



Government Polytechnic Mumbai

(Academically Autonomous Institute of Maharashtra Government)

49, Ali Yawar Jung Marg, Kherwadi, Bandra (E)

gpmumbai@gpmumbai.ac.in

Programme: Information Technology

Third Semester

With effect from June 2017

Course Code	Course Title	Teaching Hours				Credits	Examination Scheme					
		L	P	TU	Total		Theory		PR	OR	TW	Total
							TH	TS				
IT16204	Digital Techniques	3	2	----	5	5	70	30	50	---	---	150
IT16301	Professional Practice	----	2	----	2	2	---	---	---	---	50	50
IT16205	Data Communication	3	2	---	5	5	70	30	---	50*	---	150
IT16302	Computer Peripheral and Maintenance	2	2	---	4	4	50 #	---	50*	---	---	100
IT16206	Object Oriented Programming using C++	3	4	---	7	7	70	30	50*	---	---	150
IT16303	Database Management System	3	4	----	7	7	70	30	---	50*	---	150
IT16304	UID Programming	1	4	---	5	5	---	---	50*	---	50	100
	TOTAL	15	20	---	35	35	330	120	200	100	100	850

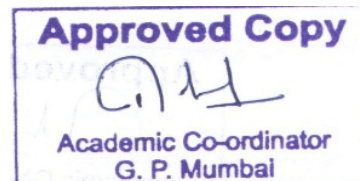
Abbreviations: L- Theory Lecture; P-Practical; TU-Tutorial; TH- Theory Paper; TS- Term Tests (02); PR-Practical Exam; OR-Oral Exam; TW- Term Work.

* Indicates assessment by External Examiner # Indicates Online Examination

Academic Coordinator

Head of Department
(Information Technology)

Principal
Government Polytechnic Mumbai



Programme : Diploma in IT / CO / IS									
Course Code: IT16204				Course Title: Digital Techniques					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	-	2	5	70 (3 Hrs.)	30	50	---	---	150

Rationale :

This course forms the foundation of computers. This course is introduced with the view that students will become familiar with various digital devices and circuits that are used in microprocessor, microcontroller, computers and other digital systems. It will enable the students to assemble, design, and test logical circuits like multiplexer, demultiplexer, counters, registers etc. This course covers the number systems, logic gates, combinational & sequential logic circuits, analog to digital and digital to analog converters which are important parts of digital systems.

Course Outcomes:

After the completion of the course student will be able to

CO1	Convert one number system to another number system
CO2	Perform binary and BCD addition and subtractions
CO3	Identify different logic gates, truth tables, symbols and pin configuration
CO4	Simplify Boolean expressions and realize the combinational circuits such as adder, subtractor, multiplexer, demultiplexer, code converters etc using logic gates
CO5	Identify different flip flops and design sequential circuits using flip flop such as counters, registers etc.
CO6	Explain working of ADC and DAC

Course Content Details:

Unit No	Topics / Subtopics
1	Number Systems and codes 1.1 Introduction to digital signal, Difference between analog signal and digital signal, Advantages of digital systems over analog systems, positive and negative logic 1.2 Concept of base of number system 1.3 Decimal number system 1.4 Binary number system, 1.5 Octal number system 1.6 Hexadecimal number system 1.7 Conversion of one number system to another number system (fractional point numbers) 1.8 Types of codes : BCD, Excess 3, Gray code 1.9 Conversion of binary to gray and gray to binary

2	<p>Binary Arithmetic</p> <p>2.1 Rules for Binary addition and subtraction</p> <p>2.2 Concept of 1's and 2's complement of a binary number</p> <p>2.3 Binary subtraction using 2's complement</p> <p>2.4 Signed and unsigned binary numbers</p> <p>2.5 BCD addition and BCD subtraction using 9's & 10's complement (Numericals based on above topic)</p> <p>2.6 Parity, Definition of even and odd parity</p>
3	<p>Logic Gates and Families:</p> <p>3.1 Basic Gates (AND, OR, NOT): circuit of basic gates using discrete components, symbol, truth table, logical expression</p> <p>3.2 Derived gates (EX-OR, EX-NOR): symbol, truth table and logical expression</p> <p>3.3 Universal gates (NAND, NOR) : symbol, truth table and logical expression, deriving all gates using universal gates</p> <p>3.4 Logic families: characteristics, classification</p> <p>3.5 Concept of integration: SSI, MSI, LSI, VLSI</p>
4	<p>Boolean Algebra:</p> <p>4.1 Boolean laws, De Morgan's theorems,</p> <p>4.2 Simplification of Boolean expression using Boolean laws and De Morgan's theorems.</p> <p>4.3 Construction of logic circuits using logic gates for Boolean expression</p> <p>4.4 Concept of SOP & POS, Minterm & Maxterm</p> <p>4.5 Karnaugh map (K-map) representation of logic function</p> <p>4.6 Simplification of K-map for 2, 3 and 4 variables with don't care condition</p> <p>4.7 Realization of reduced expression using logic gates.</p>
5	<p>Combinational Circuits:</p> <p>5.1 Design of Half adder and full adder using K-map and realization using gates</p> <p>5.2 Design of Half subtractor and full subtractor using k-map and realization using gates</p> <p>5.3 4 bit parallel binary adder (IC7483)</p> <p>5.4 Code converter using K-map: Binary to Gray code and Gray code to binary (upto 4 bit)</p> <p>5.5 BCD to seven segment decoder/driver (IC 7447 and IC 7448)</p> <p>5.6 Comparator: 1 bit, 2 bit (design using K-map and realization using logic gates), 4 bit comparator using IC 7485</p> <p>5.7 Multiplexer: Necessity of multiplexing, Principle of multiplexing, types of multiplexing 2:1, 4:1, 8:1 and 16:1, multiplexer tree</p> <p>5.8 Demultiplexer: Necessity of demultiplexing, Principle of demultiplexing, types of demultiplexing 1:2, 1:4, 1:8 and 1:16, demultiplexer tree, concept of decoder</p>
6	<p>Sequential circuits</p> <p>6.1 Difference between combinational and sequential circuits</p> <p>6.2 Basic concept of Flip-flop</p>

	<p>6.3 Types of flip flop: SR, JK, D and T flip flops, circuit of SR FF using transistors. Truth table, symbol and operation of all FFs</p> <p>6.4 Concept of preset and clear inputs</p> <p>6.5 Race around condition in JK FF, Master slave JK FF</p> <p>6.6 Triggering methods: Edge trigger and level trigger</p> <p>6.7 Excitation table of SR, JK, D and T FF</p> <p>6.8 Counters: basic concept of counters, classification (synchronous and asynchronous counter), concept of Up and Down counter, Modulus of counter(MOD N counter)</p> <p>a. Design of asynchronous up and down counter (3/4 bit) and their timing diagram</p> <p>b. Design of synchronous up and down counter (only 3bits)</p> <p>6.9 Shift Registers: Definition, classification (SISO, SIPO, PISO, PIPO), their circuit diagram and working, Universal shift register, bidirectional shift register, Ring counter, Twisted ring counter (circuit and timing diagrams)</p>
7	<p>Data Converters</p> <p>7.1 Need of data conversion</p> <p>7.2 Types of data converters ADC and DAC and their specifications</p> <p>7.3 Circuit diagram and working of R-2R ladder type DAC (mathematical derivation)</p> <p>7.4 Successive approximation and Ramp type ADC (their block diagram and working)</p>

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Number Systems and codes	04	02	04		06
2	Binary Arithmetic	04	04	02		06
3	Logic Gates and Families	05	04	04		08
4	Boolean Algebra	04	02	04		06
5	Combinational Circuits	12	02	04	12	18
6	Sequential circuits	12	02	06	10	18
7	Data Converters	04	04	04		08
Total		45	20	28	22	70

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of Practicals:- Minimum 10 experiments should be performed.

1	Assemble AND, OR, NOT gate using discrete components such as diode, transistor
2	To verify Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICS.

3	To implement basic logic gates using universal logic gates(NAND ,NOR)
4	To construct Half Adder and Half subtractor & verify the Truth Table
5	To construct Full Adder verify the Truth Table
6	To construct Full subtractor & verify the Truth table
7	To construct binary to gray code converter using gates and verify truth table.
8	To construct gray code to binary code converter using gates and verify truth table.
9	To verify truth table of 8:1 multiplexer using IC.
10	To verify truth table of 3 line to 8 line decoder using IC.
11	To verify the truth table of Comparator (IC 7485).
12	To verify truth table of SR and JK FF using ICs.
13	To verify truth table of D and T FF using ICs.
14	To construct 3 bit ripple counter using Flip Flop and verify its operation
15	To construct and test MOD-6 asynchronous counter using IC 7490.

Reference Books:

Sr. No.	Book Title	Author	Publication
1	Modern Digital Electronics	R. P. Jain	Tata McGraw Hill, Education
2	Principles of Digital Electronics	Malvino A. P. and Leach	Tata McGraw Hill, Education
3	Pulse Digital and Switching Waveforms	Milman and Taub	S. Chand
4	Digital Electronics	William Gothmann	Tata McGraw Hill, Education

Course Curriculum Development Committee:**a. Internal Faculty**

Dr. R. A. Patil (Sel. Grade Lecturer, Electronics Engineering, Govt. Polytechnic Mumbai)

Ms. Nagargoje S. N. (Lecturer, Electronics Engineering, Govt. Polytechnic Mumbai)

Ms. Kapse S. D. (Lecturer, Instrumentation Engineering, Govt. Polytechnic Mumbai)

b. External Faculty

Dr. Uday Khot (Lecturer, Electronics Engineering, St. Francis Institute of technology, Mumbai)


Academic Coordinator

**Head of Department
(Information Technology)**

**Principal
Govt. Polytechnic Mumbai**

Programme Code: Diploma in Information Technology									
Course Code: IT16301				Course Title: Professional Practice					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
---	--	02	02	--	--	--	--	50	50

*Assessed by External Examiner

Rationale:

Due to globalization and competition in the industrial and service sectors, the selection for the job is based on campus interviews or competitive tests. While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in curriculum so that there will be increased participation of students in learning process.

Course Outcomes: Student should be able to

CO1	Acquire information from different sources.
CO2	Prepare reports and make posters for given topic.
CO3	Present given topic in seminar.
CO4	Interact with peers to share thoughts.

Course Content Details:

Unit No	Topics/ Sub-topics
1	<p>Information Search</p> <p>Information search can be done through manufacturers, catalogue, internet, magazines; books etc. and submit a report.</p> <p>Following topics are suggested:</p> <ol style="list-style-type: none"> 1. Collect information about Buying of a new computer (cost, make, model etc.). 2. Comparison of different Operating Systems. 3. Collect information from Computer repairing center (at which level repairing is done, cost). 4. Collect information regarding latest requirement for a job from any industry 5. Collect information regarding number of industries open to IT professionals <p>Any other suitable topic</p>
2	<p>Lectures by Professional / Industrial Expert</p> <p>Organize lectures on any two topics of the following suggested areas or any other suitable topics</p> <ol style="list-style-type: none"> 1. spoken English 2. Personality Development 3. Current trends in IT 4. How to improve positive thinking 5. Certification courses guidance 6. Career guidance <p>Any other suitable topic</p>
3	<p>Personality Development</p> <ol style="list-style-type: none"> 1. Resume Writing 2. Aptitude, general knowledge test 3. Group Discussion 4. Interview Techniques
4	<p>Seminar Presentation</p> <p>Students should select any technical topic and deliver a seminar presentation.</p> <p>Following topics are suggested :</p> <ol style="list-style-type: none"> 1. Market survey of different processors. 2. Blue tooth Technology 3. Artificial Technology 4. Data ware-housing 5. Cryptography 6. Digital signal processing 7. Bio-informatics <p>Any other suitable topic</p>

5	<p>Case Study</p> <p>Students should work on case studies like Bribery and Extortion, Codes of Ethics, Employer/Employee Relationships, Environmental Ethics, Intellectual Property, Product Liability, Professional Responsibility, Public Safety or any other suitable topic.</p>
6	<p>Industrial Visit</p> <p>Students should visit any IT industry , Study the MIS and Network architecture of industry and submit the report.</p>

Suggested Specifications Table with Hours and Marks (Theory):

Unit No.	Topic Title	Teaching Hours	Distribution of Theory Marks
			Not Applicable
1	Information Search	04	Not Applicable
2	Lectures by Professional / Industrial Expert	04	
3	Personality Development	08	
4	Seminar Presentation	04	
5	Mini Project	10	
6	Industrial Visit	02	
Total		32	

Course Curriculum Development Committee:

a. Internal Faculty

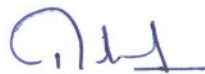
- i. Ms. P.L.Chelani (Lecturer in Computer Engineering, Govt. Polytechnic Mumbai)
- ii. Ms. Madhuri Arade (Lecturer in Information Technology, Govt. Polytechnic Mumbai)

b. External Faculty

- i. Mr. Hemant Vachani (Team leader, Intertec Software)



Academic Coordinator



**Head of Department
(Information Technology)**



**Principal
Govt. Polytechnic Mumbai**



Programme : Diploma in Information Technology									
Course Code: IT16205				Course Title: Data Communication					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	-	2	5	70 (3 Hrs.)	30		50*		150

*Assessment by External Examiner

Rationale :

During the last three decades there has been tremendous growth in communication. Various forms of communication like telephone, mobile, television, radio, internet etc. have all become an integral part of our daily lives. This course forms the foundation of communication. This course is introduced with the view that students will become familiar with various techniques used in communication such as modulation and their types, demodulation, multiplexing, FDMA, TDMA, CDMA. It also covers modes of data transmission and fiber optics communication. It is also focusing on signal encoding techniques, transmission error detection and correction. Mobile communication is introduced along with journey from 1G to 4G.

Course Outcomes:

After the completion of the course student will be able to

CO1	Describe fundamental concepts of Data communication
CO2	Describe modulation techniques
CO3	Demonstrate signal decoding techniques
CO4	Explain error detection and correction techniques
CO5	Describe mobile communication and satellite communication
CO6	Explain fiber optics and wireless communication

Note: As the course is offered to Information technology students, no mathematical derivations and analysis should be asked in examinations.

Course Content Details:

Unit No	Topics / Subtopics
1	Fundamentals of data communication 1.1 Analog and Digital signals 1.2 Periodic, non periodic and composite signals 1.3 Signal propagation 1.4 Signal types: Sine waves, square waves 1.5 Signal parameters: Amplitude, frequency, phase, wavelength, signals in frequency domain and time domain 1.6 Block diagram of a communication system 1.7 Electromagnetic Spectrum

2	<p>Analog and Digital Communication</p> <p>2.1 Modulation: Definition and necessity</p> <p>2.2 Amplitude, Frequency and Phase modulation: Definition, waveforms, bandwidth requirement, representation in time and frequency domain, modulation index.</p> <p>2.3 Demodulation in AM and FM (methods not necessary). AM, FM transmitter and receiver block diagram</p> <p>2.4 Pulse amplitude modulation, Pulse width modulation, Pulse position modulation: Block diagram for generation of waveforms, working principle, advantages, disadvantages, applications.</p> <p>2.5 Pulse Code modulation: Quantization process, Quantizing noise Nyquist's theorem, Shanon's theorem. Block diagram for generation of waveforms</p> <p>2.6 Bandwidth of a signal, Data transmission rate, signal to noise ratio.</p> <p>2.7 Signal encoding techniques: Digital data analog signal (ASK, FSK, PSK, QPSK), Analog data digital signal (PCM, delta modulation), Analog data analog signal(AM, FM, PM), Digital data digital signal.</p> <p>2.8 Channel effects on transmission: Attenuation, delay distortion, noise, effects of limited bandwidth</p>
3	<p>Fiber optics communication</p> <p>3.1 Light propagation: Basic concepts, Reflection and refraction of light</p> <p>3.2 Fiber cables: construction, fiber optic cable modes, Numerical aperture,</p> <p>3.3 Light sources: Light emitting diodes, LASER</p> <p>3.4 Optical detectors</p> <p>3.5 Block diagram of optical fiber communication</p>
4	<p>Modes of data transmission and multiplexing</p> <p>4.1 Parallel and serial communication</p> <p>4.2 Asynchronous and synchronous data transmission</p> <p>4.3 Communication modes: simplex, half duplex, full duplex</p> <p>4.4 Multiplexing: Frequency division multiplexing, Time division multiplexing (only principle, block diagram of transmitter receiver, spectrum)</p> <p>4.5 Multiple access technologies: FDMA, TDMA, CDMA (only principle and waveforms)</p>
5	<p>Transmission Media</p> <p>5.1 Guided media: Twisted pair cable, coaxial cable, Fiber optic cable</p> <p>5.2 Unguided media: Wireless communication (Electromagnetic signals, propagation methods), Radio waves, Microwaves, Infrared communication</p> <p>5.3 Latest technologies in wireless network: Bluetooth technology (Principle, block diagram), wi-fi technology (working principle, advantages, disadvantages, applications).</p> <p>5.4 Satellite communication: Satellite orbits (GEO, MEO, LEO), Geostationary satellite, satellite link and its components</p>

6	Transmission Errors 6.1 Introduction 6.2 Error classification, Types of error 6.3 Error detection and correction 6.4 Single Bit & Burst Error 6.5 Redundancy 6.6 Forward Error Correction 6.7 Feedback error recovery (based on parity check) 6.8 Longitudinal Redundancy check 6.9 Cyclic Redundancy check 6.10 Checksum 6.11 Error Correction Using Hamming Code
7	Mobile Communication 7.1 Concepts of cell and base station 7.2 Frequencies used and concept of frequency reuse 7.3 Cellular telephone system: GSM, CDMA (only principle) 7.4 Journey from 1G to 4G (only principle, advantages and disadvantages, no circuitry and mathematical treatments) 7.5 Introduction to 5G (only principle)

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Fundamentals of data communication	03	08			08
2	Analog and Digital Communication	14	04	10	06	20
3	Fiber optics communication	04		08		08
4	Modes of data transmission and multiplexing	06	02	06		08
5	Transmission Media	08		04	06	10
6	Transmission Errors	06	02	02	04	08
7	Mobile Communication	04	02	02	04	08
Total		45	18	32	20	70

Legends: R- Remember; U-Understand; A- Apply and above levels (Bloom's revised Taxonomy).

Notes: This specification table shall be treated as a general guideline and actual distribution of marks may slightly vary from table. But the questions from each topic should be asked as per marks weightage. Numerical questions are to be asked only if specified.

List of Practicals :-

1	To generate and observe Amplitude modulated and demodulated waveform.
2	To generate and observe Frequency modulated and demodulated waveform.
3	To generate and observe Phase modulated and demodulated waveform.
4	To generate and observe PWM waveform. Observe demodulated waveform.
5	To generate PCM and draw input/ output Waveforms. From the sampled outputs, measure the quantum levels.
6	To observe the demodulated output waveform of a PCM signal and measure the output voltage and frequency
7	To generate ASK signal and draw input/ output waveforms.
8	To generate FSK signal and draw input/ output waveforms
9	To generate PSK signal and draw input/ output
10	Assume a data stream consisting of 12 bits and implement various encoding techniques and draw the waveforms

Reference Books:

Sr. No.	Book Title	Author	Publication
1	Electronic Communication System	Kennedy	Tata McGraw Hill
2	Data Communication & Networking	Forouzan	Tata McGraw Hill
3	Electronic Communication	Roddy Collen	Prentice Hall of India
4	Communication Electronics	Frenzel	Tata McGraw Hill
5	Electronic communication systems	Wayne Tomasi	Prentice Hall of India

Course Curriculum Development Committee:**a. Internal Faculty**

Dr. R. A. Patil (Sel. Grade Lecturer, Electronics Engineering, Govt. Polytechnic Mumbai)

Ms. Nagargoje S. N. (Lecturer, Electronics Engineering, Govt. Polytechnic Mumbai)

b. External Faculty

Dr. Uday Khot (Lecturer, Electronics Engineering, St. Francis Institute of technology, Mumbai)



Academic Coordinator



**Head of Department
(Information Technology)**



**Principal
Govt. Polytechnic Mumbai**

Programme : Diploma in Information Technology									
Course Code: IT16302				Course Title: Computer Peripheral and Maintenance					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
02	-	02	04	50#	--	50*	---	--	100

*Assessment by External Examiner

Online Examination

Rationale:

Knowledge of Computer and its peripherals is essential for information technology students. Students must aware of specifications, types, varieties and vendors supplying different peripherals of computer systems. Installing and testing of these peripherals will help students to diagnosis the minor hardware problems and to rectify the same immediately. This will increase the confidence of students of handling hardware and software problems simultaneously.

Course Outcomes:

Student should be able to:

CO1	Understand basic hardware of computer.
CO2	Install all necessary device drivers and setup of system configuration
CO3	Identify systems hardware & related faults.
CO4	Understand various techniques of interfacing and Use serial/ parallel port.
CO5	Study of various power supplies.

Course Content Details:

Unit No	Topics / Sub-topics
1	<p>Components and working of Motherboard:</p> <p>1.1 Chipset basic, chipset Architecture, North / South Bridge architecture and Hub architecture.</p> <p>1.2 support chips on motherboard, 8288,8284,8259,8237,8253</p> <p>1.3 Motherboard Logics, Reset logic, DMA logic, Wait state logic, Bus arbitration logic, RAM logic, NMI logic, Dynamic Memory, Refresh logic, Keyboard logic.</p> <p>1.4 Overview and features of ISA,PCI-X, PCI-Xpress, AGP,PCMCIA, AGP, Processor BUS</p> <p>1.5 Logical memory organization: Conventional memory, Extended memory, Extended memory, upper memory Concept of cache memory : Internal cache, External cache (L1,L2,L3),Overview and features of RAM,DRAM,SIMM,RIMM,DIMM, DDR, DDR2, DDR3,DDR4 .</p> <p>1.6 CMOS setup- standard CMOS setup, Advanced CMOS setup.</p> <p>1.7 Introduction to processors (Intel Core2Duo, i3, i5, i7)</p>

2	<p>Storage Devices</p> <p>2.1 Hard disk construction and working</p> <p>2.2 Terms related to Hard Disk : Track, Sector cylinder, cluster, landing zone, MBR, Zone recording, write pre-compensation</p> <p>2.3 FAT basics, Introduction to file system FAT 16, FAT 32, NTFS</p> <p>2.4 Hard disk drive interface: features of parallel AT attachment (PATA), Serial ATA (SATA), SDD, Online Drive (Google Drive), comparison between SDD & HDD.</p> <p>2.5 Internal structure of Pen Drive.</p>
3	<p>Input & Output Devices</p> <p>3.1 Keyboard : Types of key switches: Membrane, Mechanical, Rubber Dome, Capacitive, optoelectronic and interfacing.</p> <p>3.2 Mouse : Opto-mechanical, optical (New design)</p> <p>3.3 Monitor</p> <p>3.3.1 CRT: - Block diagram & working of monochrome & colour Monitor, Characteristics of CRT Monitor</p> <p>3.3.2 LCD Monitor: - Functional Block Diagram of LCD monitor, Working principle, Passive matrix, and Active matrix LCD display.</p> <p>3.3.3 Touch Screen Display – The construction and working principle</p> <p>3.3.4 Plasma Display Technology: - Construction & working principle.</p> <p>3.4 Printer : Printer Characteristics, Dot matrix, Inkjet, Laser: block diagram and specifications</p> <p>3.5 Projector : Construction and working principle</p> <p>3.6 Scanner : Flat Bed, Sheet-fed, Handheld: Block diagram of flat Bed and specifications, OCR, TWAIN, Resolution, Interpolation.</p> <p>3.7 Modem: Internal and External: Block diagram and specifications.</p> <p>3.8 Webcam: Construction and working principle</p> <p>3.9 Bar code Reader: Construction and working principle</p>
4	<p>PC Power Supplies and Interfaces</p> <p>4.1 Working of SMPS.</p> <p>4.2 Power supply characteristics: Rated wattage, Efficiency, Regulation, Ripple, Load regulation, Line regulation.</p> <p>4.3 Power supply problems: Blackout, Brownout, surges and spikes.</p> <p>4.4 UPS: working, Types, Ratings.</p> <p>4.5 Interfaces: SCSI, SCSI cables and connectors, SCSI drive configuration.</p> <p>4.6 USB 3.0</p>
5	<p>Troubleshooting and Maintenance</p> <p>5.1 Preventive Maintenance : Active, Passive,</p> <p>5.2 periodic maintenance procedure</p> <p>5.3 Preventive maintenance of peripherals of PCs.</p> <p>5.4 POST: POST sequence, Beep codes,</p> <p>5.5 Fault finding and troubleshooting of the above peripherals</p>

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks
1	Components and working of Motherboard	08	Not Applicable
2	Storage Devices	06	
3	Input & Output Devices	04	
4	PC Power Supplies and Interfaces	06	
5	Troubleshooting and Maintenance	06	
Total		30	

List of experiments/Assignments (Perform Minimum Ten Experiments)

Sr. No.	Unit	List of Experiments	Approx. Hours
1	1	Drawing the motherboard layout and studying the chipset.	02
2	1	BIOS settings of motherboard.	02
3	2	Hard Disk formatting and partitioning	02
4	2	Installation of Operating System (Window & Linux)	02
5	3	Installation of Scanner and Modems.	02
6	3	Installation of local & network printer.	02
7	3	Installation of Projector and and identify different parts of Projector.	02
8	4	Installation of SMPS and and identify different parts of SMPS.	02
9	4	Interpret and analyze the use of UPS: i) off line UPS ii) on line UPS	02
10	4	Disassembling of personal computer.	02
11	4	Assembling of personal computer.	02
12	5	Analyze POST and various system beeps.	02
13	5	Use diagnostic software to identify installed computer peripherals and test their working condition.	02
14	5	Fault findings: (a) Problems related to monitor.(b) Problems related to CPU.	02
15	5	Fault findings: (a)Problems related to keyboard & mouse (b) Problems related to Printer	02
Total			30

References/ Books:

Sr. No.	Book Title	Author	Publication
2	Scott Mueller	Upgrading & Repairing PC's	Prentice Hall of India(Eighth Edition)
3	Subhadeep Choudhury	A to Z of PC Hardware & Maintenance	DhanpatRai& Co.
4	Mark Minasi	The Complete PC Upgrade & maintenance Guide	BPB Publication
5	Bigelow	Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill


Course Curriculum Development Committee:**a. Internal Faculty**

Ms.Pooja Chelani(Lecturer, Computer Engg., Govt. Polytechnic Mumbai)

Ms.Madhuri Arade (Lecturer, Information Tech, Govt. Polytechnic Mumbai)

b. External Faculty

Mr.H. H. Vachani (Team Lead,Intertec Software ltd.)


Academic Coordinator

**Head of Department
(Information Technology)**

**Principal
Govt. Polytechnic Mumbai**

Programme Code: Diploma in IT / CO									
Course Code: IT 16 206				Course Title: Object Oriented Programming using C++					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
3	--	4	7	70	30	50*	--		150

* Indicates assessment by Internal and External examiners

Rationale:

This course provides students with the introduction to entry-level fundamentals of Object Oriented Programming. The goals of the course are to develop the programming ability in students, and to improve their proficiency in applying the fundamentals of Object Oriented Programming. To achieve this goal high level programming language used is C++. The topics include different programming paradigms in computer programming, limitations of procedural approach and solution given by the object oriented programming.

Course Outcomes:

Student should be able to

CO1	To recall concepts of high level programming in C.
CO2	To explain the basic concepts of Object Oriented Programming.
CO3	To comprehend different object oriented concepts of encapsulation and data abstraction like classes, objects, constructors, destructors.
CO4	To comprehend the object oriented concepts of inheritance and polymorphism.
CO5	To apply the concept of pointers in C++.
CO6	To use the files in C++.

Course Content Details:

Unit No	Topics / Sub-topics
1.	Fundamentals of Object Oriented Programming 1.1 C Revisited 1.2 Different programming paradigms 1.3 Limitations of Procedural Programming and need of OOP 1.4 Features of OOP 1.5 Beginning with C++: Tokens, Expressions, Control Structures, Array, Functions, Structures and Unions.
2.	Functions in C++ 2.1 The main function 2.2 Function Prototyping 2.3 Call by Reference, Return by Reference 2.4 Inline Functions 2.5 Default Argument and const Arguments
3.	Classes and Objects Classes 3.1 Specifying a class 3.2 Defining member functions 3.3 Arrays within a class 3.4 Making Outside Functions Inline 3.5 Nesting of Member Functions 3.6 Private Member Functions Objects 3.7 Creating objects 3.8 Memory allocation for objects 3.9 Static data and member function 3.10 Array of objects and Objects as function arguments
4.	Constructors and Destructors 4.1 Constructors and their types 4.2 Parameterized Constructors 4.3 Constructor Overloading 4.4 Constructors with Default Arguments 4.5 Dynamic Initialization Of Objects 4.6 Copy Constructors 4.7 Dynamic Constructors 4.8 Creating Two-dimensional Arrays 4.9 Destructors
5.	Inheritance 5.1 Introduction 5.1.1 Base Classes 5.1.2 Derived classes 5.1.3 Member declaration: Public, Private, protected

	5.2 Types Of Inheritance 5.2.1 Single inheritance 5.2.2 Multilevel inheritance 5.2.3 Multiple inheritance 5.2.4 Hierarchical Inheritance 5.2.5 Hybrid inheritance 5.3 Virtual base classes 5.4 Abstract classes 5.5 Constructors in derived classes
6.	Polymorphism 6.1 Compile Time Polymorphism 6.1.1 Functions overloading 6.1.2 Operator Overloading (unary and binary) 6.1.3 Overloading Vs Overriding 6.2 Run Time Polymorphism 6.2.1 Pointers in C++ 6.2.2 Pointers to Objects 6.2.3 'This' Pointer 6.2.4 Pointers to Derived Classes 6.2.5 Virtual functions 6.2.6 Static and dynamic binding
7.	Introduction to Console and File IO 7.1 C++ Streams and Stream Classes 7.2 Unformatted IO Operations 7.3 File Stream Classes 7.4 Opening and Closing a File 7.5 Deleting a File 7.6 File Modes

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Fundamentals of Object Oriented Programming	4	4	4	-	8
2	Functions in C++	5	-	4	4	8
3	Classes and Objects	8	2	2	8	12
4	Constructors and Destructors	6	-	2	8	10
5	Inheritance	8	4	4	4	12
6	Polymorphism	8	4	4	4	12
7	Introduction to Console and File IO	6	2	2	4	8
Total		45	16	22	32	70



List of experiments/Assignments:

Sr. No	Unit	List of Experiments	Approx Hours
01	1	Input and Output Statements: a. Input and Output data for finding area of rectangle b. Accept two numbers and display their addition, subtraction, multiplication and division (Hint: Use Switch Case)	02
02	1	C++ Program using structure and array of structure: a. Declare structure Birthday having data members name, day, month and year. Accept and display this data for 5 objects. b. Declare structure Vehicle having Vehicle_No and Company_Name. Accept and display this data for 3 objects.	02
03	2	C++ Program using call by value and call by reference: a. Write a program to do menu driven operation for calculator having arithmetic operations such as addition, subtraction, division, multiplication and modulus of two numbers using switch statement.	02
04	3	C++ Program using Class and Objects: a. Declare a class 'Mydate' having data members as day, month, year. Accept and display this data for one object. b. Declare a class 'Time' having data members as Hours, Minutes and Seconds. Accept Seconds from user and convert it in appropriate hours, minutes and seconds and display this data for one object.	04
05	3	C++ Program using array of Objects: a. Declare a class 'Account' having data members as acc_no and Balance. Accept this data for 5 account and display data of accounts having balance greater than 5000. b. Declare a class 'Staff' having data members as name and Post. Accept this data for 5 account and display names of staff who are H.O.D.	04
06	3	C++ Program using static members: (variables and functions) a. Calculate weight of object at different planets using formula $weight = mass * gravitational\ force$. Declare mass as a static member variable. b. Display number of objects created in program till display moment using static member function	04
07	3	C++ Program using Friend Function: a. Find out square of a number. b. Create two classes Test1 and Test2 which stores marks of a student. Read values for class objects and calculate average of two tests.	04
08	4	C++ Program using Constructor and Destructor: a. Declare a class 'distance' having data members as dist1, dist2	04

		<p>and dist3. Initialize two data members using constructor and store their addition in third data member using function and display the addition.</p> <p>b. Declare a class 'Linear' having data members as var1 and var2 to represent a linear equation $Z = (\text{var1}) X + (\text{var2}) Y$. Use constructor to initialize the data members. Write function for addition of two linear equations. Display result.</p>	
09	6	<p>C++Program using Operator Overloading:</p> <p>a. Create a class distance to store distance in feet and inches. Overload unary – operator so that when it is used with object of this class, it will decrement values of inches by 1.</p> <p>b. Overload the operator == in a class 'string' to check the equality of string.</p>	04
10	6	<p>C++Program using Function Overloading:</p> <p>a. Calculate addition of 10 integers and 5 float numbers.</p> <p>b. Calculate volume of cube and cylinder.</p>	04
11	5	<p>C++Program using single and multilevel Inheritance:</p> <p>a. Implement single inheritance from following figure.</p> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Class :Furniture Data Members: Material, price</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Class : Table Data Mems: ht, surface_area</p> </div> </div> <p>b. Implement multilevel inheritance from following figure where sell_price is price plus 1.5% VAT.</p> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Class: Medicine Data Mems: Company, name</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Class: Dealer Data Mems: Product_name, Price</p> </div> <p style="text-align: center;">↓</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>Class: Retailer Data Mems: sell_Price</p> </div> </div>	04
12	5	<p>C++Program using Multiple Inheritance and Virtual Base Class:</p> <p>a. Implement multiple inheritance from following fig.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="border: 1px solid black; padding: 5px; width: 40%; margin-bottom: 20px;"> <p>Class : Employee Members: emp_id, name</p> </div> <div style="border: 1px solid black; padding: 5px; width: 40%; margin-bottom: 20px;"> <p>Class: Emp_union Members: Mem_Id</p> </div> </div> <div style="text-align: center;"> <div style="border: 1px solid black; padding: 5px; width: 60%; margin: 0 auto;"> <p>Class : emp_info Mems: Basic_salary</p> </div> </div>	04

		<p>b. Implement hybrid inheritance using virtual base class from following fig.</p> <pre> classDiagram Account < -- Saving_Acc Account < -- Current_Acc Saving_Acc < -- Fix_dep_acc Current_Acc < -- Fix_dep_acc </pre>	
13	5	<p>C++ Program using 'this' Pointer:</p> <p>a. Declare a class 'Student' having data members as roll_no and percentage. Using this pointer invoke member functions to accept and display this data for one object.</p>	04
14	6	<p>C++ Program using Virtual Function:</p> <p>a. Create class shape. Derive two class triangle and rectangle from class shape. Write appropriate functions in class triangle and rectangle to accept dimensions for calculating area. Make area() as virtual function.</p>	04
15	7	<p>C++ Program For File Processing:</p> <p>a. Accept source file and destination file name from user and copy the contents of source file into destination file.</p> <p>b. Open an existing file in read mode and count the number of spaces, new line characters and tabs in the file.</p>	04
16		Mini Project	06
Total			60

Reference Books:

Sr. No.	Book Title	Author	Publication
1	Object Oriented Programming with C++, 6th Edition.	E. Balagurusamy	McGraw Hill Education (India) Private Limited, New Delhi.
2	C++ The Complete Reference, 4th Edition.	Herbert Schildt	McGraw Hill/ Oshome, New Delhi
3	Let Us C++, 2nd Edition	Yashwant P. Kanetkar	BPB Publication

Course Curriculum Development Committee:**a. Internal Faculty**

Ms. Usha C. Khake (Lecturer, Computer Engineering, Govt. Polytechnic Mumbai)

Ms. Jijnasa Patil (Lecturer, Computer Engineering, Govt. Polytechnic Mumbai)

b. External Faculty

Ms. Nisha Wartha (Lecturer, Information Technology, Govt. Polytechnic Thane.)


Academic Coordinator

**Head of Department
(Information Technology)**

**Principal
Govt. Polytechnic Mumbai**

Programme : Diploma in IT / CO									
Course Code: IT16 303				Course Title: Database Management System					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
03	-	04	07	70 (3 hrs)	30	-	50*	-	150

*Assessment by External Examiner

Rationale:

Database Management System (DBMS) is vital component of modern information system. Database applications are pervasive and range in size from small in-memory databases to terra bytes or even larger in various applications domains. The course focuses on the fundamentals of database management systems and the recent developments.

Course Outcomes:

Student should be able to

CO1	Define concepts of Database Management System and Distinguish it from RDBMS.
CO2	Explain concepts of data modeling and Design the database schema and Models with the use of appropriate data types for storage of data in database.
CO3	Write Queries based on Structured Query Language.
CO4	Analyze Relational Database Designs and Normalize depending on requirement.
CO5	Comprehend recent developments in the field of Database Management System.

Course Content Details:

Unit No	Topics / Sub-topics
1	An Introduction to Database 1.1 Data, Database, Database Management Systems, Disadvantages of file processing system, advantages of DBMS over file processing system, Applications of DBMS. 1.2 Data abstraction, Data dictionary, Instance and schema, Data independence-Logical and Physical Independence 1.3 Components of a DBMS and overall structure of a DBMS , Query processor, Database Users, functions of Database Administrator 1.4 What is RDBMS, Difference between DBMS and RDBMS 1.5 Names of various DBMS and RDBMS software 1.6 The 12 Rules (Codd's laws) for fully functional RDBMS.

2	<p>Data Models and Concepts</p> <p>2.1 Introduction to client server architecture: Two/Three tier Architecture</p> <p>2.2 Data Models: Network Model ,Hierarchical Model ,Relational Model</p> <p>2.3 Relational Model: Basic concepts, attributes and domains</p> <p>2.4 Keys concept: Super Key, Candidate key, primary Key, foreign Key Constraints: Referential Integrity Constraints, Entity Integrity Constraints</p> <p>2.5 E- R Model: Types of attributes, role indicator, weak and strong entity set</p> <p>2.6 Enhanced ER Model: Introduction, Specialization & Generalization.</p>
3	<p>Introduction to Structured Query Language</p> <p>3.1 Data Types in SQL</p> <p>3.2 DDL Commands: CREATE, ALTER, DROP, TRUNCATE, DESC, RENAME</p> <p>3.3 DML Commands: INSERT, UPDATE,DELETE</p>
4	<p>Structured Query Language - I</p> <p>4.1 DQL Commands: SELECT. Where, Having ,Group by, Order by clauses</p> <p>4.2 SQL Operators: Arithmetic Operators, Comparison Operators, Logical Operators, Set Operators, Range Searching operators-Between, Pattern matching operators-Like.</p> <p>4.3 Functions: String, Arithmetic, Date and time, Aggregate Functions and Miscellaneous Functions. Conversion Functions, Special Date formats using To_char() function</p> <p>4.4 Concept of Sub Queries</p> <p>4.5 Concept of Join: Equi ,Non-equi ,outer ,self join</p>
5	<p>Structured Query Language - II</p> <p>5.1 Sequences, Indexes and Synonyms</p> <p>5.2 Views: What are Views? The Create View Command, Updating Views, Views and Joins, Views and Sub queries, What Views cannot do? , Dropping Views.</p> <p>5.3 TCL Commands: COMMIT, SAVEPOINT, ROLLBACK,</p> <p>5.4 DCL Commands: GRANT, REVOKE.</p>
6	<p>Normalization</p> <p>6.1 Relational database design</p> <p>6.2 Normalization, Data redundancy and updating anomalies</p> <p>6.3 Normalization based on Functional dependencies and Multi-valued Dependencies</p> <p>6.4 Normal Forms: 1NF, 2NF, 3NF, BCNF</p>
7	<p>Recent Developments</p> <p>7.1 Introduction to Distributed database</p> <p>7.2 Introduction to data warehousing and data mining.</p> <p>7.3 Introduction to Big Data and Hadoop.</p>

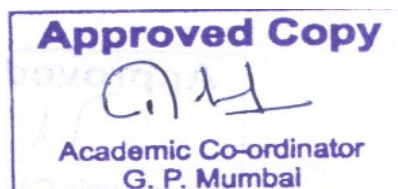
Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	An Introduction to Database	06	06	06	-	12
2	Data Models and Concepts	10	04	04	04	12
3	Introduction to Structured Query Language	06	02	-	06	08
4	Structured Query Language - I	08	-	06	08	14
5	Structured Query Language – II	05	-	04	04	08
6	Normalization	06	02	04	04	10
7	Recent Developments	04	-	06	-	06
Total		45	14	30	26	70

List of experiments/Assignments:

Sr. No	Unit	List of Experiments	Approx Hours
01	01	Searching of different Relational Databases Products and Installation of any one Product.	04
02	02	Create any Three ER Diagrams. (Example: Library Management System, Hospital Management System, Airline Reservation System, Employee information systems, banking systems, credit card processing systems, sales and order tracking system etc.)	06
Data Definition Language (DDL) statements			
03	03	03.1 Create a database named 'ITCOMPANY'. 03.2 Create a table Department including columns Dept_id and Dept_Name. Make sure that Dept_id is Primary Key (UNIQUE and NOT NULL) and Dept_Name should not be NULL at the time of insertion. 03.3 Create a table named Jobs including columns job_id, job_title, min_salary, max_salary and check that max_salary amount should not exceed the upper limit 25000. 03.4 Drop Jobs Table. 03.5 Create a table named Jobs including columns job_id, job_title, min_salary and max_salary, and make sure that, job_id should be UNIQUE and not be NULL (Primary Key), the default value for job_title is blank and min_salary is 8000 and max_salary is NULL will be entered automatically at the time of insertion if no value assigned for the specified columns. 03.6 Create a table named countries including columns country_id, country_name and region_id and make sure that no duplicate data against column country_id will be allowed at the time of insertion. 03.7 Drop Countries Table.	04

	<p>03.8 Create a table named countries including columns country_id, country_name and region_id and make sure that no countries except Italy, India and China will be entered in the table and Country_id should be UNIQUE and NOT NULL (Primary Key).</p> <p>03.9 Create a table named Employee including columns eid, ename, Dept_id, job_id, Country_id. Make sure that eid is UNIQUE and NOT NULL (Primary Key), ename should not be NULL and Dept_id, Job_id, Country_id values must be from their respective base tables or NULL at the time of insertion.</p> <p>03.10 Create a duplicate copy of Employee table including structure and data by name dup_Employee.</p> <p>03.11 Rename Employee table to Emp.</p>	
04	<p>04.1 Write SQL Alter table statement to add 'email' column to emp table.</p> <p>04.2 Write SQL Alter table statement to drop the existing column 'email' from the table emp.</p> <p>04.3 Write SQL Alter table statement to add 'Commission' column to emp table.</p> <p>04.4 Write SQL ALTER TABLE statement to modify the existing column 'commission' of 'emp' table with a default value .05,</p> <p>04.5 Write SQL ALTER TABLE statement to add UNIQUE CONSTRAINT named 'dup_che_con' for the existing column 'ename' of 'emp' table,</p> <p>04.6 Write SQL ALTER TABLE statement to drop 'dup_che_con' column constraint</p> <p>04.7 Write SQL ALTER TABLE statement to change size and data type of column 'region_id' of countries table.</p> <p>04.8 Write SQL ALTER TABLE statement to drop PRIMARY KEY of emp table.</p> <p>04.9 Write SQL ALTER TABLE statement to add PRIMARY KEY CONSTRAINT named 'pk_emp_id' to eid column of emp table.</p> <p>04.10 Write SQL ALTER TABLE statement to drop FOREIGN KEYS of emp table.</p> <p>04.11 Write SQL ALTER TABLE statement to add FOREIGN KEYS to emp table for Dept_id, Job_id, Country_id columns.</p> <p>04.12 Write SQL ALTER TABLE statement to drop CHECK CONSTRAINT of min_salary column of Jobs table.</p> <p>04.13 Write SQL ALTER TABLE statement to add CHECK</p>	04



CONSTRAINT to min_salary column of Jobs table to check minimum salary 9000.
 04.14 Write SQL ALTER TABLE statement to TRUNCATE emp table.

03 04

Create database and tables for above ER Diagram with appropriate data types and Consistency Constraints.

Data Manipulation Language (DML)

03 02

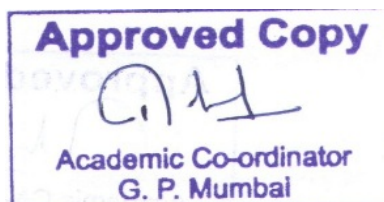
06.1 Write SQL INSERT statement to add following data in **Department** table.

Dept_id	Dept_Name
1	IT
2	CO
3	EC
4	EE
5	ME

06.2 Write SQL INSERT statement to add following data in **Jobs** table.

job_id	job_title	min_salary	max_salary
IT_PROG	Programmer	14000	20000
MK_MGR	Marketing manager	19000	25000
FI_MGR	Finance manager	18200	22000
FI_ACC	Account	14200	19000
LEC	Lecturer	16000	27000

06.3 Write SQL INSERT statement to add following data in **Countries** table.



		<table border="1"> <thead> <tr> <th>country_id</th> <th>country_name</th> <th>region_id</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Italy</td> <td>1</td> </tr> <tr> <td>2</td> <td>India</td> <td>2</td> </tr> <tr> <td>3</td> <td>China</td> <td>2</td> </tr> </tbody> </table> <p>06.4 Write SQL INSERT statement to following data in emp table.</p> <table border="1"> <thead> <tr> <th>Eid</th> <th>Ename</th> <th>Dept_id</th> <th>job_id</th> <th>Country_id</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Ajay</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>2</td> <td>Vijay</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>3</td> <td>John</td> <td>2</td> <td>2</td> <td>1</td> </tr> <tr> <td>4</td> <td>Ali</td> <td>3</td> <td>2</td> <td>2</td> </tr> <tr> <td>5</td> <td>Seema</td> <td>2</td> <td>2</td> <td>2</td> </tr> </tbody> </table> <p>06.5 Write SQL update Statement to change ename to Sejal in emp table where eid is 5.</p> <p>06.6 Write SQL DELETE Statement to delete records from emp table where job_id=1.</p> <p>06.7 Write SQL DELETE Statement to delete all records from emp table.</p>	country_id	country_name	region_id	1	Italy	1	2	India	2	3	China	2	Eid	Ename	Dept_id	job_id	Country_id	1	Ajay	1	1	1	2	Vijay	1	1	1	3	John	2	2	1	4	Ali	3	2	2	5	Seema	2	2	2	
country_id	country_name	region_id																																											
1	Italy	1																																											
2	India	2																																											
3	China	2																																											
Eid	Ename	Dept_id	job_id	Country_id																																									
1	Ajay	1	1	1																																									
2	Vijay	1	1	1																																									
3	John	2	2	1																																									
4	Ali	3	2	2																																									
5	Seema	2	2	2																																									
Data Query Language (DQL)																																													
07	04	7.1 Execute the queries containing Where, Group by & Having and Order by Clauses. 7.2 Selecting the records using set operators such as union, union all, Intersect, minus.	02																																										
08	04	Implementation of all string & Date related functions.	02																																										
09	04	Implementation of aggregate functions such as sum, avg, min, max, count.	02																																										
10	04	Selection of records with sub query.	04																																										
11	04	Implementation of All Types of Joins.	04																																										
12	05	Implement Sequences, Indexes and Synonyms.	04																																										
13	05	Implement Views.	02																																										
Data Control Language (DCL)																																													
14	05	Implement Grant and Revoke Commands.	02																																										
Transaction Control Language (TCL)																																													
15	05	Implementation of Commit, Savepoint, Rollback	02																																										
Normalization																																													
16	06	Normalize the table using different normal forms.	04																																										
Mini-Project																																													
17	1-6	Create a mini project using any programming language, with GUI page to add and display details of above prepared database.	08																																										
Total			60																																										

References/ Books:

Sr. No.	Book Title	Author	Publication
1	Database System concepts	Abraham Silberschtz, Henry Korth & S. Sudarshan	Tata McGraw Hill International
2	Introduction to Database Management Systems	ISRD Group	Tata McGraw Hill
3	Advanced Database Management System	Chakrabarti Dasgupta	Dreamtech
4	Introduction to Relational Databases & SQL programming	Allen	Tata McGraw Hill

Web Site References:

1. wielyIndia.com or DreamtechPress.com
2. <http://phindia.com/gupta/chapter>
3. www.williamstannings.com
4. www.w3schools.com
5. www.w3resource.org

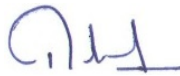
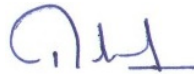
Course Curriculum Development Committee:**a. Internal Faculty**

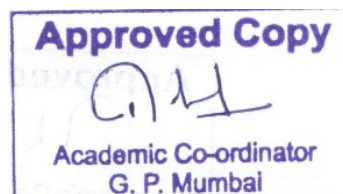
Ms. S. A. H. Shaikh (Lecturer, Information Technology, Govt. Polytechnic Mumbai)

Ms. V. S. Lokhande (Lecturer, Computer Engineering, Govt. Polytechnic Mumbai)

b. External Faculty

Ms. Farheen S. Shaikh (Senior Consultant, Capgemini)


Academic Coordinator

**Head of Department
(Information Technology)**

**Principal
Govt. Polytechnic Mumbai**

Programme Code: Diploma in Information Technology									
Course Code: IT16304				Course Title: UID Programming					
Compulsory / Optional: Compulsory									
Teaching Scheme and Credits				Examination Scheme					
TH	TU	PR	Total	TH	TS	PR	OR	TW	Total
01	--	04	05	--	--	50*	--	50	100

*Assessed by External Examiner

Rationale:

Object oriented programming has gain momentum because of the object reuse. .NET provides object oriented development framework. .NET provides a base class library that supports innovative web development. It has all the resources to provide websites with different functionality and manage it smoothly at the same time.

C# is one of the programming languages designed for the Common Language Infrastructure. ADO.NET is a set of computer software components that programmers can use to access data and data services from the database ASP.NET is an open-source server-side web application framework designed for web development to produce dynamic web pages.

Course Outcomes: Student should be able to

CO1	Use .NET framework Integrated Development Environment (IDE) and Recall basic Concepts of C#
CO2	Use basic Object Oriented Programming Concept
CO3	Create ASP.NET web page with Server Controls and Apply Cascading Style Sheets (CSS).
CO4	Create ASP.NET pages with master page and menu control.
CO5	Use different validation controls.
CO6	Use data controls to access data in database.

Course Content Details:

Unit No	Topics/ Sub-topics
1.	Introduction to C# and .Net framework. 1.1 Review of .NET framework 1.2 Introduction to C# 1.3 Data Types Literals and Variables in C# 1.4 Operators in C# 1.5 Flow controls in C# 1.6 Arrays and Strings
2.	Object Oriented Concepts using C# 2.1 Classes and Objects 2.2 Operator Overloading

	2.3 Inheritance 2.4 Interfaces 2.5 Namespaces 2.6 Exception Handling
3.	Introduction to ASP.NET and Web Server Controls 3.1 Introduction: Microsoft.NET framework, ASP.NET lifecycle. 3.2 Cascading Style Sheets: Need of CSS, Introduction to CSS, and Working with CSS with visual developer. 3.3 ASP.NET server controls: Button controls, Textboxes, Labels, checkboxes and radio buttons, list controls, and other web server controls: Image, HyperLink, ImageMap.
4.	Managing ASP.NET Pages 4.1 Validation Control: Introduction, basic validation controls, validation techniques, using advanced validation controls. 4.2 Master Pages: Creating master pages, content pages 4.3 Navigation: Introduction to use the site navigation, using site navigation controls.
5.	Introduction to ADO.Net and Data Manipulation 5.1 Connected and disconnected architecture in ado.net 5.2 Using SQL data sources 5.3 GridView Control 5.4 DetailsView 5.5 FormView Control 5.6 ListView

Suggested Specifications Table with Hours and Marks (Theory):

Unit No	Topic Title	Teaching Hours	Distribution of Theory Marks
1.	Introduction to C# and .Net framework.	04	Not Applicable
2.	Object Oriented Concepts using C#	03	
3.	Introduction to ASP.NET and Web Server Controls	03	
4.	Managing ASP.NET Pages	03	
5.	Introduction to ADO.Net and Data Manipulation	02	
Total		15	

List of Experiments/ Assignments:

Sr. No	Unit	List of Experiments	Approx Hours
1.	1	Write Simple C# Programs to: i. Print "Hello World". ii. Accept integer, Double and String Values and print on Screen. iii. Convert one data type into another using data type casting.	02
2.	1.	Write programs using conditional statements and loops to: i. Generate Fibonacci series. ii. Generate various patterns (triangles, diamond and other patterns) with numbers. iii. Test for prime numbers. iv. Test for Palindrome. v. Reverse a number and find sum of digits of a number. vi. Test for vowels. vii. Use of foreach loop with arrays.	06
3.	2.	Write Programs with different features of C#: i. Function Overloading ii. Inheritance (all types) iii. Constructor overloading iv. Interfaces v. Creating and Importing Namespaces vi. Exception handling	10
4.	3.	Create Simple ASP.NET web application i. Use different types of CSS. ii. Use different types of CSS Selectors.	02
5.	3.	Create ASP.NET web pages to use different web Server Controls.	04
5.	4.	Create Registration web page with different validation controls.	04
6.	4.	Create ASP.NET web application to test Master page and content page.	04
7.	4.	Create small application to test Menu Control, Tree Control, SiteMapPath Control.	06
8.	5.	Create Login and Registration Webpage using ADO.NET.	06
9.	5.	Create Database with different tables and bind with GridView, FormView using SQL Data Source.	04
10.	5.	Write Program to test DetailView and ListView using SQL Data Source.	04
11.	1-5	Create a Mini Project. (Example: Online Shopping, Employee Management System, any other suitable topic in group of three students)	08
Total			60

References & Books:

Sr. No	Book Title	Author	Publication
1.	Beginning ASP.NET 4 in C# and VB	I. Spanjaars	WROX
2.	The Complete Reference C#	Herbert Schildt	Mc. Graw Hill
3.	ASP.Net 4.0 Step By step	George Shepherd	Microsoft

Course Curriculum Development Committee:**a. Internal Faculty**

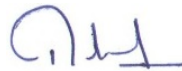
i. Ms. Sadaf A. H. Shaikh (Lecturer in Information Technology, Govt. Polytechnic Mumbai)

ii. Ms. Namrata A. Wankhade (Lecturer in Information Technology, Govt. Polytechnic Mumbai)

b. External Faculty

i. Mr. Mahendra U. Dabhade (Lecturer in Information Technology, Govt. Polytechnic Thane)

ii. Mr. Ravindra G. Suryawanshi (Proprietor, Surya InfoEdge)


Academic Coordinator

**Head of Department
(Information Technology)**

**Principal
Govt. polytechnic Mumbai**