B. Tech. (CS): Syllabus Revision in 2016-17.

S. No	Course Code	Session 2015-16	Session 2016-17	Remark Syllabus Change/ new course
	BT 101	**BT101: Engineering Physics I** **UNIT I** Atomic Structure and Solid State: Atomic energy levels and electronic configuration, Intermolecular forces and binding, phases of matter, crystal structure simple cubic , body centered cubic and face centered cubic structures, energy bands in solids , band structure of metals, semiconductors and insulators. **UNIT II** Semiconductor Physics: Extrinsic and intrinsic semiconductors, Fermi levels of undoped and doped semiconductors, p-n junction, depletion region, forward and reverse biased p-n junction, volt-Ampere characteristics of a diode , effect of temperature on diode characteristics, Zener diode , tunnel diode, photodiode and LEDs , their structure and characteristics. **UNIT III** Theory of Relativity : Absolute and relative frames of reference, Galilean transformations, importance of Michelson-Morley experiment, postulates of special theory of relativity, Lorentz transformations, time dilation and length contraction, velocity addition , mass-energy relationship, elementary ideas about general theory of relativity. **UNIT IV** Elementary Quantum Mechanics: Wave particle duality, deBroglie waves, experimental evidence of wave nature of matter, Schrodinger wave equation in One dimension, eigen values and eigen functions, physical interpretation of wave function, Heisenberg uncertainty principle, tunneling phenomenon. **UNIT V** Oscillation & Waves : Simple harmonic oscillator with example, energy of oscillator, Damping oscillator,viscous & solid friction damping,Qualityfactor,Resonance standing waves,elastic waves,	**BT101: Engineering Physics I** **UNIT I** Atomic Structure and Solid State: Atomic energy levels and electronic configuration, Intermolecular forces and binding, phases of matter, crystal structure simple cubic , body centered cubic and face centered cubic structures, energy bands in solids , band structure of metals, semiconductors and insulators. **UNIT II** Semiconductor Physics: Extrinsic and intrinsic semiconductors, Fermi levels of undoped and doped semiconductors, p-n junction, depletion region, forward and reverse biased p-n junction, volt-Ampere characteristics of a diode , effect of temperature on diode characteristics, Zener diode , tunnel diode, photodiode and LEDs , their structure and characteristics. **UNIT III** Theory of Relativity : Absolute and relative frames of reference, Galilean transformations, importance of Michelson-Morley experiment, postulates of special theory of relativity, Lorentz transformations, time dilation and length contraction, velocity addition , mass-energy relationship, elementary ideas about general theory of relativity. **UNIT IV** Elementary Quantum Mechanics: Wave particle duality, deBroglie waves, experimental evidence of wave nature of matter, Schrodinger wave equation in One dimension, eigen values and eigen functions, physical interpretation of wave function, Heisenberg uncertainty principle, tunneling phenomenon. **UNIT V** Oscillation & Waves : Simple harmonic oscillator with example, energy of oscillator, Damping oscillator,viscous & solid friction damping,Qualityfactor,Resonance standing waves,elastic waves,	No Change
	BT 102	**BT102 - INTRODUCTION TO COMPUTER FUNDAMENTAL AND IT** **UNIT I** **Computer System**: Basics of computer systems, history, types and Generation of computer, capability and limitations of computer systems. Hardware organization: Anatomy of a digital computer,	**BT102 - INTRODUCTION TO COMPUTER FUNDAMENTAL AND IT** **UNIT I** **Computer System**: Basics of computer systems, history, types and Generation of computer, capability and limitations of computer systems. Hardware organization: Anatomy of a digital computer,	No Change

		CPU.Internal architecture of CPU.Memory Units: Memory Hierarchy, Primary Memory, Secondary Memory, cache memory. Storage Devices, Input and Output Devices. **UNIT II** **Operating Systems**: DOS Internal, External commands, Windows (2000 and NT) , Overview of architecture of Windows, tools and system utilities including registry , partitioning of hard disk , Overview of Linux architecture , File system , file and permissions , concept of user and group , installation of rpm and deb based packages. **UNIT III** **Number system & Conversions:** decimal, binary, octal and hexadecimal number systems and their inter conversions, 1's and 2's complement representation, negative numbers and their representation, BCD, EBCDIC , ASCII and Unicode. Binary Arithmetic operations: addition, subtraction, multiplication, division. **UNIT IV** **Networking Basics** - Uses of a Network and Common types of Networks, Network topologies and protocols, Network media and hardware, Overview of Database Management System. **UNIT V** **Data Processing:** Introduction to MS office, MS-Power Point and MS-Excel, Introduction to Electronic Spreadsheets, Applications of Electronic Spreadsheets, Types of Spreadsheets, Features of MS-Excel, Starting MS-Excel, Contents of the MS-Excel window, Cell Referencing, Ranges and Functions, Formatting Worksheets and Creating Charts, Data Forms and Printing *Introduction to MS-PowerPoint :* Introduction to MS-PowerPoint, What is a Presentations?, Slides, Working with Slides, Slides Show and Printing Presentation	CPU.Internal architecture of CPU.Memory Units: Memory Hierarchy, Primary Memory, Secondary Memory, cache memory. Storage Devices, Input and Output Devices. **UNIT II** **Operating Systems**: DOS Internal, External commands, Windows (2000 and NT) , Overview of architecture of Windows, tools and system utilities including registry , partitioning of hard disk , Overview of Linux architecture , File system , file and permissions , concept of user and group , installation of rpm and deb based packages. **UNIT III** **Number system & Conversions:** decimal, binary, octal and hexadecimal number systems and their inter conversions, 1's and 2's complement representation, negative numbers and their representation, BCD, EBCDIC , ASCII and Unicode. Binary Arithmetic operations: addition, subtraction, multiplication, division. **UNIT IV** **Networking Basics** - Uses of a Network and Common types of Networks, Network topologies and protocols, Network media and hardware, Overview of Database Management System. **UNIT V** **Data Processing:** Introduction to MS office, MS-Power Point and MS-Excel, Introduction to Electronic Spreadsheets, Applications of Electronic Spreadsheets, Types of Spreadsheets, Features of MS-Excel, Starting MS-Excel, Contents of the MS-Excel window, Cell Referencing, Ranges and Functions, Formatting Worksheets and Creating Charts, Data Forms and Printing *Introduction to MS-PowerPoint :* Introduction to MS-PowerPoint, What is a Presentations?, Slides, Working with Slides, Slides Show and Printing Presentation	
	BT 103	**BT103- Applied Mathematics I** **UNIT I** Functions of variables: Geometric representation, limit, continuity and differentiability of functions of several variables , partial and full derivatives, derivatives of composite functions, Euler's theorem on homogeneous functions,	**BT103- Applied Mathematics I** **UNIT I** Functions of variables: Geometric representation, limit, continuity and differentiability of functions of several variables , partial and full derivatives, derivatives of composite functions, Euler's theorem on homogeneous functions,	No Change

		harmonic functions, directional derivatives, Taylor's formula, maxima and minima of functions, Lagrange's multipliers. **UNIT II** Asymptotes and curvature: Rolle's Theorem, Cauchy's mean value theorem, Taylor and Maclaurin theorems, concavity and convexity of a curve, points of inflexion, asymptotes and curvature. **UNIT III** Analytical functions: Limit, continuity and differentiability of analytic functions, Cauchy-Reimann equations, complex functions, line integrals, Cauchy's integral theorem, Cauchy's integral formula, power series, zeroes and singularity, residue theorem. **UNIT IV** Integral calculus:Definite integral as limit of sum, properties of definite integrals, mean value theorem, fundamental theorem, evaluation of definite integrals, reduction formula. **UNIT V** Differential equations: Order and degree of a differential equation, general and particular solutions, solution of differential equations by separation of variables method, integrating factor method, homogeneous differential equations of first order and their solutions, solution of linear differential equation *dy/dx+f (x)y=Q(x)* and their application in electrical, nuclear and mechanical systems.	harmonic functions, directional derivatives, Taylor's formula, maxima and minima of functions, Lagrange's multipliers. **UNIT II** Asymptotes and curvature: Rolle's Theorem, Cauchy's mean value theorem, Taylor and Maclaurin theorems, concavity and convexity of a curve, points of inflexion, asymptotes and curvature. **UNIT III** Analytical functions: Limit, continuity and differentiability of analytic functions, Cauchy-Reimann equations, complex functions, line integrals, Cauchy's integral theorem, Cauchy's integral formula, power series, zeroes and singularity, residue theorem. **UNIT IV** Integral calculus:Definite integral as limit of sum, properties of definite integrals, mean value theorem, fundamental theorem, evaluation of definite integrals, reduction formula. **UNIT V** Differential equations: Order and degree of a differential equation, general and particular solutions, solution of differential equations by separation of variables method, integrating factor method, homogeneous differential equations of first order and their solutions, solution of linear differential equation *dy/dx+f (x)y=Q(x)* and their application in electrical, nuclear and mechanical systems.	
	BT 104	**BT104 : Introduction to Electrical and Electronic Engineering** **UNIT I** **Basic Electrical Quantities:** Electromotive force, Electric Power ,Charge, current, voltage, Energy,Electric potential and field, magnetic flux,resistance, capacitance and inductance. Ohm's law, Voltage and current sources. **UNIT II** **Network analysis:** Circuit principles, Kirchoff's Laws, Node Voltage and Mesh Current Analysis;Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem.Norton Theorem.,MaximumPower Transfer Theorems. **UNIT III** **AC circuits**: Alternating Quanitities,Introduction, Generation of AC Voltages, Root Mean Square and Average Value of Alternating Currents and Voltages,	**BT104 : Introduction to Electrical and Electronic Engineering** **UNIT I** **Basic Electrical Quantities:** Electromotive force, Electric Power ,Charge, current, voltage, Energy,Electric potential and field, magnetic flux,resistance, capacitance and inductance. Ohm's law, Voltage and current sources. **UNIT II** **Network analysis:** Circuit principles, Kirchoff's Laws, Node Voltage and Mesh Current Analysis;Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem.Norton Theorem.,MaximumPower Transfer Theorems. **UNIT III** **AC circuits**: Alternating Quanitities,Introduction, Generation of AC Voltages, Root Mean Square and Average Value of Alternating Currents and Voltages,	No Change

		Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, Single Phase RLC Circuits, Introduction to 3-Phase AC System.Power in a circuit, reactive power, power factor, impedance in ac circuit, series and parallel resonance, Q factor, Introduction to 3-Phase AC System. **UNIT IV** **Transformers:** Faraday's Law of Electromagnetic Induction Basic principle of operation of transformer, construction, working, voltage and current relations, Phasor Diagram of Ideal Transformer.open circuit and short circuit test, transformer losses and efficiency, ferrite core transformers.**Electrical DC Machine:** Principle of DC Machines, Types, Different Parts ofDC Machines **UNIT V** **Power Supplies:** Half wave, full wave and bridge rectifiers, ripple factor and reduction by use of inductor,capacitor, L and pie section filters, voltage regulation using Zener diode.	Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, Single Phase RLC Circuits, Introduction to 3-Phase AC System.Power in a circuit, reactive power, power factor, impedance in ac circuit, series and parallel resonance, Q factor, Introduction to 3-Phase AC System. **UNIT IV** **Transformers:** Faraday's Law of Electromagnetic Induction Basic principle of operation of transformer, construction, working, voltage and current relations, Phasor Diagram of Ideal Transformer.open circuit and short circuit test, transformer losses and efficiency, ferrite core transformers.**Electrical DC Machine:** Principle of DC Machines, Types, Different Parts ofDC Machines **UNIT V** **Power Supplies:** Half wave, full wave and bridge rectifiers, ripple factor and reduction by use of inductor,capacitor, L and pie section filters, voltage regulation using Zener diode.	
	BT 105	**BT104 : Introduction to Electrical and Electronic Engineering** **UNIT I** **Basic Electrical Quantities:** Electromotive force, Electric Power ,Charge, current, voltage, Energy,Electric potential and field, magnetic flux,resistance, capacitance and inductance. Ohm's law, Voltage and current sources. **UNIT II** **Network analysis:** Circuit principles, Kirchoff's Laws, Node Voltage and Mesh Current Analysis;Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem.Norton Theorem.,MaximumPower Transfer Theorems. **UNIT III** **AC circuits**: Alternating Quanitities,Introduction, Generation of AC Voltages, Root Mean Square and Average Value of Alternating Currents and Voltages, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, Single Phase RLC Circuits, Introduction to 3-Phase AC System.Power in a circuit, reactive power, power factor, impedance in ac circuit, series and parallel resonance, Q factor, Introduction to 3-Phase AC System. **UNIT IV** **Transformers:** Faraday's Law of Electromagnetic Induction Basic principle of operation of transformer, construction, working, voltage and current relations, Phasor Diagram of Ideal Transformer.open	**BT104 : Introduction to Electrical and Electronic Engineering** **UNIT I** **Basic Electrical Quantities:** Electromotive force, Electric Power ,Charge, current, voltage, Energy,Electric potential and field, magnetic flux,resistance, capacitance and inductance. Ohm's law, Voltage and current sources. **UNIT II** **Network analysis:** Circuit principles, Kirchoff's Laws, Node Voltage and Mesh Current Analysis;Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem.Norton Theorem.,MaximumPower Transfer Theorems. **UNIT III** **AC circuits**: Alternating Quanitities,Introduction, Generation of AC Voltages, Root Mean Square and Average Value of Alternating Currents and Voltages, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, Single Phase RLC Circuits, Introduction to 3-Phase AC System.Power in a circuit, reactive power, power factor, impedance in ac circuit, series and parallel resonance, Q factor, Introduction to 3-Phase AC System. **UNIT IV** **Transformers:** Faraday's Law of Electromagnetic Induction Basic principle of operation of transformer, construction, working, voltage and current relations, Phasor Diagram of Ideal Transformer.open	No Change

		circuit and short circuit test, transformer losses and efficiency, ferrite core transformers.**Electrical DC Machine:** Principle of DC Machines, Types, Different Parts ofDC Machines **UNIT V** **Power Supplies:** Half wave, full wave and bridge rectifiers, ripple factor and reduction by use of inductor,capacitor, L and pie section filters, voltage regulation using Zener diode.	circuit and short circuit test, transformer losses and efficiency, ferrite core transformers.**Electrical DC Machine:** Principle of DC Machines, Types, Different Parts ofDC Machines **UNIT V** **Power Supplies:** Half wave, full wave and bridge rectifiers, ripple factor and reduction by use of inductor,capacitor, L and pie section filters, voltage regulation using Zener diode.	
	BT 106	**BT106- Engineering Chemistry** **UNIT I** **Water:** The sources of water, common Impurities, soft and hard water, Hardness of water, degrees of hardness and its effects, determination of hardness by various techniques, Municipal Water supply, requisites of drinking water, purification of water by sedimentation, filtration, reverse osmosis (RO), sterilization, chlorination. Water for boilers, corrosion, sludge and scale formation, caustic embitterment, treatment by preheating, lime-soda process, permutit de-ionizer or demineralization. **UNIT II** **Electrochemistry:** Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells. Relation between Gibbs energy change and EMF of a cell, fuel cells; corrosion. **Analysis:** Volumetric Analysis, Types of titrations, Theory of indicators. **Spectral Analysis:** Electromagnetic radiation, Lambert-Beer's Law, UV-VIS, IR, NMR instrumentation & applications. **Thermal Methods of Analysis:** principle, working and applications of Thermogravimetry, Differential thermal analysis and Differential scanning calorimetry. **UNIT III** **Fuels:** The need of fuel, origin and classification of fuels, Solid fuels, coal and its constituents, calorific value and its determination, coke: carbonization process, various types of coke ovens. **Liquid Fuels:** advantages, petroleum and its refining, synthetic petrol, reforming of gasoline, knocking, octane number and anti knocking agents, cracking. Gaseous Fuels advantages, composition and calorific value	**BT106- Engineering Chemistry** **UNIT I** **Water:** The sources of water, common Impurities, soft and hard water, Hardness of water, degrees of hardness and its effects, determination of hardness by various techniques, Municipal Water supply, requisites of drinking water, purification of water by sedimentation, filtration, reverse osmosis (RO), sterilization, chlorination. Water for boilers, corrosion, sludge and scale formation, caustic embitterment, treatment by preheating, lime-soda process, permutit de-ionizer or demineralization. **UNIT II** **Electrochemistry:** Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells. Relation between Gibbs energy change and EMF of a cell, fuel cells; corrosion. **Analysis:** Volumetric Analysis, Types of titrations, Theory of indicators. **Spectral Analysis:** Electromagnetic radiation, Lambert-Beer's Law, UV-VIS, IR, NMR instrumentation & applications. **Thermal Methods of Analysis:** principle, working and applications of Thermogravimetry, Differential thermal analysis and Differential scanning calorimetry. **UNIT III** **Fuels:** The need of fuel, origin and classification of fuels, Solid fuels, coal and its constituents, calorific value and its determination, coke: carbonization process, various types of coke ovens. **Liquid Fuels:** advantages, petroleum and its refining, synthetic petrol, reforming of gasoline, knocking, octane number and anti knocking agents, cracking. Gaseous Fuels advantages, composition and calorific value	No Change

		of coal gas and oil gas and its determination. **Lubricants:** Need of Classification, types of lubricants, their properties and uses, lubricants, viscosity and viscosity index and flash points, cloud and pour point, emulsification **UNIT IV** **Phase Rule:** Statement, definition of terms involved, application to one component system (water-sulphur system), two component systems (Ag-Pbsystems). **Polymers:** Plastics, preparation, properties and uses of polyethylene, bakelite, terylene and nylon, Rubber; natural rubber, synthetic rubber such as butyl and neoprene rubbers, vulcanization process and its advantages. **Corrosion:** its significance, theories of corrosion, Galvanic cell and concentration cell, pitting and stress corrosion, protection techniques. **UNIT V** **Explosives:** Introduction, classification of explosives, preparation of commercially important explosives, blasting fuses, uses and abuses of explosives. **Cement:** properties, Portland cement and its manufacture, chemistry of setting and hardening of cement, RCC structures. **Refractories:** definition, classification, properties of silica and fireclay refractories, **Glass:** preparation, properties and uses.	of coal gas and oil gas and its determination. **Lubricants:** Need of Classification, types of lubricants, their properties and uses, lubricants, viscosity and viscosity index and flash points, cloud and pour point, emulsification **UNIT IV** **Phase Rule:** Statement, definition of terms involved, application to one component system (water-sulphur system), two component systems (Ag-Pbsystems). **Polymers:** Plastics, preparation, properties and uses of polyethylene, bakelite, terylene and nylon, Rubber; natural rubber, synthetic rubber such as butyl and neoprene rubbers, vulcanization process and its advantages. **Corrosion:** its significance, theories of corrosion, Galvanic cell and concentration cell, pitting and stress corrosion, protection techniques. **UNIT V** **Explosives:** Introduction, classification of explosives, preparation of commercially important explosives, blasting fuses, uses and abuses of explosives. **Cement:** properties, Portland cement and its manufacture, chemistry of setting and hardening of cement, RCC structures. **Refractories:** definition, classification, properties of silica and fireclay refractories, **Glass:** preparation, properties and uses.	
	BT 107	**BT107- Electrical and Electronics Lab-I** **List of Experiments** 1. Identification, Study & Testing of various electronic components: (a) Resistances-Various types, Colour coding (b) Capacitors-Various types, Coding, (c) Inductors (d) Diodes (e) Transistors (f) SCRs (g) ICs (h) Photo diode (i) Photo transistor (j) LED (k) LDR (l) Potentiometers. 2. Study of symbols for various Electrical & Electronic Components, Devices, Circuit functions etc. 3. Study of Analog & digital multi-meters. 4. Study of Function/ Signal generators. 5. Study of Regulated d. c. power supplies (constant voltage and constant current operations). 6. Study of analog CRO, measurement of time period, amplitude and frequency. 7. Perform half wave rectifier	**BT107- Electrical and Electronics Lab-I** **List of Experiments** 1. Identification, Study & Testing of various electronic components: (a) Resistances-Various types, Colour coding (b) Capacitors-Various types, Coding, (c) Inductors (d) Diodes (e) Transistors (f) SCRs (g) ICs (h) Photo diode (i) Photo transistor (j) LED (k) LDR (l) Potentiometers. 2. Study of symbols for various Electrical & Electronic Components, Devices, Circuit functions etc. 3. Study of Analog & digital multi-meters. 4. Study of Function/ Signal generators. 5. Study of Regulated d. c. power supplies (constant voltage and constant current operations). 6. Study of analog CRO, measurement of time period, amplitude and frequency. 7. Perform half wave rectifier	No Change

		experiment and effect of filters on output. 8. Perform bridge rectifier experiment and measure the effect of filter output. 9. Application of diode as clipper and clamper. 10. Soldering & desoldering practice.	experiment and effect of filters on output. 8. Perform bridge rectifier experiment and measure the effect of filter output. 9. Application of diode as clipper and clamper. 10. Soldering & desoldering practice.	
	BT 108	**BT108- Engineering Physics Lab-I** **List of Experiments** 1. To study the charging of a condenser to plot a graph of voltage (V) across it against time (T) and to determine the time constant from this graph 2. To study the discharging of a condenser to plot a graph of voltage (V) across it against time (T) and to determine the time constant from this graph. 3. To determine the specific resistance of a material and difference between two small resistances using "Carey Foster's Bridge ". 4. To determine band gap of a semiconductor- diode. 5. To study the Zener diode as a constant voltage regular. 6. To verify Malus Law (Cosine square law) for plane polarized light with the help of a Photo voltaic cell. 7. To determine the transmission coefficient by using Lummer Brodhum Photometer. 8. To determine minimum deviation angle for different light using prism and spectrometer. 9. To determine the profile of He -Ne Laser beam. 10. To study the variation of thermo e.m.f. of iron copper thermo couple with temperature. 11. To determine the wavelength of sodium light using Michelson Interferometer. 12. To determine the curie temperature of Monel metal 13. The determination of viscosity.	**BT108- Engineering Physics Lab-I** **List of Experiments** 14. To study the charging of a condenser to plot a graph of voltage (V) across it against time (T) and to determine the time constant from this graph 15. To study the discharging of a condenser to plot a graph of voltage (V) across it against time (T) and to determine the time constant from this graph. 16. To determine the specific resistance of a material and difference between two small resistances using "Carey Foster's Bridge ". 17. To determine band gap of a semiconductor- diode. 18. To study the Zener diode as a constant voltage regular. 19. To verify Malus Law (Cosine square law) for plane polarized light with the help of a Photo voltaic cell. 20. To determine the transmission coefficient by using Lummer Brodhum Photometer. 21. To determine minimum deviation angle for different light using prism and spectrometer. 22. To determine the profile of He -Ne Laser beam. 23. To study the variation of thermo e.m.f. of iron copper thermo couple with temperature. 24. To determine the wavelength of sodium light using Michelson Interferometer. 25. To determine the curie temperature of Monel metal 26. The determination of viscosity.	No Change
	BT 109	**BT109 – IT FUNDAMENTAL LAB** **LIST OF EXPERIMENTS** 1. Dismantling a PC Part -1. 2. Dismantling a PC Part -2.	**BT109 – IT FUNDAMENTAL LAB** **LIST OF EXPERIMENTS** 9. Dismantling a PC Part -1. 10. Dismantling a PC Part -2.	No Change

		3. Internal and External commands of DOS. 4. System utilities of windows. 5. Understanding and Working knowledge of Linux/Unix OS. 6. Understanding of File system of Linux. 7. Creating user and group. 8. Understanding and Working knowledge of MS Office, Power Point and Excel: Editing and Reviewing, Drawing, Tables, Graphs, Templates.	11. Internal and External commands of DOS. 12. System utilities of windows. 13. Understanding and Working knowledge of Linux/Unix OS. 14. Understanding of File system of Linux. 15. Creating user and group. 16. Understanding and Working knowledge of MS Office, Power Point and Excel: Editing and Reviewing, Drawing, Tables, Graphs, Templates.	
	BT 110	**BT110- Engineering Chemistry Lab** **List of Experiments** 1. To determine the strength of a given unknown copper sulphate solution (Iodometrically) with titrate Hypo (sodium thio sulphate) solution. 2. To determine the strength of a given unknown FAS solution with titrate potassium dichromate solution using N-phenyl anthranilic acid (internal indicator). 3. To determine the strength of a given unknown potassium dichromate solution (Iodometrically) with titrate Hypo (sodium thio sulphate) solution. 4. Determine the percentage of available chlorine in a given sample of bleaching powder. 5. Determine the amount of free chlorine in a given water sample. 6. To determine the viscosity and viscosity index of a given sample of lubricating oil using Redwood viscometer No.1 7. To determine the flash and fire point of a given sample of lubricating oil using Pensky Marten's apparatus. 8. Determine the cloud and pour point of a given sample of lubricating oil. 9. Determination of hardness of water by complexometric method (using EDTA). 10. Determine the pH of an acid (strength of an acid) pH – metrically. 11. Determine the strength of a given	**BT110- Engineering Chemistry Lab** **List of Experiments** 13. To determine the strength of a given unknown copper sulphate solution (Iodometrically) with titrate Hypo (sodium thio sulphate) solution. 14. To determine the strength of a given unknown FAS solution with titrate potassium dichromate solution using N-phenyl anthranilic acid (internal indicator). 15. To determine the strength of a given unknown potassium dichromate solution (Iodometrically) with titrate Hypo (sodium thio sulphate) solution. 16. Determine the percentage of available chlorine in a given sample of bleaching powder. 17. Determine the amount of free chlorine in a given water sample. 18. To determine the viscosity and viscosity index of a given sample of lubricating oil using Redwood viscometer No.1 19. To determine the flash and fire point of a given sample of lubricating oil using Pensky Marten's apparatus. 20. Determine the cloud and pour point of a given sample of lubricating oil. 21. Determination of hardness of water by complexometric method (using EDTA). 22. Determine the pH of an acid (strength of an acid) pH – metrically. 23. Determine the strength of a given	No Change

		unknown HCl solution by titrating it against NaOH solution (Conductometric analysis). 12. To estimation the amount of sodium hydroxide and sodium carbonate in the given alkali mixture solution (or in water sample) by titrating against an intermediate hydrochloric acid using phenolphthalein and methyl orange indicator.	unknown HCl solution by titrating it against NaOH solution (Conductometric analysis). 24. To estimation the amount of sodium hydroxide and sodium carbonate in the given alkali mixture solution (or in water sample) by titrating against an intermediate hydrochloric acid using phenolphthalein and methyl orange indicator.	
	BT 111	**BT111- (Engineering workshop)** **FITTING AND SHEET METAL SHOP** 1. Finishing of two sides of a square piece by filing and to cut a Square notch using hacksaw. 2. To drill three holes and Tapping on the given specimen. 3. Tin smithy for making mechanical joint and soldering of joint **WELDING SHOP** 4. To prepare Lap Joint with the help of Arc welding 5. To prepare Butt Joint with the help of arc Welding 6. Gas welding practice by students on mild steel flat **MACHINE SHOP PRACTICE** 7. Job on lathe M/C with centering and one step turning 8. Job on lathe M/C with grooving and chamfering operations	**BT111- (Engineering workshop)** **FITTING AND SHEET METAL SHOP** 1. Finishing of two sides of a square piece by filing and to cut a Square notch using hacksaw. 2. To drill three holes and Tapping on the given specimen. 3. Tin smithy for making mechanical joint and soldering of joint **WELDING SHOP** 4. To prepare Lap Joint with the help of Arc welding 5. To prepare Butt Joint with the help of arc Welding 6. Gas welding practice by students on mild steel flat **MACHINE SHOP PRACTICE** 7. Job on lathe M/C with centering and one step turning 8. Job on lathe M/C with grooving and chamfering operations	No Change
	BT 201	**BT201- Engineering Physics II** **UNIT I** **Electric and Magnetic Fields** :Coulomb's law, Gauss's law, electrostatic potential and field due to discrete and continuous charge distributions, dipole and quadrupole moments, dielectric polarization, electrostatic energy, conductors and capacitors, Biot-Savart law, Ampere's law, magnetic induction due to current carrying conductors, force on a charged particle in electric and magnetic field, Faraday's law of electromagnetic induction. **UNIT II**	**BT201- Engineering Physics II** **UNIT I** **Electric and Magnetic Fields** :Coulomb's law, Gauss's law, electrostatic potential and field due to discrete and continuous charge distributions, dipole and quadrupole moments, dielectric polarization, electrostatic energy, conductors and capacitors, Biot-Savart law, Ampere's law, magnetic induction due to current carrying conductors, force on a charged particle in electric and magnetic field, Faraday's law of electromagnetic induction. **UNIT II**	No Change

		Thermodynamics: Work-Thermodynamic definition of work, examples, displacement work, path dependence of displacement work, thermal equilibrium, Zeroth law , definition of temperature, heat/work interaction systems , First law and its consequences, isothermal and adiabatic processes, reversible, irreversible and quasi-static processes. Second law and entropy. Carnot engine and cycle. Absolute temperature scale. **UNIT III** **Optical phenomena** : Principle of superposition, coherent and incoherent sources, temporal and spatial coherence, interference phenomena(Newton's ring and Michelson interferometer), diffraction of waves, diffraction from single and diffraction grating, polarization : types of polarization , Malus law, quarter and half wave plates, optical activity, specific rotation. **UNIT IV** **Lasers and Holography** : Spontaneous and stimulated emission (Einstein A and B coefficients), population inversion, basic principles of operation of He-Ne, Ruby and semiconductor lasers. **Optical Fibers** : Types of optical fibers and their characteristics, characteristics of step, graded , mono mode and multi mode fibers, numerical aperture and its measurement, fiber optical communication. Principles and applications of holography **UNIT V** **Magnetic Materials**: Magnetization-origin of magnetic moment, classification of magnetic materials- die, Para and ferromagnetism, hysteresis curve, soft and hard magnetic materials.	**Thermodynamics**: Work-Thermodynamic definition of work, examples, displacement work, path dependence of displacement work, thermal equilibrium, Zeroth law , definition of temperature, heat/work interaction systems , First law and its consequences, isothermal and adiabatic processes, reversible, irreversible and quasi-static processes. Second law and entropy. Carnot engine and cycle. Absolute temperature scale. **UNIT III** **Optical phenomena** : Principle of superposition, coherent and incoherent sources, temporal and spatial coherence, interference phenomena(Newton's ring and Michelson interferometer), diffraction of waves, diffraction from single and diffraction grating, polarization : types of polarization , Malus law, quarter and half wave plates, optical activity, specific rotation. **UNIT IV** **Lasers and Holography** : Spontaneous and stimulated emission (Einstein A and B coefficients), population inversion, basic principles of operation of He-Ne, Ruby and semiconductor lasers. **Optical Fibers** : Types of optical fibers and their characteristics, characteristics of step, graded , mono mode and multi mode fibers, numerical aperture and its measurement, fiber optical communication. Principles and applications of holography **UNIT V** **Magnetic Materials**: Magnetization-origin of magnetic moment, classification of magnetic materials- die, Para and ferromagnetism, hysteresis curve, soft and hard magnetic materials.	

		Superconductivity: General properties of superconductors, Meissonier effect, penetration depth, type I and Type II superconductors, flux quantization, magnetic levitation, high temperature superconductors, superconducting materials, Cooper pairs and postulates of BCS theory.	Superconductivity: General properties of superconductors, Meissonier effect, penetration depth, type I and Type II superconductors, flux quantization, magnetic levitation, high temperature superconductors, superconducting materials, Cooper pairs and postulates of BCS theory.	
	BT 202	**BT202- INTRODUCTION TO COMPUTER PROGRAMMING** **UNIT I** Concept of algorithms, Flow Charts, Overview of the compiler (preferably GCC) , Assembler, linker and loader , Structure of a simple Hello World Program in C ,Overview of compilation and execution process in an IDE (preferably Code Block) **UNIT II** Programming using C: Preprocessor Directive, C primitive input output using get char and put char , simple I/O Function calls from library , data type in C including enumeration , arithmetic, relational and logical operations, conditional executing using if, else, switch and break .Concept of loops , for, while and do-while , Storage Classes: Auto, Register, Static and Extern **UNIT III** Arrays and Strings: Declaring an array, Initializing arrays, accessing the array elements, working with multidimensional arrays, declaring and initializing string variables, arithmetic operations on characters. Pointers: Declaring and initializing pointers, pointer expressions, pointer increment and scale factor, pointers and arrays, pointers and strings. **UNIT IV** Functions: Defining functions, passing arguments to functions, returning values from functions, reference arguments, variables and storage classes, static functions, pointers and functions. Structures: Declaring and initializing a structure, accessing the members of a	**BT202- INTRODUCTION TO COMPUTER PROGRAMMING** **UNIT I** Concept of algorithms, Flow Charts, Overview of the compiler (preferably GCC) , Assembler, linker and loader , Structure of a simple Hello World Program in C ,Overview of compilation and execution process in an IDE (preferably Code Block) **UNIT II** Programming using C: Preprocessor Directive, C primitive input output using get char and put char , simple I/O Function calls from library , data type in C including enumeration , arithmetic, relational and logical operations, conditional executing using if, else, switch and break .Concept of loops , for, while and do-while , Storage Classes: Auto, Register, Static and Extern **UNIT III** Arrays and Strings: Declaring an array, Initializing arrays, accessing the array elements, working with multidimensional arrays, declaring and initializing string variables, arithmetic operations on characters. Pointers: Declaring and initializing pointers, pointer expressions, pointer increment and scale factor, pointers and arrays, pointers and strings. **UNIT IV** Functions: Defining functions, passing arguments to functions, returning values from functions, reference arguments, variables and storage classes, static functions, pointers and functions. Structures: Declaring and initializing a structure, accessing the members of a	No Change

		structure, nested structures, array of structures, using structures in functions, pointers and structures. **UNIT V**: File Handling in C Using File Pointers, fopen( ), fclose( ), Input and Output using file pointers, Character Input and Output with Files , String Input / Output Functions , Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files , Positioning the File Pointer.	structure, nested structures, array of structures, using structures in functions, pointers and structures. **UNIT V**: File Handling in C Using File Pointers, fopen( ), fclose( ), Input and Output using file pointers, Character Input and Output with Files , String Input / Output Functions , Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files , Positioning the File Pointer.	
	BT 203	**BT203- ENGINEERING MECHANICS** **UNIT I** Force System: Introduction, force, principle of transmissibility of force, resultant of a force system, resolution of a force, moment of force about a line. Varigon's theorem, couple, resolution of force into force and a couple, properties of couple and their application to engineering problems. Lami's theorem. Force body diagram. **UNIT II** Centroid & Moment of Inertia: Location of centroid and center of gravity, Moment of inertia, Parallel axis and perpendicular axis theorem, Radius of gyration, M.I of composite section, Polar Moment of inertia, Lifting Machines: Mechanical advantage, Velocity Ratio, Efficiency of machine, Ideal machine, Ideal effort and ideal load, Reversibility of machine, Law of machine, Lifting machines; System of Pulleys, Wheel and differential axle, differential pulley Block, **UNIT III** Friction: Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction. Belt Drive: Types of belts, Types of belt drives, Velocity ratio, Effect of slip on Velocity ratio, Length of belt, Ratio of tensions and power transmission by flat belt drives. **UNIT IV** Kinematics of Particles and Rigid Bodies: Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity and Angular Acceleration, Radial and transverse	**BT203- ENGINEERING MECHANICS** **UNIT I** Force System: Introduction, force, principle of transmissibility of force, resultant of a force system, resolution of a force, moment of force about a line. Varigon's theorem, couple, resolution of force into force and a couple, properties of couple and their application to engineering problems. Lami's theorem. Force body diagram. **UNIT II** Centroid & Moment of Inertia: Location of centroid and center of gravity, Moment of inertia, Parallel axis and perpendicular axis theorem, Radius of gyration, M.I of composite section, Polar Moment of inertia, Lifting Machines: Mechanical advantage, Velocity Ratio, Efficiency of machine, Ideal machine, Ideal effort and ideal load, Reversibility of machine, Law of machine, Lifting machines; System of Pulleys, Wheel and differential axle, differential pulley Block, **UNIT III** Friction: Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction. Belt Drive: Types of belts, Types of belt drives, Velocity ratio, Effect of slip on Velocity ratio, Length of belt, Ratio of tensions and power transmission by flat belt drives. **UNIT IV** Kinematics of Particles and Rigid Bodies: Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity and Angular Acceleration, Radial and transverse	No Change

		velocities and accelerations, Projectiles motion on plane and Inclined Plane, Relative Motion. Newton's laws, Equation of motion in rectangular Coordinate, radial and transverse components, Equation of motion in plane for a rigid body, D'Alembert principle. **UNIT V** Work, Energy and Power: Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Nonconservative Force, Conservation of energy. Impulse and Momentum: Linear and angular momentum, Linear and angular impulse, Principle of momentum for a particle and rigid body, Principle of linear impulse and momentum for a Particle and rigid body, Principle of angular momentum and Impulse, Conservation of angular	velocities and accelerations, Projectiles motion on plane and Inclined Plane, Relative Motion. Newton's laws, Equation of motion in rectangular Coordinate, radial and transverse components, Equation of motion in plane for a rigid body, D'Alembert principle. **UNIT V** Work, Energy and Power: Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Nonconservative Force, Conservation of energy. Impulse and Momentum: Linear and angular momentum, Linear and angular impulse, Principle of momentum for a particle and rigid body, Principle of linear impulse and momentum for a Particle and rigid body, Principle of angular momentum and Impulse, Conservation of angular	
	BT 204	**BT204- Digital Electronics** **UNIT I** **BASIC LOGIC GATES & BOOLEAN ALGEBRA:** Features of logic algebra, postulates of Boolean algebra. Theorems of Boolean algebra. Boolean function. Derived logic gates: Exclusive-OR, NAND, NOR gates, their block diagrams and truth tables. Logic diagrams from Boolean expressions and vice-versa. Converting logic diagrams to universal logic. Positive, negative and mixed logic. Logic gate conversion. **UNIT II** **DIGITAL LOGIC GATE CHARACTERISTICS:** TTL logic gate characteristics. Theory & operation of TTL NAND gate circuitry. Open collector TTL. Three state output logic. TTL subfamilies. MOS & CMOS logic families. Realization of logic gates in RTL, DTL, ECL, C-MOS & MOSFET. Interfacing logic families to one another. **UNIT III** **MINIMIZATION TECHNIQUES:** Minterm, Maxterm, Karnaugh Map, K map upto 4 variables. Simplification of logic functions with K-map, conversion of truth tables in POS and SOP form. Incomplete specified functions. Variable mapping. Quinn-Mc Klusky minimization techniques. **UNIT IV** **COMBINATIONAL SYSTEMS:** Combinational logic circuit design, half and full adder, subtractor. Binary serial and	**BT204- Digital Electronics** **UNIT I** **BASIC LOGIC GATES & BOOLEAN ALGEBRA:** Features of logic algebra, postulates of Boolean algebra. Theorems of Boolean algebra. Boolean function. Derived logic gates: Exclusive-OR, NAND, NOR gates, their block diagrams and truth tables. Logic diagrams from Boolean expressions and vice-versa. Converting logic diagrams to universal logic. Positive, negative and mixed logic. Logic gate conversion. **UNIT II** **DIGITAL LOGIC GATE CHARACTERISTICS:** TTL logic gate characteristics. Theory & operation of TTL NAND gate circuitry. Open collector TTL. Three state output logic. TTL subfamilies. MOS & CMOS logic families. Realization of logic gates in RTL, DTL, ECL, C-MOS & MOSFET. Interfacing logic families to one another. **UNIT III** **MINIMIZATION TECHNIQUES:** Minterm, Maxterm, Karnaugh Map, K map upto 4 variables. Simplification of logic functions with K-map, conversion of truth tables in POS and SOP form. Incomplete specified functions. Variable mapping. Quinn-Mc Klusky minimization techniques. **UNIT IV** **COMBINATIONAL SYSTEMS:** Combinational logic circuit design, half and full adder, subtractor. Binary serial and	No Change

		parallel adders. BCD adder. Binary multiplier. Decoder: Binary to Gray decoder, BCD to decimal, BCD to 7-segment decoder. Multiplexer, demultiplexer, encoder. Octal to binary, BCD to excess-3 encoder. Diode switching matrix. Design of logic circuits by multiplexers, encoders, decoders and demultiplexers. **UNIT V** **SEQUENTIAL SYSTEMS:** Latches, flip-flops, R-S, D, J-K, Master Slave flip flops. Conversions of flip-flops. Counters : Asynchronous (ripple), synchronous and synchronous decade counter, Modulus counter, skipping state counter, counter design. Ring counter. Counter applications, Registers: buffer register, shift register.	parallel adders. BCD adder. Binary multiplier. Decoder: Binary to Gray decoder, BCD to decimal, BCD to 7-segment decoder. Multiplexer, demultiplexer, encoder. Octal to binary, BCD to excess-3 encoder. Diode switching matrix. Design of logic circuits by multiplexers, encoders, decoders and demultiplexers. **UNIT V** **SEQUENTIAL SYSTEMS:** Latches, flip-flops, R-S, D, J-K, Master Slave flip flops. Conversions of flip-flops. Counters : Asynchronous (ripple), synchronous and synchronous decade counter, Modulus counter, skipping state counter, counter design. Ring counter. Counter applications, Registers: buffer register, shift register.	
	BT 205	**BT205- Applied Mathematics II** **UNIT I** Vector spaces, linear dependence of vectors, basis and linear transformations, scalar and vector fields, level surfaces, directional derivatives, gradient, divergence and curl of fields, Green, Gauss and Stokes theorems. **UNIT II** Matrix algebra, rank of a matrix, adjoint and inverse of a matrix, Solution of algebraic equations using matrix algebra , consistency conditions, eigenvalues and eigenvectors , Hermitian matrices. **UNIT III** Numerical solution of matrix equations using Gauss, Gauss-Seidel, LU decomposition and other iterative methods. **UNIT IV** Convergence of improper integrals, tests of convergence, elementary properties of beta and gamma functions, differentiation under integral sign, Leibnitz rule, integrals dependent on a parameter, trapezoidal and Simpson's integration rules, applications in engineering. **UNIT V** Numerical methods; round off and truncation errors, approximations, order of convergence, Newton's forward and backward interpolation formula, central difference interpolation, solutions of polynomial equations using bisection, Newton-Raphson and Regula-falsi methods.	**BT205- Applied Mathematics II** **UNIT I** Vector spaces, linear dependence of vectors, basis and linear transformations, scalar and vector fields, level surfaces, directional derivatives, gradient, divergence and curl of fields, Green, Gauss and Stokes theorems. **UNIT II** Matrix algebra, rank of a matrix, adjoint and inverse of a matrix, Solution of algebraic equations using matrix algebra , consistency conditions, eigenvalues and eigenvectors , Hermitian matrices. **UNIT III** Numerical solution of matrix equations using Gauss, Gauss-Seidel, LU decomposition and other iterative methods. **UNIT IV** Convergence of improper integrals, tests of convergence, elementary properties of beta and gamma functions, differentiation under integral sign, Leibnitz rule, integrals dependent on a parameter, trapezoidal and Simpson's integration rules, applications in engineering. **UNIT V** Numerical methods; round off and truncation errors, approximations, order of convergence, Newton's forward and backward interpolation formula, central difference interpolation, solutions of polynomial equations using bisection, Newton-Raphson and Regula-falsi methods.	No Change
	BT 206	**BT206- Environmental Sciences** **UNIT I** **Ecosystem and Biodiversity:** Components and types of ecosystem, Structure and functions of Ecosystem, Values, Type and	**BT206- Environmental Sciences** **UNIT I** **Ecosystem and Biodiversity:** Components and types of ecosystem, Structure and functions of Ecosystem, Values, Type and	No Change

		levels of Biodiversity, Causes of extension, and Conservation methods of biodiversity. **UNIT II** **Air Pollution:** Definition, different types of Sources, effects on biotic and abiotic components and Control methods of air pollution. **UNIT III** **Water pollution:** Definition, different types of Sources, effects on biotic and abiotic components and treatment technologies of water pollution. **UNIT IV** **Noise Pollution:** Introduction of noise pollution, different Sources, effects on abiotic and biotic environment and Control measures. **UNIT V** **Non Conventional energy sources:** Introduction, Renewable Sources of Energy: Solar energy, wind energy, Energy from ocean, energy from biomass, geothermal energy and Nuclear Energy.	levels of Biodiversity, Causes of extension, and Conservation methods of biodiversity. **UNIT II** **Air Pollution:** Definition, different types of Sources, effects on biotic and abiotic components and Control methods of air pollution. **UNIT III** **Water pollution:** Definition, different types of Sources, effects on biotic and abiotic components and treatment technologies of water pollution. **UNIT IV** **Noise Pollution:** Introduction of noise pollution, different Sources, effects on abiotic and biotic environment and Control measures. **UNIT V** **Non Conventional energy sources:** Introduction, Renewable Sources of Energy: Solar energy, wind energy, Energy from ocean, energy from biomass, geothermal energy and Nuclear Energy.	
	BT 207	**BT207- Electrical and Electronics Lab-II** **List of Experiment:** 1. To verify the truth tables of basic logic gates: AND, OR, NOR, NAND, NOR. Also to verify the truth table of Ex-OR, Ex-NOR. 2. To verify the truth table of OR, AND, NOR, Ex-OR, Ex-NOR realized using NAND & NOR gates. 3. To realize an SOP and POS expression. 4. To realize adder and Subtractor using universal gates. 5. To verify the truth table of Encoder and decoder. 6. To verify the truth table of multiplexer and demultiplexer. 7. To study and perform Various types of Flip-Flops. 8. To study and perform various types of counters. 9. To study and perform various types of shift registers. 10. To study and perform various types of Multivibrators.	**BT207- Electrical and Electronics Lab-II** **List of Experiment:** 12. To verify the truth tables of basic logic gates: AND, OR, NOR, NAND, NOR. Also to verify the truth table of Ex-OR, Ex-NOR. 13. To verify the truth table of OR, AND, NOR, Ex-OR, Ex-NOR realized using NAND & NOR gates. 14. To realize an SOP and POS expression. 15. To realize adder and Subtractor using universal gates. 16. To verify the truth table of Encoder and decoder. 17. To verify the truth table of multiplexer and demultiplexer. 18. To study and perform Various types of Flip-Flops. 19. To study and perform various types of counters. 20. To study and perform various types of shift registers. 21. To study and perform various types of Multivibrators.	No Change

		11. To study and perform Schmitt Trigger.	22. To study and perform Schmitt Trigger.	
	BT 208	**BT208- Engineering Physics Lab-II** **List of Experiments:** 1. Conversion of a Galvanometer in to an ammeter and calibrate it. 2. Conversion of a Galvanometer in to voltmeter and calibrate it. 3. To determine the value of "g" by using compound pendulum. 4. To determine Plank's constant using LED. 5. To measure the Numerical Aperture (NA) of an optical fiber. 6. To determine the profile of He-Ne Laser beam. 7. To determine the wavelength of different lights using diffraction grating and spectrometer. 8. To determine the wavelength of sodium light by Newton's ring method. 9. To determine the specific rotation of glucose using Polarimeter. 10. To determine minimum deviation angle for different light using prism and spectrometer. 11. To study of detergent on surface tension of water by observing capillary rise 12. To determine the speed of sound in air at room temperature using a resonance tube by two resonance position.	**BT208- Engineering Physics Lab-II** **List of Experiments:** 13. Conversion of a Galvanometer in to an ammeter and calibrate it. 14. Conversion of a Galvanometer in to voltmeter and calibrate it. 15. To determine the value of "g" by using compound pendulum. 16. To determine Plank's constant using LED. 17. To measure the Numerical Aperture (NA) of an optical fiber. 18. To determine the profile of He-Ne Laser beam. 19. To determine the wavelength of different lights using diffraction grating and spectrometer. 20. To determine the wavelength of sodium light by Newton's ring method. 21. To determine the specific rotation of glucose using Polarimeter. 22. To determine minimum deviation angle for different light using prism and spectrometer. 23. To study of detergent on surface tension of water by observing capillary rise 24. To determine the speed of sound in air at room temperature using a resonance tube by two resonance position.	No Change
	BT 209	**BT209- COMPUTER PROGRAMMING LAB** **LIST OF EXPERIMENTS** 1 Write a program to calculate the area & perimeter of rectangle. 2 Write a program to calculate the area and circumference of a circle for a given radius. 3 Write a program to calculate simple interest for a given principal/amount. 4 Write a program to convert temperature	**BT209- COMPUTER PROGRAMMING LAB** **LIST OF EXPERIMENTS** 24 Write a program to calculate the area & perimeter of rectangle. 25 Write a program to calculate the area and circumference of a circle for a given radius. 26 Write a program to calculate simple interest for a given principal/amount. 27 Write a program to convert temperature	No Change

		given in ◦C to temperature in ◦F.	given in ◦C to temperature in ◦F.	
		5 Write a program to find profit and loss (in percentage) of a given cost price and selling price.	28 Write a program to find profit and loss (in percentage) of a given cost price and selling price.	
		6 Write a program to find out the maximum among the three given numbers.	29 Write a program to find out the maximum among the three given numbers.	
		7 Write a program to calculate the factorial of a given number.	30 Write a program to calculate the factorial of a given number.	
		8 Write a program to print the list of first 100 odd number.	31 Write a program to print the list of first 100 odd number.	
		9 Write a program to calculate the sum of the digits of a number and display it in reverse order.	32 Write a program to calculate the sum of the digits of a number and display it in reverse order.	
		10 Write a program to generate a Fibonacci series.	33 Write a program to generate a Fibonacci series.	
		11 Write a program to generate the following series: 1 2 1 2 3 1 2 3 4 1 2 3 4 5	34 Write a program to generate the following series: 1 2 1 2 3 1 2 3 4 1 2 3 4 5	
		12 Write a program to generate the following series: 0 1 0 1 0 0 1 0 1 0 1 0 1 0	35 Write a program to generate the following series: 0 1 0 1 0 0 1 0 1 0 1 0 1 0	
		13 Write a program using a function to check whether the given number is prime or not.	36 Write a program using a function to check whether the given number is prime or not.	
		14 Write a program to check whether the given string is a palindrome or not.	37 Write a program to check whether the given string is a palindrome or not.	
		15 Write a program to find the length of a string, reverse the string and copy one string to another by using library function.	38 Write a program to find the length of a string, reverse the string and copy one string to another by using library function.	
		16 Write a program to swap two variables a & b using pointers.	39 Write a program to swap two variables a & b using pointers.	
		17 Write a program to enter a line of text from keyboard and store it in the file. User should enter file name.	40 Write a program to enter a line of text from keyboard and store it in the file. User should enter file name.	
		18 Write a recursive program for tower of Hanoi problem	41 Write a recursive program for tower of Hanoi problem	
		19 Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices • Addition of two matrices • Subtraction of two matrices • Finding upper and lower triangular matrices • Transpose of a matrix • Product of two matrices.	42 Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices • Addition of two matrices • Subtraction of two matrices • Finding upper and lower triangular matrices • Transpose of a matrix • Product of two matrices.	

		20 Write a program to copy one file to other, use command line arguments. 21 Write a program to perform the following operators an Strings without using String functions • To find the Length of String. • To concatenate two string. • To find Reverse of a string. • To Copy one sting to another string. 22 Write a Program to store records of an student in student file. The data must be stored using Binary File.Read the record stored in "Student.txt" file in Binary code.Edit the record stored in Binary File.Append a record in the Student file. 23 Write a programmed to count the no of Lowercase, Uppercase numbers and special Characters presents in the contents of File.	43 Write a program to copy one file to other, use command line arguments. 44 Write a program to perform the following operators an Strings without using String functions • To find the Length of String. • To concatenate two string. • To find Reverse of a string. • To Copy one sting to another string. 45 Write a Program to store records of an student in student file. The data must be stored using Binary File.Read the record stored in "Student.txt" file in Binary code.Edit the record stored in Binary File.Append a record in the Student file. 46 Write a programmed to count the no of Lowercase, Uppercase numbers and special Characters presents in the contents of File.	
	BT 210	**BT210- Engineering Drawing** **Engineering Drawing** Sheet 1 Orthographic Projections (3 Problems) Sheet 2 Riveted joints: Lap joints, butt joints, chain riveting, zig-zag riveting Sheet 3 Screw fasteners, different threads, Nuts & bolts locking devices, set screws, Sheet 4 Scale, plain scales, diagonal scales, scale of chords Sheet 5 Conic Sections: Construction of ellipse, parabola and hyperbola Sheet 6 Engineering Curves: Cycloid, Epicycloids, Hypo-cycloid, Involutes, Archemedian and logarithmic spirals Sheet 7 Projection of points and lines, True inclinations and true length of straight lines, Traces of straight lines Sheet 8 Projection of planes and solids: Projection of planes, Projection of polyhedra, Pyramids.	**BT210- Engineering Drawing** **Engineering Drawing** Sheet 1 Orthographic Projections (3 Problems) Sheet 2 Riveted joints: Lap joints, butt joints, chain riveting, zig-zag riveting Sheet 3 Screw fasteners, different threads, Nuts & bolts locking devices, set screws, Sheet 4 Scale, plain scales, diagonal scales, scale of chords Sheet 5 Conic Sections: Construction of ellipse, parabola and hyperbola Sheet 6 Engineering Curves: Cycloid, Epicycloids, Hypo-cycloid, Involutes, Archemedian and logarithmic spirals Sheet 7 Projection of points and lines, True inclinations and true length of straight lines, Traces of straight lines Sheet 8 Projection of planes and solids: Projection of planes, Projection of polyhedra, Pyramids.	No Change
	BT 211	**BT211- Communication Skills Lab** 1. Introducing yourself. 2. Role Plays. 3. Word Formation. 4. Listening and Speaking Skills.	**BT211- Communication Skills Lab** 1. Introducing yourself. 2. Role Plays. 3. Word Formation. 4. Listening and Speaking Skills.	No Change

		5. Words often mis-spelt and Mis-Pronounced. 6. One word for many. 7. Synonyms and Antonyms. 8. Seminar Presentation. 9. Group Discussion. 10. Job Interview.	5. Words often mis-spelt and Mis-Pronounced. 6. One word for many. 7. Synonyms and Antonyms. 8. Seminar Presentation. 9. Group Discussion. 10. Job Interview.	
	BTCS 403	**BTCS 403: Theory of Computation** **UNIT- I Automata Theory**: Basic Concepts of finite state system, Deterministic finite Automata (DFA) & Nondeterministic finite Automata (NDFA), Equivalence of NDFA and DFA, Minimization of Finite Automata, Moore and Mealy machine and their equivalence. **Formal Languages Overview:** Definition of a Grammar, Derivations and the Language Generated by a Grammar, Chomsky Classification of Languages. **UNIT-II Finite Automata & Regular Grammars:** Regular Expressions, Kleen's Theorem, Arden,s Theorem, NDFA and Regular Expressions-Construction of FA equivalent to a Regular Expression, Application of Pumping Lemma for Regular Language, Closure properties of Regular Languages, Construction of a Regular Grammar for a given DFA and vice versa. **UNIT-III PDA and Context Free Grammar:** Context free grammar, Derivation trees, Ambiguity in grammar and its removal, Simplification of Context Free grammar, Normal forms for CFGs: Chomsky Normal Form &Greibach Normal Form, Pumping Lemma for Context Free languages, Push Down Automata (PDA)-Basic Definitions, PDA and Context-free Languages. **UNIT-IV Turing Machines and Recursively Enumerable Languages:** Turing Machine Model, Representation of Turing Machines, Design of Turing Machines, Multiple Track and Multitape Turing Machine, Turing Church's Thesis, Recursive and recursively enumerable languages-Decidability- Undecidable problems. **UNIT-V Linear bounded Automata and Context Sensitive Language**: Basic Definition, Descriptions of LBA, Context-Sensitive Languages, Properties of context-sensitive languages, Relation between LBA and context-sensitive languages	**BTCS 403 Statistics and Probability Theory** Units I Introduction & Discrete random variables Sample space, events, algebra of events, Bernoulli's trials, Probability & Baye's theorem. Random variable & their event space, probability generating function, expectations, moments, computations of mean time to failure, Bernoulli & Poisson processes. Units II Discrete & continuous distributions Probability distribution & probability densities: Binomial, Poisson, normal rectangular and exponential distribution & their PDF's, moments and MGF's for above distributions. Units III Correlation & Regression Correlation & regression: Linear regression, Rank correlation, Method of least squares Fitting of straight lines & second degree parabola. Linear regression and correlation analysis. Units IV Queuing Theory Pure birth, pure death and birth-death processes. Mathematical models for M/M/1, M/M/N, M/M/S and M/M/S/N queues. Units V Discrete Parameter Markov chains: M/G/1 Queuing model, Discrete parameter birth-death process.	**New Course**
	BTCS 404	**BTCS 404: DATABASE MANAGEMENT SYSTEMS**	**Software Engineering**	Code Change

		UNIT I INTRODUCTION TO DBMS: Overview and History of DBMS. File System vs. DBMS .Advantage of DBMS Describing and Storing Data in a DBMS. Queries in DBMS. Transaction management and Structure of a DBMS. **UNIT II** ENTITY RELATIONSHIP MODEL: Overview of Data Design Entities, Attributes and Entity Sets, Relationship and Relationship Sets. Features of the ER Model-Key Constraints, Participation Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Data Base, and Design with ER Model-Entity vs Attribute, Entity vs Relationship Binary vs. Ternary Relationship and Aggregation vs ternary Relationship Conceptual Design for a Large Enterprise. **UNIT III** RELATIONAL MODEL: Relationship Algebra Selection and Projection, Set Operations, Renaming, Joints, Division, Relation Calculus, Expressive Power of Algebra and Calculus. **UNIT IV** SQL AND TRIGGERS: The Forms of a Basic SQL Query, Union, Intersection and Except, Nested Queries, Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values, Triggers and Active Databases. **UNIT V** NORMAL FORMS AND CONCURRENCY CONTROL: Normalization using Functional Dependency, Multivalued dependency and Join dependency. Concurrency Control: Lock Based Protocols; Time Stamped Based Protocols, Deadlock Handling.	Units I System Analysis: Characteristics, Problems in system Development, System Level project Planning, System Development Life cycle (SDLC), computer system engineering & system analysis, modeling the architecture, system specification. Units II Software & its characteristics: Software Development, Process Model, Prescriptive model, The water fall model, Incremental Process Modes, Evolutionary process model, specialized process model. Units III Requirement Analysis: Requirement analysis tasks, Analysis principles, Software prototyping and specification data dictionary finite state machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification behavioral modeling, extension for data intensive applications. Units IV Software Design: Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation, coding – Programming style, Program quality, quantifying program quality, complete programming example Units V Object Oriented Analysis: Object oriented Analysis Modeling, Data modeling Object Oriented Design: OOD concepts and methods class and object definitions, refining operations, Class and object relationships, object modularization, Introduction to Unified Modeling Language	
	BTCS 405	**Core PHP** **UNIT I** Introduction of web applications. Introduction to web designing with HTML and Cascaded Style Sheets. Concept of Client Side Scripting and Server Side Scripting. Static website vs Dynamic website development. Web Servers: Local Servers and Remote Servers. **UNIT II** Introduction to PHP, Installing Web servers, PHP configuration in IIS &Apache Web server. Data types in PHP, Variables, Constants, operators and Expressions. PHP Operator: Conditional Structure - if, switch case & Looping	**Principles of Communication** Units I ANALOG MODULATION: Concept of frequency translation. Amplitude Modulation: Description of full AM, DSBSC, SSB and VSB in time and frequency domains, methods of generation & demodulation, frequency division multiplexing (FDM). Angle Modulation: Phase and frequency modulation. Descriptions of FM signal in time and frequency domains, methods of generation & demodulation, pre- emphasis & deemphasis, PLL.	**Code Change**

		Structure - for, while, do while, foreach **UNIT III** Introduction to Arrays: Initialization of an array, Iterating through an array, Sorting arrays, Array Functions, Functions: Defining and Calling Functions, Passing by Value and passing By references, Inbuilt Functions: String Function, Math Function, Date Function and Miscellaneous Function. **UNIT IV** Working with Forms: Get and Post Methods, Query strings, HTML form controls and PHP, Maintaining User State: Cookies, Sessions and Application State. Working with Files: Opening and Closing Files, Reading and Writing to Files, Getting Information on Files **UNIT V** PHP Database Connectivity: Introduction to MYSQL, Creating database and other operations on database, connecting to a database, Use a particular database, Sending query to database, Parsing of the query results, Checking data errors.	Units II PULSE ANALOG MODULATION: Ideal sampling, Sampling theorem, aliasing, interpolation, natural and flat top sampling in time and frequency domains. Introduction to PAM, PWM, PPM modulation schemes. Time division multiplexing (TDM) Units III PCM & DELTA MODULATION SYSTEMS: Uniform and Non-uniform quantization. PCM and delta modulation, Signal to quantization noise ratio in PCM and delta modulation. DPCM, ADM, T1 Carrier System, Matched filter detection. Error probability in PCM system. Units IV DIGITAL MODULATION: Baseband transmission: Line coding (RZ, NRZ), inter symbol interference (ISI), pulse shaping, Nyquist criterion for distortion free base band transmission, raised cosine spectrum. Pass band transmission: Geometric interpretation of signals, orthogonalization. ASK, PSK, FSK, QPSK and MSK modulation techniques, coherent detection and calculation of error probabilities. Units V SPREAD-SPECTRUM MODULATION: Introduction, Pseudo-Noise sequences, directsequence spread spectrum (DSSS) with coherent BPSK, processing gain, probability of error, frequency-hop spread spectrum (FHSS). Application of spread spectrum: CDMA.	
	BTCS 406	**BTCS 406: JAVA PROGRAMMING** **UNIT I** The Genesis of Java: The importance of Java to Internet, Java's magic-the byte code, introduction to JDK and JVM, the Java libraries. Data Types, Variables and Arrays: Java Programming: Data types, acces specifiers, operators, control statements, arrays; Classes: Fundamentals, objects, methods, constructors. **UNIT II** Usage of this keyword, garbage collection, the finalize() method, overloading methods, using objects as parameters, argument passing, returning objects, recursion, introducing access control, understanding static, introducing final, arrays revisited, nested and inner classes, exploring string class, using command-line arguments. Inheritance: Inheritance basics, using super,	**Principles of Programming Languages** Units I Programming Language: Definition, History, Features. Issues in Language Design: Structure and Operation of computer, Programming Paradigms. Efficiency, Regularity. Issues in Language Translation: Syntax and Semantics. Units II Specifications and Implementation of Elementary and Structured Data Types. Type equivalence, checking and conversion. Vectors and Arrays, Lists, Structures, Sets, Files. Units III Sequence control with Expressions, Conditional Statements, Loops, Exception	**Code Change**

		creating a multilevel hierarchy, when constructors are called, method overriding, dynamic method dispatch, using abstract, using final with inheritance, the object class. **UNIT III** Package, Interfaces: Packages, access protection, importing packages, interfaces. Java Library: String handling (only main functions), String Buffer class. Elementary concepts of Input/Output: byte and character streams, System.in and Sysem.out, print and println, reading from a file and writing in a file. **UNIT IV** Exception Handling: exception-handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java's built-in exceptions, creating your own exception subclasses, using exceptions. Multithreaded Programming: The Java thread model, the main thread, creating a thread, creating multiple threads, using Alive() and join(), thread priorities, synchronization, inter thread Communication, suspending, resuming, and stopping threads, using multithreading **UNIT V** Applets: Introduction, Life cycle, creation and implementation, AWT controls: Button, Label, TextField, TextArea, Choice lists, list, scrollbars, check boxes, Layout managers, Elementary concepts of Event Handling: Delegation Event Model, Event classes and listeners, Adapter classes, Inner classes. Swings: Introduction and comparison with AWT controls.	handling. Subprogram definition and activation, simple and recursive subprogram, subprogram environment. Units IV Scope – Static and Dynamic, Block structures, Local Data and Shared Data, Parameters and Parameter Transmission. Local and Common Environments, Tasks and Shared Data. Units V Abstract Data type, information hiding, encapsulation, type definition. Static and Stack- Based Storage management. Fixed and Variable size heap storage management, Garbage Collection.	
	BTCS 407	**BTCS407 Micro-Processors Lab** **List of Experiments:** 1 Study the hardware, functions, memory structure and operation of 8085-Microprocessor kit. 2 Add the contents of memory locations XX00 &XX01 & place the result in memory location XX02. 3 Program to perform integer division of two 8 bit numbers. 4 Write a program to find the square of a number. 5 Transfer of a block of data in memory to another place in memory 6 Transfer of block to another location in reverse order.	**Micro Processor Lab** List of Experiments 1 Add the contents of memory locations XX00 &XX01 & place the result in memory location XX02. 2 Add the 16 bit numbers stored in memory location & store the result in another memory location. 3 Transfer a block of data from memory location XX00 to another memory location XX00 in forward & reverse order. 4 Write a program to Swap two blocks of data stored in memory. 5 Write a program to find the square of a number. 6 Write a main program & a conversion subroutine to convert Binary to its	**No change**

		7 Searching a number in an array. 8 Sorting of array in: (1) Ascending order (2) Descending order. 9 Finding parity of a 32-bit number. 10 Program to multiply two 8–bit numbers. 11 Write a program to perform traffic light control operation. 12 Write a program to control the speed of a motor.	equivalent BCD. 7 Write a program to find largest & smallest number from a given array. 8 Write a program to Sort an array in ascending & descending order. 9 Write a program to multiply two 8 bit numbers whose result is 16 bit. 10 Write a program of division of two 8 bit numbers. 11 Generate square wave from SOD pin of 8085 & observe on CRO. 12 Write a program to perform traffic light control operation. 13 Write a program to control the speed of a motor.	
	BTCS 408	**BTCS408 Computer Organization and Architecture Lab** **List of Experiments:** **1.** To recognize the various components of a personal computer. **2.** To understand how the different components of PC are connected to work properly. **3.** Simulation of fundamental unit in XILINX ISE 9.1i (i) Half Adder. (ii) Full Adder (iii) Multiplexer **4.** Exploring Instruction Set Architecture (ISA) of x86 Machines. **5.** Learning to program in Assembly Language of x86 Machines **6.** Implementing Branching in x86 Assembly Language. **7.** Array Processing in x86 Assembly Language. **8.** Learning Address Translation in Virtual Memory System using MOSS Simulator **9.** Implementing vector operations in MIPS Assembly and exploring Loop Unrolling **10.** Simulating Cache Read/Write using MIPS Pipes Simulator (These experiments can be implemented in Integrated Development Environment (IDE) i.e. Microsoft Visual Studio 2008 or simulator.)	**Communication Lab** List of Experiments 1 Harmonic analysis of a square wave of modulated waveform Observe the amplitude modulated waveform and measures modulation index. Demodulation of the AM signal 2 To modulate a high frequency carrier with sinusoidal signal to obtain FM signal. Demodulation of the FM signal 3 To observe the following in a transmission line demonstrator kit : i. The propagation of pulse in non-reflecting Transmission line. ii. The effect of losses in Transmission line. iii. The resonance characteristics of al half wavelength long x-mission line. 4 To study and observe the operation of a super heterodyne receiver 5 To modulate a pulse carrier with sinusoidal signal to obtain PWM signal and demodulate it. 6 To modulate a pulse carrier with sinusoidal signal to obtain PPM signal and demodulate it. 7 To observe pulse amplitude modulated waveform and its demodulation. 8 To observe the operation of a PCM	Code Change

			encoder and decoder. To consider reason for using digital signal x-missions of analog signals. 9 Produce ASK signals, with and without carrier suppression. Examine the different processes required for demodulation in the two cases 10 To observe the FSK wave forms and demodulate the FSK signals based on the properties of (a) tuned circuits (b) on PI.L. 11 To study & observe the amplitude response of automatic gain controller (AGC).	
	BTCS 409	**BTCS 409 Database Management Systems Lab** **List of Experiments** 1. a) Define DBMS. b) Key Component- Entity , Attributes c) SQL 1) DDL 2) DML d) Relational data model- 1) Relation 2) Tuple 3) Domain 4) Degree 2. Create the student/employee Table and construct the following requires for the database… 1. Create the table for student/employee. 2. Find out name of all students. 3. Retrieve the list of name and the city of all students. 4. List of all students/employee who stay in city "BOMBAY" or city DELHI". 5. List of all students /employee who are located in "MADRAS". 3. (1) Apply these Operations on employee relation 1. Insert 2. Select 3. Update 4. Drop 5. Delete 6. Alter	**BTCS 409 Computer Aided Software Engineering Lab** For the instructor: Assign any two projects two a group of exactly two students covering all of the experiments from given experiment list. Each group is required to prepare the following documents for projects assigned to them and develop the software using software engineering methodology. 1. Problem Analysis and Project Planning Thorough study of the problem- identify project scope, infrastructure. 2. Software Requirement Analysis- Describe the individual Phases/modules of the project deliverables. 3. Data Modeling Use work products – data dictionary, use case diagrams and activity diagrams, build and test lass diagrams, sequence diagrams and add interface to class diagrams. 4. Software Developments and Debugging. 5. Software Testing – Prepare test plan, perform validation testing coverage analysis, memory leaks, develop test case hierarchy, Site check and site monitor. 6. Describe: Relevance of CASE tools, high – end and low – end CASE tools, automated support for data dictionaries, DFD, ER diagrams.	**New Course**

4. Create table with attributes emp. No., emp. Name, designation salary, and department no. Construct for following queries…..

1. Display complete information of all the employees working as a manager.
2. Display name of all the employees working as a clerk.
3. Suppose DA for manager is 75% of salary then display name of all managers.
4. Select names and designation whose salary is greater then 15000.

5. Between operation- list of all Employee Name & DOJ(date of joining) to join the Company in 2010

6. Join operation- list of all the employees along with their department information by using join operation.

7. AND/OR operation- make a table that have an employee Perform AND/OR operation.

8. Group by function
   a) create the table for facilities having faculty-id, dept. no., designation name and group by similar dept.no. facilities by using count function.

9. Order by ACS function-

   a) Create a table for emp. Using following data:- emp. name, emp age, emp salary,emp city & display the emp salary in assending order.

10. Max-Min function- create a table for student having similar attributes s-name, s-marks, s-id, s-sec, & remark.
    i. Find the maximum marks obtained by student.
    ii. Find the minimum marks obtained by student.
    iii. Sum of all students marks using sum function.
    iv. Find the average of marks using avg function.

		11. Drop operation- perform drop operation.		
	BTCS 410	**BTCS 410 PHP Lab** **List of Experiments** **Experiment 1:** Design the following static web pages required for online book store. a) **Home page: -** the static home page must contains three pages b) **Top: -** logo and college name and links to homepage, login page, registration Page, catalogue page and cart page c) **Left: -** at least four links for navigation which will display the catalogue of Respective links d) **Right: -** the pages to links in the left frame must be loaded here initially it Contains the description of the website **Experiment 2:** Create registration and cart page in the previous created web site. **Experiment 3:** Write a java script to validate the following fields in a registration page a) userName (should contains alphabets and the length should not be less than 6 characters) b) userPassword (should not be less than 6 characters) c) userEmail (should not contain invalid addresses) d) userCity (should select city from drop down) e) userGender (Should select gender) **Experiment 4:** Implement CSS on the above create WebPages. **Experiment 5:** Write an XML file which displays the book details that includes the following: 1) Title of book 2) Author name 3) Edition 4) Price Write a DTD to validate the above XML file and display the details in a table. **Experiment 6:** Create a php program to demonstrate the different file handling methods. **Experiment 7:** Create a php program to demonstrate the different loops in php. **Experiment 8:** Create a php program to demonstrate the different predefined function in array, Math. **Experiment 9:** Create a php program to demonstrate the different predefined function in Data & Regular Expression, date. **Experiment 10:** Create a HTML form and process the HTML form in PHP. **Experiment 11:** Create a php program to connect to MySQL Server. **Experiment 12:** Create a php program to execute more SQL queries.	**BTCS 410 Business Entrepreneurship Development** 1. Introduction to Entrepreneurship- Concept and need, Entrepreneurship and innovation, Entrepreneurship and economic growth. 2. Entrepreneurial competencies, Leadership, Decision making, Motivation, Risk taking. 3. Business Enterprise Planning- Identification of business opportunity, Idea generation, Demand estimation, Preparation of project report, Feasibility analysis. 4. Intellectual Property rights, Patents, Taxation- Central excise & Sales tax, VAT. 5. Government Policies for Entrepreneurs, Entrepreneurial career opportunities for Engineers, case studies.	**New Course**

	BTCS 411	**BTCS 411 Java Programming Lab** **List of Experiments** **Practical 1:** Write a program to compute the sum of the digits of a given integer number. **Practical 2:** Given a number, write a programming using (while/ do..while/for) loop to reverse the digits of the number. For example, the number 12345 should be written as 54321. **Practical 3:** Write a program (making use of class and methods), which will read a string and rewrite it in the alphabetical order. For example, the word JAIPUR should be written as AIJPRU. **Practical 4:** Write a program that accepts a shopping list of five items from the command line and stores them in a vector. **Practical 5:** Write a program to show the application of interface and abstract class. **Practical 6:** Define an exception called "NoMatchException" that is thrown when a string is not equal to "India". Write a program that uses this exception. **Practical 7:** Write a program to implement multithreading making use of **Thread** class and/or **Runnable** interface. **Practical 8:** Write a program to implement the concept of packages. **Practical 9:** Develop an applet that receives three numeric values as input from the user and then displays the largest of the three on the screen. Write a HTML page and test the applet. **Practical 10:** Develop an applet which runs a banner with text "Welcome to Jagan Nath University" making use of multithreading.	BTCS 411 Discipline & Extra Curricular Activities	New Course
	BTCS 501	**BTCS 501 Algorithms : Designs and Analysis** **UNIT I: BACKGROUND**: Review of Algorithm Complexity and Order Notations and Sorting Methods. **DIVIDE AND CONQUER METHOD**: Binary Search, Merge Sort, Quick sort and Stassen's matrix multiplication Algorithms. **GREEDY METHOD**: Knapsack Problem, Job Sequencing, Optimal Merge Patterns and Minimal Spanning Trees. **UNIT II: DYNAMIC PROGRAMMING**: Matrix Chain Multiplication. Longest Common Subsequence and 0/1 Knapsack Problem. **BRANCH AND BOUND**: Traveling	**BTCS 501Computer Architecture** **Units I** Introduction to Computer Architecture and Organization. Von Neuman Architecture, Flynn Classification. Register Transfer and Micro operations: Register transfer language, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Bus and memory transfers. Computer Organization and Design: Instruction cycle, computer registers, common bus system, computer instructions, addressing modes, design of a basic computer. **Units II** Central Processing Unit: General register	**Code Change**

		Salesman Problem and Lower Bound Theory. Backtracking Algorithms and queens problem. **UNIT III: PATTERN MATCHING ALGORITHMS**: Naïve and Rabin Karp string matching algorithms, KMP Matcher and Boyer Moore Algorithms. **ASSIGNMENT PROBLEMS**: Formulation of Assignment and Quadratic Assignment Problem. **UNIT IV: RANDOMIZED ALGORITHMS**. Las Vegas algorithms, Monte Carlo algorithms, randomized algorithm for Min-Cut, Randomized algorithm for 2-SAT. Problem definition of Multicommodity flow, Flow shop scheduling and Network capacity assignment problems. **UNIT V: PROBLEM CLASSES** NP, NP-HARD AND NP-COMPLETE: Definitions of P, NP-Hard and NP-Complete Problems. Decision Problems. Cook's Theorem. Proving NP-Complete Problems - Satisfiability problem and Vertex Cover Problem. Approximation Algorithms for Vertex Cover and Set Cover Problem.	organization, stack organization, Instruction formats, Data transfer and manipulation, program control. RISC, CISC characteristics. Pipeline and Vector processing: Pipeline structure, speedup, efficiency, throughput and bottlenecks. Arithmetic pipeline and Instruction pipeline. **Units III** Computer Arithmetic: Adder, Ripple carry Adder, carry look Ahead Adder, Multiplication: Add and Shift, Array multiplier and Booth Multiplier, Division: restoring and Non-restoring Techniques. Floating Point Arithmetic: Floating point representation, Add, Subtract, Multiplication, Division. **Units IV** Memory Organization: RAM, ROM, Memory Hierarchy, Organization, Associative memory, Cache memory, and Virtual memory: Paging and Segmentation. **Units V** Input-Output Organization: Input-Output Interface, Modes of Transfer, Priority Interrupt, DMA, IOP processor.	
	BTCS 502	**Software Engineering** **UNIT – II Software Engineering**: Introduction and Definition of Software Engineering. Software Crisis, Software Processes & Characteristics. **Software Process Models:** Software development life cycle (SWDLC), Software development life cycle models:-Waterfall, Prototype, Evolutionary, RAD, V and Spiral Models. **UNIT – III Software Requirements analysis & specifications**: Requirement engineering, Requirement analysis tasks, Analysis principles. Requirement elicitation techniques like FAST, QFD, Requirements analysis using DFD(with case studies), Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS. **UNIT – IV Software Project Management Concepts**: The Management spectrum, The People, The Problem, The Process, The Project. **Software Project Planning**: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Analysis. **UNIT – V Software Design**: Design fundamentals, Effective modular design: Data architectural and procedural design,	**Digital Logic Design** Units I Hardware Description Languages and their use in digital logic design. VHDL: Modelling Concepts, Lexical Elements & Syntax Descriptions, Scalar Data types & Operations, Sequential Statements, Composite Data Types & Operations, Basic Modelling Constructs. Case Study: VHDL Simulation of Ripple Carry, & Look Ahead carry Adders. Units II VHDL: Subprograms, Packages & Use Clauses, Aliases, Resolved Signals, Components & Configurations, Generate Statements, Concurrent Statements. Use of VHDL in simulation and synthesis. Units III Clocked Sequential circuits. Design steps for synchronous sequential circuits. Design of a sequence detector. Moore and Mealy Machines. Design using JK flip-flops and D flip-flops. State reduction, State assignment, Algorithmic State Charts, converting ASM charts to hardware, one-hot state assignment. Considerations of clock skew, set-up time, hold-time and other flip-flop	New Course

		Design documentation. Function Oriented Design, Object Oriented Design. **Cohesion & Coupling**: Cohesion & Coupling, Classification of Cohesiveness & Coupling. **Software Maintenance**: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering.	parameters, timing constraints. Programmable Logic Devices. Read-only memory. Boolean function implementation through ROM. PLD, PGA, PLA, PAL, FPGA. Units IV Event-driven Circuits. Design procedure for asynchronous circuits, stable and unstable states, races, race-free assignments. State reduction of incompletely specified machines. Compatibility and state reduction procedure. Hazards in combinational networks. Dynamic hazards, Function Hazards, and Essential Hazards. Eliminating hazards. Units V Field Programmable Gate Arrays: Introduction, Logic Elements & programmability, Interconnect structures & programmability, Extended Logic Elements, SRAM, Flash Memory & Antifuse Configuration, Case Studies of Altera Stratix & Xilinx Virtex-II pro. Technology Mapping for FPGAs: Logic Synthesis, Lookup Table Technology Mapping.	
	BTCS 503	**BTCS 503 Java 2 Enterprise Edition** **UNIT I** Java Beans: Introduction to Java Beans, Advantage, Properties, BDK, Introduction to EJB, Java Beans API. Fundamental of Servlets**:** Advantages of Servlets over CGI, Servlet API, life cycle of servlet. Creating simple Servlet, installing and configuring Apache Tomcat 4 as a standalone servlet , Servlet Packages: HTTP package, Working with Http request and response, Security Issues. Handling cookies, session tracking. **UNIT II** JSP: Introduction to JSP, JSP processing, JSP Application Design, Tomcat Server, Implicit JSP objects, Conditional Processing, Declaring variables and methods, Error Handling and Debugging, Sharing data between JSP pages- Sharing Session and Application Data. **UNIT III** Database Connectivity: Database Programming using JDBC, Studying Javax.sql.package, accessing a database from a JSP page, Application-specific Database Action, Developing Java Beans in a JSP page, introduction to Struts framework. **UNIT IV** Distributed Computing: Overview of current technologies (J2EE, RMI, CORBA, and DCOM), RMI and	**Telecommunication Fundamentals** Units I Data Transmission: Terminology, Frequency, spectrum, bandwidth, analog and digital transmission, Transmission impairments, channel capacity, Transmission Media. Wireless Transmission: Antenna and antenna gain. Network Reference Models (OSI/ISO and TCP/IP) Physical Layer: Line Encoding Schemes. Concept of bit period, effect of clock skew, Synchronous and Asynchronous communication. Data Link Layer: Functions of data link layer and design issues Flow Control: Flow control in loss less and lossy channels using stop-and-wait, sliding window protocols. Performance of protocols used for flow control. Units II Error Control Coding: Error Detection, Two Dimensional Parity Checks, and Internet Checksum. Polynomial Codes, Standardized polynomial codes, error detecting capability of a polynomial codes. Linear codes, performance of linear codes, error detection & correction using linear codes. Data Link Control: HDLC & PPP	Code Change

		ORBs, patterns for distributed components, defining interfaces to active objects, remote RMI interfaces, RMI, clients, server, and registry. Creating simple RMI application. **UNIT V** EJB Fundamentals: Introduction to J2EE architecture, EJB – introduction, understanding stateful and stateless session beans life cycle, writing stateless session bean, introduction to entity beans, writing first entity bean.	including frame structures. MAC sublayer: Channel Allocation Problem, Pure and slotted Aloha, CSMA, CSMA/CD, collision free multiple access. Throughput analysis of pure and slotted Aloha. Ethernet Performance. Units III Wireless LAN: Hidden node and Exposed node Problems, RTS/CTS based protocol, 802.11 Architecture, protocol stack, Physical layer, MAC Sublayer. Bluetooth Architecture and Protocol Stack Data Link Layer Switching: Bridges (Transparent, Learning and Spanning Tree), Virtual LANs Units IV Multiplexing: Frequency division, time division (Synchronous and statistical) multiplexing. ADSL, DS1 and DS3 carriers. Multiple Accesses: TDMA frame structure, TDMA Burst Structure, TDMA Frame efficiency, TDMA Superframe structure, Frame acquisition and synchronization, Slip rate in digital terrestrial networks. Switching: Qualitative description of Space division, time division and space-timespace division switching. Units V Spread Spectrum Techniques: Direct sequence(DSSS) & frequency hopping(FHSS); Performance consideration in DSSS & FHSS; Code division Multiple access (CDMA): frequency & channel specifications, forward & reverse CDMA channel, pseudo noise(PN) sequences, m-sequence, gold sequence, orthogonal code, gold sequences, Walsh codes, synchronization, power control, handoff, capacity of CDMA system, IMT-2000, WCDM	
	BTCS 504	**BTCS 504 Random Variables and Stochastic Processes** **UNIT I:** PROBABILITY**:** Introduction to theory of probability, Definitions, sample, space & events, Self, joint & conditional probabilities, statistically dependent & independent events. **UNIT II:** RANDOM VARIABLES**:** Introduction, distribution & density functions, discrete & continuous random variables, special distributions: binominal, Poisson, uniform, exponential, normal, Rayleighs. Conditional distribution & density functions. **UNIT III:** MULTIPLE RANDOM	**Database Management Systems** Units I INTRODUCTION TO DATABASE SYSTEMS: Overview and History of DBMS. File System v/s DBMS .Advantage of DBMS Describing and Storing Data in a DBMS. Queries in DBMS. Structure of a DBMS. Units II ENTITY RELATIONSHIP MODEL: Overview of Data Design Entities, Attributes and Entity Sets, Relationship and Relationship Sets. Features of the ER Model- Key Constraints, Participation	**Code Change**

		VARIABLES :Vector random variable, joint distribution functions, joint probability density function(PDF), Statistical independence, distribution & density function of sum of random variable, one function of one random variable ,one function of two random variable, two function of two random variable. **UNIT IV:** OPERATION ON SINGLE & MULTIPLE RANDOM VARIABLES**:** Mean & variance, moments, chebyshev's inequality, Central limit theorem, characteristic functions &moment generating function, covariance & correlation coefficient of multiple random variables. **UNIT V:** STOCHASTIC PROCESSES**:** Introduction, random process concept, stationary & independence, ergodicity, correlation, functions. Gaussion Random Process, Transmission of Random process through linear systems. Power spectral Density (PSD), Cross Spectral density, white Gaussion Random process.	Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Data Base, Design with ER Model-Entity v/s Attribute, Entity vs Relationship Binary vs Ternary Relationship and Aggregation v/s ternary Relationship Conceptual Design for a Large Enterprise. Units III RELATIONSHIP ALGEBRA AND CALCULUS: Relationship Algebra Selection and Projection, Set Operations, Renaming, Joints, Division, Relation Calculus, Expressive Power of Algebra and Calculus. Units IV SQL QUERIES PROGRAMMING AND TRIGGERS: The Forms of a Basic SQL Query, Union, Intersection and Except, Nested Queries ,Correlated Nested Queries, Set-Comparison Operations, Aggregate Operators, Null Values and Embedded SQL, Dynamic SQL, ODBC and JDBC, Triggers and Active Databases. Units V SCHEMA REFINEMENT AND NORMAL FORMS: Introductions to Schema Refinement, Functional Dependencies, Boyce-Codd Normal Forms, Third Normal Form, Normalization-Decomposition into BCNF Decomposition into 3-NF.	
	BTCS 505	**BTCS 505 SYSTEM SOFTWARE** **UNIT I** System software introduction, Evolution of Components of a Programming System, General Machine Structure - Memory, Registers, Data and Instructions. Machine Language - No Looping, Address modification using instruction as Data and Index registers, Looping. Assembly Language Program using Literals and pseudo -ops. **UNIT II** Introduction to Assemblers - General design procedure, Design of Assembler- Statement of Problem, Data Structures, Format of Databases, Algorithm (2-pass assembler) in brief with flowchart **UNIT III** Macro Language and the Macro Processor: Macro instructions, Features of Macro facility - Macro instruction argument, Conditional Macro expansions, Macro call within Macros and Implementation- Two-Pass macro processor	**Operating Systems** Units I Introduction and need of operating system, layered architecture/logical structure of operating system, Type of OS, operating system as resource manager and virtual machine, OS services, BIOS, System Calls/Monitor Calls, Firmware- BIOS, Boot Strap Loader. Process management- Process model, creation, termination, states & transitions, hierarchy, context switching, process implementation, process control block, Basic System calls- Linux & Windows. Threads- processes versus threads, threading, concepts, models, kernel & user level threads, thread usage, benefits, multithreading models. Units II Interprocess communication- Introduction to message passing, Race condition, critical section problem, mutual exclusion with busy waiting- disabling interrupts, lock	**Code Change**

		with flowchart **UNIT IV** Loaders and Linkers: - Loader Schemes, Compile and Go Loader, General Loader scheme, Absolute Loaders, Subroutine Linkages, Relocating Loaders, Direct-Linking Loaders, Binders, Linking loaders, Overlays, Dynamic Binders. Design of an Absolute Loader **UNIT V** Introduction to Compilers: Different phases- Lexical Phase, Syntax Phase, Interpretation Phase, Optimization Phase, Storage Assignment Phase, Code Generation Phase and Assembly phase.	variables, strict alteration, Peterson's solution, TSL instructions, busy waiting, sleep and wakeup calls, semaphore, monitors, classical IPC problems. Process scheduling- Basic concepts, classification, CPU and I/O bound, CPU scheduler short, medium, long-term, dispatcher, scheduling:- preemptive and non-preemptive, Static and Dynamic Priority, Co-operative & Non-cooperative, Criteria/Goals/Performance Metrics, scheduling algorithms- FCFS, SJFS, shortest remaining time, Round robin, Priority scheduling, multilevel queue scheduling, multilevel feedback queue scheduling, Fair share scheduling. Units III Deadlock- System model, resource types, deadlock problem, deadlock characterization, methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock. Memory management- concepts, functions, logical and physical address space, address binding, degree of multiprogramming, swapping, static & dynamic loading- creating a load module, loading, static & dynamic linking, shared libraries, memory allocation schemes first fit, next fit, best fit, worst fit, quick fit. Free space management- bitmap, link list/free list, buddy's system, memory protection and sharing, relocation and address translation. Units IV Virtual Memory- concept, virtual address space, paging scheme, pure segmentation and segmentation with paging scheme hardware support and implementation details, memory fragmentation, demand paging, pre-paging, working set model, page fault frequency, thrashing, page replacement algorithms- optimal, NRU, FIFO, second chance, LRU, LRU approximation clock, WS clock; Belady's anomaly, distance string; design issues for paging system- local versus global allocation policies, load control, page size, separate instruction and data spaces, shared pages, cleaning policy, TLB (translation look aside buffer) reach, inverted page table, I/O interlock, program structure, page fault handling, Basic idea of MM in Linux & windows. Units V File System- concepts, naming, attributes, operations, types, structure, file organization & access(Sequential, Direct ,Index Sequential) methods, memory	

			mapped files, directory structures- one level, two level, hierarchical/tree, acyclic graph, general graph, file system mounting, file sharing, path name, directory operations, overview of file system in Linux & windows. Input/Output subsystems- concepts, functions/goals, input/output devices- block and character, spooling, disk structure & operation, disk attachment, disk storage capacity, disk scheduling algorithm- FCFS, SSTF, scan scheduling, C-scan schedule.	
	BTCS 506A	**BTCS 506A PRINCIPLES OF COMMUNICATION** **UNIT-I** ANALOG MODULATION: Concept of frequency translation. Amplitude Modulation: Description of full AM, DSBSC, SSB and VSB in time and frequency domains, methods of generation & demodulation, frequency division multiplexing (FDM). Angle Modulation: Phase and frequency modulation. Descriptions of FM signal in time and frequency domains, methods of generation & demodulation, pre- emphasis &deemphasis, PLL **UNIT-II** PULSE ANALOG MODULATION: Ideal sampling, Sampling theorem, aliasing, interpolation, natural and flat top sampling in time and frequency domains. Introduction to PAM, PWM, PPM modulation schemes. Time division multiplexing (TDM). **UNIT-III** PCM & DELTA MODULATION SYSTEMS: Uniform and Non-uniform quantization. PCM and delta modulation, Signal to quantization noise ratio in PCM and delta modulation.DPCM, ADM, T1 Carrier System, Matched filter detection. Error probability in PCM system. **UNIT-IV** DIGITAL MODULATION: Baseband transmission: Line coding (RZ, NRZ), inter symbol interference (ISI), pulse shaping, Nyquist criterion for distortion free base band transmission, raised cosine spectrum. Pass band transmission: Geometric interpretation of signals, orthogonalization. ASK, PSK, FSK, QPSK and MSK modulation techniques, coherent detection and calculation of error probabilities. **UNIT-V** SPREAD-SPECTRUM MODULATION: Introduction, Pseudo-Noise sequences, directsequence spread spectrum (DSSS) with coherent BPSK, processing gain, probability of error, frequency-hop spread spectrum (FHSS).	**Advanced Data Structure** Units I ADVANCED TREES: Definitions, Operations on Weight Balanced Trees (Huffman Trees), 2-3 Trees and Red- Black Trees. Dynamic Order Statistics,Interval Tree; Dictionaries. Units II MERGEABLE HEAPS: Mergeable Heap Operations, Binomial Trees, Implementing Binomial Heaps and its Operations, 2-3-4. Trees and 2-3-4 Heaps. Amortization analysis and Potential Function of Fibonacci Heap, Implementing Fibonacci Heap. Units III GRAPH THEORY DEFINITIONS: Definitions of Isomorphic Components. Circuits, Fundamental Circuits, Cut-sets. Cut- Vertices Planer and Dual graphs, Spanning Trees, Kuratovski's two Graphs. GRAPH THEORY ALGORITHMS: Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graph, Breadth First and Depth First Search, Topological Sort, Strongly Connected Components and Articulation Point. Single Min-Cut Max-Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms. Units IV SORTING NETWORK: Comparison network, zero-one principle, bitonic sorting and merging network sorter. Priority Queues and Concatenable Queues using 2-3 Trees. Operations on Disjoint sets and its union-find problem, Implementing Sets. Units V NUMBER THEORITIC ALGORITHM: Number theoretic notions, Division theorem, GCD, recursion, Modular	**Code Change**

		Application of spread spectrum: CDMA.	arithmetic, Solving Modular Linear equation, Chinese Remainder Theorem, power of an element, Computation of Discrete Logarithms, primality Testing and Integer Factorization.	
	BTCS 506B	**BTCS506B Information Theory And Coding** **UNIT 1:** Elements Of Information Theory: Measure of information, average information, entropy, information rate. Communication channel, discrete and continuous channel **UNIT 2:** Shannon-Hartley theorem and its implications. Channel capacity, Gaussian channel and bandwidth-S/N tradeoff **UNIT 3:** Introduction of Coding: types of efforts, types of codes, error control coding, methods of controlling errors **UNIT 4:** Linear Block and Binary Cyclic Codes: matrix decryption of linear block codes, error detection and error correction. Capabilities of linear block codes. Hamming codes, structure of cyclic codes, encoding using an (n-k) bit shift register syndrome calculation, its error detection & correction, special classes of cyclic codes bch. **UNIT 5**: Burst and Convolution Codes: burst and random error correcting codes, encoders for convolution codes. Decoders for convolution codes.	**Digital Signal Processing** Units I INTRODUCTION : Discrete time signals and systems, properties of discrete time systems, Linear time invariant systems - discrete time. Properties of LTI systems and their block diagrams. Convolution, Discrete time systems described by difference equations. Units II Fourier Transform: Discrete time Fourier transform for periodic and aperiodic signals. Properties of DTFT. Z-transform: The region of convergence for the Ztransform. The Inverse Z-transform. Properties of Z transform. Units III SAMPLING: Mathematical theory of sampling. Sampling theorem. Ideal & Practical sampling. Interpolation technique for the reconstruction of a signal from its samples. Aliasing. Sampling in freq. domain. Sampling of discrete time signals. Units IV THE DISCRETE FOURIER TRANSFORMS (DFT): Properties of the DFT, Linear Convolution using DFT. Efficient computation of the DFT: Decimation–in-Time and Decimation-in frequency FFT Algorithms. Units V FILTER DESIGN TECHNIQUES: Structures for discrete-time systems- Block diagram and signal flow graph representation of LCCD (LCCD – Linear Constant Coefficient Difference) equations, Basic structures for IIR and FIR systems, Transposed forms. Introduction to filter Design: Butterworth & Chebyshev.IIR filter design by impulse invariance & Bilinear transformation. Design of FIR filters by Windowing: Rectangular, Hamming & Kaiser.	**New Course**

	BTCS 506C	**BTCS506C Tele Communication Networks** **UNIT 1: Telecommunication Need and Applications:** Information Explosion in industry, government and military applications estimated bandwidth need and electromagnetic spectrum of telecommunication. **Communication Model:** Transmission system in communication introduction to WAN, MAN and LANs. Broadband and narrowband ISDN Protocols and protocol architectures. Layered Architecture. Introduction to TCP/IP protocol Architecture. **UNIT 2: Data Transmission: Concepts** and terminology, Frequency spectrum and bandwidth. Time domain and frequency domain analysis/and digital data transmission. Audio and video signals. Transmission impairments Guided transmission media, audio and video signals. Transmission impairments. Guided transmission media, twisted pair, UTP cables. Coaxial and optical fiber cables, wireless microwave and satellite transmission. **UNIT 3: Data Encoding :**Amplitude, frequency and phase modulation techniques, NRZ-I, Bipolar AMI, Manchester and differential Manchester encoding techniques. Scrambling techniques. ASK, FSK and PSK techniques. Pulse code and pulse Amplitude Modulations. Delta Modulations. **UNIT 4: Multiplexing: Frequency** Division Multiplexing, Synchronous Time Division Multiplexing, Statistical Time Division Multiplexing. **Switching Networks:** Circuit switching Networks, space and time division switching, routing in circuit switched networks. Control signaling Packet Switching principles. Fixed, flopping and adaptive routing strategies-X.25 interface packet format and X.28 protocol. **UNIT 5: Frame Relay:** Frame Relay protocol Architecture-Frame Relay Call control and congestion control. **MAC Sub layer:** Channel allocation problem, pure and slotted ALOHA protocols, persisted and Non-persisted CSMA, Collision free protocols, Digital cellular adio, CDMA.	**BTCS506C Information Theory & Coding** Units I Introduction to information theory. Uncertainty, Information and Entropy, Information measures for continuous random variables, source coding theorem. Discrete Memory less channels, Mutual information, Conditional entropy. Units II Source coding schemes for data compaction: Prefix code, Huffman code, Shanon-Fane code & Hempel-Ziv coding channel capacity. Channel coding theorem. Shannon limit. Units III Linear Block Code: Introduction to error connecting codes, coding & decoding of linear block code, minimum distance consideration, conversion of nonsystematic form of matrices into systematic form. Units IV Cyclic Code: Code Algebra, Basic properties of Galois fields (GF) polynomial operations over Galois fields, generating cyclic code by generating polynomial, parity check polynomial. Encoder & decoder for cyclic codes. Units V Convolutional Code: Convolutional encoders of different rates. Code Tree, Trllis and state diagram. Maximum likelihood decoding of convolutional code: The viterbi Algorithm fee distance of a convolutional code.	**Code Change**
	BTCS 506D	**BTCS 506D Simulations and Modeling** **UNIT 1:**Introduction: System definition and components, stochastic activities, continuous and discrete System, system modeling, types of models, static and dynamic physical models, Static and		

		dynamic mathematical models, full corporate models, types of system. **UNIT 2:** System simulation: Why to simulate and when to simulate, basic nature of simulation, technique of simulation ,comparison of simulation and analytical methods, types of system simulation , real time simulation, hybrid simulation, simulation of pure pursuit problem single server queuing system and an inventory problem, Monte Carlo simulation, Distributed Lag methods. **UNIT 3:**Simulation of continuous Systems: Analog vs. Digital simulation, simulation of water reservoir system, simulation of a servo system, simulation of an autopilot. Discrete system simulation**,** fixed time-step vs event-to event model, generation of random numbers, test for randomness, Generalization of non –uniformly distributed random numbers, Monte-Carlo computation vs stochastic simulation. **UNIT 4:** System dynamics: Exponential growth models, exponential decay models, modified exponential growth models, logistic curves, generalization of growth models, System dynamics diagrams, feedback in socio-Economic systems, world model. **UNIT 5:** Simulation of PERT networks: Critical path computation, uncertainties in Activity duration, Resource allocation and consideration. Simulation Software & Simulation language: Continuous and discrete simulation languages, expression based languages, object-oriented simulation, general –purpose vs application –oriented simulation packages, CSMP-III, MODSIM-III		
	BTCS506E	**BTCS506E ANALOG AND DIGITAL COMMUNICATION** **UNIT I ANALOG COMMUNICATION** **Noise:** Source of Noise - External Noise- Internal Noise- Noise Calculation. Introduction to **Communication Systems**: Modulation – Types - Need for Modulation. Theory of Amplitude Modulation - Evolution and Description of SSB Techniques - Theory of Frequency and Phase Modulation – Comparison of various Analog Communication System (AM – FM – PM). **UNIT II DIGITAL COMMUNICATION** Amplitude Shift Keying (ASK) – Frequency Shift Keying (FSK) Minimum Shift Keying (MSK) –Phase Shift Keying		

		(PSK) – BPSK – QPSK – 8 PSK – 16 PSK – Quadrature Amplitude Modulation (QAM) – 8 QAM – 16 QAM – Bandwidth Efficiency– Comparison of various Digital Communication System (ASK – FSK – PSK – QAM). **UNIT III DATA AND PULSE COMMUNICATION** **Data Communication:** History of Data Communication - Standards Organizations for Data Communication- Data Communication Circuits - Data Communication Codes -Error Detection and Correction Techniques - Data communication Hardware - serial and Parallel interfaces. **Pulse Communication:** Pulse Amplitude Modulation (PAM) – Pulse Time Modulation (PTM) – Pulse code Modulation (PCM) - Comparison of various Pulse Communication System (PAM – PTM – PCM). **UNIT IV SOURCE AND ERROR CONTROL CODING** Entropy, Source encoding theorem, Shannon fano coding, Huffman coding, mutual Information, channel capacity, channel coding theorem, Error Control Coding, linear Block codes, cyclic codes, convolution codes, viterbi decoding algorithm. **UNIT V MULTI-USER RADIO COMMUNICATION** Advanced Mobile Phone System (AMPS) - Global System for Mobile Communications (GSM) – Code division multiple access (CDMA) – Cellular Concept and Frequency Reuse - Channel Assignment and Hand - Overview of Multiple Access Schemes - Satellite Communication - Bluetooth.		
	BTCS 507	**BTCS 507 ALGORITHMS ANALYSIS AND DESIGN LAB** **List of Experiments:** 1. To implement following algorithm using array as a data structure and analyse its time complexity. a. Merge sort b. Quick sort c. Bubble sort d. Bucket sort e. Radix sort f. Shell sort g. Selection sort h. Heap sort 2. To implement Linear search and Binary search and analyse its time complexity.	**BTCS 507 Data Base Lab** Objectives: At the end of the semester, the students should have clearly understood and implemented the following: 1. Stating a database design & application problem. 2. Preparing ER diagram 3. Finding the data fields to be used in the database. 4. Selecting fields for keys. 5. Normalizing the database including analysis of functional dependencies. 6. Installing and configuring the database server and the front end tools. 7. Designing database and writing	**Code Change**

		3. To implement Matrix Multiplication and analyse its time complexity. 4. To implement Longest Common Subsequence problem and analyse its time complexity. 5. To implement Optimal Binary Search Tree problem and analyse its time complexity. 6. To implement Huffman Coding and analyse its time complexity. 7. To implement Dijkstra's algorithm and analyse its time complexity. 8. To implement Bellman Ford algorithm and analyse its time complexity. 9. To implement naïve String Matching algorithm, Rabin Karp algorithm and Knuth Morris Pratt algorithm and analyse its time complexity.	applications for manipulation of data for a stand alone and shared data base including concepts like concurrency control, transaction roll back, logging, report generation etc. 8. Get acquainted with SQL. In order to achieve the above objectives, it is expected that each students will chose one problem. The implementation shall being with the statement of the objectives to be achieved, preparing ER diagram, designing of database, normalization and finally manipulation of the database including generation of reports, views etc. The problem may first be implemented for a standalone system to be used by a single user. All the above steps may then be followed for development of a database application to be used by multiple users in a client server environment with access control. The application shall NOT use web techniques. One exercise may be assigned on creation of table, manipulation of data and report generation using SQL. Suggested Tool: For standalone environment, Visual FoxPro or any similar database having both the database and manipulation language may be used. For multi-user application, MYSql is suggested. However, any other database may also be used. For front end, VB.Net, Java, VB Script or any other convenient but currently used by industry may be chosen.	
	BTCS 508	**BTCS 508 SOFTWARE ENGINEERING LAB** **Tool Required: Rational Rose Enterprise Edition** **List of Experiments:** 1. Write down the problem statement for a suggested system of relevance. 2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system. 3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart. 4. To perform the user's view analysis for the suggested system: Use case diagram. 5. To draw the structural view	**BTCS 508 System Design in UML Lab.** Objectives: 1. The students shall be able to use following modules of UML for system description, implementation and finally for product development. - Capture a business process model. - The User Interaction or Use Case Model - describes the boundary and interaction between the system and users. Corresponds in some respects to a requirements model. - The Interaction or Communication Model - describes how objects in the system will interact with each other to get	New Course

		diagram for the system: Class diagram, object diagram. 6. To draw the behavioral view diagram : State-chart diagram, Activity diagram 7. To perform the behavioral view diagram for the suggested system : Sequence diagram, Collaboration diagram 8. To perform the implementation view diagram: Component diagram for the system. 9. To perform the environmental view diagram: Deployment diagram for the system. 10. To perform various testing using the testing tool unit testing, integration testing for a sample code of the suggested system. 11. 10 Perform Estimation of effort using FP Estimation for chosen system. 12. 11 To Prepare time line chart/Gantt Chart/PERT Chart for selected software project.	work done. - The State or Dynamic Model - State charts describe the states or conditions that classes assume over time. Activity graphs describe the workflows the system will implement. - The Logical or Class Model - describes the classes and objects that will make up the system. - The Physical Component Model - describes the software (and sometimes hardware components) that make up the system. - The Physical Deployment Model - describes the physical architecture and the deployment of components on that hardware architecture. The students are expected to use the UML models, prepare necessary documents using UML and implement a system. Some hardware products like digital clock, digital camera, washing machine controller, air conditioner controller, an electronic fan regulator, an elementary mobile phone etc. may also be chosen. The students shall be assigned one problem on software based systems and another involving software as well as hardware.	
	BTCS 509	**BTCS 509 Java 2 Enterprise Edition Lab** **List of Experiments** **1. (a)** Demonstrate the installation of Tomcat for servlet development. **(b)** Write a program to create a simple servlet that sends the output of the servlet to the browser display Area. **2**. Write a program to create a servlet that displays basic information about a client's session (basic info. Includes session id, creation time, last access time, and number of previous accesses) in form of a HTML table. In case of first access, it should display the message – "A warm welcome to the new Visitor" and on consequent accesses the message should be "I recognize you! You are visiting once Again". **3.** Write a program to create two servlets, ServletCreatesCookies and ServletDisplaysCookies. ServletCreatesCookies sets 3 cookies, one of which has default expiration date. The other two cookies Use setMaxAge ( ) and have a lifetime of 2 hours. The servlet	**BTCS 509 Operating Systems Simulation Lab** Objectives: Understand the basic functions of operating systems. In depth knowledge of the algorithms used for implementing the tasks performed by the operating systems. Understand & simulate strategies used in Linux & Windows operating systems. Develop aptitude for carrying out research in the area of operating system. Suggested Tools: Operating system simulator- MOSS preferably on Linux platform (Available for free download from http://www.ontko.com/moss/). Recommended Exercises: A. Exercises shall be given on simulation of	New Course

		ServletDisplaysCookies should display The active cookies. **4.** Write a program to create a simple bean (using swings) making use of Net Beans environment. **5.** Write a program to define an HTML form in a JSP source file, using JSP tags to pass data between the Form and some type of server-side object. **6.** Write a program using JSP and making good use of script lets and expressions, implement the number Guess game. **7.** Write a program using JSP to set up a simple counter and demonstrate declarations, script lets, and Expressing working together. **8**. Write a program to access an ODBC compliant database and (i) show the records in the standard output device (ii) Demonstrate the use of SQL queries through the program. **9** Build a Web interface that will allow users to retrieve a listing of J2EE books from a computer books' Database. Users will be able to query the database on one or more of the following criteria: title, Author, publisher, and publishing year. Create the database using Microsoft Access. **10**. Write a program to develop a Java Bean in a JSP page. You are required to develop the colorful Alphabet list such that the presentation of the letters remains the responsibility of the JSP page, but The color mapping will be the bean's job. **11**. Write a program to create a client/server application for summing up 5 numbers using Remote Method Invocation (RMI) technique. **12**. Write a program to create a simple Enterprise Java Bean (EJB) that encapsulates the data and behavior Associated with a real world Hotel room booking business	algorithms used for the tasks performed by the operating systems. Following modules of the simulator may be used: Scheduling Deadlock Memory Management Systems File system simulator Algorithms described in the text may be assigned. The simulation results such as average latency, hit & Miss Ratios or other performance parameters may be computed. B. One exercise shall be on simulation of algorithms reported in the recent conferences/ journals and reproducing the results reported therein.	
	BTCS 510	**BTCS 510 System Software Engineering Lab** **List of Experiments:** In this lab we will practice how source code is processed by compiler/ assembler/ pre-processor. **All programs have to be written in C++** 1. Write a class for file handling, having	**BTCS 510 Digital Hardware Design Lab** Objectives: At the end of course, the students shall be able to • Should be able to design datapath for digital systems • Create a digital system using	**New Course**

		functions to open/ read/ write/ close/ reset. (2-5) develop a program which take input a file of C language 2. Print Lines of Codes and print signature of all function (including main) 3. Print number of variables in every function (with type) 4. Generate a new file without the comments. (/ / and //). 5. Process all #define (i.e. #define MAX 100, than replace every occurrence of MAX with 100). (Macro value 100 can be an expression also.) 6. Write a program to create a symbol table. 7. Write a program which can parse a given C file and store all variables and functions in symbol table.	discrete digital ICs • Design a hard wired / micro-programmed control circuit • Simulate a digital datapath in Hardware Description Language • Understand IC descriptions and select proper IC in a given circuit based on its timing characteristics Suggested Methodology and tools: Hardware description language like Verilog /VHDL can be used for simulation. The exercise shall involve design of datapath, its simulation and finally realization on breadboard. Library of digital ICs have to be built. Similarly, manuals of Digital IC families have to be placed in the laboratories for reference by students. Suggested Exercises • Create a microprocessor from ALU 74181. For this, the students may design a small instruction set and attach necessary registers and suitable control unit to realize a microprocessor. • Simulate and realize a Cordic calculator. • Simulate & realize a Four bit Adder o Design and simulation of a 4-bit Adder o VHDL/Verilog HDL (Hardware description language) o Interfacing 7-segment decoder • Combinational Multiplier o 4x4-bit multiplier o Binary-to-BCD conversion o Timing Constraints • CRC checksum generator & verifier • Realizing a carry look ahead adder	
	BTCS 511	**BTCS511 Communication Lab** **List of Experiments** 1. Harmonic analysis of a square wave of modulated waveform Observe the amplitude modulated waveform and measures modulation index. Demodulation of the AM signal 2. To modulate a high frequency carrier with sinusoidal signal to obtain FM signal. Demodulation of the FM signal. 3. To observe the following in a transmission line demonstrator kit : i. The propagation of pulse in	BTCS 511 Discipline & Extra Curricular Activities	**New Course**

		non-reflecting Transmission line. ii. The effect of losses in Transmission line. iii. The resonance characteristics of al half wavelength long x-mission line. 4. To study and observe the operation of a super heterodyne receiver 5. To modulate a pulse carrier with sinusoidal signal to obtain PWM signal and demodulate it. 6. To modulate a pulse carrier with sinusoidal signal to obtain PPM signal and demodulate it. 7. To observe pulse amplitude modulated waveform and its demodulation. 8. To observe the operation of a PCM encoder and decoder. To consider reason for using digital signal x-missions of analog signals. 9. Produce ASK signals, with and without carrier suppression. Examine the different processes required for demodulation in the two cases 10. To observe the FSK wave forms and demodulate the FSK signals based on the properties of (a) tuned circuits (b) on PI.L. 11. To study & observe the amplitude response of automatic gain controller (AGC).		
	BTCS 512		Seminar	**Code Change**
	BTCS 601	**BTCS 601 Operations Research** **Unit I Overview of Operation Research** History of Operation Research, Linear optimization models, simplex algorithms, duality; dual linear programming, Sensitivity; Integer programming **Unit II Transportation** Transportation, Transshipment & Assignment problems **Unit III Project Scheduling by CPM/PERT**: Designing an activity network, Critical path calculations, Determination of floats, Program Evaluation and Review Technique (PERT). Cost-Time analysis of projects : crashing activities in a project. **Unit IV Deterministic and Stochastic inventory models-** Single & multi period models with continuous & discrete demands, Service level & reorder policy **Unit V Simulations-**Simulation V/S mathematical modeling, Monte Carlo simulation, simulation language ARENA.	**BTCS 601Computer Network** Unit I Network layer-design issue, routing algorithms: Distance vector, link state, hierarchical, Broadcast routing. Congestion control: congestion prevention policies, congestion control in Datagram subnets, load shedding, jitter control, Leaky bucket and token bucket algorithms. Unit II Internetworking: Differences in networks, Tunneling, Internetwork routing, Fragmentation Network layer in the Internet: IPv4 classful and	Code Change

			classless addressing, subnetting Network layer protocols(only working and purpose; packet headers etc. not included), Differences in IPV6 over IPV4. Routing to Mobile Hosts and Mobile IP Unit III Elements of transport protocols: addressing, connection establishment and release, flow control and buffering, multiplexing and demultiplexing, crash recovery, introduction to UDP protocol. Principles of Reliable Data Transfer: Reliable data transfer over a perfectly reliable channel, Channel with bit errors and Lossy Channel with bit errors. Unit IV Transport Layer in the Internet: Introduction to TCP, TCP service Model, TCP Header and segment structure, TCP connection establishment and release, transmission policy, timer management, Transactional TCP. Mobile TCP TCP Congestion Control: Fairness, TCP delay modeling. Unit V Application Layer: World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP), Introduction to Network security. P2P File Sharing: Centralized Directory, Query flooding, exploiting heterogeneity.	
	BTCS	**BTCS 602 Operating Systems and Unix Administration** **UNIT 1: Introduction to Operating**	**BTCS 602 Design and Analysis of Algorithms**	Code Change

	602	**Systems**, Operating system services, Role of Operating System as resource manager, multiprogramming, time-sharing system, storage structures, system calls, multiprocessor system. Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/0 devices Organization, I/0 devices organization, I/0 devices organization, I/0 buffering. **UNIT2: Process concept**, process scheduling, operations on processes, Threads:overview,benefitsofthreads,userand kernelthreads, inter-process communication, precedence graphs, critical section problem, semaphores, classical problems of synchronization. Deadlock Problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from Deadlock, Methods for deadlock handling. **UNIT 3: Concepts of memory management**, logical and physical address space, swapping, contiguous and non-contiguous allocation, paging, segmentation, and paging combined with segmentation. Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, Demand segmentation. Security threads protection intruders-Viruses-trusted system. **UNIT 4: Disk scheduling**, file concepts, file access methods, allocation methods, directory systems, file protection, Introduction to distributed systems and parallel processing case study. **UNIT 5: UNIX Administration**: Introduction to networking concept, Network basics, Sharing information, Topology, Protocols, Types of network, Networking devices, Internetworking: concept, Architecture and protocols. Using the VI Editor, Defining Shell Scripting Concepts, Using the tr Command to Translate Letters, Using the case Statement, Creating a Custom Function, Using the sed and awk Commands Controlling the UNIX System, Becoming the Root User, Controlling Multiple Processes. Relocating Files and Directories, Archiving Files and Directories, Restoring Files and Directories	Unit I BACKGROUND: Review of Algorithm Complexity, Order Notations: definitions and calculating complexity. DIVIDE AND CONQUER METHOD: Binary Search, Merge Sort, Quick sort and Strassen's matrix multiplication algorithms. GREEDY METHOD: Knapsack Problem, Job Sequencing, Optimal Merge Patterns and Minimal Spanning Trees. Unit II DYNAMIC PROGRAMMING: Matrix Chain Multiplication. Longest Common Subsequence and 0/1 Knapsack Problem. BRANCH AND BOUND: Traveling Salesman Problem and Lower Bound Theory. Backtracking Algorithms and queens problem. Unit III PATTERN MATCHING ALGORITHMS: Naïve and Rabin Karp string matching algorithms, KMP Matcher and Boyer Moore Algorithms. ASSIGNMENT PROBLEMS: Formulation of Assignment and Quadratic Assignment Problem. Unit IV RANDOMIZED ALGORITHMS. Las Vegas algorithms, Monte Carlo algorithms, randomized algorithm for Min-Cut, randomized algorithm for 2-SAT. Problem definition of Multicommodity flow, Flow shop scheduling and Network capacity assignment problems. Unit V PROBLEM CLASSES NP, NP-HARD	

			AND NP-COMPLETE: Definitions of P, NP-Hard and NP-Complete Problems. Decision Problems. Cook's Theorem. Proving NP-Complete Problems - Satisfiability problem and Vertex Cover Problem. Approximation Algorithms for Vertex Cover and Set Cover Problem.	
	BTCS 603	**BTCS 603 Computer Network** **UNIT 1:** Network: Network Protocols, Edge, Access Networks and Physical Media, Protocol Layers and their services models, Internet Backbones, NAP's and ISPs. **UNIT II** Application Layer: Protocol and Service provided by application layer, transport protocols. The World Wide Web. HTTP, Message formats, User Server Interaction and Web caches. FTP commands and replies. Electronic Mail, SMTP, Mail Message Formats and MIME and Mail Access Protocols DNS The internet's directory service DNS records and Message. **UNIT III** Transport Layer: Transport Layer Service and Principles, Multiplexing and Demultiplexing applications, Connectionless Transport. UDP Segment structure and UDP Checksum. Principles of Reliable Data Transfer-Go back to N and Selective Repeat. Connection Oriented Transport TCP Connection and Segment Structure, Sequence Numbers and acknowledgement numbers, Telnet, Round trip time and timeout. TCP connection management. **UNIT IV** Network Layer and Routing: Network service model, routing principles. Link State routing Algorithm, A distant Vector routing & OSPF algorithm. Router Components; Input Prot, Switching fabric and output port. IPV6 Packet Format. Point To Point Protocol (PPP), transition States, PPP Layers-Physical Layer and Data Link Layer, Link Control Protocols. LCP Packets and options. Authentication PAP and CHAP, **UNIT V** Sonet/SDH Synchronous Transport Signals. Physical configuration-SONET Devices, Sections, Lines and Paths. SONET Layers-Photonic Layer, section layer, line layer, path layer and device layer relationship. Sonnet Frame Format. Network Control Protocol (NCP). Introduction to Cell Switched Networks e.g Asynchronous Transfer Mode (ATM) and	**BTCS 603 THEORY OF COMPUTATION** **Unit I** Finite Automata & Regular Expression: Basic Concepts of finite state system, Deterministic and non-deterministic finite automation and designing regular expressions, relationship between regular expression & Finite automata minimization of finite automation mealy & Moore Machines. **Unit II** Regular Sets of Regular Grammars: Basic Definition of Formal Language and Grammars. Regular Sets and Regular Grammars, closure proportion of regular sets, Pumping lemma for regular sets, decision Algorithms for regular sets, Myhell_Nerod Theory & Organization of Finite Automata. **Unit III** Context Free Languages& Pushdown Automata: Context Free Grammars – Derivations and Languages – Relationship between derivation and derivation trees – ambiguity – simplification of CEG – Greiback Normal form – Chomsky normal forms – Problems related to CNF and GNF Pushdown Automata: Definitions – Moves – Instantaneous descriptions –	Code Change

		Packet Switched Networks.	Deterministic pushdown automata – Pushdown automata and CFL - pumping lemma for CFL - Applications of pumping Lemma. **Unit IV** Turing Machines: Turing machines – Computable Languages and functions – Turing Machine constructions – Storage in finite control – multiple tracks – checking of symbols – subroutines – two way infinite tape. Undecidability: Properties of recursive and Recursively enumerable languages – Universal Turing Machines as an undecidable problem – Universal Languages – Rice's Theorems. **Unit V** Linear bounded Automata Context Sensitive Language: Chomsky Hierarchy of Languages and automata, Basic Definition & descriptions of Theory & Organization of Linear bounded Automata Properties of context-sensitive languages	
	BTCS 604	**BTCS 604 Advanced Data Structures** **UNIT I: ADVANCED TREES:** Definitions Operations on Weight Balanced Trees (Huffman Trees),2-3 Trees and Red-Black Trees. Augmenting Red-Black Trees to Dynamic Order Statics and Interval Tree Applications. Operations on Disjoint sets and its union-find problem Implementing Sets. Dictionaries, Priority Queues and Concatenable Queues using 2-3 Trees. **UNIT II: MERGEABLE HEAPS :** Mergeble Heap Operations, Binomial Trees Implementing Binomial Heaps and its Operations, 2-3-4. Trees and 2-3-4 Heaps. Structure and Potential Function of Fibonacci Heap Implementing Fibonacci Heap. **UNIT III: GRAPH THEORY DEFINITIONS :**Definitions of Isomorphism Components. Circuits, Fundamental Circuits, Cut-sets. Cut-Vertices Planer and Dual graphs, Spanning	**BTCS 604 Computer Graphics and Multimedia Techniques** **Unit I** Introduction to Raster scan displays, Storage tube displays, refreshing, flicking, interlacing, color monitors, display processors, resolution, Introduction to Interactive. Computer Graphics: Picture analysis, Overview of programmer's model of interactive graphics, Fundamental problems in geometry. Scan Conversion: point, line, circle, ellipse polygon, Aliasing, and introduction to Anti Aliasing (No anti aliasing algorithm).	Code Change

		Trees, Kuratovski's two Graphs. **UNIT IV: GRAPH THEORY ALGORITHMS :** Algorithms for Connectness, Finding all Spanning Trees in a Weighted Graph and Planarity Testing Breadth First and Depth First Search, Topological Sort, Strongly Connected Components and Articulation Point. Single source shortest path and all pair shortest path algorithms. Min-Cut Max-Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms. **UNIT V: NUMBER THEORITIC ALGORITHM**: Number theoretic notation, Division theorem, GCD recursion, Modular arithmetic, Solving Linear equation, Chinese remainder theorem, power of an element, RSA public key Crypto system, primality Testing and Integer Factorization.	**Unit II** 2D & 3D Co-ordinate system: Homogeneous Co-ordinates, Translation, Rotation, Scaling, Reflection, Inverse transformation, Composite transformation. Polygon Representation, Flood Filling, Boundary filling. Point Clipping, Cohen-Sutherland Line Clipping Algorithm, Polygon Clipping algorithms. **Unit III** Hidden Lines & Surfaces: Image and Object space, Depth Buffer Methods, Hidden Facets removal, Scan line algorithm, Area based algorithms.Curves and Splines: Parametric and Non parametric Representations, Bezier curve, BSpline Curves. **Unit IV** Rendering: Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV **Unit V** Multimedia components, Multimedia Input/Output Technologies: Storage and retrieval technologies, Architectural and telecommunication considerations.Animation: Introduction, Rules, problems and Animation techniques.	
	BTCS 605	**BTCS 605 Advance Computer Architecture** **UNIT I Fundamentals:** Computational models, concept of computer architecture, Von Newmann architecture. Harvard Computer Architecture, Von newmann vs Harvard computational Model **UNIT II** Linear pipeline processor,	**BTCS 605 Embedded System Design** **Unit I** Introduction to embedded systems hardware needs; typical and advanced, timing diagrams, memories (RAM, ROM,	Code Change

		nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction Pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines Throughput improvement, VLIW architectures. **UNIT III RISC and CISC architectures**: **Arithmetic for Computers:** RISC design versus CISC design. **Instruction level data-parallel architectures**: Conditions of parallelism, Data and resource Dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, SIMD, vector architectures. **UNIT IV Interconnection networks**: Network topology, Static NW, Interconnection design decisions. Multiprocessors and multicomputer, various classifications & Architecture of Multiprocessor and Multicomputer Common interconnection Structures, **UNIT V Data Flow computers**: Introduction, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms Data Flow Program Graph, Activity Template, Scheme, Implementation, Pipelining in Data Flow Programs, Basic Mechanism, Data Flow Multiprocessor, Token labeling, MIT architecture.	EPROM). Tristate devices, Buses, DMA, UART and PLD's. Built-ins on the microprocessor. **Unit II** Interrupts basics, ISR;Context saving, shared data problem. Atomic and critical section, Interrupt latency. Survey of software architectures, Round Robin, Function queue scheduling architecture, Use of real time operating system. **Unit III** RTOS, Tasks, Scheduler, Shared data reentrancy, priority inversion, mutex binary semaphore and counting semaphore. Inter task communication, message queue, mailboxes and pipes, timer functions, events. Interrupt routines in an RTOS environment. **Unit IV** Embedded system software design using an RTOS. Hard real-time and soft real time system principles, Task division, need of interrupt routines, shared data. **Unit V** Embedded Software development tools. Host and target systems, cross compilers, linkers, locators for embedded systems. Getting embedded software in to the target system. Debugging techniques. Testing on host machine, Instruction set emulators, logic analysers. In-circuit emulators and monitors. Regional	
	BTCS 606A	**BTCS 606A Artificial Intelligence** **UNIT I** Introduction to AI, Various types of production systems, Characteristics of production systems, Study and comparison	**BTCS 606A Advance Topics in Operating Systems** Unit I	New Course

		of breadth first search and depth first search. Techniques, Other Search Techniques like hill Climbing, Best first Search. A algorithm, AO algorithms etc, and various types of control strategies. **UNIT II** Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning. **UNIT III** Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning. **UNIT IV** Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem in robotics, Introduction to understanding and Natural Languages Processing. **UNIT V** Introduction to learning, Various techniques used in learning, introduction to Neural Networks, applications of Neural Networks, common sense reasoning, some example of Expert systems.	ADVANCED TREES: Definitions, Operations on Weight Balanced Trees (Huffman Trees), 2-3 Trees and Red- Black Trees. Dynamic Order Statistics, Interval Tree; Dictionaries. Unit II MERGEABLE HEAPS: Mergeable Heap Operations, Binomial Trees, Implementing Binomial Heaps and its Operations, 2-3-4. Trees and 2-3-4 Heaps. Amortization analysis and Potential Function of Fibonacci Heap, Implementing Fibonacci Heap. Unit III GRAPH THEORY DEFINITIONS: Definitions of Isomorphic Components. Circuits, Fundamental Circuits, Cut-sets. Cut- Vertices Planer and Dual graphs, Spanning Trees, Kuratovski's two Graphs. GRAPH THEORY ALGORITHMS: Algorithms for Connectedness, Finding all Spanning Trees in a Weighted Graph, Breadth First and Depth First Search, Topological Sort, Strongly Connected Components and Articulation Point. Single Min-Cut Max-Flow theorem of Network Flows. Ford-Fulkerson Max Flow Algorithms. Unit IV SORTING NETWORK: Comparison network, zero-one principle, bitonic sorting and merging network sorter. Priority Queues and Concatenable Queues using 2-3 Trees. Operations on Disjoint sets and its union-find problem, Implementing Sets. Unit V NUMBER THEORITIC ALGORITHM:	

			Number theoretic notions, Division theorem, GCD, recursion, Modular arithmetic, Solving Modular Linear equation, Chinese Remainder Theorem, power of an element, Computation of Discrete Logarithms, primality Testing and Integer Factorization.	
	BTCS 606B	**BTCS 606B Advanced DBMS** **Unit I** Introduction, Parallel database architecture, speedup, scale-up I/O parallelism, Inter-query and Intra-query parallelism, Inter-operational and Intra-operational parallelism, parallel query evaluation, Design of parallel systems, Implementation issues of Parallel query evaluation, Design of parallel systems, Comparison of Inter-query and Intra-query parallelism. **Unit II** Distributed Databases, Study of DDBMS architectures, Comparison of Homogeneous and Heterogeneous Databases, Analysis of Concurrency control in distributed databases, Implementation of Distributed query processing. Distributed data storage, Distributed transactions, Commit protocols, Availability, Distributed query processing, Directory systems-l dap, Distributed data storage and transactions. **Unit III** Overview of client server architecture, Databases and web architecture, N-tier architecture, XML, Introduction, Structure of XML Data, XML Document Schema, DTD, Querying and Transformation: XQuery, FLOWR, XPath, XML validation, Web server, API to XML, Storage of XML Data, XML Applications: web services, Web based system, Implementation of XML validations, Use of web servers. XML and DTD implementation, Use of Web service like Amazon web service or Microsoft Azure. **Unit IV** Information retrieval - overview, Relevance ranking using terms and hyperlinks, synonyms, homonyms, ontologies, Indexing of documents, measuring retrieval effectiveness, web search engines, Information retrieval and structured data. Information Retrieval, Study and Comparison of Synonyms, Homonyms, Ontologies. Implementation issues of Relevance ranking Algorithm. **Unit V** Database security - Security and	**BTCS 606B Artificial Intelligence** **Unit I** Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies. Unit II Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning. Unit III Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning. Unit IV Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning, Study of the block world problem	**Code Change**

		integrity threats, Defence mechanisms, Statistical database auditing & control. Security issue based on granting/revoking of privileges, Introduction to statistical database security. PL/SQL Security – Locks – Implicit locking, types and levels of locks, explicit locking, Oracles' named Exception Handlers.	in robotics, Introduction to understanding and natural languages processing. Unit V Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.	
	BTCS 606C	**BTCS 606C Advanced PHP** **UNIT I** Introduction to PHP, Data types in PHP, Variables, Constants, operators and Expressions. PHP Operator, Arrays, User defined functions and inbuilt functions, String Function, Math Function, Date Function and Miscellaneous Function. Working with Forms: Get and Post Methods, Query strings, HTML form controls and PHP, Maintaining User State: Cookies, Sessions. **UNIT II** PHP Database Connectivity: Introduction to MYSQL, Creating database and other operations on database, connecting to a database, Use a particular database, Sending query to database, Parsing of the query results, Checking data errors. **UNIT III** PHP Advanced Data Validation, Error Handling, PHP AJAX - XML, PHP PEAR Mail, PHP Zip, Handling CSV data, PHP XML Handling **UNIT IV** Introduction to Object Oriented Programming in PHP, Classes and Objects, Abstraction, Encapsulation, Inheritance and Polymorphism , Constructors and Destructors, Overloading, Overriding of functions, Exception Handling, Regular Expressions, Session Handling ,Using Cookies. **UNIT V** Introduction to PHP frameworks. Introduction to cakePHP and Code Igniter. Introduction to Content Management System, how to configure the CMS, Working with the CMS, Sample Web Application Development using Word press.	**BTCS 606C** Human Computer Interface Unit I The Human: input-output channels, Human memory, thinking, emotions, individual differences, psychology and the design of interactive systems.The Computer: Text entry devices with focus on the design of key boards, positioning, pointing and drawing, display devices. The Interaction: Models of interaction, ergonomics, interaction styles, elements of WIMP interfaces, interactivity, experience, engagement and fun. Paradigms for Interaction. Unit II Design Process: The process of design, user focus, scenarios, navigation design screen design and layout, iteration & prototyping. Usability Engineering Design rules: Principles to support usability, standards, guidelines, rules and heuristics, HCI patterns. Unit III Evaluation Techniques: Definition and goals of evaluation, evaluation through expert analysis and user participation, choosing an evaluation method.User support, requirement, approaches, adaptive	New Course

			help systems, designing user support systems Unit IV Cognitive methods: Goals and task hierarchies, linguistic models, challenges of display based systems, physical and device models, cognitive architectures. Unit V Communications and collaborations models: Face to Face communication, conversations, Text based communication, group working.Task Analysis: Differences between task analysis and other techniques, task decomposition, knowledge based analysis, ER based analysis, sources of information and data collection, use of task analysis.	
	BTCS 606D	**BTCS 606D Principles of Programming Languages** **UNIT I:** Programming Language: Definition, History, Features. Issues in Language Design: Structure and Operation of computer, Programming Paradigms. Efficiency, Regularity. Issues in Language Translation: Syntax and Semantics. **UNIT II:** Specifications and Implementation of Elementary and Structured Data Types. Type equivalence, checking and conversion. Vectors and Arrays, Lists, Structures, Sets, Files. **UNIT III:** Sequence control with Expressions, Conditional Statements, Loops, Exception handling. Subprogram definition and activation, simple and recursive subprogram, subprogram environment. **UNIT IV:** Scope – Static and Dynamic, Block structures, Local Data and Shared Data, Parameters and Parameter Transmission. Local and Common Environments, Tasks and Shared Data. **UNIT V:** Abstract Data type, information hiding, encapsulation, type definition. Static and Stack-Based Storage management. Fixed and Variable size heap storage management, Garbage Collection.		

	BTCS 606E	**BTCS 606E E- Commerce** **UNIT I:** Overview: Definition, scope of electronic commerce, trade cycle, electronic markets, electronic data interchange, Internet commerce and e-commerce perspectives. **Business Strategy and B to B e-commerce**: Porter value chain model, inter organizational value chains, Porter model for competitive forces, e-commerce implementation and evaluation, inter organizational transactions, transaction types, credit transaction trade cycle, case study of airline booking system. **UNIT II**: Electronic Data Interchange: definition and benefits, technology, standards, communications, implementations, agreements and securities, trading patterns and transactions. E-commerce Framework: Framework, e-commerce media convergence, anatomy of e-commerce, consumer applications. **UNIT III:** E-commerce and World Wide Web: Architectural Framework for e-commerce, World Wide Web as the architecture, web background-hypertext publishing, technology behind the web, securities and the web, E-commerce Website development. **Electronic Payment Systems**: Types of payment systems based on-electronic, digital token, smart cards and credit card, risk in electronic payment systems, desiging of electronic payment systems. **UNIT IV: ERP:** Needs and Evolution of ERP Systems, Benefits of ERP, ERP and Related Technologies: Data Warehousing, Data Mining, On-line Analytical Processing (OLAP), Supply Chain Management. ERP Domain, ERP Modules, ERP Market, identification of suitable platforms, Present global and Indian market scenario, ERP implementation life cycle, Evolution, Maintenance and Retirement phases Framework for evaluating ERP acquisition, Role of consultants, vendors and users in ERP implementation, Implementation vendors evaluation criterion, ERP Implementation approaches and methodology, ERP Implementation strategies, ERP Customization, ERP-A manufacturing Perspective. **UNIT V:** ERP & E-Commerce: Future Directives- in ERP, ERP and Internet, Integrating ERP into organizational culture, guidelines for ERP Implementations.		
	BTCS 607	**BTCS 607 Operating Systems (Linux Programming and Administration) Lab** Q1. Study and practice the following-	**BTCS 607 Java Programming Lab**	Code Change

		1. cal 2. date 3. echo4. passwd 5. who 6. tty 7. pwd 8. cd 9. mkdir 10. rmdir 11. ls 12. cat 13. cp 14. rm 15. mv 16. more 17. wc 18. Cmp Q2. Study and practice the following- 1. chmod 2. head 3. tail 4. cut 5. paste 6. sort 7. uniq Q3. Study the grep, sed and awk. Q4. Study the vi Editor. Q5. Write a shell script to generate different types of star/text pattern- ** **** ****** ******** ******** ****** **** ** Q6. Write a shell script to swap values of two variables x and y. Q7. Write a shell script to generate the table for a given number. Q8. Write a shell script to simulate a simple calculator. Q9. Write a shell script to read three numbers and find the greatest among them. Q10. Write a shell script to verify whether the given number is Armstrong or not. Q11. Write a shell script to generate a pyramid of numbers. Q12. Write a shell script to generate Fibonacci series.	1. Develop an in depth understanding of programming in Java: data types, variables, operators, operator precedence, Decision and control statements, arrays, switch statement, Iteration Statements, Jump Statements, Using break, Using continue, return. 2. Write Object Oriented programs in Java: Objects, Classes constructors, returning and passing objects as parameter, Inheritance, Access Control, Using super, final with inheritance Overloading and overriding methods, Abstract classes, Extended classes. 3. Develop understanding to developing packages & Interfaces in Java: Package, concept of CLASSPATH, access modifiers, importing package, Defining and implementing interfaces. 4. Develop understanding to developing Strings and exception handling: String constructors, special string operations, character extraction, searching and comparing strings, string Buffer class. Exception handling fundamentals, Exception types, uncaught exceptions, try, catch and multiple catch statements. Usage of throw, throws and finally. 5. Develop applications involving file handling: I/O streams, File I/O. 6. Develop applications involving concurrency: Processes and Threads, Thread Objects, Defining and Starting a Thread, Pausing Execution with Sleep, Interrupts, Joins, and Synchronization. 7. Develop applications involving Applet: Applet Fundamentals, using paint method and drawing polygons.	
	BTCS 608	**BTCS 608 Computer Network Lab**	BTCS 608 **Computer Graphics &**	

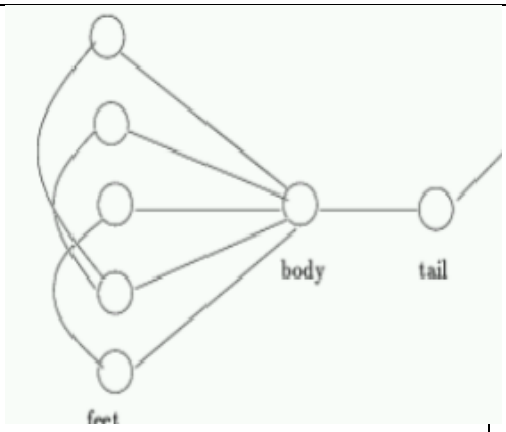
		1. To Prepare Network cable for connecting two devices. • Striate cable • Cross cable **2.** How to configure VLAN. **3**. Design Various topology (Ring , Star & Mesh) and ping the network using networking H/W devices **4.** What is Socket? Make a TCP client socket to communicate with the server **5.** What is server socket? Make a TCP server socket to communicate with the Client **6.** Write a program to UDP client. **7.** Write a program to UDP server. And establish the connection between them. **8.** How to configure the switches. **9.** How to configure the firewalls. **10**. What is NIC.? How we can set the NIC in your computer **11.** How we can use the following command • telnet • ping • sub netting • Allotment of IP addresses • How we can measure the network performance. **12**. Design Wireless topology on virtual simulation S/W and ping the network	**Multimedia Lab** 1 Implementation of Line, Circle and ellipse attributes 2 Two Dimensional transformations – Translation, Rotation, Scaling, Reflection, Shear 3 Composite 2D Transformations 4 Cohen Sutherland 2D line clipping and Windowing 5 Sutherland – Hodgeman Polygon clipping Algorithm 6 Three dimensional transformations – Translation, Rotation, Scaling 7 Composite 3D transformations 8 Drawing three dimensional objects and Scenes 9 Generating Fractal images 10 To plot a point (pixel) on the screen 11 To draw a straight line using DDA Algorithm 12 Implementation of mid-point circle generating Algorithm 13 Implementation of ellipse generating Algorithm 14 To translate an object with translation parameters in X and Y directions 15 To scale an object with scaling factors along X and Y directions 16 To rotate an object with a certain angle about origin 17 Perform the rotation of an object with certain angle about an arbitrary point	
	BTCS 609	**BTCS 609 ADVANCED DATA STRUCTURES LAB** Objectives: • To make the student learn a object oriented way of solving problems. • To make the student write ADTS for all data structures. • To make the student learn different algorithm design techniques. **Week1-** C programs to implement the	**BTCS 609 Design and Analysis of Algorithms Lab.** Objectives: Upon successful completion of this course, students should be able to: • Prove the correctness and analyze the running time of the basic algorithms for	Code Change

		following using an array. a) Stack ADT b) Queue ADT **Week2-** Write C programs to implement the following using a singly linked list. a) Stack ADT b) Queue ADT **Week3-** Write C programs to implement the deque (double ended queue) ADT using a doubly linked list and an array. **Week 4-**Write a C program to perform the following operations: a) Insert an element into a binary search tree. b) Delete an element from a binary search tree. c) Search for a key element in a binary search tree. **Week5-**.Write C programs that use non-recursive functions to traverse the given binary tree in a) Preorder b) inorder and c) postorder. **Week6-**.Write C programs for the implementation of bfs and dfs for a given graph. **Week7-** Write C programs for implementing the following sorting methods: a) Merge sort b) Heap sort **Week8-**.Write a C program to perform the following operations a) Insertion into a B-tree b) Deletion from a B-tree **Week9-**.Write a C program to perform the following operations a) Insertion into an AVL-tree b) Deletion from an AVL-tree **Week10-**Write a C program to implement Kruskal's algorithm to generate a minimum cost spanning tree. **Week11-**Write a C program to implement Prim's algorithm to generate a minimum cost spanning tree.	those classic problems in various domains; • Apply the algorithms and design techniques to solve problems; • Analyze the complexities of various problems in different domains. Suggested Tools: For implementation and estimation of running time on various sizes of input(s) or output(s) as the case may be, Linux platform is suggested. Suggested Exercises: A. It is expected that teachers will assign algorithms to the students for estimation of time & space complexity. Algorithms reported in various research journals may be chosen by the teachers. B. Problem on designing algorithms to meet complexity constraints may be assigned. For example, a problem on design, analysis and implementation for transposing a sparse matrix requiring not more than one pass from the original matrix may be assigned. C. A guide to such problems is given below: 1. Exploring a Binary Heap: Consider a binary heap containing n numbers (the root stores the greatest number). You are given a positive integer $k < n$ and a number x. You have to determine whether the kth largest element of the heap is greater than x or not. Your algorithm must take O(k) time. You may use O(k) extra storage. 2. Merging two search trees: You are given two height balanced binary search trees T and T', storing m and n elements respectively. Every element of tree T is smaller than every element of tree T'. Every node u also stores height of the subtree rooted at it. Using this extra information how can you merge the two trees in time O(log m + log n) (preserving both the	

			height balance and the order)? 3. Complete binary tree as an efficient data-structure: You are given an array of size n (n being a power of two). All the entries of the array are initialized to zero. You have to perform a sequence of the following online operations : (i) Add(i,x) which adds x to the entry A[i]. (ii) Report sum(i,j) = sum of the entries in the array from indices i to j for any $0 < i < j <= n$. It can be seen easily that we can perform the first operation in O(1) time whereas the second operation may cost O(n) in worst case. Your objective is to perform these operations efficiently. Give a data-structure which will guarantee O(log n) time per operation. 4. Problems on Amortized Analysis a. Delete-min in constant time!!! Consider a binary heap of size n, the root storing the smallest element. We know that the cost of insertion of an element in the heap is O(log n) and the cost of deleting the smallest element is also O(log n). Suggest a valid potential function so that the amortized cost of insertion is O(log n) whereas amortized cost of deleting the smallest element is O(1). b. Implementing a queue by two stack c. Show how to implement a queue with two ordinary stacks so that the amortized cost of each Enqueue and each Dequeue operation is O(1). 5. Computing a spanning tree having smallest value of largest edge weight: Describe an efficient algorithm that, given an undirected graph G, determines a spanning tree of G whose largest edge weight is minimum over all spanning trees of G.	

			6. Shortest Path Problems: i. From a subset of vertices to another subset of vertices a. Given a directed graph G(V,E), where edges have nonnegative weights. S and D are two disjoint subsets of the set of vertices. Give an O(|V| log |V| + |E|) time algorithm to find the shortest path among the set of paths possible from any node in S to any node in D. ii. Paths in Directed Acyclic Graph a. Counting the number of paths Given two nodes u,v in a directed acyclic graph G(V,E). Give an O(|E|) time algorithm to count all the paths from u to v. b. Path passing through a subset of nodes Given two nodes u,v and a set of vertices w1, w2,...,wk in a directed acyclic graph G(V,E). Give an O(|E|) time algorithm to output a path(if exists) from u to v which passes through each of the nodes w1,...,wk. If there is no such path then your algorithm must report that "no such path exists". 7.Searching for a friend: You are standing at a crossing from where there emerge four roads extending to infinity. Your friend is somewhere on one of the four roads. You do not know on which road he is and howf ar hei sf rom you. You have to walk to your friend and the total distance traveled by you must be at most a constant times the actual distance of your friend from you. In terminology of algorithms, you should traverse O(d) distance, where d is the distance of your friend from you. 8.A simple problem on sorted array: Design an O(n)-time algorithm that, given a real number x and a sorted array S of n numbers, determines whether or not there exist two elements in S whose sum is exactly x . 9. Finding the decimal dominant in linear	

			time: You are given n real numbers in an array. A number in the array is called a decimal dominant if it occurs more than n/10 times in the array. Give an O(n) time algorithm to determine if the given array has a decimal dominant. 10. Finding the first one: You are given an array of infinite length containing zeros followed by ones. How fast can you locate the first one in the array? 11. Searching for the Celebrity: Celebrity is a person whom everybody knows but he knows nobody. You have gone to a party. There are total n persons in the party. Your job is to find the celebrity in the party. You can ask questions of the form Does Mr. X know Mr. Y ?. You will get a binary answer for each such question asked. Find the celebrity by asking only O(n) questions. 12. Checking the Scorpion: An n-vertex graph is a scorpion if it has a vertex of degree 1(the sting) connected to a vertex of degree two (the tail) connected to a vertex of degree n-2 (the body) connected to the other n-3 (the feet). Some of the feet may be connected to other feet. Design an algorithm that decides whether a given adjacency matrix represents a scorpion by examining only O(n) entries.	

			 13.Endless list: You are having a pointer to the head of singly linked list. The list either terminates at null pointer or it loops back to some previous location(not necessarily to the head of the list). You have to determine whether the list loops back or ends at a null location in time proportional to the length of the list. You can use at most a constant amount of extra storage. 14. Nearest Common Ancestor: Given a rooted tree of size n. You receive a series of online queries: "Give nearest common ancestor of u, v ". Your objective is to preprocess the tree in O(n) time to get a data structure of size O(n) so that you can answer any such query in O(log n) time.	
	BTCS 610	**BTCS 610 Advance Computer Architecture Lab** **List of Experiments:** **1.** Write a program to execute three POSIX threads (P threads) simultaneously for Updating a text file. **2.** Write a program for synchronizing POSIX threads (P threads) using • Semaphore • Mutex **3.** Write a program to create child process & Parent Process **4.** Write a program to find child process Id & Parent Process ID **5.** Write a program to implement Pipelining **6.** Write an algorithm and program to perform matrix multiplication of two n * n matrices On the 2-D mesh SIMD model.	**BTCS 610Embedded System Design Lab**. Course Objectives Upon successful completion of the course, students will be able to design simple embedded systems and develop related software. Students also learn to work in a team environment and communicate the results as written reports and oral presentations. Suggested Microcontroller Platform: Texas Instruments MSP430, ARM 9, 68HC12, 8051. It is assumed that there are 14 weeks in the	New Course

		7. Write an algorithm and program to perform matrix multiplication of two n * n matrices On Hypercube SIMD Model **8.** Write an algorithm and program for Block oriented Matrix Multiplication on Multiprocessor system. **9.** Configure a serial interface on each of two routers so that they can communicate. **10.** Configure an Ethernet interface on the router with an IP address and a subnet	semester and about 5 to 6 experiments will be carried out. More experiments are provided to bring in variation. 1. Get familiar with the microcontroller kit and the development software. Try the sample programs that are supplied to get familiar with the Microcontroller. 2. a) Blink an LED which is connected to your microcontroller using the built-in timer in the microcontroller. Assume that the LED should be on for x milliseconds and off for y milliseconds; assume that these values are stored in memory locations X and Y. We should be able to change the value of x and y and rerun the program. b) Consider an alternate way to program this application. Here, the microcontroller turns the LED on and waits in a busy loop to implement a delay of x milliseconds. Then it turns the LED off and waits in a busy loop to implement a delay of y milliseconds. How do you compare these two solutions? 3. Assume that in Experiment #1, the values of x and y have been chosen to be 200 and 500 respectively. When the LED blinking program	

			runs, pressing a key on the keyboard should generate an interrupt to the microcontroller. If the key that has been pressed is a numeric key, the value of x and y must be interchanged by the interrupt service routine. If the key that has been pressed is not a numeric key, then the LED must be turned off for 2 seconds before resuming the blinking. 4. If your microcontroller kit has an LCD interface, write a program to display a character string on the LCD. Assume that the string is stored at a location 5. STRING and consists of alphanumeric characters. The string is null- terminated. Modify your program to scroll the displayed string from left to right. 6. Modern microcontrollers usually have an in-built Digital-to-Analog and Analog- to-Digital converter. Use the built-in DAC to generate voltage waveforms such as (a) pulse train (b) triangular waveform (c) sinusoidal waveform. Observe these waveforms on an oscilloscope. 7. Your microcontroller may have a built-in temperature sensor. If not, interface an external temperature sensor to the microcontroller. Write a program to take several measurements of temperature at regular intervals and display the average temperature on the LCD display. Test if the readings change when the ambient temperature changes.	

			8. Your microcontroller may have a built-in ADC. Build a voltmeter that can measure stable voltages in a certain range. The measured value must be displayed on the LCD display. Measure the same voltage using a multimeter and record the error in measurement. Tabulate the error for several values of the voltage. 9. Build a simple security device based on the microcontroller kit. Interface an external motion sensor to the microcontroller. An alarm must be generated if motion is sensed in a specified region. There must be a provision to record the time at which the intrusion was detected. Similarly, there must be a provision to turn the alarm off by pressing a key. 10. A voltage waveform v(t) is available as an input to the microcontroller. We must continuously check the waveform and record the maximum value of the waveform and display the maximum value on the LCD display. Test the program by using a DC supply to generate v(t) and varying the DC value.	
	BTCS 611		**Humanities and Social Sciences** 1. India-brief history of Indian constitution ,framing-features fundamental rights,duties,directive principles of states,History of Indian National movement,Socio	**New course**

			economic growth after independence. 2. Society-Social groups-concepts and types,socialization-concept theory,social control:concept,social problem in contempory India,status and role. 3. The fundamental of Economics-meaning,definition animportance of economics,Logic of choice,central economic problems,positive and normative approaches,economic systemssocialism and capitalism. 4. Microeconomics-Law of demand and supply,utility approach,indifferencecurves,elasti city of demand & supply and applications,consumer surplus,Law of returns to factors and returns to scale. 5. Macroeconomics- concept relating to National product-National income and its measurement,simple Keynesian theory,simple multiplier, money and banking.Meaning,concept of international trade,determination of exchange rate,Balance of payments.	
	BTCS 612		Discipline & Extra Curricular Activities	**New Course**
	BTCS 701	Practical Training & Seminar	**Cloud Computing** Unit I Introduction Cloud Computing: Nutshell of cloud computing, Enabling Technology, Historical development, Vision, feature Characteristics and components of Cloud Computing. Challenges, Risks and Approaches of Migration into Cloud.	**New Course**

			Ethical Issue in Cloud Computing, Evaluating the Cloud's Business Impact and economics, Future of the cloud. Networking Support for Cloud Computing. Ubiquitous Cloud and the Internet of Things. Unit II Cloud Computing Architecture: Cloud Reference Model, Layer and Types of Clouds, Services models, Data center Design and interconnection Network, Architectural design of Compute and Storage Clouds. Cloud Programming and Software: Fractures of cloud programming, Parallel and distributed programming paradigms-MapReduce, Hadoop , High level Language for Cloud. Programming of Google App engine. Unit III Virtualization Technology: Definition, Understanding and Benefits of Virtualization. Implementation Level of Virtualization, Virtualization Structure/Tools and Mechanisms , Hypervisor VMware, KVM, Xen. Virtualization: of CPU, Memory, I/O Devices, Virtual Cluster and Resources Management, Virtualization of Server , Desktop, Network, and Virtualization of data-center. Unit IV Securing the Cloud : Cloud Information security fundamentals, Cloud security services, Design principles, Policy Implementation, Cloud Computing Security Challenges, Cloud Computing Security Architecture . Legal issues in cloud Computing. Data Security in Cloud: Business Continuity and Disaster Recovery , Risk Mitigation , Understanding and Identification of Threats in Cloud, SLA-Service Level Agreements, Trust Management. Unit V Cloud Platforms in Industry: Amazon web services , Google AppEngine, Microsoft Azure Design, Aneka: Cloud Application Platform -Integration of Private and Public Clouds Cloud applications: Protein structure prediction, Data Analysis, Satellite Image Processing, CRM and ERP ,Social networking . Cloud Application- Scientific Application, Business Application. Advance Topic in Cloud Computing: Federated Cloud/InterCloud, Third Party Cloud Services.	

	BTCS 702		Information System Security UNIT I Introduction to security attacks, services and mechanism, classical encryption techniques- substitution ciphers and transposition ciphers, cryptanalysis, stream and block ciphers. Modern Block Ciphers: Block ciphers principals, Shannon's theory of confusion and diffusion, fiestal structure, data encryption standard(DES), differential and linear cryptanalysis of DES, block cipher modes of operations, triple DES. UNIT II AES, RC6, random number generation. S-box theory: Boolean Function, S-box design criteria, Bent functions, Propagation and nonlinearity, construction of balanced functions, S-box design. UNIT III Public Key Cryptosystems: Principles of Public Key Cryptosystems, RSA Algorithm, security analysis of RSA, Exponentiation in Modular Arithmetic. Key Management in Public Key Cryptosystems: Distribution of Public Keys, Distribution of Secret keys using Public Key Cryptosystems. X.509 Discrete Logarithms, Diffie-Hellman Key Exchange. UNIT IV Message Authentication and Hash Function: Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MAC, MD5 message digest algorithm, Secure hash algorithm(SHA). Digital Signatures: Digital Signatures, authentication protocols, digital signature standards (DSS), proof of digital signature algorithm. Remote user Authentication using symmetric and Asymmetric Authentication. UNIT V Pretty Good Privacy. IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulation Security Payload in Transport and Tunnel mode with multiple security associations (Key Management not Included). Strong Password Protocols: Lamport's Hash, Encrypted Key Exchange.	Code Change
				Code Change

	BTCS 703		**Data Mining & Ware Housing** UNIT I Overview, Motivation(for Data Mining),Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data, (Binning, Clustering, Regression, Computer and Human inspection), Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation. UNIT II Concept Description: Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases. UNIT III What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods K-nearest neighbour classifiers, Genetic Algorithm. Cluster Analysis: Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering- CURE and Chameleon. Density Based Methods-DBSCAN, OPTICS. Grid Based Methods-STING, CLIQUE. Model Based Method – Statistical Approach, Neural Network approach, Outlier Analysis. UNIT IV Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Mining.	

			UNIT V Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.	
	BTCS 704		**Computer Aided Design for VLSI** UNIT I Complexity in microelectronic circuit design and Moore's Law, design styles - Fullcustom design, standard-cell design, Programmable Logic Devices, Field Programmable Gate Arrays, Design Stages, Computer-Aided Synthesis and Optimizations, design flow and related problems. UNIT II Boolean functions and its representations – co-factor, unite, derivatives, consensus and smoothing; tabular representations and Binary Decision Diagram (BDD), OBDD, ROBDD and Bryant's reduction algorithm and ITE algorithm. Hardware abstract models – structures and logic networks, State diagram, data-flow and sequencing graphs, hierarchical sequencing graphs. Compilation and behavioral optimizations. UNIT III Architectural Synthesis – Circuit description and problem definition, temporal and spatial domain scheduling, synchronization problem. Scheduling algorithms – ASAP and ALAP scheduling algorithms, scheduling under constraints, relative scheduling, list scheduling heuristic. Scheduling in pipelined circuits. UNIT IV Resource Sharing & Binding in sequencing graphs for resource dominated circuits, sharing of registers and busses; binding variables to registers. Two-level logic optimization principles – definitions and exact logic minimizations. Positional cube notations, functions with multi-valued logic. List-oriented manipulations. UNIT V Physical Design. Floor planning – goals and objectives. Channel definition, I/O and power planning. Clock Planning. Placement – goals and objectives. Placement algorithms. Iterative improvement algorithms. Simulated Annealing. Timing-	**New Course**

			driven Placement. Global routing – goals and objectives. Global routing methods. Timingdriven global routing. Detailed Routing – goals and objectives. Left-edge algorithm. Constraints and routing graphs. Channel routing algorithms. Via minimization. Clock routing, power routing, circuit extraction and Design Rule Checking.	
	BTCS 705		**Compiler Construction** UNIT I Compiler, Translator, Interpreter definition, Phase of compiler introduction to one pass & Multipass compilers, Bootstrapping, Review of Finite automata lexical analyzer, Input, buffering, Recognition of tokens, Idea about LEX: A lexical analyzer generator, Error handling. UNIT II Review of CFG Ambiguity of grammars, Introduction to parsing. Bottom up parsing, Top down parsing techniques, Shift reduce parsing, Operator precedence parsing, Recursive descent parsing predictive parsers. LL grammars & passers error handling of LL parser. LR parsers, Construction of SLR, Conical LR & LALR parsing tables, parsing with ambiguous grammar. Introduction of automatic parser generator: YACC error handling in LR parsers. UNIT III Syntax directed definitions; Construction of syntax trees, L-attributed definitions, Top down translation. Specification of a type checker, Intermediate code forms using postfix notation and three address code, Representing TAC using triples and quadruples, Translation of assignment statement. Boolean e xpression and control structures. UNIT IV Storage organization, Storage allocation, Strategies, Activation records, Accessing local and non local names in a block structured language, Parameters passing, Symbol table organization, Data structures used in symbol tables. UNIT V Definition of basic block control flow graphs, DAG representation of basic block,	Code Change

			Advantages of DAG, Sources of optimization, Loop optimization, Idea about global data flow analysis, Loop invariant computation, Peephole optimization, Issues in design of code generator, A simple code generator, Code generation from DAG.	
	BTCS 706A		Advance DataBase Management Systems UNIT I Query Processing and Optimization: Overview of Relational Query Optimization, System Catalog in a Relational DBMS, Alternative Plans, Translating SQL, Queries into Algebra, Estimating the Cost of a Plan, Relational Algebra Equivalences, Enumeration of Alternative Plans. [2] UNIT II Object Database Systems: Motivating Examples, Structured Data Types, Operations On Structured Data, Encapsulation and ADT's, Inheritance, Objects, OIDs and Reference Types, Database Design for an ORDBMS, ORDBMS Implementation Challenges, ORDBMS, Comparing RDBMS, OODBMS, and ORDBMS. UNIT III Parallel and Distributed Databases: Architectures for Parallel, Databases, Parallel Query Evaluation, Parallelizing Individual Operations, Parallel Query Optimization, Distributed DBMS Architectures, Storing Data in a Distributed DBMS, Distributed Catalog Management, Distributed Query Processing, Updating Distributed Data, Introduction to Distributed Transactions, Distributed Concurrency Control, Distributed Recovery. [2] UNIT IV Database Security and Authorization: Introduction to Database Security, Access Control, Discretionary Access Control-Grant and Revoke on Views and Integrity Constraints, Mandatory Access Control-Multilevel Relations and Polyinstantiation, Covert Channels, DoD Security Levels, Additional Issues Related to Security- Role of the Database Administrator, Security in Statistical Databases, Encryption. [2] UNIT V POSTGES: POSTGRES user interfaces, sql variations and extensions, Transaction	Code Change

			Management, Storage and Indexing, Query processing and optimizations, System Architectures. XML: Motivation, Structure of XML data, XML Document Schema, Querying and Transformation, Application Program Interface to XML, Storage of XML Data, XML applications. [2]	
	BTCS 706B		**Robotics** UNIT I Introduction -- brief history, types, classification and usage, Science and Technology of robots, Some useful websites, textbooks and research journals. UNIT II Elements of robots -- joints, links, actuators, and sensors Position and orientation of a rigid body, Homogeneous transformations, Representation of joints, link representation using D-H parameters, Examples of D-H parameters and link transforms, different kinds of actuators – stepper, DC servo and brushless motors, model of a DC servo motor, Types of transmissions, Purpose of sensors, internal and external sensors, common sensors – encoders, tachometers, strain gauge based force-torque sensors UNIT III Introduction, Direct and inverse kinematics problems, Examples of kinematics of common serial manipulators, workspace of a serial robot, Inverse kinematics of constrained and redundant robots, Tractrix based approach for fixed and free robots and multi-body systems, simulations and experiments, Solution procedures using theory of elimination, Inverse kinematics solution for the general 6R serial manipulator. UNIT IV Degrees-of-freedom of parallel mechanisms and manipulators, Active and passive joints, Constraint andloop-closure equations, Direct kinematics problem, Mobility of parallel manipulators, Closed-from and numerical solution, Inverse kinematics of parallel manipulators and mechanisms, Direct kinematics of Gough-Stewart platform. UNIT V Linear and angular velocity of links, Velocity propagation, Manipulator Jacobians for serial and parallel manipulators, Velocity ellipse and ellipsoids, Singularity analysis for serial and parallel manipulators, Loss and gain of	**New Course**

			degree of freedom, Statics of serial and parallel manipulators, Statics and force transformation matrix of a Gough-Stewart platform, Singularity analysis and statics.	
	BTCS 706C		**Data Compression Techniques** UNIT I Compression Techniques: Lossless, lossy, measure of performance, modeling & coding. Lossless compression: Derivation of average information, data models, uniquely decodable codes with tests, prefix codes, Kraft-Mc Millan inequality. Huffman coding: Algorithms, minimum variance Huffman codes, optimality, length extended codes, adaptive coding, Rice codes, using Huffman codes for lossless image compression. UNIT II Arithmetic coding with application to lossless compression. Dictionary Techniques: LZ77, LZ78, LZW Predictive coding: Burrows-Wheeler Transform and move-to-front coding, JPEG-LS Facsimile Encoding: Run length, T.4 and T.6 UNIT III Lossy coding- Mathematical preliminaries: Distortion criteria, conditional entropy, average mutual information, differential entropy, rate distortion theory, probability and linear system models. Scalar quantization: The quantization problem, uniform quantizer, Forward adaptive quantization, non-uniform quantization-Formal adopting quantization, companded Quantization Vector quantization: Introduction, advantages, The Linde-Ruzo-Grey algorithm, lattice vector quantization. UNIT IV Differential encoding – Introduction, Basic algorithm, Adaptive DPCM, Delta modulation, speech and image coding using delta modulation. Sampling in frequency and time domain, z-transform, DCT, DST, DWHT, quantization and coding of transform coefficient. UNIT V Sub band coding: Introduction, Filters, Basic algorithm, Design of Filter banks, G.722, MPEG. Wavelet based compression: Introduction, wavelets multi-resolution analysis and the scaling function implementation using	Code Change

			filters.	
	BTCS 707		Web Development Lab 1. Creation of HTML Files 2. Working with Client Side Scripting : VBScript, JavaScript 3. Configuration of web servers: Apache Web Server, Internet Information Server (IIS) 4. Working with ActiveX Controls in web documents 5. Experiments in Java Server Pages: Implementing MVC Architecture using Servlets, Data Access 6. Programming (using ADO), Session and Application objects, File System Management 7. Working with other Server Side Scripting: Active Server Pages, Java Servlets, PHP 8. Experiments in Ajax Programming 9. Developing Web Services 10. Developing any E-commerce application (Mini Project) 11. Application Development in cloud computing Environment 12. Experiment Using Open Source Tool e.g. ANEKA	**New Course**
	BTCS 708		**VLSI Physical Design Lab** VLSI Physical Design Automation is essentially the research, development and productization of algorithms and data structures related to the physical design process. The objective is to investigate optimal arrangements of devices on a plane (or in three dimensions) and efficient interconnection schemes between these devices to obtain the desired functionality and performance. Since space on a wafer is very expensive real estate, algorithms must use the space very efficiently to lower costs	**New Course**

			and improve yield. In addition, the arrangement of devices plays a key role in determining the performance of a chip. Algorithms for physical design must also ensure that the layout generated abides by all the rules required by the fabrication process. Fabrication rules establish the tolerance limits of the fabrication process. Finally, algorithms must be efficient and should be able to handle very large designs. Efficient algorithms not only lead to fast turn-around time, but also permit designers to make iterative improvements to the layouts. The VLSI physical design process manipulates very simple geometric objects, such as polygons and lines. As a result, physical design algorithms tend to be very intuitive in nature, and have significant overlap with graph algorithms and combinatorial optimization algorithms. In view of this observation, many consider physical design automation the study of graph theoretic and combinatorial algorithms for manipulation of geometric objects in two and three dimensions. However, a pure geometric point of view ignores the electrical (both digital and analog) aspect of the physical design problem. In a VLSI circuit, polygons and lines have inter-related electrical properties, which exhibit a very complex behavior and depend on a host of variables. Therefore, it is necessary to keep the electrical aspects of the geometric objects in perspective while developing algorithms for VLSI physical design automation. With the introduction of Very Deep Sub-Micron (VDSM), which provides very small features and allows dramatic increases in the clock frequency, the effect of electrical parameters on physical design will play a more dominant role in the design and development of new algorithms. (Source: Algorithms For VLSI Physical Design Automation, by Naveed A. Sherwani). The exercise should be such that the above objectives are met. Automation tools such as Synopsis/ Cadence are available in the area. However, to begin, the students shall be assigned exercises on route optimization, placement & floor planning. Small circuits may be taken & algorithms implemented. At a later stage, the students may use tools and design more complex circuits.	
	BTCS		**Compiler Design Lab**	**New Course**

	709		Objectives: At the end of the semester, the students should have clearly understood and implemented the following: 1. Develop an in depth understanding of system programming concept. Lexical analysis, syntax analysis, semantics analysis, code optimization, code generation. Language specification and processing 2. Develop an Understanding of Scanning by using concept of Finite state automaton. Parse tree and syntax tree, Top down parsing (recursive decent parsing, LL (1) parser) Bottom up parsing (operator precedence parsing) .Managing symbol table, opcode table, literal table, pool table 3. Develop an Understanding of Intermediate code form: Three address code, Polish notation (Postfix strings) 4. Develop an Understanding of Allocation data structure. Heaps 5. Develop an Understanding about Language processor development tools: LEX, YACC. Language processing activities (Program generation and execution) It is expected that each laboratory assignments to given to the students with an aim to In order to achieve the above objectives Indicative List of exercises: 1. Write grammar for a fictitious language and create a lexical analyzer for the same. 2. Develop a lexical analyzer to recognize a few patterns in PASCAL and C (ex: identifiers,	

			constants, comments, operators etc.) 3. Write a program to parse using Brute force technique of Top down parsing 4. Develop on LL (1) parser (Construct parse table also). 5. Develop an operator precedence parser (Construct parse table also) 6. Develop a recursive descent parser 7. Write a program for generating for various intermediate code forms i) Three address code ii) Polish notation 8. Write a program to simulate Heap storage allocation strategy 9. Generate Lexical analyzer using LEX 10. Generate YACC specification for a few syntactic categories 11. Given any intermediate code form implement code optimization techniques	
	BTCS 710		Project-I	Code Change
	BTCS 711		Practical Training*	Code Change/ Title Change
	BTCS 712		Discipline & Extra Curricular Activities	New Course
	BTCS 801	**BTCS 801 C# and .NET Programming** **UNIT 1:** Intorduction to .NET framework, the technologies that constitute the framework., components of .net framework, ,.Net Framework Architecture: Common Language Infrastructure (CLI). Know the role of the Common Type System (CTS), the Common Language Specification (CLS) and the Common Language Runtime (CLR), Understand the assembly, namespace, type distinction, Contrast single-file and multi-file assemblies, Know the role of the Common Intermediate Language (CIL), Platform independent .NET(Mono / Portable .NET distributions). **UNIT 2:** Introduction to C#: Introducing C#, **:** Language Fundamentals Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations. **UNIT 3:** Object Oriented Aspects of C#: Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator	**BTCS 801** Mobile Computing UNIT-I Mobile computing: Definitions, adaptability issues (transparency, Environmental Constraints, application aware adaptation), mechanisms for adaptation and incorporating adaptations. Mobility management: mobility management, location management principle and techniques, PCS location management Scheme. UNIT-II Data dissemination and management: challenges, Data dissemination, bandwidth allocation for publishing, broadcast disk scheduling, mobile cache maintenance schemes, Mobile Web Caching. Introduction to mobile middleware. UNIT-III Middleware for application development: adaptation, Mobile agents. Service Discovery Middleware: Service Discovery & standardization Methods (universally Unique Identifiers, Textual Description & using interfaces), unicast Discovery, Multicast Discovery & advertisement,	New Course

		Overloading, Delegates, Events, Errors and Exceptions. Application Development on .NET: Building Windows Applications, Accessing Data with ADO.NET. **UNIT 4:** Web Based Application Development on .NET: Programming Web Applications with Web Forms, ASP.NET Architecture, Control based Programming, User Interface Elements, Web Services. **UNIT 5:** The CLR and the .NET Framework: Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.	service catalogs, Garbage Collection, Eventing. UNIT-IV Mobile IP, Mobile TCP, Database systems in mobile environments, World Wide Web and mobility UNIT-V Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.	
	BTCS 802	**BTCS 802** **SOFTWARE TESTING & QUALITY ASSURANCE** **UNIT I Software Configuration Management:** SCM Process, Objects in Software configuration, Version Control, Change control, Configuration audit, Status reporting, SCM standards. **Software Quality Assurance:** Software Quality Concept, Software Control, Quality Assurance, Quality Assurance Analyst, Quality Factor, Quality Management, Methods of Quality Management, Core components of Quality, Cost Aspect of Quality. **UNIT II Testing Fundamental*:*** Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Software Testing Principles, Tester Role in Software Development, Artifacts of testing (Faults, Errors, and Failures), Characteristics of Testable Software , Test Characteristics, Limitations of Testing, Challenges in Software Testing, Testing and debugging, Verification, Validation, Test levels. **UNIT III Testing Techniques: White Box and Black Box Testing:** Different Testing Techniques, Differences between testing techniques ***Black Box Testing*:** Equivalence partitioning, Boundary value analysis, Input domain & Output domain, Special Value, Error based Cause-effect Graph, Comparison Testing. ***White Box Testing*:** Basis Path Testing, Cyclomatic Complexity, Control Structure Testing - Conditions Testing, Data Flow Testing, Loop Testing. **UNIT IV Testing Strategies:** unit test, Integration testing approaches, System testing, Validation Testing	**Digital Image Processing** UNIT-I Introduction to Image Processing: Digital Image representation, Sampling & Quantization, Steps in image Processing, Image acquisition, color image representation UNIT-II Image Transformation & Filtering: Intensity transform functions, histogram processing, Spatial filtering, Fourier transforms and its properties, frequency domain filters, colour models, Pseudo colouring, colour transforms, Basics of Wavelet Transforms UNIT-III Image Restoration: Image degradation and restoration process, Noise Models, Noise Filters, degradation function, Inverse Filtering, Homomorphism Filtering UNIT-IV Image Compression: Coding redundancy, Interpixel redundancy, Psychovisual redundancy, Huffman Coding, Arithmetic coding, Lossy compression techniques, JPEG Compression UNIT-V Image Segmentation & Representation: Point, Line and Edge Detection, Thresholding, Edge and Boundary linking, Hough transforms, Region Based Segmentation, Boundary representation, Boundary Descriptors, Regional	New Course

		Some Other Strategies: Performance Testing, Load Testing, Stress Testing, Security Testing, User Acceptance Testing, Alpha Testing, Beta Testing, Regression Testing, **UNIT V Test Planning:** Introduction of Test Plan, Need of test plan, The Level of Test Plan, Test Plan Document: Plan Identifier, Test Items, Software Risk Issues, Features to be Tested, Features not to be Tested, Features not to be Tested, Test Pass/Fail Criteria, Test Pass/Fail Criteria, Test Deliverables, Environmental Requirements, Staffing/Training Needs, Schedule of Test, Planning for Risks and Contingencies, Approvals, **Quality Standards:** Quality Models/Standards, Standards and guidelines, Types of Models, ISO Standards, CMM and CMMI, Six Sigma concepts, Quality Challenge, National Quality Awards.		
	BTCS 803	**BTCS 803 Compiler Design** **UNIT I:** Brief overview of the compilation process, structure of compiler &its different phases, introduction to one pass, Multi-pass, andCross compiler, Bootstrapping, Review of Finite automata lexical analyzer, buffering, Recognition of tokens, Idea about LEX: A lexical analyzer generator, Error handling. **UNIT II:** Review of CFG Ambiguity of grammars, Introduction to parsing. Bottom up parsing Top down parsing techniques, Shift reduce parsing, Operator precedence parsing, Recursive descent parsing,Predictive parsers. LL grammars &passers,Error handling of LL parser. LR parsers, Construction of SLR, Conical LR & LALR parsing tables, Parsing With ambiguous grammar. Introduction of automatic parser generator, YACC error handling in LR parsers. **UNIT III**: Syntax directed definitions; Construction of syntax trees, L-attributed definitions, Top down translation. Specification of a type checker, Intermediate code forms using postfix notation and three address code, Representing TAC using triples and quadruples, Translation of assignment statement.Boolean expression and Control structures.	**BTCS 803 Distributed Systems** UNIT-I Distributed Systems: Features of distributed systems, nodes of a distributed system, Distributed computation paradigms, Model of distributed systems, Types of Operating systems: Centralized Operating System, Network Operating Systems, Distributed Operating Systems and Cooperative Autonomous Systems, design issues in distributed operating systems. Systems Concepts and Architectures: Goals, Transparency, Services, Architecture Models, Distributed Computing Environment (DCE).Theoretical issues in distributed systems: Notions of time and state, states and events in a distributed system, time, clocks and event precedence, recording the state of distributed systems. UNIT-II Concurrent Processes and Programming: Processes and Threads, Graph Models for Process Representation, Client/Server Model, Time Services, Language Mechanisms for Synchronization, Object Model Resource Servers, Characteristics of Concurrent Programming Languages (Language not included).Inter-process Communication and Coordination: Message Passing, Request/Reply and Transaction Communication, Name and Directory services, RPC and RMI case studies. UNIT-III Distributed Process Scheduling: A System Performance Model, Static Process Scheduling with Communication, Dynamic	Code Change

		UNIT IV: Storage organization, Storage allocation, Strategies, Activation records, Accessing local and nonlocal names in a block structured language, Parameters passing, Symbol table organization, Data structures used in symbol tables. **UNIT V:** Definition of basic block control flow graphs, DAG representation of basic block, Advantages of DAG, Sources of Optimization, Loop optimization, Idea about global data flow analysis, Loop invariant computation, Peephole Optimization, Issues in design of code generator, A simple code generator, Code generation from DAG.	Load Sharing and Balancing, Distributed Process Implementation.Distributed File Systems: Transparencies and Characteristics of DFS, DFS Design and implementation, Transaction Service and Concurrency Control, Data and File Replication. Case studies: Sun network file systems, General Parallel file System and Window's file systems. Andrew and Coda File Systems UNIT-IV Distributed Shared Memory: Non-Uniform Memory Access Architectures, Memory Consistency Models, Multiprocessor Cache Systems, Distributed Shared Memory, Implementation of DSM systems. Models of Distributed Computation: Preliminaries, Causality, Distributed Snapshots, Modeling a Distributed Computation, Failures in a Distributed System, Distributed Mutual Exclusion, Election, Distributed Deadlock handling, Distributed termination detection. UNIT-V Distributed Agreement: Concept of Faults, failure and recovery, Byzantine Faults, Adversaries, Byzantine Agreement, Impossibility of Consensus and Randomized Distributed Agreement. Replicated Data Management: concepts and issues, Database Techniques, Atomic Multicast, and Update Propagation. CORBA case study: Introduction, Architecture, CORBA RMI, CORBA Services.	
	BTCS804 / BTCS 804A	**BTCS 804 INFORMATION SECURITY SYSTEMS** **Unit I:** Multi level model of security, Cryptography, Secret Key Cryptography, Modes of Operation, Hashes and Message Digest, Public Key Algorithm, Security Handshake Pitfall, Strong Password Protocol; Case study of real time communication security; **Unit II:** Introduction to the Concepts of Security, Security Approaches, Principles of security, Types of attacks; Cryptographic Techniques: Plain text and Cipher text, Substitution Techniques, Transposition Techniques Encryption and Decryption, Symmetric and Asymmetric Key Cryptography. Computer-based symmetric Key Cryptographic; **Unit III:** Algorithms: Algorithm Types and Modes, An Overview of Symmetric Key Cryptography, Data Encryption Standard (DES), International Data Encryption	**BTCS 804A Hardware Testing and Fault Tolerance** UNIT-I Overview of hardware testing. Reliability and Testing, Difference between Verification and Testing, Concepts of fault models, test pattern generation and fault coverage. Types of tests – exhaustive testing, pseudo-exhaustive testing, pseudo-random testing, and deterministic testing. Test Application. Design for Test. Testing Economics. Defects, Failures and Faults. How are physical defects modeled as faults. Stuck-at faults, Single stuck-at-faults multiple stuck-at faults, bridging faults, delay faults, transient faults UNIT-II Relation between VLSI Design and Testing. a) Design Representation for the purpose of testing – Representation in the form of mathematical equations, tabular format, graphs, Binary Decision Diagrams, Netlists, or HDL descriptions. b) Recap of VLSI	**New Course**

		Algorithm (IDEA), Advanced Encryption Standard (AES); Computer-based Asymmetric Key Cryptographic Algorithms; Cryptography, An Overview of Asymmetric Key Cryptography, The RSA algorithm, Symmetric and Asymmetric Key Cryptography Together, Digital Signatures, Knapsack Algorithm; **Unit IV:** Public Key Infrastructure (PKI) Digital Certificates, Private Key Management , The PKI Model, Public Key Cryptography Standards (PKCS); Internet Security Protocols Secure Socket Layer (SSL) , Secure Hyper Text Transfer Protocol (SHTTP) , Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL versus SET, 3-D Secure Protocol , Electronic Money , Email Security; **Unit V:** User Authentication Mechanisms : Authentication Basics, Passwords, Authentication Tokens, Certificate-based Authentication; Practical Implementations of Cryptography/Security: Cryptographic Solutions Using Java, Cryptographic Solutions Using Microsoft, Cryptographic Toolkits, Security and Operating Systems; Network Security: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN); Case Studies on Cryptography and Security:	Design Flow and where testing fits in the flow. Importance of Simulation and Fault Simulation. Compiled and event-driven simulation. Parallel and deductive fault simulation. Using fault simulation to estimate fault coverage and building a fault dictionary UNIT-III Combinational Test Pattern Generation. D-algorithm. Critical Path Tracking. PODEM algorithm for test generation. Testing sequential circuits. Functional and deterministic ATPG for sequential circuits and the associated challenges. Motivation for Design for Testability. Test Points, Partitioning for Testability. Scan Testing. Scan Architectures. Cost of Scan Testing. Boundary Scan Testing. Board-level testing. Boundary-scan Architecture and various modes of operation UNIT-IV a) Built-in Self Test. Pseudo-random test generation. Response Compaction. Random pattern-resistant faults. BIST architectures – Circular BIST, BILBO, STUMPS. b) Testing of Memories – Fault models, Functional tests for memories, Memory BIST. c) Testing of microprocessors. UNIT-V Hardware fault tolerance. Failure Rate, Reliability, Mean Time to Failure. Different kinds of redundancy schemes for fault-tolerance (Space, Time, and Information Redundancy). Nmodular Redundancy. Watch Dog Processors, Byzantine Failures. Information Redundancy – parity codes, checksums, m-of-n codes. RAID architectures for disk storage systems. Fault tolerance in interconnection networks. Fault-tolerant routing techniques.	
	BTCS 804B		**BTCS 804B Real Time System** UNIT-I Introduction: Definition, Typical Real Time Applications, concept of tasks, types of tasks and real time systems, block diagram of RTS, and tasks parameters -Release Times, execution time, period, Deadlines, and Timing Constraints etc. RTS requirements. UNIT-II Reference Models for Real Time Systems: processors and Resources, Temporal Parameters of Real-Time Workload, Periodic and Aperiodic Task Model, Precedence Constrains and Data Dependency, Other Types of Dependencies,	**New Course**

			Functional Parameters, Resource Parameters. Real Time Scheduling: classification of Real Time Scheduling, scheduling criteria, performance metrics, schedulability analysis, Introduction to Clock Driven scheduling, Weighted Round Robin Approach and Priority Driven Approach. Dynamic Versus Static systems, Offline Versus Online Scheduling. UNIT-III Periodic tasks scheduling: Clock Driven Scheduling – definition, notations and assumption, scheduler concepts, general scheduling structure, cyclic executives. Priority Driven Scheduling; notations and assumption, fixed priority verses dynamic priority, fixed priority scheduling algorithms (RM and DM) and their schedulability analysis, concept of schedulability tests – Inexact and exact schedulability tests for RM and DM, Optimality of the RM and DM algorithms, practical factors. UNIT-IV Aperiodic task scheduling; assumption and approaches, server based and non-server based fixed priority scheduling algorithms – polling server, deferrable server , simple sporadic server, priority exchange, extended priority exchange, slack stealing. Introduction to scheduling of flexible computations –flexible applications, imprecise computation model and firm deadline model. UNIT-V Resources Access Control: Assumptions on Resources and their usage, Effect of Resource Contention and Resource Access Control (RAC), Non-preemptive Critical Sections, priority inversion problem, need of new resource synchronization primitives/protocols for RTS, Basic Priority-Inheritance and Priority-Ceiling Protocols, Stack Based Priority-Ceiling Protocol, Use of Priority- Ceiling Protocol in Dynamic Priority Systems, Preemption Ceiling Protocol, Access Control in MultipleUnit Resources, Controlling Concurrent Accesses to Data Objects	
	BTCS 804C		**BTCS 804C Information Retrieval** UNIT-I Knowledge Representation: Knowledge representation, Basics of Prepositional logic, Predicate logic, reasoning using first order logic, unification, forward chaining, backward chaining, resolution Production rules, frames, semantic networks scripts. UNIT-II	**New Course**

			Ontology Development: Description logic-taxonomies, Topic maps Ontology, Definition expressing ontology, logically ontology representations, – XML, RDF, RDFS, OWL, OIL, ontology development for specific domain, ontology engineering, Semantic web services. UNIT-III Information Retrieval Modeling: Information retrieval, taxonomy, formal characterization, classic information retrieval, set theoretic model, algebraic model, probabilistic model, structured text, retrieval models, models for browsing, retrieval performance evaluation, keyword based querying, pattern matching, structural queries, query operations. UNIT-IV Text and Multimedia Languages and Properties: Introduction, metadata, markup languages, multimedia. Text operations: document preprocessing, document clustering text Compressionbasic concepts - statistical methods. Indexing and searching: inverted files, suffix trees, signature file, Boolean queries, sequential searching, pattern matching. UNIT-V Recent Trends in IR: Parallel and distributed IR, multimedia IR, data modeling, query languages, A generic Multimedia indexing Approach, one dimensional time series, two dimensional color images, Automatic feature extraction. Web Searching, Characterizing the Web, Search Engines, Browsing, Meta searchers, Searching using hyperlinks	
	BTCS 805/ BTCS 805A	**BTCS 805A Embedded Systems** **UNIT 1:** Introduction: Review of embedded hardware, Terminology- Gates, Timing Diagram, Memory, Microprocessor Buses, Direct Memory Access, Interrupts, Built ins on the Microprocessor. Conventions used on Schematic, Microprocessor Architecture – Interrupt Basic – Shared Data Problems – Interrupt Latency. **UNIT 2:** PIC Micro controller & Interfacing: Introduction, CPU Architecture, Registers, Instruction Sets, Addressing Modes, Programs, Interfacing Methods, Parallel I/O Interface, Parallel Port Interface, Memory Interfacing, High Speed I/O Interfacing, Interrupts – Interrupt Service Routine – features of Interrupts – Interrupt vector & Priority, Timing Generation & Measurements, Input Capture, Output Compare, Frequency Measurement, Serial I/O Device RS232,	**BTCS 805A Unix Network Programming & Simulation Lab** Objectives: At the end of course, the students should be able to • Understand various distributions of Unix viz. BSD, POSIX etc. • Write client/server applications involving unix sockets involving TCP or UDP involving iterative or concurrent server. • Understand IPV4 & IPV6 interoperability issues • Use fork( ) system call. • Understand the network simulator NS2 and Simulate routing algorithm on NS2 (Available on http://www.isi.edu/nsnam/ns/). Suggested Platform: For Socket Programming- Linux, For NS2 Any of Microsoft Windows or Linux (In case of	New Course

		RS845, Analog Interfacing, Applications. **UNIT 3**: Embedded Microcomputers Systems: Architecture Registers, Addressing Modes, Programs Interfacing Methods, Parallel I/O interface, Parallel Port Interface, Memory Interfacing, High Speed I/O Interfacing, Interrupts, Timing Generation and measurement, Input Capture Output Compare, Frequency Measurement, Serial I/O device RS232, RS485, Analog Interfacing, Applications. **UNIT 4:** Software Development & Tools: Embedded System Evolution Trends, Round – Robin, Robin with Interrupts, Function – one – Scheduling architecture, Algorithms, Introduction to assembler – Compiler –n Cross compilers and Integrated Development Environment IDE, Object Oriented Interfacing, Recursion, Debugging Strategies, Simulators. **UNIT 5:** Real Time Operating Systems: Task And Task States, Tasks And Data, Semaphores and shared data operating System, Services, Message queues, Timer Function, Events, Memory Management, Interrupt Routines in an RTOS Environment, Basic Design Using RTOS.	Microsoft, Virtual environment cygwin will also be required). Suggested Exercises 1. Write two programs in C: hello_client and hello_server • The server listens for, and accepts, a single TCP connection; it reads all the data it can from that connection, and prints it to the screen; then it closes the connection • The client connects to the server, sends the string "Hello, world!", then closes the connection 2. Write an Echo_Client and Echo_server using TCP to estimate the round trip time from client to the server. The server should be such that it can accept multiple connections at any given time. 3. Repeat Exercises 1 & 2 for UDP. 4. Repeat Exercise 2 with multiplexed I/O operations 5. Simulate Bellman-Ford Routing algorithm in NS2 References: • Stevens, Unix Network Programming, Vol-I	
	BTCS 805B	**BTCS 805B Data Mining & Business Intelligence** **UNIT I** Introduction to Data Mining, Importance of Data Mining, Data Mining functionalities, Classification of Data mining systems, Data mining architecture, Major Issues in Data Mining, Applications of Data Mining, Social impacts of data mining. Data Preprocessing, Data cleaning, Data Integration and Transformation, Data reduction, Discretization and Concept Hierarchy Generation. **UNIT II** The Compelling Need for data warehousing: Escalating Need for strategic information, failures of Past decision-support systems, operational versus decision-support systems, Introduction to Data Warehouse and OLAP Technology for Data Mining, Multidimensional data Model, Data warehouse Data Model, Data warehouse Architecture, Data warehouse Implementation, Development of Data Cube Technology, From Data warehousing to Data Mining. **UNIT III** Data Mining primitives, Languages and System Architectures, Concept description: Characterization and Comparison, Analytical Characterization, Mining Class Comparison. Association Rule Mining, Mining of Single		

		dimensional Boolean association rules, Multilevel association rules and Multidimensional association rules. **UNIT IV** Classification and Predication: Basic issues regarding classification and predication, Classification by Decision Tree, Bayesian classification, and classification by back propagation, Associative classification, Prediction, Classifier accuracy. Cluster Analysis, basic issues, clustering using partitioning methods, Hierarchical methods, Density based methods, Grid based methods and model based methods, Algorithms for outlier analysis. **UNIT V** Mining complex Types of data: Multidimensional analysis and descriptive mining of complex data objects, Introduction to spatial mining, multimedia mining, temporal mining, text mining and web mining with related algorithms.		
	BTCS 805C	**BTCS 805C NATURAL LANGUAGE PROCESSING** **UNIT-I Introduction to NLP** Achievement and brief history, open problems, major goal, characteristic of Language, Language structure, Language analyzer **UNIT-II Study of Grammar and Semantics** Morphology, word formation, theory of semantics, componential theory of meaning, truth conditional theory of meaning, pragmatics and discourse **UNIT-III Machine Translation** Introduction, problems of machine translation. Approaches, language Accesor, Structure of Anusaraka system. **UNIT-IV Lexical: Functional Grammar (LFG)** Overview of LGF, LFG formalism, well formedness conditions, computational aspects. **UNIT V** CFG and Indian languages, functional specification, tree adjoining grammar.		
	BTCS 805D	**BTCS 805D: WEB INTELLIGENCE AND BIG DATA** **UNIT-I Introduction:** Web Scale AI and Big Data, Web Intelligence, Big Data Look**:** Indexing- Index creation, Ranking, Page Rank Searching- Enterprise search, Searching structured data, Object Search, Locality Sensitive Hashing and Memory. **UNIT-II Listen:** Streams, Information and Language, Analyzing Sentiment and Intent Load**:** Databases and their Evolution, Big		

		data Technology and Trends. **UNIT III** **Programming:** Map-Reduce, Map-Reduce applications and its efficiency, Big-Table and HBase **UNIT-IV** **Learn:** Classification, Clustering, and Mining, Information Extraction **Connect:** Reasoning: Logic and its Limits, Dealing with Uncertainty. **UNIT-**V **Predict:** Forecasting, Neural Models, Deep Learning, and Research Topics. **Data Analysis:** Regression and Feature Selection		
	BTCS 805E	**BTCS 805E Wireless Communication & Networks** **UNIT I: DIGITAL COMMUNICATION THROUGH FADING MULTIPATH CHANNELS**: Fundamentals of fading, Multipath channels, Fading channel and their characteristics, Channel modeling, Digital signaling over a frequency non selective slowly fading channel, frequency selective slowly fading channel, Spread Spectrum signals: Direct-sequence spread spectrum signals, p-n sequences, Frequency-hopped spread spectrum signals, Code-division multiplexing. **UNIT II: MULTIPLE ACCESS TECHNIQUES**: Introduction, Frequency Division Multiple Access, Time Division Multiple Access TDMA based networks, CDMA with reference to mobile radio and satellite systems. CDMA based networks Spread Spectrum Multiple Access, Space Division Multiple Access, Packet Radio Protocols, pure ALOHA, Slotted ALOHA Cellular Systems **UNIT III: CELLULAR WIRELESS NETWORKS**: GSM: Introduction, overview of the GSM systems, GSM codec, channel coding and interleaving, radio like control. Cordless systems and WLL, Mobile IP, Wireless access protocol. Wireless LAN's: Technology, IEEE 802.11 standards and Blue tooth. Broadband Wireless 802.16, Wi-Fi technology **UNIT IV: WIRELESS NETWORKING:** Introduction, Difference between Wireless & Fixed Telephone Networks, Development of Wireless Networks, Traffic Routing in Wireless Networks, Wireless Data Services, Common Channel signaling, broad band ISDN & ATM, Signaling System No. 7(SS-7), Personal Communication Services/ Networks,		

		Protocols for Network Access, Network Databases. **UNIT V: SATELLITE COMMUNICATION**: Elements of satellite communication: Frequency bands, Transmission and multiplexing. Modulation, Multiple access. Satellite orbit and description- orbital period and velocity, effects of orbital inclination, Azimuth and elevation, Coverage angle and slant range, Geostationary orbit, Satellite description. Earth Station antenna, high-power amplifier, low-noise amplifier, up converter, down converter, monitoring and control, reliability. Satellite Link: basic link analysis.		
	BTCS 806 / BTCS 806A	**BTCS 806A PARALLEL COMPUTING** **UNIT I** Theory of Parallelism: Parallelism, Reason of parallel processing, Concepts and challenges, applications of parallel processing. Parallel computer models: The state of computing, Classification of parallel computers, Flynn and Feng's classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors, multiprocessors and multicomputers, Multivector and SIMD computers, PRAM and VLSI Models. Program and Network Properties: Conditions of parallelism, program partitioning and scheduling, program flow mechanism, system interconnection architecture. **UNIT II** Memory Hierarchy Design: Memory technologies and optimization, inclusion, coherence and locality, cache memory organization and cache performance optimization, shared memory organization, memory protection, virtual memory technology and introduction to buses, crossbar and multi-stage switches. **UNIT III** Pipelining and ILP: Instruction level parallelism and its exploitation-concepts and challenges, overcoming data hazards with dynamic scheduling. Pipelining, instruction and arithmetic pipelining designs, branch handling techniques, linear and non-linear pipeline processors, superscalar and super pipeline design. **UNIT IV** Parallel architectures: multi-processor system interconnects, cache coherence and synchronization mechanism, message passing mechanism, vector processing principles, multivector multiprocessors, compound vector processing, principles of multithreading, latency hiding techniques- shared virtual	**BTCS 806A FPGA Lab** Fundamental Theory • Introduction to DSP architectures and programming • Sampling Theory, Analog-to-Digital Converter (ADC), Digital-toAnalog Converter (DAC), and Quantization; • Decimation, Interpolation, Convolution, Simple Moving Average; • Periodic Signals and harmonics; Design (Simulation) using MATLAB/ Simulink • Simulate the lab exercises using MATLAB/Simulink • Fourier Transform (DFT/FFT), Spectral Analysis, and time/spectrum representations; FIR and IIR Filters; Implementation using pure DSP, pure FPGA and Hybrid DSP/FPGA platforms • Digital Communications: On-Off-Keying (OOK), BPSK modulation, and a simple transceiver design • Adaptive Filtering: Echo/Noise Cancellation, Least Mean Square (LMS) algorithm (2 weeks) Wireless Communications: Channel coding/decoding, Equalization, Simple Detection Algorithm, OFDM Speech Processing: Prediction Algorithms, Speech Classification and	New Course

		memory, prefetching techniques, distributed coherent cache, scalable and multithread architectures, dataflow and hybrid architecture. **UNIT V** 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. Parallel Programming Models: Shared variable models, message passing models, parallel languages and complier, code optimization and scheduling, Introduction of shared-memory MIMD machines and message-passing MIMD machines.		
	BTCS 806B	**BTCS 806B ADVANCED COMPUTER NETWORKS** **UNIT-I Network Layer** ARP, RARP, ICMP, IPv4 Routing Principles, Routing and overview, DVR and LSR, the IGRP and EIGRP, BGP, Routing Information Protocol (RIP), OSPF (IPv4 / IPv6). Multicasting in IP Environments-Broadcasting, Multicasting, IGMP and Multicast Listener Discovery (MLD). The Distance Vector Multicast Routing Protocol (DVMRP), Multicast OSPF (MOSPF), Protocol Independent Multicast (PIM). **UNIT-II Transport Layer:** Transport layer overview, UDP, TCP (Flow Control, Error Control, and Connection Establishment), TCP Protocol: TCP Tahoe, TCP Reno. **UNIT-III Optical Networking:** Introduction to Optical networking, its benefits and drawbacks, SONET layered architecture, frame format, SONET network configuration, its advantages and benefits. **UNIT-IV Quality of Service:** Introducing QoS, Queue Analysis, QoS Mechanisms, Queue Management algorithms, Resource Reservation, **UNIT-V Overview of latest concepts: TCP/IP Applications:** VoIP, NFS, Telnet, FTP, SMTP, SNMP, Finger, Whois and WWW, IP v6 and Next Generation Networks, xAAS(PAAS,SAAS,HAAS) and Cloud Computing, Big data, Elements of Social Network.		
	BTCS 806C	**BTCS 806C Distributed Systems** **UNIT I** Architectural models for distributed and mobile computing systems. Basic concepts in distributed computing such as		

		clocks, message ordering, consistent global states, and consensus. Basic Algorithms in Message: Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Fault-Tolerant Consensus, Causality and Time. Message Passing: PVM and MPI. **UNIT II** Distributed Operating Systems:OS and network operating systems, Distributed File systems. Middleware, client/server model for computing, common layer application protocols (RPC, RMI, streams), distributed processes, network naming, distributed synchronization and distributed object-based systems. **UNIT III** Simulation:A Formal Model for Simulations, Broadcast and Multicast, Distributed Shared Memory, Fault-Tolerant Simulations of Read/Write Objects Simulating Synchrony, Improving the Fault Tolerance of Algorithms, Fault-Tolerant Clock Synchronization. **UNIT IV** Distributed Environments: Current systems and developments (DCE, CORBA, JAVA). Advanced Topics: Randomization, Wait-Free Simulations of Arbitrary Objects, Problems Solvable in Asynchronous Systems, Solving Consensus in Eventually Stable Systems, High Performance Computing-HPF, Distributed and mobile multimedia systems. Adaptability in Mobile Computing. Grid Computing and applications. Fault tolerant Computing Systems. **UNIT V** Parallel Processing:Basic Concepts: Introduction to parallel processing, parallel processing terminology, Parallel & Distributed Programming: Parallel Programming environments		
	BTCS 806D	**BTCS 806D SOFT COMPUTING**		

		UNIT-I: Neural Networks: History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks. **UNIT-II: Fuzzy Logic:** Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation, Operations. **UNIT-III: Fuzzy Arithmetic:** Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic: Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers, **Uncertainty based Information:** Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets. **UNIT-IV: Introduction of Neuro-Fuzzy Systems:** Architecture of Neuro Fuzzy Networks. **Application of Fuzzy Logic:** Medicine, Economics etc. **UNIT V: Algorithm:** An Overview of Genetic Algorithm, Artificial Bee Colony Algorithm, Ant Colony Algorithm etc. Applications and implementation of these algorithms.		
	BTCS 806E	**BTCS 806E Data Compression Techniques** Unit I**: Compression Techniques: Lossless, lossy, measure of Compression Techniques: performance, modeling & coding. Lossless compression: Derivation of average informa Lossless compression: tion, data models, uniquely decodable codes with tests, prefix codes, Kraft-Mc Millan inequality. Huffman coding: Algorithms, minimum variance Huffman codes, optimality, length extended codes, adaptive coding, Rice codes, using Huffman codes for lossless image compression.**		

		Unit II **Arithmetic coding with application to lossless compression. Dictionary Techniques: LZ77, LZ78, LZW Dictionary Techniques: Predictive coding: Burrows-Wheeler Transform and mo Predictive coding: ve-to-front coding, JPEG-LS Facsimile Encoding: Run length, T.4 and T.6 Facsimile Encoding:** Unit: III **Lossy coding- Mathematical preliminaries: Distortio Lossy coding n criteria, conditional entropy, average mutual information, differential entropy, rate distortion theory, probability and linear system models. Scalar quantization: The quantization problem, unif Scalar quantization: orm quantizer, Forward adaptive quantization, non-uniform quantization-Formal adopting quantization, companded Quantization Vector quantization: Vector quantization: ntization: Introduction, advantages, The Linde-Ruzo-Grey algorithm, lattice vector quantization.** **Unit IV Differential encoding – Introduction, Basic algorit Differential encoding hm, Adaptive DPCM, Delta modulation, speech and image coding using delta modulation. Sampling in frequency and time domain, z-transform, DCT, DST, DWHT, quantization and coding of transform coefficient.** Unit V **Sub band coding: Introduction, Filters, Basic algor Sub band coding: ithm, Design of Filter banks, G.722, MPEG. Wavelet based compression: Introduction, wavelets m Wavelet based compression: ulti-resolution analysis and the scaling function implementation using filters.**		

	BTCS 807	**BTCS 807 C# and DOT NET Programming Lab** 1. Visual Studio DOT NET Installation with various facilities. 2. Write a program in C# which include these following topics:- 1. Data Types 2. Operators & Expressions 3. Branching ,Looping ,Methods 4. Array, String 3. Write a program in C# which include all OOP features like:- 1. Class ,Object , 2. Inheritance, 3. Polymorphism , 4. Exception Handling etc. 4. Write a program make clone of a given array. 5. Write a program to make property as read-only and write only. 6. Write an application to print the rank of an array of integers. 7. Write an application that will store 10 string values into hash table and print the contents of this hash table. 8. Write an application that will use Hash table to store 10 elements. Also write a code that will search for a specific element. 9 .write a program in C# Language to demonstrate the usage of Delegates. 10. To write a program in C# Language to demonstrate the Mouse Events. 11. Write a program to connect to the master database in SQL Server, in the Page_Load event. When the connection is established, the message "Connection has been established" should be displayed in a label in the form. 12. Write an application that contains a list of following technologies: • ASP.NET • ADO.NET • C# It also contains a textbox in which the user has to enter a name and a textarea in which the user has to enter his comments. When the Submit is clicked, the output should display the name entered in the textbox and the user-selection from the listbox. All the above should be displayed with the tracing for the page being enabled. 13. Write a Web application that generates the "IndexOutOfRange" exception when a button is clicked. Instead of displaying the above exception, it redirects the user to a custom error page. All the above should be done with the trace for the page being enabled. 14. Create a component that contains an array of 100 integers and a corresponding indexer. From a Web page, assign values to some of its elements. Then the Web Form	**BTCS 807 Digital Image Processing lab** List of Experiment 1 Color image segmentation algorithm development 2 Wavelet/vector quantization compression 3 Deformable templates applied to skin tumor border finding 4 Helicopter image enhancement 5 High-speed film image enhancement 6 Computer vision for skin tumor image evaluation 7 New Border Images	New Course

		should display the first 10 elements of the indexer.		
	BTCS 808	BTCS 808 Compiler Design Lab **1. Develop an in depth understanding of system programming concept.Lexical analysis, syntax analysis, semantics analysis, code optimization, code generation. Language specification and processing** **2. Develop an Understanding of Scanning by using concept of Finite state automaton. Parse tree and syntax tree, Top down parsing (recursive decent parsing, LL (1) parser) Bottom up parsing (operator precedence parsing) .Managing symbol table, opcode table, literal table, pool table** **3. Develop an Understanding of Intermediate code form: Three address code, Polish notation (Postfix strings)** **4. Develop an Understanding of Allocation data structure. Heaps** **5. Develop an Understanding about Language processor development tools: LEX, YACC. Language processing activities (Program generation and execution) It is expected that each laboratory assignments to given to the students with an aim to In order to achieve the above objectives** **Indicative List of exercises:** **1. Write grammar for a fictitious language and create a lexical analyzer for the same.** **2. Develop a lexical analyzer to recognize a few patterns in PASCAL and C (ex: identifiers, constants, comments, operators etc.)** **3. Write a program to parse using Brute**	**BTCS 808 Project-II**	Code Changed

		force technique of Top down parsing **4. Develop on LL (1) parser (Construct parse table also).** **5. Develop an operator precedence parser (Construct parse table also)** **6. Develop a recursive descent parser** **7. Write a program for generating for various intermediate code forms i) Three address code ii) Polish notation** **8. Write a program to simulate Heap storage allocation strategy** **9. Generate Lexical analyzer using LEX** **10. Generate YACC specification for a few syntactic categories** **11. Given any intermediate code form implement code optimization techniques** **Reference** V.V Das, Compiler Design using FLEX and YACC, PHI		
	BTCS 809	**BTCS 809 ISS Lab** List of Projects are as follows (Implement any one with specific reference to Information System Security) 1. Shopping cart project using ADO.NET: This sample project has all basic features required for a shopping cart web site including Login, Registration, Add to Cart, Checkout etc. A good ASP.NET learning project using C#, ASP.NET, SQL Server. 2. Personal Assistant: This is a small project for managing personal details. Current version of this project support Address Book feature - Add, Edit and Manage contacts and addresses using VB.NET. 3. Address Book: This is a small project for managing contact details. This is a C# version of the 'Personal Assistant' project. 4. School Management System: This is a project for managing education institutes using C#. 5. Library Management System: This is an academic project for students using Java. 6. spider Alerts & Web services: This project communicates with web services and downloads Alerts from the web server using Java & XML. 7. Patient Information System: This software can be used to keep track of the patients' information and treatment details in a hospital or clinic. Some of the	**BTCS 809 Seminar**	Code Change

		advanced features include patient consulting, lab information, billing etc using JSP, Servlet & JDBC. 8. Web based Address Book: This application can be used to keep track of your contacts/addresses. N Tier architecture is used to separate data layer, business layer and UI layers.		
	BTCS 810		Discipline & Extra Curricular Activities	**New Course**