transistor Logic(TTL), Emitter-Coupled Logic(ECL), MOSFET Logic, TTL Gates.	4	5
9	Programmable Logic Devices: Introduction to Programmable Logic	5	10

	Read-Only Memory, Programmable Logic Arrays (PLA), Programmable Array Logic (PAL), Combinational PLD-Based State Machines, State Machines on a Chip.		
Total		**52**	

Reference Books:

1. Digital Logic & State Machine Design By David J. Comer, Third Indian Edition, Oxford University Press
2. Digital Logic and Computer Design By M Morris Mano, Fourth Edition, Prentice Hall Publication
3. Digital Principles and Applications By Malvino & Leach, Seventh Edition, McGraw-Hill Education
4. Modern Digital Electronics By R.P.Jain, Fourth Edition, Tata McGraw-Hill Education.
5. Digital Electronics: Principles and Integrated Circuits By A.K. Maini, Wiley India Publications
6. Digital Design M. Morris Mano and Michael D. Ciletti, Pearson Education
7. Digital Electronics and Design with With VHDL, Volnei A. Pedroni, Elsevier
   (Morgan Kaufmann Publishers)

Course Outcome:

After learning the course the students should be able to explain about digital number systems and logic circuits. The student should be able to solve logic function minimization. The students should be able to differentiate between combinational and sequential circuits such as decoders, encoders, multiplexers, demultiplexers, flip- flops, counters, registers. They should be able to design using FSM. In the laboratory, they should be able to verify the functions of various digital integrated circuits. The students should be able state the specifications of logic families. They should be able to start writing HDL codes for various digital circuits. The student should be able to compare the design using digital circuits and PLDs. At the end they should be able to develop a course project using digital integrated circuits.

List of Experiments:

1. Getting familiar with various digital integrated circuits of different logic families. Study of data sheet of these circuits and see how to test these circuits using Digital IC Tester.
2. Digital IC Testers and Logic State Analyzer as well as digital pattern generators should be demonstrated to the students.
3. Configure diodes and transistor as logic gates and Digital ICs for verification of truth table of logic gates.
4. Configuring NAND and NOR logic gates as universal gates.
5. Implementation of Boolean Logic Functions using logic gates and combinational circuits. Measure digital logic gate specifications such as propagation delay, noise margin, fan in and fan out.
6. Study and configure of various digital circuits such as adder, subtractor, decoder, encoder, code converters.
7. Study and configurations of multiplexer and demultiplexer circuits.
8. Study and configure of flip-flop, registers and counters using digital ICs. Design digital system using these circuits.
9. Perform an experiment which demonstrates function of 4 bit or 8 bit ALU.
10. Introduction to HDL. Use of HDL in simulation of digital circuits studied in previous sessions using integrated circuits. Illustrative examples using FPGA or CPLD boards.

Design based Problems (DP)/Open Ended Problem:
1. Design of combinational lock circuits with varying number of bits (For example 4, 8 …..)
2. Design of various types of counters.
3. Design of Arithmetic and Logic Unit using digital integrated circuits.

4. Design of digital integrated circuit tester
5. Measurement of logic family specifications.
6. Design project for example digital clock, digital event counter, timers, and various multi-vibrator Circuits, small processor, ports or scrolling display.

A student and faculty may choose any other such problem which includes the concept used in the course.

Major Equipments:

1. Pattern Generators
2. Logic State Analyzers
3. Digital Storage Oscilloscopes
4. Digital Integrated Circuits Tester.
5. Complete Bread Board Systems, switches and I/O indicators, multimeters, pulse, square wave generators and display faciltity.

List of Open Source Software/learning website:

1. Web packages for HDL, GHDL, FreeHDL
2. PSpices and NGSpice
3. Xcircuit and Scilab
4. NPTEL website and IITs virtual laboratory

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

DESIGN ENGINEERING
SUBJECT CODE: 2130005

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
L	T	P	C	Theory Marks			Practical Marks		
				ESE (E)	PA (M)		PA (V)	PA (I)	
					PA	ALA	ESE		
0	0	3	3	0	0	0	80	20	100

Design Engineering 1, 2 and 3

What is design? Design is a plan of a system, its implementation and utilization for attaining a goal. It is to change undesired situation into desired situation means to find solution for undesired/uncomfortable situation.

Designs can be for
(1) Technical systems (power plant)
(2) Educational systems (Montessori Method)
(3) Aesthetic systems (logo designs, advertisements)
(4) Legal systems
(5) Social, religious or cultural systems
(6) Theories, Models, etc.

Design thinking gives students a taste of the rich internal-remunerations associated with knowledge-creation and in curiosity and problem-driven contexts. Design need to satisfy technical functions, ergonomics functions, aesthetic functions, cost function and environment functions.

Essential features of Design:
Design solution of a problem starts with planned constructions for achieving goal/s. Designing means evolving goal oriented processes. At the beginning of the design process only goals are known while at the end, both the goals and plans are known and that to with more clarity. Goal and plans evolve together and they influencing each other. In designing process some goals are more important than others and similarly some plans are better than others. Designing does not guarantee that the design will work.

Design thinking process:
(1) Find goals or need
(2) Evaluate goals or need
(3) Generate proposals to satisfy goals
(4) Evaluate proposals
(5) Improve goals and proposals

Teaching methodology:
The design engineering should be with fun and should create excitement. It should be integrated theme across the various courses. It should promote the team work. Design is thinking and doing. The complete design process should be included in design engineering 1, 2 and 3. The prototype design must consider technical, aesthetic, ergonomics, cost and environmental requirements.

Content:

Design Engineering 1: (3 credits in Semester 3, 3 credits in Semester 4)
Introduction to product innovation process (Need-requirement-concept-detail-prototype-services-business)
Modules on: Task clarification and conceptualization: Problem-idea-solution-evaluation
- Problem identification
- Ideation
- Consolidation
- Evaluation
Project: identifying need to developing proof of concept to demonstrate solution selected

Students can tackle simple design problems with engineering content – posed by the teacher or based on a survey of real life concerns of the public. The second is more effective – the students "own the problem" - but has to be accepted by the teacher.

Examples: (a) A device to help carry heavy luggage to the upper floors of a building – a building that has no lifts. (b) Systems to ensure that water does not come out as a jet from the taps in the lower floors of a tall building. One can insist on multiple realistic solutions and all should be part of the submission along with statements of their shortcomings or advantages. Teacher should not entertain fancy solutions – based on fancy ideas - with no engineering or scientific basis.

Short lectures on the topics in the syllabus should parallel the activity.

Design Engineering 2: (3 credits in Semester 5, 3 credits in Semester 6)
    Introduction to detail design
Modules on
- Design for performance, safety, reliability
- Design for ergonomics and aesthetics
- Design for manufacturability
- Design for cost, environment
Project: developing the concept into a detailed design with a functional prototype

Here one could ask students to develop products based on themes - "Garbage compactors, Energy from kitchen waste, etc" making sure that the problems identified by the students within the themes possess an engineering content and insisting on some facets of design for assembly, for manufacturability, ...and so on while preparing the design and the prototypes. One could encourage students to innovate, arrive at multiple solutions and conduct a detailed design of one of the solutions.

Prototyping requires funds and effort, so it pays to identify one subsystem of the design of the whole machine. One can insist on prototyping demonstrating at least that sub-system, if not the whole system.

Design Engineering 3: (3 credits in Semester 7, 3 credits in Semester 8)
    Introduction to services and business planning
Modules on
- Design of services
- Intellectual property
- Materials and recourse planning
- Business planning
Project: developing a business model

OR

Research or Technology Development project
Modules on

- Detailed literature survey and to find out technology gap
- Intellectual property
- Re-evaluate prototype of DE-2 and proposal of novel idea Project: developing a novel functional prototype

GUJARAT TECHNOLOGICAL UNIVERSITY
4th Semester BE
BE 4th Semester Exam Scheme & Subject Code (w.e.f. 2014-15)

Computer Engineering (07), Computer Sceince & Engineering (31)

Semester IV

Subject code	Subject name	Teaching Scheme (Hours)			Credits
		Theory	**Tutorial**	**Practical**	
2140702	Operating System	4	0	2	6
2140705	Object Oriented Programming With C++	4	0	4	8
2140706	Numerical and Statistical Methods for Computer Engineering	3	0	2	5
2140707	Computer Organization	4	1	0	5
2140709	Computer Networks	4	0	2	6
2140002	Design Engineering - I B	0	0	3	3
	Total	19	1	13	33

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07), INFORMATION TECHNOLOGY (16) & INFORMATION & COMMUNICATION TECHNOLOGY (32)

OPERATING SYSTEM
SUBJECT CODE: 2140702

B.E. 4th SEMESTER

Type of course: Core

Prerequisite: Data structures(stack, queue, linked list, tree, graph), hashing, File structures, Any structured Programming Language (like C),

Rationale: As a core subject of Computer Engineering/Information Technology, this course enables to understand importance of Operating System, its functionalities to manage resources of Computer and Peripherals, program development and its execution. Student will be made aware of Process Management, Memory Management, File Management and I/O Management in detail, which will be useful to them for Large Application Development in engineering field with emphasis given to Linux type of Open Source Operating System.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Introduction: Basics of Operating Systems: Definition – Generations of Operating systems – Types of Operating Systems, OS Service, System Calls, OS structure: Layered, Monolithic, Microkernel Operating Systems – Concept of Virtual Machine	5	10
2	Process Management **Processes:** Definition , Process Relationship , Process states , Process State transitions , Process Control Block ,Context switching – Threads – Concept of multithreads , Benefits of threads – Types of threads **Process Scheduling:** Definition , Scheduling objectives ,Types of Schedulers ,Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) , Scheduling algorithms : Pre emptive and Non , pre emptive , FCFS – SJF – RR , Multiprocessor scheduling : Types , Performance evaluation of the scheduling.	8	14
3	Interprocess Communication Race Conditions, Critical Section, Mutual Exclusion, Hardware Solution, Strict Alternation , Peterson's Solution, The Producer Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing, Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc., Scheduling , Scheduling Algorithms.	6	12

4	**Deadlocks:** Definition,Deadlock characteristics , Deadlock Prevention , Deadlock Avoidance :banker's algorithm, Deadlock detection and Recovery.	4	9
5	**Memory Management** **Basic Memory Management:** Definition ,Logical and Physical address map , Memory allocation : Contiguous Memory allocation – Fixed and variable partition – Internal and External fragmentation and Compaction , Paging : Principle of operation – Page allocation – Hardware support for paging –,Protection and sharing – Disadvantages of paging. **Virtual Memory:** Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging (Concepts only) – Page Replacement policies : Optimal (OPT) , First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU)	8	15
6	I/O Management Principles of I/O Hardware: I/O devices, Device controllers , Direct memory access Principles of I/O Software: Goals of Interrupt handlers , Device drivers , Device independent I/O software , Secondary-Storage Structure: Disk structure ,Disk scheduling algorithm	4	8
7	File Management File concept, Aaccess methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous,linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table),efficiency & performance.	6	15
8	Security & Protection Security Environment, Design Principles Of Security, User Authentication, Protection Mechanism : Protection Domain, Access Control List	3	8
9	Unix/Linux Operating System Development Of Unix/Linux, Role & Function Of Kernel, System Calls, Elementary Linux command & Shell Programming, Directory Structure, System Administration Case study: Linux, Windows Operating System	4	9

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Operating System Concepts (8th Edition) by Silberschatz, Peter B. Galvin and Greg Gagne, Wiley-Indian Edition (2010).
2. Modern Operating Systems (Third Edition) by Andrew S Tanenbaum, Prentice Hall India (2008).
3. Principles of Operating Systems by Naresh chauhan, Oxford Press (2014).
4. Operating Systems by D.M. Dhamdhere, Tata McGraw Hill 2nd edition.

5. Operating Systems (5th Ed) – Internals and Design Principles by William Stallings, Prentice Hall India, 2000
6. UNIX Concepts and Applications(4th Edition)– by Sumitabha Das, Tata McGraw Hill.
7. Unix Shell Programming – by Yashwant Kanetkar, BPB publications.

Course Outcome:

After learning the course the students should be able to:
1. Operating System Concepts (8th Edition) by Silberschatz, Peter B. Galvin and Greg Gagne, Wiley-Indian Edition (2010).
2. Modern Operating Systems (Third Edition) by Andrew S Tanenbaum, Prentice Hall India (2008).
3. Principles of Operating Systems by Naresh chauhan, Oxford Press (2014).
4. Operating Systems by D.M. Dhamdhere, Tata McGraw Hill 2nd edition.
5. Operating Systems (5th Ed) – Internals and Design Principles by William Stallings, Prentice Hall India, 2000
6. UNIX Concepts and Applications(4th Edition)– by Sumitabha Das, Tata McGraw Hill.
7. Unix Shell Programming – by Yashwant Kanetkar, BPB publications.

List of Experiments:

There should be minimum 10 programs/shell

scripts. Practical List:
1. Study of Basic commands of Linux/UNIX.
2. Study of Advance commands and filters of Linux/UNIX.
3. Write a shell script to generate marksheet of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student.
4. Write a shell script to find factorial of given number n.
5. Write a shell script which will accept a number b and display first n prime numbers as output.
6. Write a shell script which will generate first n fibonnacci numbers like: 1, 1, 2, 3, 5, 13,…
7. Write a menu driven shell script which will print the following menu and execute the given task.
8. MENU
9. Display calendar of current month
10. Display today's date and time
11. Display usernames those are currently logged in the system
12. Display your name at given x, y position
13. Display your terminal number
14. Exit
15. Write a shell script to read n numbers as command arguments and sort them in descending order.
16. Write a shell script to display all executable files, directories and zero sized files from current directory.
17. Write a shell script to check entered string is palindrome or not.
18. Shell programming using filters (including grep, egrep, fgrep)
19. Study of Unix Shell and Environment Variables.
20. Write a shell script to validate the entered date. (eg. Date format is : dd-mm-yyyy).
21. Write an awk program using function, which convert each word in a given text into capital.
22. Write a program for process creation using C. (Use of gcc compiler).

Assignment – It should consist of theoretical and analytical questions covering the whole syllabus.

Design based Problems (DP)/Open Ended Problem:

Major Equipments: Desktop, Laptop

List of Open Source Software/learning website:
- www.nptel.ac.in

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07), INFORMATION TECHNOLOGY (16) & INFORMATION & COMMUNICATION TECHNOLOGY (32)

OBJECT ORIENTED PROGRAMMING WITH C++
SUBJECT CODE: 2140705

B.E. 4ᵗʰ SEMESTER

Type of course: Core Course

Prerequisite: Programming Fundamentals

Rationale: The object oriented approach for software development has become the de-facto standard for the industry to develop the product based or customized software based on customer demand. The software libraries developed for various fields also follows the phenomena of object oriented development. The subject covers the basic concepts of the object oriented paradigm and popular object oriented programming language C++. The subject covers the basics of C++, objects and classes, Inheritance, Polymorphism, I/O and file management, and advance topics including templates, exceptions and STL (Standard Template Library).

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	4	8	70	20	10	20	10	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	**Concepts of OOP :** Introduction OOP, Procedural Vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP	4	8%
2	**C++ Basics** : Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures	6	10%
3	**C++ Functions :** Simple functions, Call and Return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments, friend functions, virtual functions	6	12%
4	**Objects and Classes :** Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, type conversion	8	15%
5	**Inheritance :** Concept of Inheritance, types of inheritance: single, multiple, multilevel, hierarchical, hybrid, protected members, overriding, virtual base class	8	15%
6	**Polymorphism :** Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism	6	10%

7	**I/O and File Management :** Concept of streams, cin and cout objects, C++ stream classes, Unformatted and formatted I/O, manipulators, File stream, C++ File stream classes, File management functions, File modes, Binary and random Files	8	15%
8	**Templates, Exceptions and STL :** What is template? function templates and class templates, Introduction to exception, try-catch-throw, multiple catch, catch all, rethrowing exception, implementing **user defined exceptions, Overview and use of Standard Template Library**	8	15%

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
14	24	24	4	4

Suggested Specification table with Marks (Theory):

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Object Oriented Programming With C++, E Balagurusamy, TMH
2. C++ Programming, Black Book, Steven Holzner, dreamtech
3. Object Oriented Programming in Turbo C++, Robert Lafore, Galgotia
4. Object Oriented Programming with ANSI and Turbo C++, Ashok Kamthane, Pearson
5. The Compete Reference C++, Herbert Schlitz, TMH
6. C++ and Object Oriented Programming Paradigm, PHI
7. C++ : How to Program, 9th Edition, Deitel and Deitel, PHI
8. Object Oriented Programming with C++, Saurav Sahay, Oxford

Course Outcome:

After learning the course the students should be able to:
- Describe the important concepts of object oriented programming like object and class, Encapsulation, inheritance and polymorphism
- Write the skeleton of C++ program.
- Write the simple C++ programs using the variables, operators, control structures, functions and I/O objects cin and cout
- Write the simple object oriented programs in C++ using objects and classes.
- Use features of C++ like type conversion, inheritance, polymorphism, I/O streams and files to develop programs for real life problems.
- Use advance features like temples and exception to make programs supporting reusability and sophistication.
- Use standard template library for faster development.
- Develop the applications using object oriented programming with C++.

List of Experiments:

Practical list should be based on the topics covered. Following guideline is to be kept in mind while framing the list:

- At least 25 programs are to be assigned
- Programs should cover particular feature from syntactic concepts together with OOP feature and definition based on real life problem.
- Practical list should cover entire syllabus.

Design based Problems (DP)/Open Ended Problem:

1. Develop an object oriented application to perform all the basic operations like insert, delete, search

   on binary tree.
2. Develop an object oriented application to compute the Income-tax for the salaried person.
3. Develop an object oriented system "Visiting Card Management" which allows user to add, delete and update and search the visiting card details.
4. Develop an object oriented system "Student Attendance Management" for recording and analyzing the student attendance.
5. Develop a library for performing various Matrix operations. Use templates to make them generalized for any data type.

Major Equipment:
- Latest Desktop PCs with any C++ compiler

List of Open Source Software/learning website:
- Open source software dev C++
- www.nptel.ac.in
- www.learncpp.com

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07), INFORMATION TECHNOLOGY (16) & INFORMATION & COMMUNICATION TECHNOLOGY (32)

NUMERICAL AND STATISTICAL METHODS FOR COMPUTER ENGINEERING
SUBJECT CODE: 2140706

B.E. 4th SEMESTER

Type of course: Foundation

Prerequisite: Differentiation, Integration, Matrix operation, Various Mathematical Series, FundamentalMathematics

Rationale: To know about various types of Errors, Calculate the error correction and get actualroot of the equation. Understand different methods of solution of the equations and compare them. Student will be made aware of different numerical and statistical methods which are used in engineering field, with emphasis on how to prepare program for different methods.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Mathematical modeling andengineering problem Solving.Approximations and errors. Significant figures, accuracy and precision,Errors, round-off and truncation errors, error propagation.	4	10
2	Roots of Equations: Mathematical background, Bisection, RegulaFalsi, NR method, Secant ,Successive approximation method, Budan's Theorem, Barristow's method, case studies.	6	15
3	Systems of linear algebraic equations: Mathematical background, Gauss elimination; pitfalls and techniques for improvement, matrix inversion and Gauss-Seidel methods, ill- conditional Equations, Predictor-Corrector methods, case studies.	8	20
4	Curve Fitting: Mathematical background, Least squares linear and polynomial regression, Lagrange interpolating Polynomials. Splineinterpolation, Case studies.	6	15
5	Numerical Integration: Newton-Cotes integration formulas; trapezoidalrule and Simpson's rules: Interpolation, case studies.	5	10
6	Ordinary differential equations: Euler's method, Runge-Kutta methods. General methods for boundary value problems, Case studies.	5	10

7	**Statistical Methods:** Frequency distributions, Data analysis, Expectations and moments, Co-relation and regression, Trend analysis, Seasonal effects, Cyclical Fluctuation, Moving average, MSE, Predictions. Non-parametric statistics. Computer-based resampling techniques. Confidence intervals and statistical significance.	8	20

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level

Suggested Specification table with Marks (Theory):

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1) Numerical Methods for engineers. S C Chapra and R P Canale .McGrow Hill International Edition
2) Numerical Methods for Scientific & Engineering Computation, M. K. Jain, S.R.K.
3) Introduction to Numerical Analysis - By S. S. Sastry., PHI .
4) Numerical Methods, J B Dixit, Laxmi Publications, New Delhi
5) Statistics and Numerical Methods, Dr Manish Goyal, Laxmi Publications, New Delhi
6) Numerical Methods in Science & Engineering Prog.- By Dr. B. S. Grawal, Khanna Pub., New Delhi.
7) Computer Oriented Numerical Methods, R. S. Salaria.,Khanna Publisher.
8) Miller & Freund's Probability and Statistics for Engineers – By Richard A Johnson., PHI

Course Outcome:

After learning the course the students should be able to:
1. Solve system of linear equations.
2. Understand various methods of modeling.
3. Apply Mathematical Modeling and for Engineering Problem Solving.
4. Solve Mathematical Equations by various methods.
5. Find Best Curve fitting for given data.
6. Apply Numerical Integration.
7. Solve Differential Equations.
8. Understand Statistical Methods for Data Analysis and sampling techniques.
9. Write programs for various numerical and statistical methods

List of Experiments and Open Ended Problems:

Practicals/Programs based on methods covered in the syllabus. There should be minimum 10 programs, out of which 2 should be from statistical portion.

The student should be encouraged to create a menu driven project consisting of various methods studied in the syllabus.

Practical List:
1. Develop a C program to find a root of a non-linear equation using **Bisection method**.
2. Develop a C program to find a root of a non-linear equation using **False Position method.**
3. Develop a C program to find a root of a non-linear equation using **Secant method.**

4. Develop C program to find a root of a non-linear equation using **Newton-Raphson method.**
5. Develop a C program to find a root of a non-linear equation using **Barirstow's method**
6. Develop a C program to implement Simpsons 1/3rd Rule.
7. Develop a C program to solve linear equation using **Gauss Elimination method.**
8. Develop a C program to solve linear equation using **Gauss Seidel method**.
9. Develop a C program to compute the Gauss Jacobi Interactive methods
10. Develop a C program to compute the interpolation value using **Newton's Forward Difference formula**
11. Develop a C program to compute the interpolation value using **Newton's Backward Difference formula**.
12. Develop a C program to compute derivatives of a tabulated function at a specified value using the Newton interpolation approach.
13. Develop a C program to implement Simpsons 3/8th Rule.
14. Develop a C program to implement Runge- Kutta 2nd order method.
15. Develop a C program to implement fitting of straight line.
16. Write a program to find mean for direct series.
17. Write a program to find median for direct series.
18. Write a program to calculate different percentiles.
19. Write a program to calculate mode for discrete distribution.
20. Write a program to calculate harmonic and geometric means for any distribution.
21. Write a program to calculate probability using binomial distribution and Poisson distribution.

Assignment – It should consist of minimum 10 different problems to be solved covering the whole syllabus.

Major Equipments: Desktop, Laptop

List of Open Source Software/learning website:

1) **www.nptel.ac.in**

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07), INFORMATION TECHNOLOGY (16) & INFORMATION & COMMUNICATION TECHNOLOGY (32)

COMPUTER ORGANIZATION
SUBJECT CODE: 2140707

B.E. 4th SEMESTER

Type of Course: NA

Prerequisite: Basic Understanding of Computer System

Rationale: NA

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	1	0	5	70	20	10	30	0	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Computer Data Representation Basic computer data types, Complements, Fixed point representation, Register Transfer and Micro-operations: Floating point representation, Register Transfer language, Register Transfer, Bus and Memory Transfers (Tree-State Bus Buffers, Memory Transfer), Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations, Arithmetic logical shift unit	6	10
2	Basic Computer Organization and Design Instruction codes, Computer registers, computer instructions, Timing and Control, Instruction cycle, Memory-Reference Instructions, Input-output and interrupt, Complete computer description, Design of Basic computer, design of Accumulator Unit.	4	10
3	Programming The Basic Computer Introduction, Machine Language, Assembly Language, assembler, Program loops, Programming Arithmetic and logic operations, subroutines, I-O Programming.	4	10
4	Micro programmed Control: Control Memory, Address sequencing, Micro program Example, design of control Unit	3	5
5	Central Processing Unit Introduction, General Register Organization, Stack Organization, Instruction format, Addressing Modes, data transfer and manipulation,Program Control, Reduced Instruction Set Computer (RISC)	4	15
6	Pipeline And Vector Processing Flynn's taxonomy, Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction, Pipeline, RISC Pipeline, Vector Processing, Array Processors	3	10

7	Computer Arithmetic Introduction, Addition and subtraction, Multiplication Algorithms (Booth Multiplication Algorithm), Division Algorithms, Floating Point Arithmetic operations, Decimal Arithmetic Unit.	4	10
8	Input-Output Organization Input-Output Interface, Asynchronous Data Transfer, Modes Of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPUIOP Communication, Serial communication.	4	10
9	Memory Organization Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory.	2	10
10	Multipreocessors Characteristics of Multiprocessors, Interconnection Structures, Inter-processor Arbitration, Inter-processor Communication and Synchronization, Cache Coherence, Shared Memory Multiprocessors.	4	10

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. M. Morris Mano, Computer System Architecture, Pearson
2. Andrew S. Tanenbaum and Todd Austin, Structured Computer Organization, Sixth Edition, PHI
3. M. Murdocca & V. Heuring, Computer Architecture & Organization, WILEY
4. John Hayes, Computer Architecture and Organization, McGrawHill

Course Outcomes:
After successful completion of the course students should be able to:
1. To apply knowledge of the processor's internal registers and operations by use of a
2. PC based microprocessor simulator.
3. To write assembly language programs and download the machine code that will
4. provide solutions real-world control problems.
5. To eliminate or remove stall by altering order of instructions
6. To write programs using the capabilities of the stack, the program counter, the status register and show how these are used to execute a machine code program.

List of Tutorial:

1) A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers.
   How many selection inputs are there in each multiplexer
   ? What size of multiplexers are needed ?
   How many multiplexers are there in the bus ?

2) The following transfer statements specify a memory. Explain the memory operation in each case.

R2 ← M[AR]

M[AR] ← R3

R5 ← M[R5]

3) The adder-subtractor circuit of Fig 4.7 has the following values for input mode M and data inputs A and B. In each case, determine the values of the outputs : S_3, S_2, S_1, S_0 and C_4.

	M	A	B
a.	0	0111	0110
b.	0	1000	1001
c.	1	1100	1000
d.	1	0101	1010
e.	1	0000	0001

4) Design a 4-bit combinational circuit decrementer using four full-adder circuits.

5) Design a digital circuit that performs the four logic operations of exclusive-OR, exclusive-NOR, NOR, and NAND. Use two selection variables. Show the logic diagram of one typical stage.

6) Register A holds the 8bit binary 11011001. Determine the B operand and the logic microoperation to be performed in order to change the value in A to :

f. 01101101

g. 11111101

7) The 8bit registers AR, BR, CR and DR initially have the following values :

AR = 11110010

BR = 11111111

CR = 10111001

DR = 11101010

8) Determine the 8bit values in each register after the execution of the following sequence of microoperations.

AR ← AR + BR

CR ← CR ∧ DR, BR ← BR + 1

AR ← AR − CR

9) An output program resides in memory starting from address 2300. It is executed after the computer recognizes an interrupt when FGO becomes a 1 (while IEN = 1).

a. What instruction must be placed at address 1 ?

b. What must be the last two instruction of the output program ?

10) Write an assembly level program for the following pseudocode.

SUM = 0

SUM = SUM + A + B DIF

= DIF − C

SUM = SUM + DIF

11) Write a program loop using a pointer and a counter to clear the contents of hex locations 500 to 5FF with 0.

12) Write an ALP to add two Double-Precision numbers.

13) Write a program that evaluates the logic ex-or of two logic operands.

14) Write a program for the arithmetic shift-left operation. Branch to OVF if an overflow occurs.

15) For the given program below :
   1. Explain in words what the program accomplishes when it is executed. What is the value of location CTR when the computer halts ?
   2. List the address symbol table obtained during the first pass of the assembler.

```
              ORG 100 CLE
                  CLA STA
                  CTR
              LDA WRD SZA
              BUN ROT
                  BUN STP
ROT,              CIL
              SZE
              BUN AGN
                  BUN ROT
AGN,              CLE
              ISZ CTR SZA
              BUN ROT
STP,              HLT
CTR,              HEX 0
WRD,              HEX 62C1
```

16) Write a subroutine to subtract two numbers. In the calling program, the BSA   instruction is followed by the subtrahend and minuend. The difference is returned to the main program in the third location following the BSA instruction.

17) Convert the following into reverse polish notation. 1)
      A+B*[C*D+E*(F+G)]
   2) A*[B+C*(D+E)] / [F+G*(H+I)]

18) Explain Stack and evaluate the following expression using stack
      (3+4)*[10(2+6)+8]

List of Open Source Software/learning website:

- NPTEL Lecture Series
- http://www.intel.com/pressroom/kits/quickreffam.htm
- web.stanford.edu/class/ee282/

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07), INFORMATION TECHNOLOGY (16) & INFORMATION & COMMUNICATION TECHNOLOGY (32)

COMPUTER NETWORKS
SUBJECT CODE: 2140709

B.E. 4th SEMESTER

Type of course: Bachelor of Engineering

Prerequisite: data structure and operating system.

Rationale: To understand the basic concepts of computer network and firm foundation for understanding how data communication occurring using computer network. It is based around the OSI Reference Model which deals with the major issues and related protocol studies in the various layers (Physical, Data Link, Network, Transport, Session, Presentation and Application) of the model. This course provides the student with fundamental knowledge of the various aspects of computer networking and enables students to appreciate recent developments in the area. The course will be driven from the engineering perspective.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1	Introduction to computer networks and Internet; Understanding of network and Internet, The network edge, The network core, Understanding of Delay, Loss and Throughput in the packet-switching network, protocols layers and their service model, History of the computer network	07	17
2	Application Layer: Principles of computer applications, Web and HTTP, E-mail, DNS, Socket programming with TCP and UDP	07	18
3	Transport Layer: Introduction and transport layer services, Multiplexing and Demultiplexing, Connection less transport (UDP), Principles of reliable data transfer, Connection oriented transport (TCP), Congestion control.	10	25
4	Network Layer: Introduction, Virtual and Datagram networks, study of router, IP protocol and addressing in the Internet, Routing algorithms, Broadcast and Multicast routing	10	25
5	The Link layer and Local area networks: Introduction and link layer services, error-detection and correction techniques, Multiple access protocols, addressing, Ethernet, switches.	06	15

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
R Level	U Level	A Level	N Level	E Level
14	28	20	4	4

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Computer Networking- A Top-Down approach, 5th edition, Kurose and Ross, Pearson
2. Computer Networks- A Top-Down approach, Behrouz Forouzan, McGraw Hill
3. Computer Networks (4th edition), Andrew Tanenbaum, Prentice Hall
4. Computer Networking and the Internet (5th edition),Fred Halsall, Addison Wesley
5. Data Communications and Networking (4th edition), Behrouz Forouzan, McGraw Hill
6. TCP/IP Protocol Suite (3rd edition), Behrouz Forouzan, McGraw Hill

Course Outcomes:

After successful completion of the course students should be able to:
1. analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;
2. specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols;
3. analyze, specify and design the topological and routing strategies for an IP based networking infrastructure
4. Have a working knowledge of datagram and internet socket programming

List of Experiments:

Experiments will be based on the topics taught in the theory

Open ended problems:

1. Solve the travelling salesman problem (TSP) with optimal and shortest routing algorithm.
2. Compatibility issues of IPv6 with existing IPv4.
3. Adaptability of the wired networking protocols in wireless network environments.

Major Equipments:

1. Computer systems
2. LAN trainer kit

List of Open Source Software/learning website:

1. Wireshark packet analyzer, Boson network simulator
2. Netsim
3. NS2

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GUJARAT TECHNOLOGICAL UNIVERSITY

DEGREE IN COMPUTER SCIENCE &   ENGINEERING

PROPOSED TEACHING SCHEME

Semester - V

SR NO	SUBJECT	TEACHING SCHEME(HOURS)			CREDITS
		THEORY	TUTORIAL	PRACTICAL	
1	Management - II	2	0	0	2
2	Advance Processors	3	0	2	5
3	Computer Network	4	0	2	6
4	Design and Analysis of Algorithms	4	0	2	6
5	Object Oriented Programming With Java	2	0	2	4
6	Seminar	0	0	1	1
7	Visual Basic Application & Programming (Institute Elective - II)	4	0	2	6
	TOTAL	**19**	**0**	**11**	**30**

Subject Name: **Management – II**

Course Objective:

The objective of the course is to provide an understanding and an introduction to the basic functional areas of management such as Marketing, Finance, Human Resources and Production. The emphasis of the course is to give basic introduction to the concepts. At the same time an attempt is made to incorporate relevant basic topics of strategic management.

(1)   Introduction to Marketing Management

Sr. No.	Course Content
1.	**Marketing Function:** The four P's in Marketing, Different concepts in marketing, Production, Product, Selling, Marketing, Societal and holistic.
2.	**Marketing Demand:** Method of demand forecasting- survey of buyers' intentions, sales force opinion method, expert opinion method, market test method, time series analysis, statistical demand analysis(concepts only no examples).
3.	**Market Segmentation:** Meaning, Importance and different bases of market segmentation with reference to consumer product and industrial product.

(2)   Introduction to Financial Management

Sr. No.	Course Content
1.	Meaning of finance and scope of financial management
2.	Finance functions.
3.	Financial management and role of financial manager.
4.	Objectives of financial management.

(3)   Introduction to Production Management

Sr. No.	Course Content
1.	Meaning, characteristics , plant location, factors affecting location
2.	Plant layout: Product and process layout – meaning, merits and demerits.
3.	Break-even analysis (sums).

(4)   Introduction to Human Resource Management

Sr. No.	Course Content
1.	Importance
2.	Manpower planning : concept and features and objectives
3.	Manpower planning process
4.	Recruitment : sources
5.	Selection : process
6.	Selection tests : types of tests

(5)   Introduction to Strategic Management

Sr. No.	Course Content
1.	Management by objectives.
2.	How strategic and operational plans differ.
3.	The evolution of the concept of strategy.
4.	Levels of strategy : Some key distinctions.
5.	The contents of a corporate strategy.

Text Books:

1. Principles and Practices of Management by L. M. Prasad.

Reference Books:

1. Principles of Management by Tripathy and Reddy.
2. Business Organization and Management by C. B. Gupta.
3. Management by James Stoner and Edward Freemen.
4. Management by Herold Knootz and Heinz Wechnch.
5. Principles of Management, Charles WL.

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
COMPUTER SCIENCE &
ENGINEERING/INFORMATION
TECHNOLOGY/COMPUTER ENGINEERING

Subject Name: **Advance Processors**
Subject Code: **150701**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
3	0	2	5	70	30	50

Sr. No.	Course content
1.	Introduction to 16-bit microprocessors, 8086 architecture, Segments, Flags, Instruction set assembly language programming on 8086 using assembler, Interrupts, Writing interrupt services routines, Debugging programs, 8086 pin functions, Minimum and maximum mode operations, Memory banks.
2.	80286/386/486 register set, Data types, Overview of instruction set, Memory segmentation with descriptor tables including LDT and GDT, Privilege levels, Changing privilege levels, Paging including address translation, Page level protection, MMU cache, Virtual memory, Paging and segmentation, Multitasking with TSS, Context switching, Task scheduling, Extension and I/O permission, Managing interrupts with IDT, Gates and exception handlers.
3.	Technical overview (only features) of the Pentium architecture including Pentium-Pro, MMX, Hyper Threading, Core-2-duo, Concepts of RISC, RISC vs CISC architecture of SUN SPARC.

Reference Books:

1. Microprocessor & Interfacing, Douglas Hall, TMH.
2. Advanced 80386 Programming Techniques, James Turley, TMH.
3. Advance Microprocessor, Deniel Tabak, TMH.
4. The Intel Microprocessors (Eight Edition): Barry B. Brey, Pub-Pearson (Prentice Hall).
5. The 8086 Microprocessor, Kenneth Ayala, Cengage Learning.
6. The 8088 and 8086 Microprocessors, Triebel & Singh, Pearson Education.
7. IBM PC Assembly Language & Programming, Peter Abel, PHI.

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
COMPUTER SCIENCE &
ENGINEERING/INFORMATION
TECHNOLOGY/COMPUTER ENGINEERING

Subject Name: **Computer Network**
Subject Code: **150702**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
4	0	2	6	70	30	50

Sr. No.	Course content
1.	**Introduction:** Uses of computer network, Network hardware, Network software, OSI model, TCP/IP model, Comparison of OSI and TCP/IP model, Example network: The internet, X.25, Frame Relay, ATM, Ethernet, Wireless LANs: 802.11.
2.	**The Physical layer:** Bandwidth, Maximum data rate of a signal, Guided and unguided transmission media.
3.	**The Data Link Layer :** Design Issues: Framing, error control, flow control, error detection and correction, Elementary data link protocols**:** Simplex, stop and wait, Sliding window protocol, HDLC.
4.	**The Medium Access Control Sublayer:** The channel allocation problem, Multiple access protocols: ALOHA, CSMA, Collision free protocols, Limited contention protocols, Wavelength division multiple access protocols, Wireless LAN protocols, Ethernet**:** Traditional Ethernet, Switched Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.2: LLC Data link layer switching**:** Bridges, Local internetworking, Spanning tree bridges, Remote Bridge, Repeaters, Hub, Switches, Routers, Gateway, Virtual LANs.
5.	**The Network Layer:** Design Issues**:** Store and forward packet switching, Service provided to transport layer, Implementation of connection oriented and connection less service, Comparison of virtual circuit and datagram subnets, Routing algorithms, The Optimality principle, Shortest path routing, Flooding, Distance vector routing, Link state routing hierarchical routing, Broadcast routing, Multicast routing, Routing for mobile host, Routing in ad-hoc network, Congestion control algorithms, Principles, Prevention policies, Congestion control in virtual circuit subnets, Congestion control in datagram subnets, Load shedding, Jitter control quality of service requirements, Techniques for achieving good quality of service, Internetworking: How

	network can be connected, Concatenated virtual circuit, Connectionless internetworking, Tunneling, Internetwork routing and fragmentation, The network layer in the internet: The IP protocol, IP addresses, Internet control protocol, OSPF, BGP, Internet multicasting, Mobile IP, IPv6.
6.	**The Transport Layer:** The transport service: Services provided to the upper layers, Transport service primitives, Socket, Elements of transport protocols Addressing, Connection establishment, Connection release, Flow control, Multiplexing, Crash recovery, The transport protocol: UDP, TCP.
7.	**The Application Layer:** DNS**:** The DNS name space, Resource records, Name servers, Electronic mail: Architecture and services, The user agent, Message formats, Message transfer, Final delivery, World Wide Web: Architectural overview, HTTP.

Reference Books:

1. Computer network, Andrew S. Tanenbaum, Pearson.
2. Introduction to Data Communication and Networking, Behrouz Forouzan, TMH.
3. Computer Network, natalia olifer, victor olifer, wiley-india edition.
4. Data and computer communication, WilliamStallings, Pearson.

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
COMPUTER SCIENCE &
ENGINEERING/INFORMATION
TECHNOLOGY/COMPUTER ENGINEERING

Subject Name: **Design and Analysis of Algorithms**
Subject Code: **150703**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
4	0	2	6	70	30	50

Sr. No.	Course content
1.	**Basics of Algorithms and Mathematics:** What is an algorithm? Mathematics for algorithmic, Sets, Functions and relations, Vectors and matrices , Linear inequalities and linear equations.
2.	**Analysis of Algorithm:** The efficient algorithm, Average and worst case analysis, Elementary operation, Asymptotic notation, Analyzing control statement, Amortized analysis, Sorting algorithm, Binary tree search.
3.	**Divide and Conquer Algorithm:** Introduction, Multiplying large integers problem, Problem solving using divide and conquer algorithm - Binary search, Sorting (Merge Sort, Quick Sort), Matrix multiplication, Exponential.
4.	**Greedy Algorithm:** General characteristics of greedy algorithms, Problem solving using greedy algorithm, Activity selection problem, Elements of greedy strategy, Minimum spanning trees (Kruskal's algorithm, Prim's algorithm), Graphs**:** Shortest paths, The knapsack problem, Job scheduling problem.
5.	**Dynamic Programming:** Introduction, The principle of optimality, Problem solving using dynamic programming, Calculating the binomial coefficient, Making change problem, Assembly line-scheduling, Knapsack problem, Shortest path, Matrix chain multiplication, Longest common subsequence.
6.	**Exploring Graphs:** An introduction using graphs and games, Traversing trees, Preconditioning, Depth first search, Undirected graph, Directed graph, Breath first search, Backtracking – The Knapsack problem, The Eight queens problem, General template.

7.	**String Matching:** Introduction, The naive string matching algorithm, The Rabin-Karp algorithm, String matching with finite automata.
8.	**Introduction to NP-Completeness:** The class P and NP, Polynomial reduction, NP- Completeness problem, NP-Hard problems.

Reference Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, PHI.
2. Design and Analysis of Algorithms, Dave and Dave, Pearson.
3. Fundamental of Algorithms by Gills Brassard, Paul Bratley, PHI.
4. Introduction to Design and Analysis of Algorithms, Anany Levitin, Pearson.

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
COMPUTER SCIENCE &
ENGINEERING/INFORMATION
TECHNOLOGY/COMPUTER ENGINEERING

Subject Name: **Object Oriented Programming with Java**
Subject Code: **150704**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
2	0	2	4	70	30	50

Sr. No.	Course content
1.	**Introduction to Java:** Basics of Java programming, Data types, Variables, Operators, Control structures Including selection, Looping, Java methods, Overloading, Math class, Arrays in java.
2.	**Objects and classes:** Basics of objects and classes in Java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like string, character, string Buffer, file, this reference.
3.	**Inheritance and Polymorphism:** Inheritance in Java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.
4.	**Event and GUI Programming:** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like buttons, check boxes, radio buttons, labels, text fields, text areas, combo boxes, lists, scroll bars, sliders, windows, menus, dialog box, applet and its life cycle, Introduction to swing.
5.	**I/O programming:** Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files.
6.	Multithreading in Java, Thread life cycle and methods, Run able interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and network programming.

Reference Books:

1. Introduction to Java Programming (Comprehensive Version), Daniel Liang, SeventhEdition, Pearson.
2. Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford UniversityPress.
3. Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.
4. Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, PearsonEducation.
5. The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH.
6. Java Programming, D. S. Malik, Cengage Learning.

7.	Big Java, 3rd Ed., Horstmann, Wiley-India.
8.	Head First Java, Katy Sierra & Bert Bates, SPD (O'Reilly).

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: V
COMPUTER SCIENCE &
ENGINEERING/INFORMATION TECHNOLOGY/COMPUTER ENGINEERING

Subject Name: **Visual Basic Applications and Programming(Institute Elective-II)**

Subject Code: **150706**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
4	0	2	6	70	30	50

Sr. No.	Course content
1.	**Advantages of VBA:** • An easy-to-use and versatile language • Integrated with off-the-shelf products • Minimizes development time and costs
2.	**Macros: The first step:** • Recording and executing macros • Limitations • Enhancing with VBA code
3.	**The code design and debugging tools:** • Project explorer • Help system • Code window • IntelliSense • Properties window • Object browser • Block commenting and uncomment • Code stepping • Immediate window • Breakpoints
4.	**Event-driven Programming:** • The role of events in windows • How events are triggered • Responding to events through event procedures
5.	**Putting Objects to Work:** • Properties • Methods

	• Events • Collections • Using With...End With
6.	**Storing Data in Variables:** • How and when to declare variables • Selecting data types • Fixed and dynamic arrays • Constants • The scope and lifetime of variables
7.	**Conditional Branching:** • If...Then...Else • Select...Case
8.	**Looping Through Code:** • Do...Loop, While and Until • For...Next and For Each...Next
9.	**Building Procedures:** • Creating Sub and function procedures • Calling procedures • Passing arguments to procedures
10.	**Understanding object model structures** • Exploring the hierarchy using the Object Browser and Help system • Referencing specific objects
11.	**Writing Application-specific Procedures:** • Key objects within Excel, Word and Outlook • Creating templates and add-ins
12.	**Exploiting the Power of Automation:** • Controlling one Office application while working in another application • Accessing data in databases using ActiveX Data Objects
13.	**Using Intrinsic Dialogs:** • Communicating with the user through the message box • Gathering user information with the input box • Utilizing the FileDialog object and Dialogs collections
14.	**Creating Customized Dialogs with UserForm Objects:** • Command buttons • List and Combo boxes • Option buttons • Check boxes • Labels • Text boxes • Frames • Adding more functionality with advanced ActiveX controls

15.	**Modifying menus and toolbars:** • Simplifying user interaction with the CommandBar object • Adding and removing CommandBarControl objects
16.	**Handling Runtime Errors:** • The On Error Go To structure • Classifying errors with the Err object • Continuing execution with Resume, Resume Next or Resume label
17.	**Implementing Security:** • The dangers of macro viruses • Macro security levels in Office • Applying digital signatures to macros • Password protecting your VBA code

Reference Books:

1. VBA Developer's Handbook, 2nd Edition, 2001, Authors: Ken Getz Ken Getz, MikeGilbert , Publication: Wiley Publication, Sybex.
2. Excel VBA Macro Programming, 2004, Author: Richard Shepherd, Publication: McGraw Hill.
3. Mastering VBA, 2nd Edition, 2005, Author: Guy Hart-Davis, Publication: WileyPublication, Sybex.
4. Access VBA Programming, Authors: Charles Brown, Ron Petrusha Publication: McGraw Hill.
5. Mastering VBA for Microsoft Office 2007, 2nd Edition , Author, Richard Mansfield,Publication: Wiley Publication, Sybex.

GUJARAT TECHNOLOGICAL UNIVERSITY
DEGREE IN COMPUTER SCIENCE AND ENGINEERING

PROPOSED TEACHING SCHEME

Semester - VI

SR NO	SUBJECT	TEACHING SCHEME(HOURS)			HOURS
		THEORY	TUTORIAL	PRACTICAL	
1	Software Enginerring	4	0	2	6
2	Information Security	4	0	2	6
3	Computer Graphics	4	0	2	6
4	Theory Of Computation	3	0	0	3
5	Web Application Development	3	0	2	5
6	Operating System Design	2	0	2	4
	TOTAL	**20**	**0**	**10**	**30**

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VI
Computer Engineering/Information Technology/Computer Science & Engineering

Subject Name: **Software Engineering**
Subject Code: **160701**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
4	0	2	6	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**Introduction to Software Engineering:** Study of Different Models, Software Characteristics, Components, Applications, Layered Technologies, Processes, Methods And Tools, Generic View Of Software Engineering, Process Models- Waterfall model, Incremental, Evolutionary process models- Prototype, Spiral And Concurrent Development Model.	08
2.	**Requirements Engineering:** Problem Recognition, Requirement Engineering tasks, Processes, Requirements Specification, Use cases and Functional specification, Requirements validation, Requirements Analysis, Modeling – different types	08
3.	**Structured System Design:** Design Concepts, Design Model, Software Architecture, Data Design, Architectural Styles and Patterns, Architectural Design, Alternative architectural designs, Modeling Component level design and its modeling, Procedural Design, Object Oriented Design.	08
4.	**Data Oriented Analysis & Design:** Difference between Data and Information, E-R Diagram, Dataflow Model, Control Flow Model, Control and Process Specification, Data Dictionary	06
5.	**User Interface Design:** Concepts of UI, Interface Design Model, Internal and External Design, Evaluation, Interaction and Information Display Software	05

6.	**Planning a Software Project:** Scope and Feasibility, Effort Estimation, Schedule and staffing, Quality Planning, Risk management- identification, assessment, control, project monitoring plan, Detailed Scheduling	06
7.	**Quality Assurance :** Quality Control, Assurance, Cost, Reviews, Software Quality Assurance, Approaches to SQA, Reliability, Quality Standards- ISO9000 And 9001	05
8.	**Coding and Unit Testing:** Programming principles and guidelines, Programming practices, Coding standards, Incremental development of code, Management of code evaluation, Unit testing- procedural units, classes, Code Inspection, Metrics – size measure, complexity metrics, Cyclomatic Complexity, Halstead measure, Knot Count, Comparison Of Different Metrics.	06
9.	**Testing:** Concepts, Psychology of testing, Levels of testing, Testing Process- test plan, test case design, Execution, Black-Box testing – Boundary value analysis – Pairwise testing- state based testing, White-Box testing – criteria and test case generation and tool support, Metrics – Coverage analysis- reliability	05
10.	**Software Project Management:** Management Spectrum, People –Product – Process- Project, W^5HH Principle, Importance of Team Management	04
11.	**Case Tools And Study:** Introduction To CASE, Building Blocks Of CASE, Integrated CASE Environment	03

Text Book:

1. Pressman R.S., Software Engineering : A Practitioner's Approach, TMH

Reference Books:

1. Software Engineering, Eighth Edition, Sommerville, Pearson
2. Software Engineering, Rajiv Mall, PHI
3. Software Engineering, Pankaj Jalote, – A Precise Approach, Wiley India
4. Software Engineering, An Engineering Approach, Peters & Pedrycz, Wile-India
5. Software Engineering, Principles and Practice, JAwadekar, TMH

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VI
Computer Engineering/Information Technology/Computer Science & Engineering

Subject Name: **Information Security**
Subject Code: **160702**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
4	0	2	6	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**Conventional Encryption:** Conventional Encryption Model, Steganography, Classical Encryption Techniques	04
2.	**Conventional Encryption Techniques:** Simplified Des, Block Cipher Principles, Data Encryption Standards, Differential And Linear Cryptography Principles, Block Cipher Design Principles, Modes Of Operations, Algorithms Like Triple Des, International Data Encryption Algorithm, Blowfish, Rc5, Cast-128, Rc2, Characteristics Of Advanced Symmetrical Block Cipher, Issues Of Conventional Encryption Like Traffic Distribution, Random Number Generation, Key Distribution	14
3.	**Public Key Cryptography:**Principles Of Public-Key Cryptography, RSA Algorithm, Key Management, Elliptic Curve Cryptography, Diffie-Hellman Key Exchange	08
4.	**Number Theory:**Prime And Relative Prime Numbers, Modular Arithmetic, Euler's Theorem, Euclid's Algorithm, Discrete Logarithm Tics	04
5.	**Message Authentication And Hash Functions:**Authentication Requirement, Functions, Message Authentication Code, Hash Functions, Security Of Hash Functions And Macs, MD5 Message Digest Algorithm, Secure Hash Algorithm, Ripemd-160, Hmac	06
6.	**Introduction To E-Commerce:** Introduction To E-Commerce, Transactions On E-Commerce, Requirement Of Security On E-Commerce	04

7.	**Network Security:** Digital Signatures, Authentication Protocols, Digital Signature Standards, Application Authentication Techniques Like Kerberos, X.509 Directory Authentication Services, Active Directory Service Of Windows NT/Windows 2000	10
8.	**IP Security E-Mail Security:** IP Security Overview, Architecture, Authentication Header, Encapsulation Security Payload, Combining Security Association, Key Management, Pretty Good Privacy, S/Mime And Types	08
9.	**Web Security:** Web Security Requirement, SSL And Transport Layer Security, Secure Electronic Transactions, Firewall Design Principles, Trusted Systems	06

Text Book:

1. Cryptography And Network Principles And Practice Fourth Edition, William Stallings, Pearson

Reference Books:

1   Cryptography & Network Security, Forouzan, Mukhopadhyay, McGrawHill
2   Cryptography and Network Security (2nd Ed.), Atul Kahate, TMH
3   Information Systems Security, Godbole, Wiley-India
4   Information Security Principles and Practice, Deven Shah, Wiley-India

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VI
Computer Engineering/Information Technology/Computer Science & Engineering

Subject Name: **Computer Graphics**
Subject Code: **160703**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
4	0	2	6	70	30	50

Sr. No	Course Content	Total Hrs.
1.	Basic of Computer Graphics, Applications of computer graphics, Display devices, Random and Raster scan systems, Graphics input devices, Graphics software and standards	04
2.	**Graphics Primitives :** Points, lines, circles and ellipses as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes, area-fill attributes, character attributers, antialiasing methods	14
3.	**2D transformation and viewing :** Transformations (translation, rotation, scaling(, matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping (cohen-sutherland, liang bersky, NLN), polygon clipping	12
4.	**3D concepts and object representation :** 3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bazier curves and surfaces, B-spline curves and surfaces	14
5.	**3D transformation and viewing :** 3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations	10

6.	**Advance topics :** visible surface detection concepts, back-face detection, depth buffer method, illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection), Color models: properties of light, XYZ, RGB, YIQ and CMY color models	10

Text Book:

1. Computer Graphics C Version, D.Hearn And P.Baker, Pearson Eduction

Reference Books:

1. Procedural Methods for computer graphics, Rogers, TMH
2. Computer Graphics, Foley and van Dam, Person Education
3. Computer Graphics with virtual reality systems, R. K. Maurya, Wiley-India
4. Computer Graphics with OpenGL, Hearn and Baker, Pearson
5. Computer Graphics, Sinha & Udai, TMH
6. Computer Graphics, Peter Shirley, Steve Marschner, Cengage Learning

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VI
Computer Engineering /Computer Science & Engineering

Subject Name: **Theory of Computation**
Subject Code: **160704**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
3	0	0	3	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**Review Of Mathematical Terms And Theory:** Basic Mathematical Notations And Set Theory, Logic Functions And Relations, Language Definitions, Mathematical Inductions And Recursive Definitions	04
2.	**Finite Automata:** Deterministic And Non Deterministic Finite Automata, $\wedge$-Transitions, Conversion From NFA To DFA, Kleene's Theorem, Regular And Non Regular Languages	12
3.	**CFG (Context Free Grammar):** Introduction To CFG, CFG And Known Languages, Unions Concatenations And *'S Notations And CFL, Derivations Of Trees And Ambiguity, Unambiguous CFG And Algebric Expressions, Normal Forms And Siplified Forms	09
4.	**Pushdown Automata, CFL and NFL:** Introduction To PDA, Definition, DPDA, PDA Corresponding To CFG, CFG Corresponding To PDA, Introduction To CFL, Intersections And Complements Of CFL, Decisions Problems And CFL	09
5.	**Turing Machines, Recursive Language:** Model Of Computation And Church Turning Thesis, Definition Of Turing Machine, Tm And Language Acceptors, Variations Of Tm, Non Deterministic Tm, Universal Tm, Enumerable And Language, Recursive And Non Recursive Enumerable	05
6.	**Computation Functions, Measuring, Classifications And Complexity:** Primitive Recursive Functions, Halting Problem, Recursive Predicates And Some Bounded Operations, Unbounded Minimizations And μ-Recursive Functions, Godel Numbering, Computable Functions And μ-Recursive, Numerical Functions	05

7.	**Tractable And Intractable Problems:** Growth Rate And Functions, Time And Speed Complexity, Complexity Classes, Tractable And Possibly Intractable Problems, P And Np Completeness, Reduction Of Time, Cook's Theorem, Np-Complete Problems	04

Text Book:

1. Introduction To Languages And Theory Of Computation By John C. Martin, Third Edition,TMH.

Reference Books:

1. Automata Theory, Languages and Computation, Hopcroft, Motwani, Ullman, Pearson Education
2. Theory of automata, Langusges and computation, Kumar, McGraHill
3. The Theory of Computation, Moret, Pearson Education
4. Introduction to Computer Theory, Cohen, Wiley-India

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VI
Computer Engineering /Computer Science & Engineering

Subject Name: **Web Application Development**
Subject Code: **160705**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
3	0	2	5	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**Introduction to WWW** : Protocols and programs, secure connections, application and development tools, the web browser, **Web Design**: Web site desin principles, planning the site and navigation	05
2.	**Introduction to HTML** : The development process, basic HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, simple HTML forms, web site structure **Introduction to XHTML** : XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser.	07
3.	**Style sheets** : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2	05
4.	**Javascript** : Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition Javascript : Advance script, Javascript and objects, Javascript own objects, the DOM and web browser environments, forms and validations DHTML : Combining HTML, CSS and Javascript, events and buttons, controlling your browser,	07

5.	**XML** : Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application. XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT	06
6.	**Web services, Feeds and and Blogs** : Need for web services, SOAP, SOAP XML and HTTP, Web feeds, Blogs, The server side : What is server, choices, setting up UNIX and Linux web servers, Logging users, dynamic IP	08
7.	**PHP** : Starting to script on server side, Arrays, function and forms, advance PHP **Databases :** Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs.	10

Text Book:

1. Developing Web Application, Ralph Moseley, Wiley India
2. Web Design, Joel Sklar, Cengage Learning

Reference Books:

1. Web Design, Joel Sklar, Cengage Learning
2. Web Technologies, Black Book, dreamtech Press
3. Web Applications : Concepts and Real World Design, Knuckles, Wiley-India
4. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill
5. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel. Pearson publication

GUJARAT TECHNOLOGICAL UNIVERSITY
B. E. SEMESTER: VI
Computer Science Engineering

Subject Name: **Operating System Design**
Subject Code: **163101**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
2	0	2	4	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**General Overview of the System:** History; System Architecture; User Perspective; Operating System Services; Assumptions about hardware	2
2.	**Introduction to Kernel:** Architecture of Unix Operating System; Introduction to system concepts; kernel Data Structure; System Administration	3
3.	**The Buffer Cache:** Buffer Headers; Structure of the buffer pool; Scenarios for Retrieval of buffer; Reading and writing disk blocks; advantages and disadvantages of the buffer cache	2
4.	**Internal Representation of Files:** Inodes; Structure of a regular file; Directories; Conversion of Path name to an inode; Super Block; Inode assignment to new file; allocation of disk blocks	2
5.	**System Calls for The File System:** Open; Read; Write; File and record Locking; Adjusting the position of file; Close; File Creation; Creation of Special Files; Change Directory and change root; STAT and FSTAT; Pipes; DUP; Mounting and Unmouting File System; Link; unlink; File System Abstractions; File system Maintenance	6
6.	**The Structure of Process:** Process States and transitions; layout of System Memory; The Context of Process; Saving the context of a process; manipulation of the process address space; Sleep	5
7.	**Process Control:** Process Creation; Signals; Process Termination; Awaiting Process termination; Invoking other programs; The user ID of a process; Changing the size of a process; the shell; system Boot and The init process	6

8.	**Process and the kernel:** Introduction; Mode, Space and Context; The process abstraction; Executing in Kernel mode; Synchronization; Process Scheduling; Signals; new Process Programs	6

Text Book:

1. The Design of the Unix Operating System by Maurice J. Bach, PHI Edition;ISBN:81-203-0516-7

Reference Book:

1. Unix Internals- The New Frontiers by Uresh Vahalia
2. Learning the UNIX Operating System By Jerry Peek, Grace Todino & John Strang; ISBN 1-56592-390-1, Fourth Edition, January 1998.

GUJARAT TECHNOLOGICAL UNIVERSITY
DEGREE IN COMPUTER SCIENCE & ENGINEERING
PROPOSED TEACHING SCHEME

Semester - VII   (w.e.f. 27th June 2011)

SUBJECT CODE	SUBJECT	TEACHING SCHEME(HOURS)			
		THEORY	TUTORIAL	PRACTICAL	CREDITS
170701	Compiler Design	3	0	2	5
170702	Mobile Computing [Valid from August 2011 to May 2012]	3	0	2	5
170702N	Wireless Communication and Mobile Programming [w.e.f June 2012]	3	0	2	5
170703	Advance Java Technology	3	0	2	5
173101	Soft Computing	3	0	2	5
	Department Elective - I	4	0	2	6
170001	Project - I	0	0	4	4
	TOTAL	16	0	14	30

DEPARTMENT ELECTIVE -I

SUBJECT CODE	DEPARTMENT ELECTIVE -I
173102	Software Testing and Quality
173103	E-commerce & E-Business
171605	Enterprise Resource Planning
170708	Web Data Management

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER SCIENCE & ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Compiler Design**
Subject Code: **170701**

Teaching Scheme				Evaluation Scheme			
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**		**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
				Theory	**Practical**		
3	0	2	5	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	Overview of the Translation Process, A Simple Compiler, Difference between interpreter, assembler and compiler. Overview and use of linker and loader , types of Compiler, Analysis of the Source Program, The Phases of a Compiler, Cousins of the Compiler, The Grouping of Phases, Lexical Analysis, Hard Coding and Automatic Generation Lexical Analyzers, Front-end and Back-end of compiler, pass structure	06
2.	**Lexical Analyzer** Introduction to Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, A Language for Specifying Lexical Analyzers, Finite Automata From a Regular Expression, Design of a Lexical Analyzer Generator, Optimization of DFA	08
3.	**Parsing Theory** Top Down and Bottom up Parsing Algorithms, Top-Down Parsing, Bottom-Up Parsing, Operator-Precedence Parsing, LR Parsers, Using Ambiguous Grammars, Parser Generators, Automatic Generation of Parsers. Syntax-Directed Definitions, Construction of Syntax Trees, Bottom-Up Evaluation of S-Attributed Definitions, L-Attributed Definitions, syntax directed definitions and translation schemes	10
4.	**Error Recovery** Error Detection & Recovery, Ad-Hoc and Systematic Methods	06
5.	**Intermediate Code Generation** Different Intermediate Forms, Syntax Directed Translation Mechanisms And Attributed Mechanisms And Attributed Definition.	06

6.	**Run Time Memory Management** Source Language Issues, Storage Organization, Storage-Allocation Strategies, and Access to Non local Names, Parameter Passing, Symbol Tables, and Language Facilities for Dynamic Storage Allocation, Dynamic Storage Allocation Techniques.	06
7.	**Code Optimization** Global Data Flow Analysis, A Few Selected Optimizations like Command Sub Expression Removal, Loop Invariant Code Motion, Strength Reduction Etc.	06
8.	**Code Generation** Issues in the Design of a Code Generator, The Target Machine, Run-Time Storage Management, Basic Blocks and Flow Graphs, Next-Use Information, A Simple Code Generator, Register Allocation and Assignment, The DAG Representation of Basic Blocks, Peephole Optimization, Generating Code from DAGs, Dynamic Programming Code-Generation Algorithm, Code-Generator Generators.	06

Text Books:

1. Compiler Tools Techniques - A.V.Aho, Ravi Sethi, J.D.Ullman, Addison Wesley
2. The Theory And Practice Of Compiler Writing - Trembley J.P. And Sorenson P.G.Mcgraw-Hill

Reference Books:

1. Modern Compiler Design - Dick Grune, Henri E. Bal, Jacob, Langendoen, WILEYIndia
2. Compiler Construction - Waite W.N. And Goos G., Springer Verlag
3. Compiler Construction-Principles And Practices - D.M.Dhamdhere, Mcmillian
4. Principles of Compiler Design, V. Raghavan, McGrawHill

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER ENGINEERING
B. E. SEMESTER: VII

[Valid from August 2011 to May 2012]

Subject Name: **Mobile Computing**
Subject Code: **170702**

Teaching Scheme				Evaluation Scheme			
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**		**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
				Theory	**Practical**		
3	0	2	5	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	**Mobile Computing Introduction** History of Wireless Communications, Types, propagation modes Wireless network architecture, Applications, Security, Concerns and Standards, Benefits, Future. Evolution of mobile computing, What mobile users need, SOC and AOC client, Mobile computing OS, Architecture for mobile computing, Three tier architecture, design considerations for mobile computing, mobile computing through internet, making existing applications Mobile-Enabled.	11
2.	**Mobile Technologies** Bluetooth, Radio frequency identification(Rfid),Wireless Broadband, Mobile IP: Introduction, Advertisement, Registration, TCP connections, two level addressing, abstract mobility management model, performance issue, routing in mobile host, Adhoc networks, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP. ,IPv6 Global system for mobile communication, Global system for mobile communication, GSM architecture, GSM entities, call routing in GSM,PLMN interface, GSM addresses and identifiers, network aspects in GSM,GSM frequency allocation, authentication and security, Short message services, Mobile computing over SMS,SMS, value added services through SMS, accessing the SMS bearer	15
3.	**General packet radio service(GPRS)** GPRS and packet data network, GPRS network architecture, GPRS network operation, data services in GPRS, Applications of GPRS, Billing and charging in	10

	GPRS	
4.	**Wireless Application Protocol(WAP) WAP,MMS,GPRS application CDMA and 3G** Spread-spectrum Technology, CDMA versus GSM, Wireless data, third generation networks, applications in 3G Wireless LAN, Wireless LAN advantages,IEEE802.11 standards ,Wireless LAN architecture, Mobility in Wireless LAN, Deploying Wireless LAN, Deploying Wireless LAN, Mobile ad hoc networks and sensor networks, wireless LAN security, WiFi v/s 3G Voice over Internet protocol and convergence, Voice over IP,H.323 framework for voice over IP,SIP, comparison between H.323 ad SIP, Real time protocols, convergence technologies, call routing, call routing, voice over IP applications, IMS, Mobile VoIP, Security issues in mobile Information security, security techniques and algorithms, security framework for mobile environment	18

Text Books:

1. Mobile Computing , Asoke K Telukder, Roopa R Yavagal, TMH
2. The complete reference J2ME, TMH
3. Programming for Mobile and Remote Computers, G. T. Thampi, dreamtech
4. Handbook of Wireless Networks and Mobile Computing, Ivan Stojmenovic ,Wiley

Reference Books:

1. Principles of Mobile Computing, - Hansmann, Merk, Nicklous and Stober, Springer
2. Mobile Communications, Jochen Schiller, Pearson
3. Mobile Computing, Raj Kamal, Oxford
4. Mobile Computing, Wandra & Wandra, Akshat Pub.
5. Android Wireless Application Development, Shane Conder, Lauren Darcey, Pearson
6. Professional Android 2 Application development, Reto Meier, Wrox, Wiley India

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER ENGINEERING
B. E. SEMESTER: VII

[w.e.f. June 2012]

Subject Name: **Wireless Communication and Mobile Programming**
Subject Code: **170702N**

Teaching Scheme				Evaluation Scheme			
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**		**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
				Theory	**Practical**		
3	0	2	5	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	**Mobile Computing Introduction** History of Wireless Communications, Types, propagation modes Wireless network architecture, Applications, Security, Concerns and Standards, Benefits, Future. Evolution of mobile computing, What mobile users need, SOC and AOC client, Mobile computing OS, Architecture for mobile computing, Three tier architecture, design considerations for mobile computing, mobile computing through internet, making existing applications Mobile-Enabled.	11
2.	**Mobile Technologies** Bluetooth, Radio frequency identification(Rfid),Wireless Broadband, Mobile IP: Introduction, Advertisement, Registration, TCP connections, two level addressing, abstract mobility management model, performance issue, routing in mobile host, Adhoc networks, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP. ,IPv6 Global system for mobile communication, Global system for mobile communication, GSM architecture, GSM entities, call routing in GSM,PLMN interface, GSM addresses and identifiers, network aspects in GSM,GSM frequency allocation, authentication and security, Short message services, Mobile computing over SMS,SMS, value added services through SMS, accessing the SMS bearer	15
3.	**General packet radio service(GPRS)** GPRS and packet data network, GPRS network architecture, GPRS network operation, data services in GPRS, Applications of GPRS, Billing and charging in	10

	GPRS	
4.	**Wireless Application Protocol(WAP) WAP,MMS,GPRS application CDMA and 3G** Spread-spectrum Technology, CDMA versus GSM, Wireless data, third generation networks, applications in 3G Wireless LAN, Wireless LAN advantages,IEEE802.11 standards ,Wireless LAN architecture, Mobility in Wireless LAN, Deploying Wireless LAN, Deploying Wireless LAN, Mobile ad hoc networks and sensor networks, wireless LAN security, WiFi v/s 3G Voice over Internet protocol and convergence, Voice over IP,H.323 framework for voice over IP,SIP, comparison between H.323 ad SIP, Real time protocols, convergence technologies, call routing, call routing, voice over IP applications, IMS, Mobile VoIP, Security issues in mobile Information security, security techniques and algorithms, security framework for mobile environment	18

Text Books:

1. Mobile Computing , Asoke K Telukder, Roopa R Yavagal, TMH
2. The complete reference J2ME, TMH
3. Programming for Mobile and Remote Computers, G. T. Thampi, dreamtech
4. Handbook of Wireless Networks and Mobile Computing, Ivan Stojmenovic ,Wiley

Reference Books:

1. Principles of Mobile Computing, - Hansmann, Merk, Nicklous and Stober, Springer
2. Mobile Communications, Jochen Schiller, Pearson
3. Mobile Computing, Raj Kamal, Oxford
4. Mobile Computing, Wandra & Wandra, Akshat Pub.
5. Android Wireless Application Development, Shane Conder, Lauren Darcey, Pearson
6. Professional Android 2 Application development, Reto Meier, Wrox, Wiley India

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER SCIENCE & ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Advance Java Technology**
Subject Code: **170703**

Teaching Scheme				Evaluation Scheme			
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**		**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
				Theory	**Practical**		
3	0	2	5	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	Introduction To Swing, MVC Architecture, Applets, Applications and Pluggable Look and Feel, Basic swing components : Text Fields, Buttons, Toggle Buttons, Checkboxes, and Radio Buttons	06
2.	Java database Programming, java.sql Package, JDBC driver types, java beans	06
3.	Network Programming With java.net Package, Client Programs And Server Programs, Content And Protocol Handlers	06
4.	RMI architecture, RMI registry, Writing distributed application with RMI, Naming services, Naming And Directory Services, Overview of JNDI, Object serialization and Internationalization	10
5.	J2EE architecture, Enterprise application concepts, n-tier application concepts, J2EE platform, HTTP protocol, web application, Web containers and Application servers	04
6.	Server side programming with Java Servlet, HTTP and Servlet, Servlet API, life cycle, configuration and context, Request and Response objects, Session handling and event handling, Introduction to filters with writing simple filter application	08
7.	JSP architecture, JSP page life cycle, JSP elements, Expression Language, Tag Extensions, Tag Extension API, Tag handlers, JSP Fragments, Tag Files, JSTL, Core Tag library, overview of XML Tag library, SQL Tag library and Functions Tag library	10
8.	Introduction to Hibernate, Hibernate Architecture, O/R Mapping in Hibernate	04

Text Books:

1. Java 6 Programming, Black Book, dreamtech
2. Java Server Programming, Java EE6 (J2EE 1.6), Black Book, dreamtech
3. Java Programming Advance Topics, Joe Wigglesworth and Paula McMillan, Cengage Learning

Reference Books:

1. Professional Java Server Programming, a! Apress
2. Core Java, Volume II – Advanced Features, Eight Edition, Pearson
3. Unleashed Java 2 Platform, Sams Techmedia
4. The Complete Reference J2EE, Keogh, McGrawHill
5. Java EE 5 for beginners, Bayross and Shah, SPD
6. JDBC 3 Java Database Connectivity, Bernand Van Haecke, Wiley-dreamtech
7. Java Server Pages for Beginners, Bayross and Shah, SPD
8. Java Servlet Programming, Jason Hunter, SPD (O'Reilly)

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER SCIENCE & ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Soft Computing**
Subject Code: **173101**

Teaching Scheme				Evaluation Scheme			
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**		**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
				Theory	**Practical**		
3	0	2	5	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	**Neural Networks** Supervised Learning Neural Networks – Perceptrons - Adaline – Back propagation Multilayer Perceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.	04
2.	**Fuzzy Set Theory** Introduction to Neuro – Fuzzy and Soft Computing – Fuzzy Sets – Basic Definition and Terminology – Set-theoretic Operations – Member Function Formulation and Parameterization – Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.	08
3.	**Genetic Algorithm:** Difference between Traditional Algorithms and GA, The basic operators, Schema theorem, convergence analysis, stochastic models, applications in search and optimization. Encoding, Fitness Function, Reproduction, Cross Over, Mutation, Convergence Theory; Applications – Match Word Finding, Travelling Sales Man Problem.	08
4.	**Rough Set:** Indiscernibility Relations, Reducts, Rough Approximation. Applications. Hybrid Systems: Neuro Fuzzy Systems, Fuzzy Logic Controlled GA, Fuzzy Membership Interpretation using Rough Set theory etc.	06

5.	**Neuro Fuzzy Modeling**	08
	Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum. Neuro-Fuzzy Systems for Pattern Recognition: Image-, Speech- and Language Processing , Application - Speech Recognition	
6.	**Neuro-Genetic Information Processing For Optimization**:	06
	Adaptation in Intelligent Systems, Evolving Connectionist and Fuzzy Connectionist Systems, Applications for Adaptive Systems, On-line Intelligent Systems, GA Based Weight Optimization.	
7.	**Machine Learning**	08
	Learning form Examples - Inductive Concept Learning - Sequence Prediction - Effect of Noise in Input. Learning by Analogy- Concept formation - Derivational Analogy. Learning by Observation and Discovery - Search for Regularity-Conceptual Clustering, Computational Learning Theory.	
8.	**Applications Of Computational Intelligence**	06
	Shortest Path Algorithm, Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction, Stock Marker Forecasting	

Text Books:

1. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.
2. Michalski, Carbonnel & Michel (Eds.): Machine Learning - An A. I. Approach, Vol-I.
3. Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
4. Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
5. S Machine Learning by Tom. M Mitchell, McGrawHill International Edition, Computer Science Series.

Reference Books:

1. Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
2. Neural network fuzzy logic genetic algorithm synthesis and application- S. RjaeshKaran.
3. Neuro-Fuzzy Techniques for Intelligent Information Systems by Nikola Kasabov and Robert Kozma (eds), ISBN 3-7908-1187-4.

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER SCIENCE & ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Software Testing and Quality (Department Elective -I)**
Subject Code: **173102**

Teaching Scheme				Evaluation Scheme			
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**		**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
				Theory	**Practical**		
4	0	2	6	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	**Basic Concepts of Testing and Quality:** Software Quality, Errors, Correctness, Faults and Failures, Role and objectives of Testing, Test automation, Test case and its preparation, Correctness of Program, Software Testing metrics, Software testing metrics, development & testing phases in V model, Sources of Information for test case selection, Overview of CFG, Overview of string, languages and regular expressions, Types of testing –Black Box, White Box, Model Based, Interface, Unit testing, System Testing, Regression, Beta testing etc.	07
2.	**Unit Testing:** Concept, Static Unit Testing, Defect Prevention, Dynamic Unit Testing, Mutation testing, Debugging, Tools for Unit Testing	03
3.	**Control Flow Testing:** Introduction, CFG, Paths and their Selection Criteria, Generating Test input, Examples of test data selection, Containment of infeasible paths	03
4.	**Data Flow Testing:** Introduction, Anomaly of data flow, DFG, DF Testing criteria, Data Flow Test Selection Criteria comparison, Feasible Paths and test selection criteria,	03
5.	**Domain Testing:** Domain Error, Testing for domain error, Sources of domains, Types of domain errors, ON and OFF points, Test Selection criterion	04

6.	**System Integration Testing:** Introduction, Types of interface and types of interface errors, System integration techniques, Integration of software and hardware, Test Plan, Off-the-shelf component integration testing	04
7.	**Test Generation from FSM models:** State oriented model, Points of control, FSM, Test generation from FSM, W-method, UIO method, Distinguishing and characterizing sequence, Test architectures, Extended FSM, Test generation	07
8.	**System Test categories:** Introduction, **Basic tests**- Boot, Upgrade-downgrade, LED, Diagnostic, Command line i/f **Functionality tests**- Communication System, Module, Log and Trace, GUI, Security **Robustness tests** – Boundary value, Power cycle, Online Insertion and removal Interoperability test, Performance test, Scalability test, Stress test, Load and stability test, regression test, Documentation test	07
9.	**Functional testing:** Introduction, Complexity, Pair-wise testing, Equivalence class partitioning, boundary value analysis, decision tables, random testing, category partition	03
10.	**System test design:** Factors, Requirements Identification, Characteristics of testable requirements, Identification of test objectives, Modeling a test design process, modeling test results	04
11.	**System Test Planning:** Introduction, Assumptions, test Environment and structure, Test execution strategies, test effort estimation, Scheduling and test milestones	03
12.	**System test execution:** Introduction, Modeling Defects, Metrics for Tracking system test, Orthogonal defect classification, defect causal analysis, Beta testing	03
13.	**Software Quality:** Introduction, Different views of quality, Measurement of quality, Quality factors- correctness, reliability, efficiency, testability, portability, reusability etc. Quality criteria and relationship with factors	03

Text Books:

1. "Software Testing & Quality Assurance" by Kshirsagar Naik and PriyadarshiTripathy, Wiley Student edition
2. "Foundations of Software Testing" by Aditya P Mathur, Pearson, Fourth printyear 2011
3. "Introducing Software testing- A practical guide to getting started", LouiseTamres, Pearson

Reference Books:

1. "Rapid Testing" by Robert Culbertson, Chris Brown and Gary Cobb; Prentice-Hall, 2002.ISBN 0-13-091294-8
2. "Black-Box Testing: Techniques for Functional Testing of Software and Systems", by Boris Beizer, John Wiley & Sons, Inc., 1995. ISBN# 0-471-12094-

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER SCIENCE & ENGINEERING
B. E. SEMESTER: VII

Subject Name: **E-Commerce & E-Business (Department Elective -I)**
Subject Code: **173103**

Teaching Scheme				Evaluation Scheme			
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**		**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
				Theory	**Practical**		
4	0	2	6	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	**Introduction to Electronic Commerce** Defining Electronic Commerce, Brief History of Electronic Commerce, Forces Fueling Electronic Commerce. Electronic Forces. Marketing and Customer Interaction Forces. Technology and Digital Convergence. Implications of Various Forces, Electronic Commerce Industry Framework, The Information Superhighway, Multimedia Content and Network Publishing, Messaging and Information Distribution, Common Business Services Infrastructure. Other Key Support Layers, Putting the Framework into Action: Microsoft Corporation. Types of Electronic Commerce. Inter-organizational Electronic Commerce, Intra-organizational Electronic Commerce, Consumer-to-Business Electronic Commerce, Intermediaries and Electronic Commerce.	07
2.	**The Internet and the Access Provider Industry & Firewalls and Transaction Security** Internet Service Providers. Key Market Drivers for the Internet. Who Is Making Money on the Internet. Clarifying Internet Terminology. Companies Providing Internet Access. Internet Topology. Differentiating Market Segments: Commercial versus Consumer. Internet versus Online Services. Open versus Closed Architecture. Controlled Content versus Uncontrolled Content. Metered Pricing versus Flat Pricing. Innovation versus Control. Firewalls and Network Security. Types of Firewalls. Firewall Security Policies. Emerging Firewall Management Issues. Transaction Security. Types of Online Transactions. Requirements for Transaction Security.	05

3.	**Electronic Payment Systems & Overview of the Electronic Payment Technology.** The Online Shopping Experience. Limitations of Traditional Payment Instruments. Electronic or Digital Cash. Properties of Electronic Cash. Digital Cash in Action. Electronic Checks. Benefits of Electronic Checks. Electronic Checks in Action. NetCheck: A Prototype Electronic Check System. Electronic Check Project. Online Credit Card-Based Systems. Types of Credit Card Payments. Secure Electronic Transactions (SET). Other Emerging Financial Instruments. Debit Cards at the Point of Sale (POS). Debit Cards and Electronic Benefits Transfer. Smart Cards. Consumer, Legal, and Business Issues.	07
4.	**Electronic Commerce and Banking** Changing Dynamics in the Banking Industry. Changing Consumer Needs. Cost Reduction. Demographic Trends. Regulatory Reform. Technology-based Financial Services Products. Home Banking History. Why Will It Be Different This Time? Home Banking Implementation Approaches. Home Banking Using Bank's Proprietary Software. Banking via the PC Using Dial-Up Software. Banking via Online Services. Banking via the Web: Security First Network Bank. Open versus Closed Models. Management Issues in Online Banking.	05
5.	**From e-Commerce to e-Business** Linking Today's Business with Tomorrow's Technology. E-Business = Structural Transformation. e-Business Requires Flexible Business Designs Challenge Traditional Definitions of Value. Define Value in Terms of the Whole Customer Experience. e-Business Communities: Engineering the End-to-End Value Stream Integrate, Integrate, Integrate: Create the New Techno-Enterprise. Needed: A New Generation of e-Business Leaders	05
6.	**e-Business Trend Spotting** Increase Speed of Service: For the Customer, Time Is Money Empower Your Customer: Self-Service Provide Integrated Solutions, Not Piecemeal Products Integrate Your Sales and Service: Customization and Integration Ease of Use: Make Customer Service Consistent and Reliable , Ease of Use: Make Customer Service Consistent and Reliable Provide Flexible Fulfillment and Convenient Service Delivery Contract Manufacturing: Become Brand Intensive, Not Capital Intensive Learn to Outsource: You Cannot Be Good at Everything Increase Process Visibility: Destroy the Black Box Learn the Trends in Employee Retention Integrated Enterprise Applications: Connect the Corporation Meld Voice, Data, and Video	05

	Multichannel Integration: Look at the Big Picture Wireless Applications Enter the Mainstream Middleware: Supporting the Integration Mandate What Is Common to All These Trends?	
7.	**Think e-Business Design, Not Just Technology** Constructing an e-Business Design The First Step of e-Business Design: Self-Diagnosis The Second Step of e-Business Design: Reversing the Value Chain The Third Step of e-Business: Choosing a Narrow Focus Case Study: Service Excellence at American Express Case Study: Operational Excellence at Dell Computer Case Study: Continuous Innovation at Cisco Systems Business Design Lessons Learned	05
8.	**Constructing the e-Business Architecture** Why Is Application Integration Important? The New Era of Cross-Functional Integrated Apps Integrating Application Clusters into an e-Business Architecture Aligning the e-Business Design with Application Integration	05
9.	**Customer Relationship Management: Integrating Processes to Build Relationships** Why Customer Relationship Management? Defining Customer Relationship Management Organizing around the Customer: The New CRM Architecture Supporting Requirements of the Next-Generation CRM Infrastructure. Organizational Challenges in Implementing CRM. Next-Generation CRM Trends .Building a CRM Infrastructure: A Manager's Roadmap	05
10.	**E-Procurement: The Next Wave of Cost Reduction** Structural Transition: From Isolated Purchasing to Real-Time Process Integration Why Procurement Is a Top-Management Issue? What Exactly Is Operating Resource Procurement? Operating Resource Procurement at Microsoft: MS Market Procurement Business Problem: Lack of Process Integration Next-Generation Integrated Procurement Applications Elements of Buy-Side e-Procurement Solutions Buy-Side Applications for the Procurement Professional Elements of Sell-Side e-Procurement Solutions	05

Text Books:

1. Electronic Commerce : A Managers Guide, Ravi Kalakota, Andrew B. Whinston**,** Pearson Education
2. E-Business: Roadmap For Success, Kalakota R, Pearson Education

Reference Books:

1. E-business & commerse (Startegic Thinking & Practice), Brahm Canzer,dreamtech
2. E-commerse Foundations and Applications, HENRY CHAN, RAYMOND LEE,THARAM DILLON, ELIZABETH CHANG, Wiley India

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER SCIENCE & ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Enterprise Resource Planning (Department Elective -I)**
Subject Code: **171605**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	0	2	6	70	30	30	20

Sr. No.	Course Contents	Total Hrs
1.	**Introduction to ERP** Enterprise – An Overview Integrated Management Information, Business Modeling, Integrated Data Model	04
2.	**ERP and Related Technologies** Business Processing Reengineering(BPR), Data Warehousing, Data Mining,On-line Analytical Processing(OLAP), Supply Chain Management (SCM),Customer Relationship Management(CRM), MIS - Management InformationSystem, DSS - Decision Support System, EIS - Executive Information System.	06
3.	**ERP Manufacturing Perspective** MRP - Material Requirement Planning, BOM - Bill Of Material, MRP - Manufacturing Resource Planning, DRP - Distributed Requirement Planning, PDM - Product Data Management	08
4.	**ERP Modules** Finance, Plant Maintenance, Quality Management, Materials Management	06
5.	**Benefits of ERP** Reduction of Lead-Time, On-time Shipment, Reduction in Cycle Time, Improved Resource Utilization, Better Customer Satisfaction, Improved Supplier Performance, Increased Flexibility, Reduced Quality Costs, Improved Information Accuracy and Design-making Capability	06

6.	**ERP Implementation Lifecycle** Pre-evaluation Screening, Package Evaluation, Project Planning Phase, Gap Analysis, Reengineering, Configuration, Implementation Team Training, Testing, Going Live, End-user Training, Post-implementation (Maintenance mode)	06
7.	**ERP Case studies** E-Commerce to E-business E-Business structural transformation, Flexible Business Design, Customer Experience, Create the new techo enterprise, New generation e-business leaders, memo to CEO, Empower your customer, Integrate Sales and Service, Integrated Enterprise applications	06
8.	**E-Business Architecture** Enterprise resource planning the E-business Backbone Enterprise architecture planning, ERP usage in Real world, ERP implementation, Future of ERP applications ,memo to CEO E-Procurement, E-Governance, Developing the E-Business Design	08
9.	**Introduction to ERP Tools** JD Edwards-Enterprise One Microsoft Dynamics-CRM Module	04

Text Books:

1. Enterprise Resource Planning - Alexis Leon, Tata McGraw Hill.
2. Enterprise Resource Planning – Diversified by Alexis Leon, TMH.
3. Enterprise Resource Planning - Ravi Shankar & S. Jaiswal , Galgotia.

Reference Books:

1. Guide to Planning ERP Application, Annetta Clewwto and Dane Franklin,McGRaw-Hill, 1997
2. The SAP R/3 Handbook, Jose Antonio, McGraw – Hill
3. E-Business Network Resource planning using SAP R/3 Baan and Peoplesoft : APractical Roadmap For Success By Dr. Ravi Kalakota

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER ENGINEERING
B. E. SEMESTER: VII

[w.e.f. June 2012]

Subject Name: **Web Data Management**
Subject Code: 170708

Course Description

XML and, more generally, semistructured data, differs in shape from traditional relational data.
More importantly, it is used in novel kinds of applications: exchange and retrieval on the
Web, rather than local storage and processing. This course covers some major developments
in semistructured data and XML that happened over the last few years: data models, syntax,
query languages, schemas, query analysis, type- checking, publishing, indexes, and storage
methods.

Prerequisite: Database Programming, Database Management Systems

Course Contents

Topics	Hours
Introduction: Modeling Web Data • Database Technology and Web Applications • Semistructured data • Web Data Management with XML • XML and syntax • XML Data Model, XLink, and XPointer	7
XPath and XQuery • Regular Path Expressions • XPath Basics • XPath steps and expressions • Path evaluations, axes, node tests, predicates • XQuery Syntax • FLWOR expression, advanced features • XUpdate	7
Typing • Automata on ranked trees, unranked trees • XML Schema, other schema languages • Graph semistructured data, graph bisimulation, data guides • XML query evaluation • XML identifiers, XML evaluation techniques	8
Ontologies, Querying and Data Integration • RDF, RDF Schema, OWL • Description Logic • Querying data through ontologies • Querying RDF data, querying through RDFS	8

• Answering queries though DL • Global-as-view (GAV) and Local-as-view (LAV) mediation • Ontology based mediation, Peer-to-peer data management systems	
Building Web scale applications • Web search, web crawlers, web information retrieval • Web graph mining and hot topics in web search • Distributed systems, failure management • Required properties of a distributed system, P2P networks • Hash-based structures, distributed indexing • Distributed computing with MapReduce	7

Text Book

S. Abiteboul, I. Manolescu, P. Rigaux, M. Rousset and P. Senellart, Web Data Management, Cambridge University Press, 2012

Reference Books

1. S. Abiteboul, P. Buneman and D. Suciu, Data on the Web: From Relational to Semistructured Data to XML, Morgan Kaufman Publisher
2. Research papers and W3C web site

GUJARAT TECHNOLOGICAL UNIVERSITY
COMPUTER ENGINEERING / INFORMATION TECHNOLOGY / COMPUTER SCIENCE & ENGINEERING
B. E. SEMESTER: VII

Subject Name: **Project**
Subject Code: **170001**

Teaching Scheme				Evaluation Scheme			
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (E)**		**Mid Sem Exam (Theory) (M)**	**Practical (Internal)**
				Theory	**Practical**		
0	0	4	4	0	100	0	50

General Guidelines for the Project – I & II
   Following are the General guidelines:

1. Semester 7th, teaching scheme is 0-0-4, with 4 credits worth of 150 marks
2. Semester 8th, teaching scheme is 0-0-8 or 0-0-12 in some cases worth of 300 to 450 marks.

Note:

In the 7th Semester 50 marks are to be given for Problem Definition which is to be given in a specified format. The format may be specified by dept. /college. The common form for theproblem definition can be downloaded from GTU website.

Procedure:

a) Each defined project needs to be from Industry/Research organization/Govt.organization/socio-technical issues.

b) Project identification should be based on "Shodh- Yatra" carried out by the students after completion of B.E Semester 6th Examination but before starting of the 7th Semester.

c) Problem definition for the project needs to be submitted by every student in the first week of the 7th Semester to his/her college.

d) Each definition will be evaluated based on merit in the beginning of the 7th semester itself by the College.

e) Every College should send the list of students along with the Problem Definition in the specified format to GTU before 15th August, 2011.

Facilitation:

You may contact your Udisha club co-ordinator/Faculty /Department/Principal or Chairman of your Sankul for arranging "Shodh-Yatra" to the industries.
   Guidelines for the Students:

1. The students are required to identify their problem during the summer of 2011 and

they are required to follow all the rules and instructions issued by department, for safety and other requirements.

2. Each student or student group would work under the guidance of the Faculty from the College. In case any problem/other issue arises for the smooth progress of IDP discovery/Practical Training, it should be immediately brought to the notice of the Udisha club co-ordinator/Faculty /Department/Principal or Chairman of your Sankul.

3. The students are required to submit the Problem Definition (in the specified format) to their Head of the Department in their College during the first week of the 7th semester.

4. Problem is to be located from industry floor and then it has to be developed in 7th and 8th semester in college with possible periodic inputs from concerned industries. Both the project parts are single major project. Student has complete work in College premise only under supervision of College teacher along with Other Subjects/Course as per Teaching Scheme

5. Any student can pick an industry in any Sankul as per his/her feasibility. He/she is allowed to choose any particular industry and interdisciplinary projects are allowed inside same college. Student has complete work in College premise only under supervision of College teacher along with Other Subjects/Course as per TeachingScheme

6. The project is mandatory for each branch. Sankuls are not boundary for choosing an IDP. Any students can be linked to anywhere.

7. The project work will be in-house industry project, where student need to implement project related to any domain of industry like education, legal, manufacturing, design, pharmaceutical, Ecommerce, etc.

8. Students are required to get approval of project definition from the department.

9. After approval of project definition students are required to report their project work weekly to respective internal guide.

10. Maximum 4 students can allow working in particular project group.

11. Students have to submit project with following listed documents after the approval of their project definition. Format for same will be provided by department.

    a. Project Synopsis
    b. Software Requirement Specification
    c. SPMP
    d. Final Project Report
    e. Company certificate
    f. Project Setup file with Source code
    g. Project Presentation (PPT)

GUJARAT TECHNOLOGICAL UNIVERSITY
DEGREE IN COMPUTER SCIENCE & ENGINEERING
TEACHING SCHEME

Semester - VIII

Subject Code	Subject Name	Teaching Scheme(Hours)			Credits
		Theory	Tutorial	Practical	
180701	Distributed Systems	4	0	2	6
180702	Parallel Processing	4	0	2	6
183103	Business Intelligence & Data Mining (Department Elective II)	4	0	2	6
180703	Artificial Intelligence (Department Elective II)	4	0	2	6
181605	Service Oriented Computing (Department Elective II)	4	0	2	6
180707	iOS Programming (Department Elective -II)	4	0	2	6
180708	Android Programming (Department Elective -II)	4	0	2	6
183106	Project II	0	0	12	12
	TOTAL	**12**	**0**	**18**	**30**

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : VIII
COMPUTER SCIENCE & ENGINEERING

Subject Name: **DISTRIBUTED SYSTEMS**

Sr. No.	Course Contents	Total Hrs
1.	**Concepts of Distributed Systems :** Introduction, Distributed computing models, Software concepts, Design issues in distributed systems, Client-server model, WWW 1.0 and 2.0	02
2.	**Network Communication:** LAN and WAN technologies, OSI Model and Internet protocols, ATM, Protocols for Distributed systems	04
3.	**Interprocess Communication:** Message Passing and its features, IPC message format, IPC synchronization, Buffering, multi datagram messaging, process addressing techniques, failure handling, Formal Models for message passing systems, Broadcast and converge cast on a spanning tree, Flooding and building a spanning tree, Constructing a DFS spanning tree with and without a specified root	10
4.	**Remote Communication:** Introduction, RPC basics, RPC implementation, RPC Communication and Other issues, Sun RPC, RMI basics, RMI Implementation, Java RMI	08
5.	**Synchronization:** Clock synchronization, Logical clocks, Global state, Mutual exclusion, Election algorithms: Bully algorithm, Ring algorithm, Leader election in rings, anonymous rings, Asynchronous rings, synchronous rings, election in wireless networks, Deadlocks in Distributed systems, Deadlocks in Message communication	10
6.	**Formal Model for Simulation:** Problem specification, Communication systems, asynchronous point to point message passing, asynchronous broadcast, Processes, Admissibility, Simulations	04
7.	**Distributed System Management:** Resource management, Task management approach, Load balancing approach, Load sharing approach, Process Management, Process migration, threads, fault tolerance	10
8.	**Distributed Shared Memory:** Concepts, Hardware DSM, Design issues in DSM systems, Implementation issues, Heterogeneous and other DSM systems, Case studies : Munin, Linda	06
9.	**Naming:** Overview, Features, Basic concepts, System oriented names, Object locating mechanisms, Issues in designing human oriented names, Name caches, Naming and security, DNS	06

Text Books:

1. Distributed Computing, Sunita Mahajan and Seema Shah, Oxford University Press
2. Distributed Computing, Fundamentals, Simulations and Advanced topics, 2nd Edition, Hagit Attiya and Jennifer Welch, Wiley India

Reference Books:

1. Distributed Systems: Principles and Paradigms, Taunenbaum
2. Distributed Systems: Concepts and Design, G. Coulouris, J. Dollimore, and T. Kindberg, Pearson Education

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : VIII
COMPUTER SCIENCE & ENGINEERING

Subject Name: **PARALLEL PROCESSING**

Sr. No.	Course Contents	Total Hrs
1.	**Parallel Programming Platforms** • Implicit Parallelism: Trends in Microprocessor Architectures • Limitations of Memory System Performance • Dichotomy of Parallel Computing Platforms • Physical Organization of Parallel Platforms • Communication Costs in Parallel Machines • Routing Mechanisms for Interconnection Networks • Impact of Process-Processor Mapping and Mapping Techniques	04
2.	**Principles of Parallel Algorithm Design algorithms** • Preliminaries • Decomposition Techniques • Characteristics of Tasks and Interactions • Mapping Techniques for Load Balancing • Methods for Containing Interaction Overheads • Parallel Algorithm Models	06
3.	**Basic Communication Operations, algorithms** • One-to-All Broadcast and All-to-One Reduction • All-to-All Broadcast and Reduction • All-Reduce and Prefix-Sum Operations • Scatter and Gather • All-to-All Personalized Communication • Circular Shift • Improving the Speed of Some Communication Operations	08
4.	. **Analytical Modeling of Parallel Programs** • Sources of Overhead in Parallel Programs • Performance Metrics for Parallel Systems • Effect of Granularity and Data Mapping on Performance • Scalability of Parallel Systems • Minimum Execution Time and Minimum Cost-Optimal Execution Time • Asymptotic Analysis of Parallel Programs • Other Scalability Metrics	06
5.	**Programming Using the Message Passing Paradigm** • Principles of Message-Passing Programming • The Building Blocks: Send and Receive Operations • MPI: The Message Passing Interface • Topologies and Embedding • Overlapping Communication with Computation • Collective Communication and Computation Operations • Groups and Communicators	08
6.	**Programming Shared Address Space Platforms Thread Basics** • Why Threads? • The POSIX Thread Application Programmer Interface • Synchronization Primitives in POSIX • Controlling Thread and Synchronization Attributes • Thread Cancellation • Composite Synchronization Constructs	08
7.	. **Dense Matrix Algorithms** • Matrix-Vector Multiplication • Matrix-Matrix Multiplication	06

8.	**Sorting** Issues in Sorting on Parallel Computers - Sorting Networks - Bubble Sort and its Variants - Quick sort	06
9.	**Graph Algorithms** - Definitions and Representation - Minimum Spanning Tree: Prim's Algorithm - Single-Source Shortest Paths: Dijkstra's Algorithm - All-Pairs Shortest Paths	08

Text Books:

1. Introduction to Parallel Computing, Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, By Pearson Publication
2. Introduction to Parallel Processing, M. SasiKumar, Dinesh Shikhare, P.Raviprakash By PHI Publication

Reference Books:

1. Introduction To Parallel Programming - By Steven Brawer
2. Introduction To Parallel Processing – By M.Sasikumar, Dinesh Shikhare And P. Ravi Prakash
3. Parallel Computers – Architecture And Programming – By V. Rajaraman And C. Siva Ram Murthy

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : VIII
COMPUTER SCIENCE & ENGINEERING

Subject Name: **BUSINESS INTELLIGENCE & DATA MINING**

Sr. No.	Course Contents	Total Hrs
1.	**Overview and concepts Data Warehousing and Business Intelligence** Why reporting and Analyzing data, Raw data to valuable information-Lifecycle of Data - What is Business Intelligence - BI and DW in today's perspective - What is data warehousing - The building Blocks: Defining Features - Data warehouses and data marts, Virtual Warehouses - Overview of the components - Metadata in the data warehouse - Need for data warehousing - Basic elements of data warehousing, Architectures, OLAP and OLAP Servers – recent trends in data warehousing, Dynamic Warehousing.	14
2.	**The Architecture of BI** BI and DW architectures and its types - Relation between BI and Data Mining.	06
3.	**Introduction to data mining (DM)** Motivation for Data Mining - Data Mining-Definition and Functionalities – Classification of DM Systems – DM task primitives - Integration of a Data Mining system with a Database or a Data Warehouse - Issues in DM – KDD Process- Various Models and their significance.	12
4.	**Concept Description and Association Rule Mining** What is concept description? - Data Generalization and summarization-based characterization - Attribute relevance - class comparisons Association Rule Mining: Market basket analysis - basic concepts - Finding frequent item sets: Apriori algorithm - generating rules – Improved Apriori algorithms, FP Growth Algorithm – Incremental ARM – Associative Classification – Rule Mining, ARCS.	10
5.	**Classification and Prediction** What is classification and prediction? – Issues regarding Classification and prediction: • Various Classifiers and Classification methods: Decision tree, Bayesian Classification, Rule Based Classifiers, CART, Neural Network, Nearest Neighbour, Case Based Reasoning, Rough Set Approach. The role of Genetic Algorithm and fuzzy logic. • Prediction methods: Linear and non linear regression, Logistic Regression.	14
6.	**Data Mining for Business Intelligence Applications**	04

Text Books:

1. J. Han, M. Kamber, "Data Mining Concepts and Techniques", 3rd Edition, Morgan Kaufmann.

References:

1. Paulraj Ponnian, "Data Warehousing Fundamentals", John Willey.
2. M. Kantardzic, "Data mining: Concepts, models, methods and algorithms, John Wiley & Sons Inc.
3. M. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education.
4. Pieter Adriaans, Dolf Zantinge , "Data Mining", Pearson Education Asia

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : VIII
COMPUTER SCIENCE & ENGINEERING

Subject Name: **ARTIFICIAL INTELLIGENCE**

Sr. No.	Course Contents	Total Hrs
1.	**Problems And State Space Search** The AI Problems, The Underlying Assumption, What Is An AI Techniques, The Level Of The Model, Criteria For Success, Some General References, One Final Word.	02
2.	**Problems And State Space Search** Defining The Problems As A State Space Search, Production Systems, Production Characteristics, Production System Characteristics, And Issues In The Design Of Search Programs, Additional Problems.	04
3.	**Heuristic Search Techniques** Generate-And-Test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis.	04
4.	**Knowledge Representation Issues** Representations And Mappings, Approaches To Knowledge Representation.	04
5.	**Using Predicate Logic :** Representation Simple Facts In Logic, Representing Instance And Isa Relationships, Computable Functions And Predicates, Resolution.	04
6.	**Representing Knowledge Using Rules** Procedural Versus Declarative Knowledge, Logic Programming, Forward Versus Backward Reasoning.	04
7.	**Symbolic Reasoning Under Uncertainty** Introduction To Non-monotonic Reasoning, Logics For Non-monotonic Reasoning.	04
8.	**Statistical Reasoning :** Probability And Bays' Theorem, Certainty Factors And Rule-Base Systems, Bayesian Networks, Dempster-Shafer Theory, Fuzzy Logic.	04
9.	**Weak Slot-And-Filler Structure :** Semantic Nets, Frames.	04
10.	**Game Playing: Overview, And Example Domain** The Blocks World, Components Of A Planning System, Goal Stack Planning, Nonlinear Planning Using Constraint Posting, Hierarchical Planning, Reactive Systems, Other Planning Techniques.	04
11.	**Natural Language Processing** Introduction, Syntactic Processing, Semantic Analysis, Semantic Analysis, Discourse And Pragmatic Processing.	04
12.	**Connectionist Models** Introduction: Hopfield Networld, Learning In Neural Networld, Application Of Neural Networks, Recurrent Networks, Distributed Representations, Connectionist AI And Symbolic AI.	04
13.	**Expert Systems** An Introduction To Expert System, Explanation Facilities, Expert System Developments Process, knowledge Acquisition.	04
14.	**Introduction to Prolog** Introduction To Prolog: Syntax and Numeric Function, Basic List Manipulation Functions In Prolog, Functions, Predicates and Conditional, Input, Output and Local Variables, Iteration and Recursion, Property Lists and Arrays, Miscellaneous Topics, LISP and Other AI Programming Languages.	10

Texts:

1 "Artificial Intelligence" -By Elaine Rich And Kevin Knight (2nd Edition) Tata Mcgraw-Hill
2 Introduction to Prolog Programming By Carl Townsend.

References:

1. "Artificial Intelligence And Expert System, Development" -By D.W.Rolston Mcgraw-Hill International Edition.
2. "Artificial Intelligence And Expert Systems " -By D.W.Patterson
3. "PROLOG Programming For Artificial Intelligence" -By Ivan Bratko(Addison-Wesley)
4. "Programming with PROLOG" –By Klocksin and Mellish.
5. "Artificial Intelligence" (Fifth Edition) –By George F Luger, Pearson Education.
6. "Artificial Intelligence" (Second Edition)–By Stuart Russell and Peter Norvig, Pearson Education.
7. Artificial Intelligence Application Programming, Tim Jones, Wiley India

GUJARAT TECHNOLOGICAL UNIVERSITY
B.E. SEMESTER : VIII
COMPUTER SCIENCE & ENGINEERING

Subject Name: **SERVICE ORIENTED COMPUTING**

Sr. No.	Course Contents	Total Hrs
1.	**Introduction** Introduction, Brief history of information technology, Distributed computing in the large, Motivations for composition, Challenges for composition, Web Services Architectures and Standards. Computing with Services, Visions for web, Semantic web, Peer to Peer Computing, Processes and Protocols. Pragmatic web, Open environments	04
2.	**Basic concepts** Directory services, SOAP, WSDL, UDDI	08
3.	**Enterprise architectures** Integration versus interoperation, J2EE, .NET, Model Driven Architecture, Legacy systems.	06
4.	**Principles of Service-Oriented Computing** Use cases: Intra-enterprise and Inter-enterprise Interoperation, Application, Configuration, Dynamic Selection, Software Fault Tolerance, Grid, and, Utility Computing, Elements of Service-Oriented Architectures, RPC versus Document, Orientation, Composing Services	10
5.	**Description: Modeling and representation** XML primer, Conceptual modeling, Ontology and knowledge sharing, Relevant standards: RDF, RDFS, and OWL, Differencing and tools, Matchmaking	10
6.	**Engagement** Execution Models: Messaging, CORBA, Peer to peer computing, Jini, Grid Computing, Transactions: ACID Properties, Schedules, Locking, Distributed Transactions, Transactions over Composed Services: Architecture, Properties, Compositional Serializability, Process specification: Processes, Workflows, Business Process Management, Process Specification Language, Relevant standards: BPEL4WS, WSCI, WS-C, ebXML, Relaxed transactions, Exception handling	12
7.	**Collaboration** Describing collaborations, Agents, Multiagent systems, Agent communication, languages, Protocols, Commitments and contracts, Planning, Consistency maintenance, Relevant standards: FIPA, OWL-S, Economic models, Organizational models	08

Text Books:

1. Service-Oriented Computing: Semantics, Processes, Agents, Munindar P. Singh and Michael N. Huhns, John Wiley & Sons, Ltd., 2005

Reference Books:

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education.
2. Newcomer, Lomow, "Understanding SOA with Web Services", Pearson Education.
3. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services, An Architect's Guide", Pearson Education.
4. Dan Woods and Thomas Mattern, "Enterprise SOA Designing IT for Business Innovation" O'REILLY.

GUJARAT TECHNOLOGICAL UNIVERSITY

iOS PROGRAMMING
B.E. 8th Semester

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
4	0	2	6	70	30	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr #	Topic	Teaching Hrs.	Module Weightage
1	**Fundamentals:** OOP concepts and SQL Queries, Basics of Designing, Overview of MAC OS and X-Code	10	15%
2	**Learning the Language (Objective C):** Data Types, NSInteger, NSNumber, Operators, Loop, Intro to .H and .M, FilesInheritance, Method Overloading, Mutable and Immutable Strings, Mutable and Immutable Arrays, File Management	10	20%
3	**IPhone OS:** Introduction to iPhone Architecture, Essential COCOA TouchClasses, Interface Builder, Nib File, COCOA and MVC Framework, Overview of features of latest ios.	16	55%
4	**Application Development in iPhone:** Controls and Gestures, Controllers and Memory Management, Using Application Delegate, Connecting Outlets, Managing Application Memory, Advance Controllers Programming, Views (Alert View, Table Views, Picker, Date and Time, Image), Navigation Based Application Development, Tab Bar and Tool Bar, Audio and Video, Releasing Memory, Reading PDF File in iPhone Simulator, Animation, Accelerometer, Location Services and 2-D Graphics, Email Sending, XML Parsing,JSON Parsing, Web Services Integration	15	8%
5	**Database:** SqLite, Creating Outlets and Actions, Parsing Data with Sqlite, Overview of Networking- SCNetwork, CFHTTP, CFFTP, CFSocket, Berkeley Sockets, Web Server	5	2%

Reference Books:

1. Building iPhone and iPad Electronic Projects - MikeWesterfield - O'Reilly Media Pub.
2. Head First iPhone and iPad Development, 2nd Edition - Dan Pilone, Tracey Pilone - O'Reilly Media
3. Beginning iPhone and iPad Web Apps - ChrisApers, Daniel Paterson - Apress Pub

Course Outcome:

The main objectives to give the subject Mobile Application Development in iOS are:

- To introduce basic concepts of Objective C Programming
- To introduce iOS
- To introduce Building Mobile Application With iOS
- To introduce cutting edge technology to the students

Instructional Method and Pedagogy:

- Lectures will be taken in class room with the use of multi-media presentations, black board or mix of both.
- Assignments based on above course content will be given to the students at the end of each module. Each assignment contains minimum 10 questions.
- Mini Project based learning.

Reference Links/ e-content

1. **List of Open Source Software/learning website:** Video Tutorials: http://www.youtube.com/watch?v=1Xqn5IHbusA&list=PL640F44F1C97BA581
2. Video Tutorials: http://www.youtube.com/watch?v=abcMmyhKCno&list=PL9044DA7A3AD61277

3. Study Tutorial: https://developer.android.com/sdk/index.html

GUJARAT TECHNOLOGICAL UNIVERSITY

ANDROID PROGRAMMING
B.E. 8th Semester

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE Viva (V)	PA (I)	
4	0	2	6	70	30	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Content:

Sr #	Topic	Teaching Hrs.
1	**Fundamentals:** OOPS, Software Engineering, SQL Queries, Basics of Designing	5
2	**Android OS:** Introduction to Java And Android, Introducing Development Framework, Dalvik Virtual Machine – DVM, Developing with Eclipse,Android Virtual Device and SDK Manager, Android Architecture and OOPS, Android Development Tools, Android Asset Packaging Tool (AAPT), Android Debug Bridge, Types of Android Applications, Android Architecture and OOPS, Activity Lifecycle, Activity Classes, Introduction to Application Manifest, Installing Android, Component Lifecycle	15
3	**Building mobile applications with android:** Android Layouts, Android UI and Advance Java, Android GUI Architecture, Layouts, Android Widget Toolbox, WebView, GridView, Understanding Android Menus, Intents and Processes, Graphics Animation and Multimedia, Bitmaps, Introduction to Audio on Android, Introduction to Video, Android Persistence, Android Preferences, Using File system, Accessing SD cards, Location and maps, Using GEOCoder, Creating and Using Overlays, Projections, Using Wake Locks, Android Text To Speech, Interprocess Communication, Paranoid Android, Internet Services, Broadcast receivers, Using Camera, Sensor Manager, Bluetooth, Network, Wi-Fi, AIDL and IPC, XML Parsing, Dom Parsing, SAX Parsing, JSON Parsing, SQLite Databases, Services and Content Providers, Introduction to Android NDK	25
4	**Database Connectivity:** SQLite Database, SQLite Data Types, Cursors and Content Values, SQlite Open Helper, Adding, Updating and Deleting Content	4
5	**Applicability to industrial projects:** Project Scope, Database Dictionary, Flow Chart, High Level Requirements, Using Bluetooth and NFC in Android ,device, Localization in Android, Configuration changes, Security and permissions, Web Services Integration, Deployment	2

Reference Books:

1. Android Developer Tools Essentials by Mike Wolfson - O'Reilly Media Publications
2. Learn Java for Android Development, 2nd Edition - Jeff Friesen - Apress Publications
3. OpenGL ES 2 for Android - Kevin Brothaler- The Pragmatic Programmers

Course Outcome:

The main objectives to give the subject Mobile Application Development in Android are:

1. To introduce basic concepts of Android Programming
2. To introduce Android OS
3. To introduce Building Mobile Application With Android
4. To introduce cutting edge technology to the students

Instructional Method and Pedagogy:

1. Lectures will be taken in class room with the use of multi-media presentations, black board or mix of both.
2. Assignments based on above course content will be given to the students at the end of each module. Each assignment contains minimum 10 questions.
3. Mini Project based learning

Reference Links/ e-content

1. VideoTutorials: http://www.youtube.com/watch?v=SUOWNXGRc6g&list=PL2F07DBCDCC01493A
2. Study Tutorial: https://developer.android.com/sdk/index.html