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No	Syllabus **Subject: logic circuits** **Stage: 1st class** **Units: 4**	No. of Hour/Week		No. of weeks
		Theoretical 2	Laboratory 2	
١	Ch.1 Numbers and arithmetic 1. Numbering systems : Decimal, Binary, Octal and Hexadecimal 2. Number base conversions. 3. Complements. 4. Binary arithmetic. 5. Codes: Binary code, Decimal code, Gray code, ASCII code. 6. Binary storage and registers			٤
٢	Ch.2 Boolean algebra and logic gates 1. Basic definitions and theorems. 2. Boolean functions. 3. Logic simplification using Boolean algebra. 4. Minterms and Maxterms. 5. Truth Tables. 6. Gates and symbols: AND, OR, Inverter, NAND, NOR, XOR. 7. Simplifications of Boolean functions using Karnoph map.			٦
٣	Ch.3 Combinational logic 1. Arithmetic operations: Half and full Adder/subtractor, Multiplier and Divisor. 2. Encoders and Decoder 3. Multiplexers and Demultiplexers. 4. Comparators.			٧
٤	Ch .4 Sequential circuits 1. Flip flops: RS , D, JK and T flip flops. 2. Counters: Ripple counters, BCD counters, Up-Down counters. 3. Shift registers: Unidirectional and Bidirectional shift registers. 4. Parallel to serial converters			٨

Text book :

1: Introduction To Logic Design, Alan B. Marcovitz , 2nd edition, 2005
2: Digital design, M. Mano, 3rd edition, 2002

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No	Syllabus **Subject: Calculus** **Stage: 1st class** **Units: 4**	No. of Hour/Week		No. of weeks
		Theoretical ٤	Laboratory ٠	
١	**Chapter One Preliminaries** 1-1 Cartesian Coordinates, Lines and Circles 1-2 Functions and Their Functions 1-3 Combining Functions 1-4 Trigonometric Functions			٢
٢	**Chapter Two Limits and Continuity** 4 2-1 Limit Laws 1-5 One-Sided Limits and Limits at Infinity 1-6 Infinite Limits and Vertical Asymptotes 1-7 Continuity 1-8 Tangents and Derivatives			٤
٣	**Chapter Three Differentiation** 4 3-1 The derivative as a Function 3-2 Differentiation Rules. 3-3 The Derivative as a Rate of Change 3-4 Derivatives of Trigonometric Functions 3-5 The Chain Rule and Parametric Equations 3-6 Implicit Differentiation 3-7 Related Rates 3-8 Linearization and Differentials			٤
٤	**Chapter Four Integrations** 4-1 The Definite Integral 4-2 Indefinite Integrals and the Substitution Rule 4-3 Substitution and Area Between Curves 4-4 Techniques of Integration 4-5 Basic Integration Formulas 4-6 Integration by Parts 4-7 Integration of Rational Functions by Partial Fractions 4-8 Trigonometric Integrals 4-9 Trigonometric Substitutions			٥
٥	**Chapter Five Application of Definite Integrals** 5-1 Volume by Cylindrical Shells 5-2 Lengths of Plane Curves 5-3 Areas of Surfaces of Revolution			٢
٦	**Chapter Six Transcendental Function** 6-1 Natural Logarithms			٢

	6-2 The Exponential Function 6-3 a^x and $\log_a x$ 6-4 Inverse Trigonometric Functions 6-5 Hyperbolic Functions	
٧	**Chapter Seven Infinite Sequence and Series** 7-1 Sequence 7-2 Infinite Series 7-3 The Integral Test 7-4 Comparison Tests 7-5 The Ratio and Root Tests 7-6 Alternating Series 7-7 Power Series 7-8 Taylor and Maclaurin Series	٤
٨	**Chapter Eight Vectors and the Geometry of Space** 8-1 Three-Dimensional Coordinate Systems 8-2 Vectors 8-3 The Dot Product 8-4 The Cross Product 8-5 Lines and Planes in Space 8-6 Cylinders and Quadric Surfaces	٣
٩	**Chapter 9 Differential Equations** 9-1 General First-Order Differential Equations and Solutions 9-2 First-Order Linear Equations 9-3 Applications 9-4 Second Order Differential Equation 9-5 Nonhomogeneous Linear Equations	٤

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No	Syllabus **Subject: Auto Cad** **Stage: 1st class** **Units: 4**	No. of Hour/Week		No. of weeks
		Theoretical 1	Laboratory 2	
١	**Ch1: AutoCAD Fundamentals** 1. Starting Up AutoCAD 2009 • User Interface • Application Window • Menu Browser • Quick Access Toolbar • Info Center • Ribbon • Status Bar 2. Drawing Units Setup 3. Drawing Area Setup			٢
٢	**Ch2: Working with the Draw Panel** 1. Drawing Straight Lines 2. The Polyline Command 3. The Rectangle Command 4. The Polygon Command 5. The Circle Command 6. The Arc Command 7. The Ellipse Command 8. The Construction Line Command 9. The Ray Command 10. The Spline Command 11. The Gradient Command 12. The Boundary Command 13. The Region Command			٦
٣	**Ch3: Working with the Modify Panel** 1. The Move Command 2. The Copy Command 3. The Rotate Command 4. The Stretch Command 5. The Scale Command 6. The Offset Command 7. The Mirror Command 8. The Erase Command 9. The Explode Command			٤

	10. The Trim Command 11. The Extend Command 12. The Fillet Command 13. The Chamfer Command 14. The Break Command 15. The Array Command 16. The Break at point Command 17. The Lengthen Command	
٤	**Ch4: Dimensioning** 1. The Linear Dimension Commands • The Continue Dimension Command • The Baseline Dimension Command • The Aligned Dimension Command • The Radial Dimension Commands • The Diameter Dimension Command • The Radius Dimension Command • The Center Mark Command 2. Angular Dimensions • The Angular Dimension Command • The Ordinate Dimension Command 3. The Dimension Text Edit Command 4. The Dimension Edit Command	٣
٥	**Ch5: Creating Text** 1. Adding and Formatting Text 2. Adding Tables to Your Drawing	٢
٦	**Ch6: 3D Fundamentals (**Isometric) 1. GRID Command 2. SNAP Command 3. ISOPLANE Command 4. Draw Isometric Circles	٤
٧	**Ch7: 3D Fundamentals (3D Model Objects)** 1. 3D Model Objects • Wireframes • Surfaces • Solids 2. Viewports • Steering Wheel • VPOINT Command (Tripod) 3. User Coordinate System (UCS)	٥
٨	**Ch8: Creating a Camera** 1. Changing a Camera's Properties 2. Walk and Fly	٤

	3. Introduction to Rendering 4. Materials 5. Lights 6. Render Environments and 7. Background	
Text book 1: James A. Leach, "AutoCad 2002 companion", 2003.		

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No	Syllabus **Subject: C++ programming** **Stage: 1st class** **Units: 6**	No. of Hour/Week		No. of weeks
		Theoretical ٣	Laboratory	
١	**Introduction** • Introduction to computers. • Computer systems • Types of programming languages. • Programming and problem solving. • Testing and debugging.			٣
٢	**The Basics in C++ programming** • Data types. • Program style. • Assignment statements. • Expressions. • Standard Input and Output (I/O) statements. • Arithmetic operators. • Logical operator. • Control structures (Selection). • Designing a loop. • Control Structures (repetition). • Predefined functions			٥
٣	**Arrays** • Declaration • Initialization • Processing • Multidimensional arrays. • Strings.			٤
٤	**Functions** • User defined function • Scopes of variables. • Passing arrays to functions. • Calling functions			٤
٥	**Pointers** • Pointer declaration • Operations on pointers. • Arrays and Pointers.			٣
٦	**Structure** • Structures, Unions, Enumerations. • Declaring a Structure • Defining a structure variable.			٤
٧	**Files**			٤

	• Opening and Closing a data file. • Creating a data file	
Text book 1: "Computer organization and Architecture, designing for performance"by William Stallings (2010)		

No	Syllabus **Subject: fundamental of electrical Engineering** **Units: 6**	No. of Hour/Week		No. of weeks
		Theoretical 3	Laboratory 3	
١	CH.1 Basic Concepts 1. Introduction 2. Systems of Units 3. Charge and Current 4. Voltage 5. Power and Energy **6.** Circuit Elements			٤
٢	CH.2 Basic Laws 1. Ohm's Laws 2. Rationalization of energy consumption 3. Nodes, Branches, and Loops 4. Kirchhof's Laws 5. Series Resistors and Voltage Division 6. Parallel Resistors and Current Division 7. Wye-Delta Transformation			٦
٣	CH.3 Network Theorems. 1. Nodal Analysis 2. Mesh Analysis 3. Thevenin's Theorem 4. Norton's Theorem 5. Superposition Theorem 6. Reciprocity Theorem 7. Compensation Theorem 8. Power Dissipation in the circuit 9. Maximum power transfer			٦
٤	CH .4 Sinusoids and Phasors 1. Definition of AC Quantities 2. Average Value, Root mean square 3. Phasor representation of AC quantities 4. Impedance and Admittance			٥
٥	CH .5 Capacitors and Inductors 1. Introduction 2. Capacitors 3. Series and Parallel Capacitors 4. Inductors			٥

	5. Series and Parallel Inductors 6. Network Theories (AC)	
٦	CH. 6 Resonance 1. Resonance in Serial Circuits 2. Resonance in Parallel Circuits	٤
Text book 1: Introductory Circuit Analysis, tenth edition, Boylestad **Text book 2:** Fundamentals of Electric Circuits Floyd		

No	Syllabus **Subject: Electronics I** **Stage: 1st class** **Units: 5**	No. of Hour/Week		No. of weeks
		Theoretical 2	Laboratory 2	
١	**CH.1 Introduction to Semiconductors** - Band Theory. - Lattice Bands - Conduction. - Semiconductors - The PN junction diode			٣
٢	**CH.2 Diode Applications** - Rectification - Half -wave Rectifier. - Full wave Rectifier. - Bridge Rectifier. - Zener voltage Regulator - Diode Clippers. - Diode Clampers.			٤
٣	**CH.3 Bipolar Junction Transistor (BJT)** - BJT operation			٤

	- BJT parameters & characteristics - dc biasing & load-line - Voltage divider(fixed bias) - Other bias methods	
٤	**CH.4 BJT as an Amplifier** - Small-signal equivalent circuit (ac circuit) - Single-stage BJT amplifier configurations a. Common Emitter. b. Common Base. c. Common collector.	٤
٥	**CH.5 The Field Effect Transistor(MOSFET)** - Enhancement MOSFET (E-MOSFET) a. operation. b. characteristics. c. dc biasing & load-line. - Depletion MOSFET (D-MOSFET) a. operation. b. characteristics. c. dc biasing & load-line.	٤
٦	**CH.6 MOSFET as an Amplifier** - Small-signal ac equivalent circuit - Single-stage **MOSFET** amplifier configurations a. Common Source. b. Common Gate. c. Common drain	٤
٧	**Ch.7 Compound Configuration** **1. Cascade Connection** - RC coupled amplifier - Direct coupled Transistor Amplifier **2. Cascode Connection** **3. Darlington Connection** **4. Current Source Circuit** **5. Current Mirror Circuit** **6. Differential Amplifier Circuit**	٦

Text book 1: " Electronic Devices", Thomas L. Floyd, Eighth Edition, 2008.
Text book 2: "Microelectronic circuit", Adel Sedra , Smith
Text book 3: "Electronic Devices & Circuit Theory", R. Boylestad, L. Nashelskey
Text book 4: "Electronic Devices & Circuit", J. Millman

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No	Syllabus **Subject: Information Technology** **Stage: 1st class** **Units: 4**	No. of Hour/Week		No. of weeks
		Theoretical ١	Laboratory 2	
١	Fundamentals of Information Technology 1. Introduction to information technology. 2. History of information technology. 3. Impact of information technology on business and society. 4. Identify the hardware components associated with information systems.			٢
٢	Computer Fundamentals 1. Introduction to computer systems. 2. Computing history. 3. Generations of computers. 4. Categories of computers. 5. Computer architecture.			٢
٣	Computer Hardware 1. Basic introduction to computer hardware components. 2. The basic parts and functions of computer systems. 3. Processing devices, Memory devices. 4. Input and output devices, Storage devices.			٤
٤	Computer Software, Operating Systems, and File Management 1. Identify the purpose and functions of major software categories (System Software and Application Software). 2. Differentiate between the roles and functions of application and systems software. 3. Introduction to file management.			٢
٥	Hardware and Software Basics 1. Troubleshooting computer. 2. Installing hardware. 3. Installing and removing application in Microsoft windows.			٢
٦	Communication and Connectivity 1. The basic communication system components. 2. How computers communicate over networks, including the Internet. 3. Identify the types of physical connections used to connect to the Internet. 4. Network types, topologies and devices.			٤
٧	Internet Fundamentals 1. Historical background. 2. Explore and uses of Internet in business, industry, education, and society. 3. The security and privacy issues related to using the Internet. 4. The Internet and Web Applications. 5. Multimedia and the Web. 6. E-Business / Ecommerce			
٨	Design a Web Page by Using World Wide Web Programming Language 1. Introduction to world wide web programming.			

	2. HTML language description and running through it. 3. How to write codes in HTML, Heading, Titles. 4. The body in HTML language, Background colors, Pages and Borders. 5. Lists in HTML language, Tables in HTML language. 6. Images, Combining paragraphs with tables and images. 7. Forms in HTML language, Command buttons. 8. Textboxes and text areas, Checkboxes and radio buttons 9. Select lists in forms, Combining forms with images and tables. 10. Introduction to dynamic programming.	

Text book 1: Understanding Computers Today and Tomorrow, M. Deborah, C. Parker, Thomson/Course Technology 2008.
Text book 2: Introduction to Computers, Peter Norton, McGraw Hill 2007.
Text book 3: The complete Internet and World Wide Web Programming, M. Harrey, J. Paul, N. Tem, Prentice Hall.

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No	Syllabus Subject: OOP & GUI Stage: 2nd Class Units: 6	No. of Hour/Week		No. of weeks
		Theoretical 2	Laboratory 2	
١	Ch.1 Records (structS) 1. Accessing struct members 2. Assignment 3. Composition (Relational Operators) 4. Input/output Operations 5. Struct variables and Functions 6. Arrays versus Structs 7. Arrays in Structs 8. Structs in Arrays 9. Structs within a Structs 10. Exercises			١
٢	Ch.2 Classes 1. Introduction to Object Oriented Design 2. Classes and Data Abstraction 3. Variables (Objects)Declaration 4. Accessing class members 5. Assignment operator and classes 6. Functions and Classes 7. Reference parameters and classes objects (variables) 8. Implementation of member functions 9. Order of public and private members of a class 10. Constructors 11. Abstract Data Type (ADT) 12. Static			٦
٣	Ch.3 Inheritance and Composition 1. Inheritance 2. Member functions of the base class 3. Constructors of Derived and Base class 4. Inheritance as public, protected, or private 5. Accessing members in a Derived class 6. Composition (Aggregation) 7. Exercises			٥
٤	Ch.4 Pointers ,Classes 1. Pointer data type and pointer variables 2. Declaring pointer variables 3. Classes, Structs, and pointer variables 4. Operator new and delete 5. Dynamic arrays			٢
٥	Ch.5 Overloading 1. Operator overloading 2. Syntax for operator functions 3. Pointer this 4. Friend functions of classes 5. Overloading Binary operators			٤

	6. Overloading the assignment operator(s) 7. Overloading Unary operators	
٦	Ch.6 Templates 1. Template Functions. 2. Template Classes	٣
٧	Ch.7 Visual C++ Programming 1. Introduction 2. Building MFC Project 3. Control tools, workspace, and Dialogue	١
٨	Ch.8 Command Buttons, Edit Box and Static Box 1. Member Variables and Member Functions. 2. Command Buttons Variables and Function. 3. Edit Box Variables and Function. 4. Static Box Variables and Function. 5. Exams and Project.	٢
٩	Ch.9 Checks, Radio Checks, and Groups 1. Checks Variables and Functions 2. Example 3. Radio Check Variables and Functions 4. Example 5. Projects	٢
١٠	Ch.10 List Box, Combo Box, New Dialogue Box 1. List Box Variables and Functions. 2. Example. 3. Combo Box Variables and Functions. 4. Example. 5. Adding new dialogue box to existing one. 6. Message Type. 7. Project.	٤
١١	Ch.11 Single Document Interface (SDI) 1. Menu and Submenu. 2. Popup Menus and Codes.	٢

Text book 1: C++ Programming from problem analysis to program design , D.S Malik 2011
Text book 2: Introduction to Object Oriented Programming in C++ 2001
Text book 3: Learning Visual C++ Step by Step 2001
Text book 4:Professional Visual C++ ver. 6.0 Programming by Steve Holzner 2003

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No	Syllabus **Subject: Analog Communication Systems** **Stage: 2nd class** **Units: 4**	No. of Hour/Week		No. of weeks
		Theoretical 2	**Laboratory 1(tutorial)**	
١	Ch.1 Introduction 1. Elements of communication System . 2. Reasons of Modulation			١
٢	Ch.2 Signal Analysis 1. Classification of signals :(Analog/ Digital, periodic/aperiodic, energy signal/power signal, deterministic/probabilistic). 2. Useful Functions. (Unit Impulse and Unit step). 3. Review of Fourier Analysis: - Fourier series. - Fourier Transform. 4. Review of electrical filters. 5. Signal transmission through a linear system (impulse response and transfer function). 6. Signal distortion over a communication channel.			٤
٣	Ch.3 Amplitude Modulation 1. Normal amplitude modulation (normal AM). 2. Double sideband suppressed carrier (DSB-SC) modulation. 3. Single sideband suppressed carrier (DSB-SC) modulation. 4. Vestigial sideband (VSB) Modulation. 5. Super heterodyne AM receiver. 6. Interference in AM. 7. Quadrature Amplitude Multiplexing (QAM). 8. AM stereo Multiplexing. 9. TV fundamentals (picture resolution, bandwidth consideration, multiplexing luminance and chrominance signals).			٨
٤	Ch.4 Angle Modulation 1. Frequency modulation (FM). - Narrowband FM (NBFM). - Wideband FM (WBFM). 2. Phase modulation (PM). 3. Super heterodyne FM receive. 4. Frequency division multiplexing (FDM). 5. FM stereo Multiplexing. 6. Interference in Angle modulated system. 7. Telephone channel multiplexing.			٨
٥	Ch.5 Random Signals 1. Random variable and random process. 2. Power spectral density. 3. Transmission of random process through linear system. 4. Bandpass random process.			٣

٦	Ch.6 Noise in Analog Communication 1. Introduction (sources of noise, thermal noise, effective noise, temperature and noise figure). 2. Narrow band noise representation. 3. Noise in amplitude modulation(noise in normal AM,DSB-SC,SSB-SC and VSB) 4. Noise in Angle Modulation (noise in FM and PM). 5. Figure of merit	٦

Text book 1:Modren Digital and Analog Communication Systems by Lathi

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No	Syllabus Subject Antenna and propagation Stage: 2nd class Units: 6	No. of Hour/Week		No. of weeks
		Theoretical 2	Laboratory 1(tutorial)	
١	Ch.1 Field: 1. Vector Analysis. 2. Coulomb's law and Electric field intensity. 3. Electric flux density, Gauss's law and Divergence. 4. Energy and Potential. 5. The steady of magnetic field.			٦
٢	Ch.2 Antenna and Propagation: 1. Maxwell's Equations. - Ampere's law. - Faraday's law. - Gauss's law. - Non-existence of magnetic monopole.			٦
٣	Ch.3 Electromagnetic Waves 1. Introduction. - The uniform plane wave propagation in free space. - Wave propagation in a lossless dielectric. - Poynting vector and power consideration. - Wave propagation in good conductor and skin depth. - Reflection of plane waves. 2. Wave Guides. 3. Guided Waves.			٦
٤	Ch.4 Fundamentals of antennas and antenna parameters 1. Introduction - Radiation intensity. - Beam solid angle. - Gain and Directivity. - Antenna impedance. - Antenna polarization. - Antenna Aperture. 2. The Isotrope. 3. The ideal dipole. 4. The short dipole. 5. Small loop Antenna. 6. Thin linear antenna. 7. Antenna arrays. - Broadside array. - Endfire array. 8. Some common antenna types - Yagi-Uda. - Helix. - Horns. - Slots. - Parabolic dishes. - Phased array antenna.			٦

	9. Antennas in communication systems.	
٥	Ch. 5 Radiation and Radar Equation. 1. Radio wave propagation - Troposphere propagation. - Free-space path loss. - Multi-path fading on LOS links. - Propagation in mobile and portable systems. - Path loss prediction.	٦

Text book 1: Electromagnetic Waves and Radiation System by E. C. Jordan and Balman.
Text book 2: : Antenna Theory and design by Stutzman.
Text book 3 : Electromagnetic Field theory by B. Thide

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No	Syllabus Subject: CADD Stage: 2nd class Units: 4	No. of Hour/Week		No. of weeks
		Theoretical 2	Laboratory 1	
١	Ch.1 Introduction 1. What is the meaning of Computer Aided Design (CAD)? 2. What is the advantage of studying this subject? 3. Main two parts of our subject: VHDL and MATLAB. 4. Brief history of VHDL and description of general concepts of the language			٣
٢	Ch.2 Basic concepts in VHDL 1. Interface description and architectural description. 2. VHDL operators. 3. An illustrate example. 4. Timing and concurrency. 5. Signal assignments. 1. Comparison between signals and variables			٢
٣	Ch.3 Timing and Concurrency 1. Concurrent and Sequential Assignments. 2. Timing diagram. 3. The effect of delay			١
٤	Ch.4 Structural building of a digital system 1. Building basic gates. 2. Constructing a specific library for each student. 3. Wiring between gates. 4. Design a digital system. 1. Modeling a test bench.			٣
٥	Ch.5 Building a specific digital system from scratch 1. Design some types of flip-flops. 2. Design some types of counters. 3. Design some types of registers. 4. Studying of time diagram for these designs.			٣
٦	Ch.6 Design parameterization 1. Packaging components. 2. Packaging subprograms. 3. Using default values. 4. Using fixed values. 5. Passing generic parameters. 1. General purpose test bench			٢
٧	Ch.7 behavioral description of hardware 1. Process statement. 2. Assertion statement. 3. Sequential wait			١
٨	Ch.8 Arrays and Attributes 1. Subtypes decelerations. 2. Array decelerations. 3. Predefined attributes.			٣

	4. Array attributes.	
٩	Ch.9 Introduction to MATLAB 1. Usage of MATLAB. 2. General description. 3. Description of the fields that MATLAB deals with.	٤
١٠	Ch.10 Control statement and conditional statement 1. If statement. 2. If else statement. 3. For loops. 4. While, do_while loops. 5. Exiting from progam.	٢
١١	Ch.11 GUI 1. Importance of GUI. 2. Dialog box. 3. I/O box. 4. Delay computation	٢
١٢	Ch.12 Arrays Operation 1. Declaration of an array. 2. Processing a specific array. 3. Image in an array.	٣
١٣	Ch.13 Image Processing in MATLAB 1. RGB and gray scale image. 2. Some processing. 3. Conversion between some types. 4. Some types of filters.	٤
١٤	Ch.14 Plotting in MATLAB 1. 2D plotting. 1. 3D plotting	٢

Text book 1: VHDL Analysis and Modeling of Digital System by ZainAlabedin
Text book 2: Digital Image Processing Using MATLAB by Gonzalez
Text book 3: Digital Signal and Image Processing Using MATLAB by Gerard Blanchet

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No	Syllabus Subject: electronic II Stage: 2nd Class Units: 6	No. of Hour/Week		No. of weeks
		Theoretical ٣	Laboratory ٣	
١	**CH.1 Operational Amplifier** 1. The ideal OP AMP. 2. Negative feedback. 3. Inverting configuration. 4. Integrator 5. Differentiators 6. Summing amplifier 7. The non-inverting configuration. 8. The voltage follower. 9. Comparators 10. Schmitt Trigger. 11. Limiter circuits 12. Precision rectifier circuits. 13. Large-Signal operation of OP AMPS			٥
٢	**CH.2 Special -Purpose Op-Amp circuits** 1. Instrumentation amplifiers. 2. Operational Transconductance amplifier (OTAs) 3. Log and Antilog amplifiers. 4. Converters and other op-amp circuits.			٤
٣	**CH.3 Active Filters** 1. Basic filter types & specifications 2. Filter functions 3. Single-Amplifier biquad sections 4. Second-order LRC resonator 5. Second-order **Active Filters** based on inductor replacement 6. Second-order **Active Filters** based on two-integrator-loop			٥
٤	**CH.4 Sinusoidal Oscillators** 1. Basic Principles. 2. RC Oscillator circuits 1. Wien-Bridge Oscillator 2. Active-filter tuned Oscillator 3. LC Oscillators 1. Hartley Oscillator 2. Colpitts Oscillator 4. Crystal Oscillator			٤
٥	**CH.5 Multivibrators** 1. Bistablemultivibrator 2. Astablemultivibrator 3. Monostablemultivibrator 4. The **555** circuit timer a. Monostable MV using 555 b. Astable MV using 555			٤
٦	**CH.6 Data Converters**			٣

	1. Sampling of analog signals 2. D/A converters 3. A/D converters a. Feedback-type b. Dual-slope type	
٧	**CH.7 Communications Circuits** 1. The linear multiplier 2. Basic application of the multiplier 3. AM modulation 4. AM demodulation 5. IF and audio amplifiers 6. FM modulation 7. The phase-locked loop (PLL) 8. FM demodulation	**٥**

Text book 1: Electronic devices by Floyd 8th edition 2008
Text book 2: " Microelectronic circuit", Adel Sedra , Smith; 5th edition
Text book 3: " Electronic Devices & Circuit Theory", R. Boylestad, L. Nashelskey
Text book 4: " Electronic Devices & Circuit", J. Millman

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		Theoretical 2	negotiation=1	
١	Fourier series, Finding Fourier coefficients			
٢	Exponential F.S., Line spectrum, Effective value, power			
٣	Solution of exercises, Solution of exercises, applications			
٤	Laplace transform, L.T. for elementary functions			
٥	Properties of L.T., Solution of exercises			
٦	Half-year Break, Theorems of L.T.			
٧	Convolution in time, Numerical methods, Solution of differential eqs			
٨	Numerical methods, Solution of differential eqs			
٩	matricies			
١٠	Inverse of a matrix Eigen values & Eigen vectors			
١١	Cayley-Hamilton theorem, Numerical methods			
١٢	Execises			

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No	Syllabus Subject: Microprocessor (MP) Stage: 2nd class Units: 5	No. of Hour/Week		No. of weeks
		Theoretical 2	tutorial=1	
١	Ch.1 Introduction 1. What is cryptography? 2. Information security. 3. Different aspect of security. 4. Information integrity function. 5. Internet security. 6. Security attacks. 7. Security mechanisms. 8. Security service			٢
٢	Ch.2 Assembly Language 1. Addressing mode. 2. Converting Assembly language to machine language. 3. Data transfer instruction. 4. Arithmetic instruction. 5. Logic instruction.			٦
٣	Ch.3 8086 µp programming 1. Flag control instruction. 2. Compare control instruction. 3. Jump control instruction. 4. Call control instruction. 5. String control instruction.			٥
٤	Ch.4 The Memory Interface to the 8086 1. The 8086 µp pin configuration. 2. Minimum mode and maximum mode. 3. Bus buffering and latching. 4. Demultiplexing the 8086. 5. Memory interface.			٥
٥	Ch.5 I/O Interface 1. Isolated and memory mapped I/O. 2. I/O instruction. 3. The programmable peripheral interface 8255.			٤
٦	Ch.6 Direct Memory Access (DMA) 1. The DMA concept. 2. The 8237 DMA controller. 3. Internal Architecture of the DMA.			٤
٧	Ch.7 Interrupt 1. The interrupt concepts. 2. The 8254 programmable Interrupt controller. 3. Programming the 8259.			٤

Text book 1: the 8086 microprocessor by W. Trible 1981

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No	Syllabus **Subject: Information Theory** **Stage: 3rd class** **Units: 6**	No. of Hour/Week		No. of weeks
		Theoretical 3	Practical=0	
١	Chapter One: Introduction to Information Theory 1. Introduction 2. The Concept of Information 3. Probability 4. Mutual Information 5. Average Mutual Information			٤
٢	Chapter Two: The Entropy 1. Conditional and joint entropy 2. Relationship between I and H 3. Joint entropy in terms of conditional entropy 4. Maximum entropy of a discrete source			٥
٣	Chapter Three: Type of Channels and Their Capacity 1. Discrete Memoryless Channels 2. Channel Capacity 3. Capacity of Special Channels 4. Capacity of a Band Limited Analog White 5. Gaussian Noise (AWGN) Channel 6. Capacity of Infinity Bandwidth Channel			٥
٤	Chapter Four: Markove Source			٢
٥	Chapter Five: Introduction to Coding 1. Introduction 2. Type of codes 3. Parity check			٢
٦	Chapter Six: Source Coding 1. Source Coding 2. Shannon-Fano Coding 3. Huffman Coding 4. Lempel-Ziv coding			٦
٧	Chapter Seven: Channel Coding 1. Error-detection Codes 2. Linear Block Codes 3. Cyclic Block Code 4. The Convolutional Codes 5. Viterbi Decoding			٨

Stephen C. Wilson, "Digital Communication and coding",Prentice-Hall, 1996
Man Young Rhee, "Error-Correcting Coding Theory", McGraw-Hill, 1989

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No	Syllabus Subject: Computer Architecture Stage: 3rd class Units: 6	No. of Hour/Week		No. of weeks
		Theoretical 3	Practical=0	
١	**Introduction** • Organization and Architecture • Structure and function			١
٢	**Computer evaluation and performance** • A brief History of computers • Designing for performance			٢
٣	**A Top Level View of computer Function and Interconnection** • Computer Components • Computer Function • Interconnection structure • Bus Interconnection • PCI			٣
٤	**Cache Memory** • Computer memory system • Cache memory principles • Elements of cache memory • Pentium 4 cache organization			٤
٥	**Internal memory Technology** • Semiconductor main memory • Error correction • Advanced DRAM organization			٢
٦	**External Memory** • Magnetic Disk • RAID • Optical memory • Magnetic Tape			٣
٧	**Input/ Output** • External Devices • I/O Modules • Programmed I/O • DMA • I/O channels and processors • The external interface			٣
٨	**Computer Arithmetic** • ALU • Integer Representation • Integer Arithmetic • Floating- Point Representation			٣

	• Floating- Point Arithmetic	
٩	**Instruction Sets** • Machine Instruction Characteristics • Types of operands • Types of operations • Intel x86 • Addressing • Instruction formats • Assembly Language • Instruction cycle • Instruction pipelining • The x86 processor family	٤
١٠	**Reduced Instruction Set Computers(RISCs)** • Instruction Execution Characteristics • Compiler- Based Register Optimization • Reduced Instruction Set Architecture • RISC pipelining • The RISC versus CISC controversy.	٣
١١	**Control Unit Operation** • Micro-operation • Control of the processor • Hardwired Implementation	٢
١٢	**Micro programmed Control** • Microinstruction Sequencing • Microinstruction Execution	٢
١٣	**Parallel Organization** • Symmetric multiprocessors • Cache coherence and MESI protocol • Clusters • Nonuniform memory Access computers	١

Text book 1: "Computer organization and Architecture, designing for performance"by William Stallings (2010)

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No	Syllabus Subject: Control & Interfacing Stage: 3rd Class Units: 4	No. of Hour/Week		No. of weeks
		Theoretical ٢	Practical=0	
١	**PART# I Microcontroller And PC Interfacing** **Introduction** 1.1 The purpose of Microcontroller 1.2 Single Board Computer (SBC) 1.3 Types of Microcontroller 1.4 Microprocessor vs. Microcontroller			١
٢	**MCS-51** 2.1 8051 Hardware Architecture 2.1.1 8051 Block diagram 2.1.2 8051 Pinout 2.1.3 I/P Ports 2.1.4 Memory Organization 2.2 8051 Programming (simple example)			٢
٣	**Timers** 3.1 Timer Mode Register (TMOD) 3.2 Timer Control Register (TCON) 3.3 Clocking Sources 3.4 Starting , stopping and controlling the timers 3.5 Initializing and accessing timer registers			١
٤	**Serial Port Operation** 4.1 Serial Communication 4.2 Serial Port Buffer Register (SBUF) 4.3 Serial Port Control Register (SCON) 4.4 Modes of Operation 4.5 Full Duplex Serial Communication 4.6 Initialization and Accessing Serial Port Registers 4.7 Multiprocessor Communications			٢
٥	**Interrupts** 5.1 Interrupt organization 5.2 Processing interrupt 5.3 Program design using interrupt 5.4 Timer interrupt 5.5 Serial Port interrupt 5.6 External interrupt 5.7 Interrupt timing			١
٦	**Assembly Language Programming (ALP)** 6.1 Assembler Operation			٢

	6.2 ALP Format 6.3 Assemble-Time Expression Evaluation 6.4 Assembler Directives 6.5 Linker Operation	
٧	**Case Study #1** 7.1 Traffic Light Control Project **Case Study #2** 7.2 Stepper Motor Control Project	٤
٨	**PART # 2 Control System** **Introduction** 8.1 Examples of Control System 8.2 Closed-Loop vs. Open Loop control	١
٩	**Mathematical Modeling** 9.1 Transfer Function 9.2 Mathematical Modeling of Mechanical System 9.3 Mathematical Modeling of Electrical System	١
١٠	**Block Diagram** 10.1 Block Diagram Transformation Theorems 10.2 Multiple Inputs 10.3 Reduction of Complicated Block Diagrams	٢
١١	**Signal Flow Graph** 11.1 Fundamentals of Signal Flow Graph 11.2 Construction of Signal Flow Graph 11.3 Block Diagram Reduction using Signal Flow Graph	٢
١٢	**Transient and Steady State Response Analysis** 12.1 First Order System 12.2 Second Order System 12.3 Routh's Stability Criteria 12.4 Steady State Error in Unity Feedback Control System 12.5 Transient Response Analysis with MATLAB	٤
١٣	**Root-Locus Analysis** 13.1 Root-Locus Plot 13.2 Summary of General Rules for Constructing root loci 13.3 Conditionally Stable System 13.4 Root Locus with MATLAB	٣
١٤	**Frequency Response Analysis** 14.1 Bode Diagram 14.2 Polar Plot 14.3 Nyquist Stability Criterion 14.4 Stability Analysis	٣

	14.5 Closed Loop Frequency Response of Unity Feedback 14.6 Plotting Bode Diagrams with MATLAB 14.7 Drawing Nyquist Plot With MATLAB	
١٥	**Analysis of Control System in State Space** 15.1 State Space Representation of Transfer Function System. 15.2 Transformation of System Models with MATLAB. 15.3 Solving the Time-Invariant State Equation.	٣

Text book 1: ***Modern control system,*** **Katsuhiko Ogata, 5th 2010, or older**
Text book 2: ***8051Microcontroller*** **/ I. Scott MacKenzie , Raphael C.-W.Phan, - 4th edition, 2007**

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No	Syllabus Subject: Data Structure Stage: 3rd Class Units: 6	No. of Hour/Week		No. of weeks
		Theoretical ٢	Practical 2	
١	Ch.1 Programming Principles 1. Introduction 2. Specification and Design 3. Running Time Analysis 4. Testing and Debugging			٣
٢	Ch.2 ADTs, C++ classes and files			٢
٣	Ch.3 Stack			٣
٤	Ch.4 Queue			٣
٥	Ch.5 Pointers and Dynamic Array			٢
٦	Ch.6 Linked List 1. Single Linked List 2. Double Linked List 3. Dynamic Stack and Queue			٥
٧	Ch.7 Tree 1. Binary Tree 2. Multi-way Tree			٣
٨	Ch.8 Searching 1. Serial and Binary search 2. Open address Hashing			٢
٩	Ch.9 Sorting 1. Quadratic Sorting Algorithms 2. Recursive Sorting Algorithms			٤
١٠	Ch.10 Graph 1. Definition 2. Implementation 3. Traversals 4. Path Algorithm			٣

Text book 1: Data Structures and Program Design in C++ 1999
Text Book 2: Data Structure and other Objects using C++ 1998
Text Book 3: Problem Solving with C++ The Object of Programming 1999

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No	Syllabus Subject: Database Design Stage: 3rd Class	No. of Hour/Week		No. of weeks
		Theoretical ٢	Practical 2	
١	**Introduction to Data Base** 1. the Data Base Processing 2. Four DB Application • Personal DBA • Multi User DBA • Organizational DBA • Internet Technology DBA			٤
٢	**The Relationship with DBMS** 1. DBMS 2. File Processing System 3. DB Processing System			٤
٣	**The Relation Model** 1. data base Elements 2. Network, Hierarchical, Relational Models			٣
٤	**Data Base Design** 1. Relational Data Base Design 2. Entity Relationship Diagram 3. elements of DBD 4. Functional dependencies			٥
٥	**The Normalization** 1. Modification Anomalies 2. The essence of normalization 3. 1NF(first normal form) 4. 2NF(second Normal Form) 5. 3NF(third Normal Form) 6. BCNF 7. Domain/Key NF 8. De-normalization			٦
٦	**Database Design Strategies** 1. Top- Down and Bottom- up *design,* 2. centralized Design 3. de-centralized design 4. Disrupted database design 5. distributed database management system			٦
Text book 1: Database System (Design, Implementation and Management) by Coronel / Morris / Rob (2011				**٧**

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No	Syllabus Subject: Digital Communication 6/unit	No. of Hour/Week		No. of weeks
		Theoretical ٢	tutorial ١	
١	Ch.1 Introduction 1. Elements of communication System . 2. Reasons of Modulation 3. advantages &disadvantages of digital communication			١
٢	Ch.2 Signal Analysis 1. Classification of signals :(Analog/ Digital, periodic/aperiodic, energy signal/power signal, deterministic/probabilistic). 2. Useful Functions. (Unit Impulse and Unit step). 3. Review of Fourier Analysis: - Fourier series. - Fourier Transform. 4. Signal bandwidth. 5. Signal transmission through a linear system. 6. Signal distortion over a communication channel.			٣
٣	Ch.3 Probability and random variables 1. Probability. 2. Probability Density Function pdf. 3. statistical average (discrete R.V. Continuous R.V) 4. Some important Pdf. -Uniform -Binomial -Gaussian			٣
٤	Ch.4 Pulse Modulation and data transmission 1. Sampling theorem 2. PCM 3. DPCM 4.DM 5. TDM 6.Quantization Noise 7. PAM, PPM, PWM 8. waveform coding 9. detection of binary signals in AWGN 10. Matched filter 11. ISI ,pulse shaping and Raised cosine filter			٨
٥	Ch.5 Digital Modulation techniques 1. PSK 2.ASK 3.DPSK 4. FSK 5.coherent and non coherent detection 6.error performance of binary signaling 7. M-arysinalling -MPSK -MFSK -MQAM			٨

٦	Ch.6 Synchronization 1. PLL 2 carrier synchronization 3. clock recovery 4.Early late gate synchronization 5. costas loop 6.square low	٤
٧	Ch7: spread spectrum techniques 1.DS-SS system 2. FH-SS systems	٣
٨		
٩		

Text book 1:Modren Digital and Analog Communication Systems by Lathi
Text book 2 Digital communications, fundamentals and applications B. SKLAR 2001

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No	Syllabus Subject: Digital System Design Stage: 3th Class Units: 4	No. of Hour/Week	No. of weeks
		Theoretical ٢	
١	1. Introduction- to Design Methodological and Implementation Technologies a. Different Levels of Design b. The Design Process- Top-down design strategies, Bottom-up design strategies, Mixed strategies. c. Design Descriptions d. Design Tools e. Implementation technologies		٢
٢	2. Review of Combinational Logic a. Basic Logic Review ° Boolean equations, Truth Tables, K-Maps ° Basic Gates (AND,OR,XOR,NAND,NOR) b. Combinational Logic Blocks c. Multi-Bit Combinational Logic Blocks ° Multi-bit multiplexers ° Multi-bit adders ° Comparators		٤
٣	3. Review of Sequential Circuits a. Sequential Logic Building Blocks ° Latches, Flip-Flops b. Sequential Logic Circuits ° Registers, Shift Registers, Counters ° Memory (RAM, ROM) ° Simple Finite State Machines (Mealy, Moore)		٤
٤	4. Design Implementation Technologies a. Introduction to CPLD, ASICs and FPGAs b. FPGA & CPLD Architectures c. FPGA Programming Technologies d. FPGA Logic Cell Structures e. FPGA Programmable Interconnect and I/O Ports f. FPGA Implementation of Combinational Circuits g. FPGA Sequential Circuits h. Timing Issues in FPGA Synchronous Circuits		٧
٥	5. Synchronous Sequential Circuits a. Basic Design Steps b. State – Assignment problem c. Mealy State Model d. Design of Finite State Machine Using CAD Tools e. VHDL Code for Moore – The FSMs f. Synthesis of VHDL Code		٧

	g. Simulating and Testing the Circuit h. Specifying the State Assignment in VHDL Code i. Specification of Mealy FSMs Using VHDL j. Serial Adder Example ° Mealy – Type FSM for Serial Adder ° Moore – Type FSM for Serial Adder ° VHDL Code for Serial Adder k. FSM as an Arbiter Circuit ° Implementation of the arbiter Circuit ° Minimizing the Output Delays for an FSM l. Analysis of Synchronous Sequential Circuits m. Algorithm State Machine (ASM) Charts n. Formal Model for Sequential Circuits	
٦	6. Asynchronous Sequential Circuits a. Asynchronous Behavior b. Analysis of Asynchronous Circuits c. Synthesis of Asynchronous Circuits d. State reduction e. State assignment ° Transition Diagram ° Exploiting Unspecified Next-State Entries ° State Assignment Using Additional State Variables ° One-Hot State Assignment f. Hazards ° Static Hazards ° Dynamic Hazards ° Significance of Hazards g. Complete Design Example- The vending –Machine Controller	٧
٧	7. Digital System Design a. Building Block Circuits ° Flip-Flop and Registers with Enable Inputs ° Shift registers with Enable Inputs ° State Random Access Memory (SRAM) ° SRAM Blocks In PLD b. Design Examples c. Clock Synchronization	٦
٨	8. Testing of logic Design a. Fault Models ° Stuck-at Model ° Single and Multiple Faults ° CMOS Circuits b. Complexity of a Test Set c. Path Sensitizing- Detection od a Specific Fault a. Circuits with Tree Structure d. Random Tests e. Combinational and Sequential Logic Circuit Testing - Design of Testability	٦

	f. Built-in Self-Test ° Built-in Logic Block Observer ° Signature Analysis ° Boundary Scan g. Printed Circuit Boards ° Testing of PCBs Instrumentation	

Books:

1) Stephen Brown and ZvonkoVranesic, “Fundamentals of Digital Logic with VHDL” Design, 2nd edition
2) Robert Dueck, “Digital Design with CPLD Applications and VHDL “, 2nd edition
3) Digital Design – By Morris Mano- 3rd Edition, PHI
4) Wayne Wolf, "FPGA-Based System Design," Prentice Hall, 2004

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No	Syllabus Subject: Digital Signal Processing Stage: 3rd class Units: 6	No. of Hour/Week		No. of weeks
		Theoretical ٢	negotiation= 1	
١	Discrete time signals, Properties of linear systems			
٢	Impulse response of linear systems,			
٣	Convolution of sequences, Computation of convolution sum			
٤	Stability& causality of linear systems, Linear difference equations with constant coefficients			
٥	FIR & IIR systems, Frequency responce			
٦	Discrete time Fourier transform, Properties of DTFT, Computation of system output in frequency domain			
٧	Sampling of continuous time signals, Z-transform & ROC			
٨	Relationships between impulse response,system function,frequency response &difference equation			
٩	Discrete Fourier series, Discrete Fourier transform			
١٠	Circular convolution			
١١	Computation of discrete Fourier transform, Fast Fourier Transform			
١٢	Decimation in frequency, Analogue filter design Elliptic filters, Digital filter design			
١٣	FIR filter design			
١٤	Introduction to DSP chips			

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No	Syllabus Subject: Communications lab. Stage: 4th class Units: 2	No. of Hour/Week		No. of weeks
		Theoretical	Practical=3	
١	Amplitude modulation and demodulation			١
٢	DSB/SSB modulation and demodulation.			١
٣	Frequency modulation and demodulation.			١
٤	Pulse width modulation and demodulation.			١
٥	Pulse position modulation and demodulation.			١
٦	Sampling Technique.			١
٧	Digital time division multiplexing.			١
٨	Pulse code modulation and demodulation.			١
٩	Differential code modulation and demodulation			١
١٠	Delta modulation and demodulation.			١
١١	Amplitude shift keying modulation and demodulation.			١
١٢	Frequency shift keying modulation and demodulation			١
١٣	Phase shift keying modulation and demodulation.			١
١٤	Differential Phase shift keying modulation and demodulation.			٢
١٥	555 timer.			٢
١٦	Phase-locked loop.			٢
١٧	Direct frequency syntheser.			٢
١٨	DSB/SSB Transmitter.			١
١٩	Transmission line.			٢
٢٠	Antenna parameters measurement			٢
٢١	Lab projects.			٢

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No	Syllabus **Subject: Satellite Communication** **Stage: 4th Class** **Units: 4**	No. of Hour/Week		No. of weeks
		Theoretical	tutorial=1	
١	Ch.1 Introduction 1. history of the Satellite 2. Basic Satellite system 3. Elements of Satellite communication system			٢
٢	Ch.2 Satellite orbits 1. Kepplers' laws 2. Types of satellite systems - LEO (low earth orbit) - MEO (Medium earth orbit) - GEO (Geostationary earth orbit) 3. orbit equation 4. look angle determination - Sub satellite point - elevation angle - azimuth angle 5. Altitude and control system			٤
٣	Ch.3 Satellite communication. 1. propagation losses 2. rain attenuation 3. Antennas - antenna polarization - Feed system - double reflector antennas 4. link budget Analysis 5. system noise 6. noise temperature and G/T ratio 7. noise Figure 8. carrier to noise ratio determination			٨
٤	Ch .4 Multiple Access Techniques 1. FDMA , inter modulation 2. TDMA , TDMA Frame structure 3. CDMA , DS- CDMA Capacity ,FH			٧
٥	Ch .5 Principles of Cellular communication - introduction - Examples of mobile radio systems - paging systems - cordless telephone systems - cellular telephone systems 3. Frequency reuse 4. Co-channel interference 5. Improving capacity in cellular system - cell splitting - cell sectoring 6. Handof techniques 7. First generation systems			٩

	8. Second generation systems -GSM	

Text book 1: "Satellite Communications Systems Engineering" by Louis J. Ippolito,
Text book 2: "Mobile Communication Systems" by Krzysztof Wesolowsk
Text book 3:"Principles of Mobile Communication" by Gordon.L
Text book 4:"satellite Communication Networking" by Regis. J. Bates

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No	Syllabus **Subject: Computer Network** **Stage: 4th class** **Units: 6**	No. of Hour/Week		No. of weeks
		Theoretical=3	Practical=3	
١	Ch.1 Data Communication and Networking Introduction 1. A communication model. 2. Data Communication. 3. Data Communication Networking. 4. An Example Configuration.			١
٢	Ch.2 Protocol Architecture 1. The Need for Protocol architecture. 2. A Simple Protocol Architecture. 3. Standardized Protocol Architectures. 4. OSI model. 5. Service Primitives and Parameters.			٣
٣	Ch.3 Transmission Media 1. Guided Transmission Media. 2. Twisted pair. 3. Coaxial Cable. 4. Optical fiber. 5. Wireless Transmission. 6. Terrestrial Microwave. 7. Satellite Microwave. 8. Broadcast Radio. 9. Infrared.			٣
٤	Ch.4 Digital Data Communication Techniques 1. Asynchronous and Synchronous Transmission. 2. Types of Errors 3. Line Configurations 4. Interfacing.			٢
٥	Ch.5 Data Link Control 1. Flow Control. 2. Error Control. 3. High-Level Data Link Control (HDLC).			٢
٦	Ch.6 Circuit Switching and Packet Switching 1. Switching Networks. 2. Circuit-Switching Networks. 3. Circuit-Switching Concepts. 4. Control Signaling. 5. Softswitch Architecture. 6. Packet-Switching Principles. 7. Frame Relay.			٣
٧	Ch.7 Asynchronous Transfer Mode 1. Protocol Architecture. 2. ATM Logical Connection. 3. ATM Cells. 4. Transmission of ATM Cells			٢
٨	Ch.8 Congestion Control in Switched Data Networks			٣

	1. Effect of Congestion. 2. Congestion Control. 3. Traffic Management. 4. Congestion Control in Packet-Switching Networks.	
٩	Ch.9 Local Area Network 1. Topologies and Transmission Media. 2. LAN Protocol Architecture. 3. Bridges. 4. Layer 2 and Layer 3 Switches	٣
١٠	Ch.10 High-Speed LANs 1. The Emergence of High-Speed LANs. 2. Ethernet. 3. Token Ring	٣
١١	Ch.11 Wireless LANs 1. Wireless LAN Technology. 2. IEEE 802.11 Architecture and Services. 3. IEEE 802.11 Medium Access Control. 4. IEEE 802.11 Physical Layer.	٣
١٢	Ch.12 Transport Protocol - Connection-Oriented Transport Protocol mechanisms.	٢

Text book 1: Computer Network by Taninbum 2003
Text book 2: Data and Computer Comm. By William Stallings

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No	Syllabus Subject: Cryptography Stage: 4th class Units: 4	No. of Hour/Week		No. of weeks
		Theoretical ٢	tutorial=1	
١	Ch.1 Introduction 1. What is cryptography? 2. Information security. 3. Different aspect of security. 4. Information integrity function. 5. Internet security. 6. Security attacks. 7. Security mechanisms. 8. Security service			١
٢	Ch.2 Conventional Encryption: Classical techniques 1. Conventional Encryption. 2. Cryptanalysis and Brute-force. 3. Classical techniques: substitution (Caesar, 4. Monoalphabatic, playfair, hill cipher,poly alphabetic). 5. Classical techniques: transposition. 6. Rotor machines			٣
٣	Ch.3 Conventional Encryption: modern techniques 1. Festal cipher. 2. Confussion and diffusion. 3. Data encryption standard (DES). Encryption			٣
٤	Ch.4 Advance Encryption Standard (AES) 1. Rijndael algorithm. 2. Substitution box. 3. Shift row techniques. 4. Mix column techniques. 5. Round computation. 6. Encryption and decryption process.			٢
٥	Ch.5 public key encryption 1. Number theory. 2. RSA. 3. diffic_hellman key exchange			٣
٦	Ch.6 Stream Cipher 1. RC4			٣
٧	Ch.7 Authentication Processes 1. Message Authentication code. 2. Hash function. 3. Confidentiality.			٣
٨	Ch.8 Hash Algorithm 1. Message digest 5.			١
٩	Ch.9 Authentication servers 1. Kerberos: Introduction 2. Dialogue 3. Kerberos V4.			٤

	4. Releam Kerberos. 5. Kerbero V5.	
١٠	Ch.10 Security Protocols 1. IP security. 2. VPN. 3. Firewall. 4. Firewall Architecture.	٣
١١	Ch.11 Security Wireless 1. 802.11. 2. WEP.	١
١٢	Ch.12 Viruses 1. Viruses. 2. Worms. 3. Infection process. 4. Trojan Horse.	٣

Text book 1: Cryptography and Network Security by W. Stalling 2006.
Text book 2: Computer Network by Taninbum 2003

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No	Syllabus **Subject Internet Architecture** **Stage: 4th class** **Units: 4**	No. of Hour/Week		No. of weeks
		Theoretical ٢	Practical 1	
١	History of Internet Internet Usage Architecture of the Internet Internetworking and Intranet Internetworking Model and The Layered Approach TCP/IP Model Host-to-Host Layer operation			٦
٢	TCP and UDP segments format The Internet Layer Protocols IP, ICMP, ARP and RARP protocols IP packet format IP addressing Subnetting and CIDR NAT VLSM Supernetting and Route summarization IPv6 :header format and addressing Routing and routed protocols The Route Decision Time and Place			٦
٣	Routing Protocols (Strategies) Switching Versus Routing Static Routing Flooding Adaptive (Dynamic) Routing Distance Vector and Link-State Routing Protocols Interior and Exterior Routing Protocols Routing Loops Routing Information Protocol (RIP) Open Shortest Path First (OSPF) BGP routing Protocol Wide Area Networking (WAN) Protocols			٦

	WAN Connection Types HDLC PPP Frame Relay-CIR and DLCI Frame Relay- switching and management ISDN	
٤	Application layer protocols Overview of Telnet WWW and HTTP FTP and TFTP BootP and DHCP E-mail: SMTP and POP3 DNS Firewall and Security Management General Review and Questions	٦

Text book 1: Network and Internet By Taninbum2006

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No	Syllabus **Subject: Information System Analysis & Design** **Stage: 4th Class** **Units: 6**	No. of Hour/Week Theoretical ٢	 Practical 1	No. of weeks
١	**1. Information System Analysis Concepts** • What is System Analysis (SAD) • Information Technology • Information system building blocks			٤
٢	**2. System Development Life Cycle (SDLC)** • SDLC concepts • Planning Phase • Analysis Phase • Design Phase • Implementation Phase			٤
٣	**3. System Development Methodologies** • What is a methodology • Structured Design Development • Rapid application Development (RAD) • Selecting the Appropriate Methodology • CASE tools technology			٣
٤	**4. Data and Process Modeling** • System concept or data modeling • Entity-Relationship modeling • Process modeling • Data Flow Diagrams (DFD) • How to create DFD			٥
٥	**5. System Design Strategies** • Selecting a design strategy • Developing the design plan			٦
٦	**6. System Design Architecture** • Computing Architectures • Design Infrastructure • Communication Infrastructure			٦

Text book 1: System analysis and design 7th Edition, By Shelly, Cashman, Rosenblatt.(2009)
Text book 2: System analysis and design 9th Edition, By Alan Dennis and Barbara Haley Wixom.(2008)

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والاتصالات

No	Syllabus **Subject: Optical Fiber Communication** **Stage: 4th class** **Units: 4**	No. of Hour/Week		No. of weeks
		Theoretical ٢	Practical 0	
١	**Ch1 Basic Concepts** Light generation Wave properties Snell's Law Definition of the optical fiber Optical fiber structure Propagation of light in fiber Types of optical fiber			٣
٢	**Ch2 Signal degradation in optical fiber** Attenuation Absorption Scattering losses Bending losses Material dispersion Wave-guide dispersion			٣
٣	**Ch3 Optical sources** Topics from semiconductor physics Light emitting diodes(LED) LED structure Light source material Modulation of an LED Laser diodes(LD) Laser diode modes and threshold conditions Laser diode structures Modulation of laser diodes Light source linearity			٤
٤	**Ch4 Photo-Detectors** Physical principals of photodiodes The PIN photo-detector Avalanche photodiodes Photo-detector noise Noise sources Signal-to-noise ratio Detector response time Comparisons of photo-detectors			٤
٥	**Ch5 Digital transmission system** Point-to-point links System considerations Digital optical transmitter Digital optical receiver Link power budget Rise time edge Noise effect on system performance			٣

٦	**Ch6 Analog systems** Overview of analog links Carrier-to-noise ratio Analog optical transmitter Analog optical receiver	٢
٧	**Ch7 WDM concepts and components** Operational principals of WDM Passive components The fiber coupler	٣
٨	**Ch8 Optical Amplifiers** Basic applications and types of optical amplifiers Semiconductor optical amplifier Erbium-Doped fiber amplifier Amplifier noise	٣
٩	**Ch9 Optical network** Basic networks Broadcast and select WDM networks Performance of WDM + EDFA systems	٣
١٠	**Ch10 Measurements** Test equipment Attenuation measurements Dispersion measurements	٢

Text book 1: Optical Fiber Communication, Principles and Practice, John M. Senior.
Text book 2: Optical Fiber Communication , Gerd_keiser

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No	Syllabus **Subject: Operating System Lab.** **Stage: 4th Class** **Units: 6**	No. of Hour/Week		No. of weeks
		Theoretical ٢	Practical 2	
١	Ch.1 Introduction 1. What is an Operating System? 2. Simple Batch Systems. 3. Multiprogrammed Batched Systems. 4. Time Sharing Systems. 5. Personal Computer Systems. 6. Clustered systems 7. Parallel Systems. 8. Distributed Systems. 9. Handheld systems 10. Real-Time Systems			٢
٢	Ch.2 Computer –System Structures 1. Computer System Operation. 2. I/O Structure. - I/O Interrupts. - DMA (Direct Memory Access). 3. Storage Structure. 4. Storage Hierarchy. 5. Hardware Protection. 6. General System Architecture.			٢
٣	Ch.3 Operating System Structure 1. System Components. 2. Operating System services. 3. System calls and its implementation 4. Operating system styles			٢
٤	Ch.4 Process Management 1. Process Concept. 2. Process Scheduling. 3. Operation on Processes. 4. Threads. 5. Interprocess Communication.			٢
٥	Ch.5 **Threads** 1. What is thread 2. Benefits of threads 3. User and kernel threads 4. Threading issues			٣
٦	Ch.6 CPU Scheduling 1. Basic Concepts. 2. Scheduling Criteria. 3. Scheduling Algorithms. 4. Real time scheduling			٢
٧	Ch.7 Process Synchronization 1. Classical problems of synchronization 2. Critical region			٢

	3. Race condition 4. Peterson's solution 5. Semaphores	
٨	Ch.8 Dead locks 1. Method for Handling Deadlocks 2. Deadlock prevention 3. Deadlock Avoidance 4. Deadlock Detection	٢
٩	Ch. 9 Memory Management 1. Swappins 2. Contiguous Allocation 3. Paging	٢
١٠	Ch10 Memory Management 1. Swappins 2. Contiguous Allocation 3. Paging	٢
١١	Ch. 11 Mass storage structure 1. Overview of Mass- Storage structure 2. Disk structure 3. Disk scheduling 4. Disk Management	٤
١٢	Ch. 12 I/O System 1. I/O Hardware 2. Application I/O Interface	١
١٣	Ch . ١٣ Protection 1. Goals of Protection 2. Principles of Protection 3. Domain of Protection	٢
١٤	Ch . 14 Security 1. The security Problem 2. Program threats 3. System and Network Threats	٢
١٥	Ch. 15 Distributed System Structure 1. Types of Distributed Operating Systems 2. Network Structure 3. Network Topology	٢
	Ch.10 File System Interface 1. File concept 2. Access Methods 3. Directory Structure	2

Text book 1: Silberschatz, Galvin and Gagne, Operating System Concepts, 7th Edition 2005
Text book 2: John Wiley & Sons, 2004.
Text book 3: Silberschatz, Galvin and Gagne, Operating System Concepts, 8th Edition 2009