Scheme & Syllabus of
Bachelor of Vocational Studies
(B.Voc.)
Electronics & Information Technology
Batch 2020

By
Department of Academics
IKG Punjab Technical University

Semester 1st

Course Code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BVET101-20	**Basic Electronics**	**3**	**0**	**40**	**60**	**100**	**3**
BVET102-20	**Introduction to Internet & MS-Office**	**3**	**0**	**40**	**60**	**100**	**3**
BVET103-20	**Communicative English**	**3**	**0**	**40**	**60**	**100**	**3**
BVET104-20	**Basic IT Skills**	**3**	**0**	**40**	**60**	**100**	**3**
BVET105-20	**Basic Electronics Lab**	**0**	**3**	**30**	**20**	**50**	**1.5**
BVET106-20	**Introduction to Internet & MS-Office Laboratory**	**0**	**3**	**30**	**20**	**50**	**1.5**
On-Job Training / Qualification Pack(QP)*							
BVET107-20	**Test Engineer (SSC/Q1301)** Technical Writer (SSC/Q0505) **Or Any one of the QP's can be opted as offered in Semester I**	**On Job Training (OJT) in Collaboration with MoU industry**		**200**	**200**	**400**	**15**
Total		**12**	**6**	**420**	**480**	**900**	**30**

***The qualification packs may vary from institute to institute.**

Semester 2nd

Course Code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BVET201-20	**Digital Electronics**	**3**	**0**	**40**	**60**	**100**	**3**
BVET202-20	**Object Oriented Programming using C++**	**3**	**0**	**40**	**60**	**100**	**3**
BVET203-20	**Computer Networking**	**3**	**0**	**40**	**60**	**100**	**3**
BVET204-20	**Analog Circuits**	**3**	**0**	**40**	**60**	**100**	**3**
BVET205-20	**Computer Networking Laboratory**	**0**	**3**	**30**	**20**	**50**	**1.5**
BVET206-20	**Object Oriented Programming using C++ Laboratory**	**0**	**3**	**30**	**20**	**50**	**1.5**
On-Job Training / Qualification Pack (QP)*							
BVET207-20	**Junior Software Developer SSC/Q0508, version 1.0** Web Developer SSC/Q0503) **or Any one of the QP's can be opted as offered in Semester II**	**On Job Training (OJT) in Collaboration with MoU industry**		**200**	**200**	**400**	**15**
Total		**12**	**6**	**420**	**480**	**900**	**30**

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Semester 3rd

Course Code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BVET 301-20	Software Engineering	3	0	40	60	100	3
BVET 302-20	Computer Peripherals and Interfacing	3	0	40	60	100	3
BVET 303-20	Principles of Communication	3	0	40	60	100	3
BVET 304-20	Human Values & Professional Ethics (HVPE)	3	0	40	60	100	3
BVET 305-20	Principles of Communication - Lab	0	3	30	20	50	3
On-Job Training / Qualification Pack (QP)*							
BVET 306-20	On the Job training on Computers and Peripherals or Any one of the QP's can be opted as offered in Semester III	On Job Training (OJT) in Collaboration with MoU industry		200	200	400	15
Total		12	6	420	480	900	30

***The qualification packs may vary from institute to institute.**

Semester 4th

Course Code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BVET 401-20	Medical Electronics	3	0	40	60	100	3
BVET 402-20	Introduction to Microprocessor	3	0	40	60	100	3
BVET 403-20	Operating Systems	3	0	40	60	100	3
BVET 404-20	Entrepreneurship Development	3	0	40	60	100	3
BVET 405-20	Microprocessors Laboratory	0	3	30	20	50	3
On-Job Training / Qualification Pack (QP)*							
BVET 406-20	On the Job training on Arduino or Any one of the QP's can be opted as offered in Semester IV	On Job Training (OJT) in Collaboration with MoU industry		200	200	400	15
Total		12	6	420	480	900	30

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-2020

Semester 5th

Course Code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BVET 501-20	Data Structures	3	0	40	60	100	3
BVET 502-20	Mobile Technologies	3	0	40	60	100	3
BVET 503-20	Digital Marketing	3	0	40	60	100	3
BVET 504-20	Computer Programming Using Python	3	0	40	60	100	3
BVET 505-20	Programming Using Python Laboratory	0	3	30	20	50	3
On-Job Training / Qualification Pack(QP)*							
BVET 506-20	On the Job training on Digital Marketing or Any one of the QP's can be opted as offered in Semester V	On Job Training (OJT) in Collaboration with MoU industry		200	200	400	15
Total		12	6	420	480	900	30

***The qualification packs may vary from institute to institute.**

Semester 6th

Course Code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BVET 601-20	Internet of Things	3	0	40	60	100	3
BVET 602-20	Optical Communication	3	0	40	60	100	3
BVET 603-20	Principles of Management	3	0	40	60	100	3
BVET 604-20	Introduction to Robotics	3	0	40	60	100	3
BVET 605-20	Project work	0	3	30	20	50	3
On-Job Training / Qualification Pack (QP)*							
BVET 606-20	On the Job training on android / raspberry pi or Any one of the QP's can be opted as offered in Semester VI	On Job Training (OJT) in Collaboration with MoU industry		200	200	400	15
Total		12	6	420	480	900	30

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET101-20**
Course Name: **Basic Electronics**

Program: **B. Voc.**	L: **3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **1st**	Contact hours: **33**
Theory/Laboratory: **Theory**	Elective status: **Core**
Internal max. marks: **40**	External max. marks: **60**
Total marks: **100**	

Course Outcomes:

CO#	Course outcomes
CO1	Plot the VI characteristics of PN junction diode and Zener diode. Measure voltage gain, input and output impedance in a single state CE amplifier circuit.
CO2	Fabricate half wave, full wave and bridge rectifier and observe waveforms of each Plot the waveforms of the rectifier circuit with different filters.
CO3	Plot input and output characteristics of transistor in CB and CE mode
CO4	Measure voltage gain, input and output impedance in a single state CE amplifier circuit.

Detailed contents	Contact hours
Unit 1: Semiconductor Physics: Review of basic atomic structure and energy levels, concept of insulators, conductors and semi conductors, atomic structure of Germanium (Ge) and Silicon (Si), covalent bonds. Concept of intrinsic and extrinsic semi conductor, process of doping. Energy level diagram of conductors, insulators and semi conductors; minority and majority charge carriers. P and N type semiconductors and their conductivity, effect of temperature on conductivity of intrinsic semi conductors.	9
Unit 2: Semiconductor Diode: PN junction diode, mechanism of current flow in PN junction, forward and reverse biased PN junction, potential barrier, drift and diffusion currents, depletion layer, concept of junction capacitance in forward and reverse biased condition. V-I characteristics, static and dynamic resistance and their value calculation from the characteristics. Application of diode as half-wave, full wave and bridge rectifiers. Peak Inverse Voltage, rectification efficiencies and ripple factor calculations, shunt capacitor filter, series inductor filter, LC and RC filters. Types of diodes, characteristics and applications of Zener diodes. Zener and avalanche breakdown.	8
Unit 3: Introduction to Bipolar-Transistors: Concept of a bipolar transistor, its structure, PNP and NPN transistors, their symbols and mechanism of current flow; Current relations in a transistor; concept of leakage current; CB, CE, CC configurations of a transistor; Input and output characteristics in CB and CE configurations; input and output dynamic resistance in CB and CE configurations; Current amplification factors. Comparison of CB, CE and CC Configurations; Transistor as an amplifier in CE Configuration; concept of DC load line and calculation of current gain and voltage gain using DC load line.	8

Unit 4: Transistor Biasing Circuits: Concept of transistor biasing and selection of operating point. Need for stabilization of operating point. Different types of biasing circuits.	8

Text Books:

1. Basic Electronics and Linear Circuit by NN Bhargava, Kulshreshta and SC Gupta, Tata McGraw Hill Education Pvt Ltd., New Delhi.
2. Principles of Electrical and Electronics Engineering by VK Mehta; S Chand and Co., New Delhi
3. Electronic Components and Materials by SM Dhir, Tata McGraw Hill Education Pvt Ltd., New Delhi.
4. Principles of Electronics by SK Bhattacharya and Renu Vig, SK Kataria and Sons, Delhi
5. Basic Electronics – Problems and Solutions by Albert Malvino and David J. Bates; Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi.

Reference Books:

1. Electronics Devices and Circuits by Millman and Halkias; McGraw Hill.
2. Principles of Electronics by Albert Paul Malvino; Tata McGraw Hill Education Pvt Ltd.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET102-20**
Course Name: **Introduction to Internet & MS-Office**

Program: **B. Voc.**	L: **3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **1st**	Contact hours: **33**
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: **40**	External max. marks: **60**
Total marks: **100**	

Course Outcomes:

CO#	Course outcomes
CO1	To develop an understanding & practical exposure to MS Office used as business tool.
CO2	To equip the students with the relevant skills and working knowledge of various office management tools
CO3	To develop an understanding of the practices and technology required for the Internet.

Detailed contents	Contact hours
Unit 1: Introduction: About internet and its working, business use of internet, services. Internet Protocol: Introduction, file transfer protocol (FTP), Gopher, Telnet, other protocols like HTTP and TCPIP. WWW: Introduction, working of WWW, Web browsing (opening, viewing, saving and printing a web page and bookmark)	9
Unit 2: Microsoft Word: Interface, Toolbar, Working with a document (Create, open, Save, Export etc.), Working with text, Images and Tables, Page layout (Headers and footers, Margins, Page and line numbers), Mail Merge, Automating tasks (Smart documents, Macros), File formats and Export features.	8
Unit 3: MS-Excel: Introduction, Components of Excel History, Creating, Saving, Opening, Spreadsheet, Formatting numbers and Text, Graph and Chart Formatting Commands, Menu Bar, Toolbars, Producing Charges, Protecting Cell Macro and Printing Operation, Spell Checking, Cell Editing, Calculation of various Financial and Statistical Functions using Formulas.	8
Unit 4: Microsoft Power Point: Interface, Working with a document (Create, open, Save, Export etc.), Creating and editing power point presentations (Slideshows, Animations, Transitions, graphics and charts), File formats and Export features.	8

Text Books:

1. Understanding The Internet by Kieth Sutherland, Butterworth-Heinemann.
2. Internet Technologies by S. K. Bansal, APH Publishing Corporation.
3. MS-Office 2007 Training Guide by S. Jain, BPB Publication.

Reference Books:

1. Computer Basics and Beyond by Michael A. Price.
2. MS-Office 2007 for Dummies by Wallace Wang, Wiley Publishing Inc.
3. Fundamentals of Computers. Delhi: Prentice-Hall.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET103-20**
Course Name: **Communicative English**

Program: **B. Voc.**	L: **3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **1st**	Contact hours: **33**
Theory/Laboratory: **Theory**	Elective status: **Core**
Internal max. marks: **40**	External max. marks: **60**
Total marks: **100**	

Course Outcomes:

CO#	Course outcomes
CO1	To introduce students to the theory, fundamentals and tools of communication.
CO2	To help the students become the independent users of English language.
CO3	To develop vital communication skills integral to their personal, social and professional interactions.
CO4	The syllabus shall address the issues relating to the Language of communication.
CO5	Students will become proficient in professional communication such as interviews, group discussions, office environments, important reading skills and writing skills.

Detailed contents	Contact hours
Unit1- 1 (Introduction) • Theory of Communication, • Types and modes of Communication	9
Unit- 2 (Language of Communication) • Verbal and Non-verbal • (Spoken and Written) • Personal, Social and Business • Barriers and Strategies • Intra-personal, Inter-personal and Group communication	8
Unit-3 (Reading and Understanding) • Close Reading • Comprehension • Summary Paraphrasing • Analysis and Interpretation • Translation(from Hindi/Punjabi to English and vice-versa • Literary/Knowledge Texts	8
Unit-4 (Writing Skills) • Documenting • Report Writing • Making notes • Letter writing	8

Text Books:

1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.

Reference Books:

1. Practical English Usage by Michael Swan. OUP. 1995.
2. Communication Skills by Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET104-20**
Course Name: **Basic IT Skill**

Program: **B. Voc.**	L: **3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **1st**	Contact hours: **33**
Theory/Laboratory: **Theory**	Elective status: **Core**
Internal max. marks: **40**	External max. marks: **60**
Total marks: **100**	

Course Outcomes:

CO#	Course outcomes
CO1	Understanding the concept of input and output devices of Computers.
CO2	Learn the functional units and classify types of computers, how they process information and how individual computers interact with other computing systems and devices.
CO3	Learn basic word processing, Spreadsheet and Presentation Graphics Software skills.
CO4	Study to use the Internet safely, legally, and responsibly.
CO5	To develop an understanding and practical exposure to different IT tools used as an aid in business and ecommerce.

Detailed contents	Contact hours
Unit 1 : Human Computer Interface, Concepts of Hardware and Software; Data and Information. Functional Units of Computer System: CPU, registers, system bus, main memory unit, cache memory, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors. Devices: Input and output devices, keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter. Memory: Primary, secondary.	9
Unit 2: Types of Languages: Machine, assembly and High level Language; Operating system as user interface, utility programs. Word processing: Editing features, formatting features, saving, printing, table handling, page settings, spell-checking, macros, mail-merge, equation editors.	8
Unit 3: Spreadsheet: Workbook, worksheets, data types, operators, cell formats, freeze panes, editing features, formatting features, creating formulas, using formulas, cell references, replication, sorting, filtering, functions, Charts & Graphs. Presentation Graphics Software: Templates, views, formatting slide, slides with graphs, animation, using special features, presenting slide shows.	8
Unit 4: The Impact of Computing and the Internet on Society. Electronic Payment System: Secure Electronic Transaction, Types of Payment System: Digital Cash, Electronic Cheque, Smart Card, Credit/Debit Card E-Money, Immediate Payment System (IMPS).	8

Text Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. Computer Fundamentals, A. Goel, 2010, Pearson Education.
3. Fundamentals of Computers, P. K.Sinha& P. Sinha, 2007, BPB Publishers.

Reference Books:

1. Introduction to Computers by Peter Norton.
2. Computers Today by D. H. Sanders, McGraw Hill.
3. Computers by Larry long & Nancy long, 12th edition, Prentice Hall.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET105-20**
Course Name: **Basic Electronics Laboratory**

Program: **B. Voc.**	L: 0 T: 0 P: **3**
Branch: **Electronics & Information Technology**	Credits: **1.5**
Semester: **1st**	Percentage of numerical/design problems:-
Theory/Laboratory: **Laboratory**	Duration of end semester exam (ESE):-
Internal max. marks: **30**	External max. marks: **20**
Total marks: **50**	Status (Elective/Core): **Core**

Course Outcomes:

CO#	Course outcomes
CO1	Understand the function of CRO, Multimeter and LCR meter.
CO2	Performing and analyzing V-I characteristics of PN junction and Zener Diode.
CO3	Calculating the gain of various amplifiers and understanding the rectifiers.

Task 1 :	Operation and use of the following instruments: Multi-meter, CRO, Signal generator, LCR meter, Regulated Power Supply by way of taking readings of relevant quantities with their help.
Task 2 :	Plotting of V-I characteristics of a PN junction diode
Task 3 :	Plotting of V-I characteristics of a Zener diode
Task 4 :	Measurement of the voltage gain, input and output impedance in a single state CE amplifier circuit.
Task 5 :	Design of following circuit on breadboard and observe the output of : a. Half-wave rectifier circuit using one diode b. Full-wave rectifier circuit using two diodes c. Bridge-rectifier circuit using four diodes
Task 6 :	Plotting of input and output characteristics and calculation of parameters of transistors in CE configuration.
Task 7 :	Plotting of input and output characteristics and calculation of parameters of transistors in CB configuration
Task 8 :	Measurement of voltage gain, input and output impedance in a single state CE amplifier circuit.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET106-20**
Course Name: **Introduction to Internet & MS-Office Laboratory**

Program: **B.Voc**	L: 0 T: 0 P: **3**
Branch: **Electronics & Information Technology**	Credits: **1.5**
Semester: **1st**	
Theory/Laboratory : **Laboratory**	Percentage of numerical/design problems:-
Internal max. marks: **30**	Duration of end semester exam (ESE):-
External max. marks: **20**	Status (Elective/Core): **Core**
Total marks: **50**	

Course Outcomes:

CO#	Course outcomes
CO1	Familiarizing with Open Office (Word processing, Spreadsheets and Presentation).
CO2	To acquire knowledge on editor, spread sheet and presentation software.
CO3	The students will be able to perform documentation and accounting operations.
CO4	Students can learn how to perform presentation skills.

Task 1:	Microsoft Word: To familiarize with parts of Word, to create and save a document, to set page settings, create headers and footers, to edit a document and resave it, to use copy, cut and paste features, to use various formatting features such as bold face, italicize, underline, subscript, superscript, line spacing, etc. To use spelling and grammar checking feature, to preview print a document. To create a table with specified rows and columns, to enter data in a table, to select a table, a row, a column or a cell, to inset new row and/or a column, to delete a row and/or a column, to split and merge a row, column or a cell. To understand the mail-merge and to use mail merge feature of MS-Word.
Task 2:	Microsoft Excel: To familiarize with parts of Excel window, to create and save a workbook with single and/or multiple worksheets, to edit and format text as well numbers, to apply operations on range of cells using built-in formulae, to preview and print a worksheet, to insert new row and/or column in a worksheet, to delete a row and/or column in a worksheet, to create a variety of charts, to import and export data to or from worksheet.
Task 3:	Microsoft PowerPoint: To familiarize with parts of PowerPoint, to create and save a new presentation, to apply design templates to a presentation, to insert, edit and delete a slide, to use different views of slides, to use slide show from beginning or from the current slide, to preview and print a presentation, to check spellings in a presentation, to add clip art and pictures in a slide, to add chart, diagram and table in a slide, to set animation for a selected slide and/or for entire presentation, to create slide master and title master, to create a custom show.

Recommended Hardware & Software:

Intel Core i-3 / i-5 / i-7 processor with a speed of minimum 2 GHz, RAM 2 GB or higher, HDD 200 GB or higher, LED / LCD screen and Microsoft MS Office 2003 / XP / 2007

Test Books:

1. IT Tools, R.K. Jain, Khanna Publishing House.
2. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET201-20**
Course Name: **Digital Electronics**

Program: **B. Voc.**	L: **3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **2nd**	Contact hours: **33**
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: **40**	External max. marks: **60**
Total marks: **100**	

Course Outcomes:

CO#	Course outcomes
CO1	Demonstrate the operation of simple digital gates, identify the symbols, develop the truth table for those gates; combine simple gates into more complex circuits; change binary, hexadecimal, octal numbers to their decimal equivalent an vice versa..
CO2	Understanding Boolean algebra and K-maps for analysis of the digital circuits.
CO3	Demonstrate the operation of a flip-flop. Design counters and clear the concept of shift registers.
CO4	Study different types of memories and their applications. Convert digital signal into analog and vice versa.

Detailed Contents	Contact hours
Unit-I: **NUMBER SYSTEMS:** Binary, Octal, Decimal, Hexadecimal. Number base conversions, 1's, 2's complements, signed Binary numbers. Binary Arithmetic, Binary codes: Weighted BCD, Gray code, Excess 3 code, ASCII. **LOGIC GATES:** AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR. Implementations of Logic Functions using gates, NAND-NOR implementations.	9
Unit-II **BOOLEAN ALGEBRA:** Boolean postulates and laws – De-Morgan's Theorem, Principle of Duality, Boolean expression – Boolean function, Minimization of Boolean expressions – Sum of Products (SOP), Product of Sums (POS), Minterm, Maxterm, Canonical forms, Conversion between canonical forms, Karnaugh map Minimization, Don't care conditions.	8
Unit-III **COMBINATIONAL CIRCUITS:** Design procedure – Adders, Subtractors, BCD adder, Magnitude Comparator, Multiplexer/Demultiplexer, encoder/decoder, parity checker, code converters. Implementation of combinational logic using MUX, BCD to 7 segment decoder. **SEQUENTIAL CIRCUITS:** Flip flops SR, JK, T, D and Master slave, Excitation table, Edge triggering, Level Triggering, Realization of one flip flop using other flip flops. Asynchronous/Ripple counters, Synchronous counters, Modulo-n counter, Ring Counters. Design of Synchronous counters: state diagram, Circuit implementation. Shift registers.	8
Unit-IV **MEMORY DEVICES**: Classification of memories, RAM organization, Write operation, Read operation, Memory cycle. ROM organization, PROM, EPROM, EEPROM, Programmable logic array. **A/D & D/A CONVERTORS :** Analog & Digital signals. sample and hold circuit, A/D and D/A conversion techniques (Weighted type, R-2R Ladder type, Counter Type, Dual Slope type, Successive Approximation type).	8

Text Books:

1. R.P.Jain, Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
2. Thomas L. Floyd, Digital Fundamentals, Pearson Education, Inc, New Delhi, 2003
3. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Digital System - Principles and Applications, PearsonEducation.

Reference Books:

1. Morris Mano, Digital Design, Prentice Hall of India Pvt. Ltd
2. Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 5 ed., Tata McGraw HillPublishing CompanyLimited, New Delhi, 2003.
3. Ghosal ,Digital Electronics, Cengage Learning.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET202-20**
Course Name: **Object Oriented Programming using C++**

Program: **B. Voc.**	L: **3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **2nd**	Contact hours: **33**
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: **40**	External max. marks: **60**
Total marks: **100**	

Course Outcomes:

CO#	Course outcomes
CO1	To learn programming from real world examples.
CO2	To understand Object oriented approach for finding Solutions to various problems with the help of C++ language.
CO3	To create computer based solutions to various real-world problems using C++.
CO4	To learn various concepts of object oriented approach towards problem solving.

Detailed Contents	Contact hours
Unit-I **Principles of object oriented programming:** Introduction to OOP and its basic features, Basic components of a C++, Program and program structure, Compiling and Executing C++ Program. Difference between Procedure Oriented Language(C) and Object Oriented Language.	9
Unit-II **Classes & Objects and Concept of Constructors:** Defining classes, Defining member functions, Declaration of objects to class, Access to membervariables from objects, Different forms of member functions, Access specifiers (Private, public, protected), Array of objects. Introduction to constructors, Parameterized constructors, Copy Constructor, Multiple constructors in class, Dynamic initialization of objects, Destructors.	8
Unit-III **Inheritance and Operator overloading:** Introduction to Inheritance, Types of inheritance: - Single inheritance, Multiple inheritance, Multilevel inheritance, Hierarchical inheritance, Hybrid inheritance, Defining operator overloading, Overloading of Unary and Binary operators, Rules for overloading operators.	8
Unit-IV **Polymorphism and File Handling:** Early Binding, Late Binding, Virtual Functions, pure virtual functions, Abstract Classes. Opening and Closing File, Reading and Writing a file.	8

Text Books:

1. Object Oriented Progg. with C++, E. Balagurusami, Fourth Edition, Tata Mc-Graw Hill.
2. Object Oriented Progg. in Turbo C++, Robert Lafore, 4th Edition Galgotia Publications.

Reference Books:

1. C++ Progg. Language, Bjarna Stroustrup, 3rd Edition, Addison Wesley Publishing Comp.
2. Object Oriented Progg. Using C++, Salaria, R. S, Fourth Edition, Khanna Book Publishing.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET203-20**

Course Name: **Computer Networking**

Program: **B. Voc.**	L: **3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: 2nd	Contact hours: **33**
Theory/Laboratory: **Theory**	Elective status: **Core**
Internal max. marks: **40**	External max. marks: **60**
Total marks: **100**	

Course Outcomes:

CO#	Course outcomes
CO1	Familiar with the different Network Models.
CO2	Understand different protocols working at Medium Access Sub-layer.
CO3	Learn the concept of network routing through algorithms.
CO4	Learn and understand Internet protocols and network security.

Detailed contents	Contact hours
Unit 1 : Data Communications Concepts: Digital and analog transmissions-Modem, parallel and serial, synchronous and asynchronous, Modes of communication: Simplex, half duplex, full duplex, Concept of multiplexing, De-multiplexing. Types of Networks: LAN, MAN, WAN Network Topologies: Bus, Star, Ring, Mesh, Tree, Hybrid Communication Channels: Wired transmissions: Telephone lines, leased lines, switch line, coaxial cables-base band, broadband, optical fiber transmission.	9
Unit 2 : Transmission Media: Guided Media(Twisted Pair Cable, Coaxial Cable, Fiber Optics Cable), Unguided Media (Radio Waves, Microwaves, Infrared) Communication Devices (Switches, Hub, Routers, gateway etc) Introduction to Switching: Circuit Switch Networks, Datagram Switch Networks Network Models.	8
Unit 3 : Introduction to OSI Model – Physical Layer, Data Link Layer, Network Layer, Transport Layer, Session Layer, Presentation Layer TCP/IP (Layer Architecture) Data Link Layer, Internet Layer, Transport Layer, Application Layer	8
Unit 4 : MAC sub layer: 802.4Token Bus, IEEE 802.5 Token Ring Concept of Internetworking.	8

Text Books:

1. Computer Networks, Tanenbaum, Andrew, Fifth Edition, PHI.
2. Data Communication and Networking, Behrouz A. Forouzan, Fourth Edition.
3. Computer Today, S.K. Basandra, First Edition, Galgotia.

Reference Books:

1. Data Communication System, Black, Ulysse, Third Edition, PHI.
2. Data and Computer Communications, Stalling, Ninth Edition, PHI.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET204-20**
Course Name: **Analog Circuits**

Program: **B. Voc.**	L: **3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **2nd**	Contact hours: **33**
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: **40**	External max. marks: **60**
Total marks: **100**	

Course Outcomes:

CO#	Course outcomes
CO1	Understand the biasing of transistors and analyze BJT/FET amplifiers
CO2	Analyze various rectifier and amplifier circuits
CO3	Analyze sinusoidal and non-sinusoidal oscillators
CO4	Understand various types of Power Amplifiers

Detailed Contents	Contact hours
Unit-I Diode and Transistor Amplifier Circuits Diode Circuits, Amplifiers types: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier; biasing schemes for BJT and FET amplifiers; bias stability; transistor configurations: CE/CS, CB/CG, CC/CD and their features; small-signal analysis. amplifier analysis: current gain, voltage gain, input resistance and output resistance; amplifier design procedure.	9
Unit-II Feedback Amplifiers Feedback topologies: Voltage series, current series, voltage shunt and current shunt feedback; effect of feedback on gain, bandwidth, input & output impedances; concept of stability, gain margin and phase margin.	8
Unit-III Oscillators Introduction, Types of Oscillators, Barkhausen criterion, RC-phase shift, Wien bridge, Hartley, Colpitt, Clapp oscillators and non-sinusoidal oscillators.	8
Unit-IV Power Amplifiers Class A, B, AB and C power amplifiers, their efficiency and distortions; frequency response: single stage, multistage amplifiers and cascade amplifier	8

Text Books:

4. J Millman & A Grabel, *Microelectronics*, McGraw Hill
5. J Millman& C Halkias, *Integrated Electronics*, Tata McGraw Hill
6. A Ramakant, Gayakwad, *Op-Amps And Linear Integrated Circuits*, PHI
7. P Horowitz & W Hill, *The Art of Electronics*, Cambridge University Press
8. AS Sedra & KC Smith, *Microelectronic Circuits*, Saunder's College Publishing

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET2065-20**
Course Name: **Computer Networking Laboratory**

Program: **B. Voc.**	L: 0 T: 0 P: **3**
Branch: **Electronics & Information Technology**	Credits: **1.5**
Semester: 2nd	Percentage of numerical/design problems:-
Theory/Laboratory: **Laboratory**	Duration of end semester exam (ESE):-
Internal max. marks: **30**	External max. marks: **20**
Total marks: **50**	Status (Elective/Core): **Core**

Course Outcomes:

CO#	Course outcomes
CO1	To execute and evaluate network administration commands and demonstrate their use in different network scenarios.
CO2	To demonstrate the installation and configuration of network simulator.
CO3	Demonstrate and measure different network scenarios and their performance behavior.

Task 1 :	Preparing Computer Network Cable using Connectors and Networking tools
Task 2 :	LAN & WAN Connectivity using Hub, Switch and Router
Task 3 :	Installation of Windows and Server
Task 4 :	Sharing Peripheral Devices.
Task 5 :	Configuration of Network Connectivity
Task 6 :	Troubleshooting of Computer Hardware and Network

Recommended Hardware:

Simple Network Components, Networking Components like Switch, Router, Hub, NIC, PC/Laptop, Router, Connectivity Network lab

Text Books:

1. Computer Networks, Tanenbaum, Andrew, Fifth Edition, PHI.
2. Data Communication and Networking, Behrouz A. Forouzan, Fourth Edition.
3. Computer Today, S.K. Basandra, First Edition, Galgotia.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-

Course Code: **BVET207**6-**20**
Course Name: **Object Oriented Programming using C++ Laboratory**

Program: **B. Voc.**	L: 0 T: 0 P: **3**
Branch: **Electronics & Information Technology**	Credits: **1.5**
Semester: 2nd	Percentage of numerical/design problems:-
Theory/Laboratory: **Laboratory**	Duration of end semester exam (ESE):-
Internal max. marks: **30**	External max. marks: **20**
Total marks: **50**	Status (Elective/Core): **Core**

Course Outcomes:

CO#	Course outcomes
CO1	To learn programming from real world examples.
CO2	To understand Object oriented approach for finding Solutions to various problems with the help of C++ language.
CO3	To create computer based solutions to various real-world problems using C++ .
CO4	To learn various concepts of object oriented approach towards problem solving.

Task 1:	Write a program to enter mark of 6 different subjects and find out the total mark (Using cin and cout statement).
Task 2:	Write a function using reference variables as arguments to swap the values of pair of integers.
Task 3:	Write a function to find largest of three numbers.
Task 4:	Write a program to find the factorial of a number.
Task 5:	Define a class to represent a bank account which includes the following members as Data members: a) Name of the depositor b) Account Number c) Withdrawal amount d) Balance amount in the account Member Functions: a) To assign initial values b)To deposit an amount c) To withdraw an amount after checking the balance d) To display name and balance.
Task 6:	Write the above program for handling n number of account holders using array of objects.
Task 7:	Write a program for overloading of Unary ++ operator & Binary + operator.
Task 8:	Write a program of Virtual Functions & Abstract Class.
Task 9:	Write a program to read and write from file.

Recommended Hardware & Software:
Intel Core i-3 / i-5 / i-7 processor with a speed of minimum 2 GHz, RAM 2 GB or higher, HDD 200 GB or higher, LED / LCD screen and Oracle/ Microsoft SQL Server/ MySQL/ Microsoft Access.

Text Books:

1. Computer Networks, Tanenbaum, Andrew, Fifth Edition, PHI.
2. Data Communication and Networking, Behrouz A. Forouzan, Fourth Edition.
3. Computer Today, S.K. Basandra, First Edition, Galgotia.

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: BVET 301-20

Course Name: **Software Engineering**	L: **3** T: 0 P: 0
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 3th	Contact hours: 33
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO#	Course Outcomes
CO 1	Analyze business problems and develop a requirements/specification document.
CO 2	Describe various phases of the system development life cycle.
CO3	Identify the expected benefits and scope of the projects
CO4	Prepare and develop data flow diagrams and decision tables.
CO5	Perform a feasibility study of the system
CO6	Write detailed design specifications for programs and database.

Detailed Contents	Contact Hours
Unit 1: Introduction Concept of system. Types of systems, Open and Closed, Static and Dynamic with examples	4
Unit 2: Overview of System Analysis and Design Systems Development life cycle, brief Introduction to feasibility, design implementation and testing and maintenance	8
Unit 3: Preliminary Investigations Project selection, scope definition and preliminary investigation	8
Unit 4: Feasibility Study Technical and economic and operational feasibility, cost and benefit analysis	8
Unit 5: Requirement Specifications and Analysis Fact finding techniques, data flow diagrams, data dictionaries, decision trees and tables.	5

Text Books:

1. Structured System Analysis and Design by ISRD Group, Tata McGraw Hill Education Pvt Ltd, New Delhi
2. System Analysis and Design by Awad, Galgotia Publications, New Delhi
3. Software Engineering by Nasib Singh Gill; Khanna Book Publishing Co. (P) Ltd., New Delhi
4. System Analysis and Design Vol. I & II by Lee, Galgotia Publications
5. System Analysis and Design with Case Tools by Len Fertuck WCB Publications 1992

6. Reference Books:

1. Introducing System Analysis by Skidmore, BPB Publication, New Delhi
2. Introducing System Design by Skidmore, BPB Publication, New Delhi

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: BVET 302-20

Course Name: **Computer Peripherals and Interfacing**	L: **3** T: 0 P: 0
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 3th	Contact hours: 33
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO#	Course Outcomes
CO 1	Identify various types of display devices/technologies. Change various BIOS features. Assemble/maintain and troubleshoot a system.
CO 2	Describe different types and various parts of motherboard.
CO3	Use and describe various storage devices.
CO4	Identify, various input-output devices and explain their working.
CO5	Change various BIOS features.

Detailed Contents	**Contact Hours**
Unit 1: Video Display The basic principle of working of video monitors (CRT, LCD,LED), video display adapters, video modes, Overview of raster scan, vector graphic, their main difference and relative advantages, refreshing of screen.	6
Unit 2: Hardware Organization of PCs Types of motherboard and their details, types of processors (INTEL, AMD) and their compatibility with motherboards, serial and parallel ports, USB Ports, Interconnection between units, connectors and cables.	6
Unit 3: Storage Devices Types of Hard Disk Drives- EIDE, SATA, SCSI, SAS External Hard Disk. Constructional features and working of hard disk drive, optical (CD, DVD, Blue Ray) disk drive and Flash Drive, Logical structure of Hard Disk and its organization, boot record.	6
Unit 4: Input Devices Detailed working principle and troubleshooting of various input devices such as keyboard, mouse, scanner. Basic principle of touch screen, light pen, digitizers. Drivers for various input devices and their role.	6
Unit 5: Output Devices Overview of printer and its classification, impact and non-impact printer, principle and working of desk Jet, dot matrix, line Printer and laser printers (Monochrome and Color), plotter (Piezoelectric and Thermal), and modems. Software drivers for various output devices and their role.	6
Unit 6: The Basic Input/ Output System What is BIOS? Function of BIOS, software interrupts, configuring the system.	3

Text Books:

1. Hardware and Software of Personal Computers by SK Bose; Wiley Eastern Limited, New Delhi.
2. Fundamentals of Computers by Sukhvir Singh; Khanna Publishers, New Delhi
3. Hardware and Software of Personal Computers by SK Bose; Wiley Eastern Limited, New Delhi.
4. Computer Peripherals for Micro Computers, Microprocessor and PC by Levis Hahensteu

Reference Books:

1. Inside the PC (Eight Edition) by Peter Norton; Tech Media Publication, New Delhi.
2. Microprocessors and Interfacing by Hall, Douglas: McGraw Hill.

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: BVET 303-20

Course Name: **Principles of Communication**	L: **3** T: 0 P: 0
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 3th	Contact hours: 33
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO#	Course Outcomes
CO 1	Explain the concept and need of modulation and demodulation.
CO 2	Measure the modulation index of the Amplitude Modulated wave
CO3	Measure the frequency deviation of FM wave for different modulating signals
CO4	Use different types of Pulse Modulation Techniques (PAM, PPM, PWM, PCM) and Delta Modulation.
CO5	Use different types of modulators and demodulators

Detailed Contents	Contact Hours
Unit 1: Introduction Need for modulation, frequency translation and demodulation in communication systems. Basic scheme of a modern communication system.	4
Unit 2: Amplitude modulation Expression for an amplitude modulated wave. Carrier and side band components. Modulation index. Spectrum and BW of AM Wave. Relative power distribution in carrier and side bands.	6
Unit 3: Frequency modulation Expression for frequency modulated wave and its frequency spectrum (without Proof and analysis of Bassel function) Modulation index, maximum frequency deviation and deviation ratio, BW of FM signals, Carson's rule. Effect of noise on FM carrier. Comparison of FM and AM in communication systems.	6
Unit 4: Phase Modulation Expression for phase modulated wave, modulation index, comparison with frequency modulation.	6
Unit 5: Pulse Modulation Statement of sampling theorem and elementary idea of sampling frequency for pulse modulation. Pulse Amplitude Modulation (PAM), Pulse Position Modulation (PPM), Pulse Width Modulation (PWM). Pulse code Modulation (PCM): Basic scheme of PCM system. Concepts of differential PCM (DPCM) and Delta Modulation.	5
Unit 6: Principles of Modulators and Demodulators Working principles and typical application as: Square Law Modulator. Balanced Modulator. Ring Modulator. Principles of demodulation of AM wave using diode detector circuit.	6

Text Books:

1. Electronics Communication System by Kennedy, Tata McGraw Hill Education Pvt Ltd, New Delhi.
2. Radio Engineering by GK Mittal, Khanna Publishers, New Delhi.
3. Principles of Communication Engineering by DR Arora, Ishan Publications, Ambala.

Reference Books:

1. Communication Engineering by A Kumar
2. Principles of Communication Engineering by Manoj Kumar, Satya Prakashan, New Delhi

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: BVET- 304-20

Course Name: **Human Values and Professional Ethics**	L: **3** T: 0 P: 0
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 3th	Contact hours: 33
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO#	Course Outcomes
CO 1	Understand the significance of value inputs in a classroom and start applying them in their life and profession.
CO 2	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc.
CO3	Understand the role of a human being in ensuring harmony in society and nature.
CO4	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

Detailed Contents	Contact Hours
Unit 1: Introduction to Value Education Value Education, Definition, Concept and Need for Value Education. The Content and Process of Value Education. Basic Guidelines for Value Education. Self-exploration as a means of Value Education. Happiness and Prosperity as parts of Value Education.	7
Unit 2: Harmony in the Human Being Human Being is more than just the Body. Harmony of the Self ('I') with the Body. Understanding Myself as Co-existence of the Self and the Body. Understanding Needs of the Self and the needs of the Body. Understanding the activities in the Self and the activities in the Body.	7
Unit 3: Harmony in the Family and Society and Harmony in the Nature Family as a basic unit of Human Interaction and Values in Relationships. The Basics for Respect and today's Crisis: Affection, e, Guidance, Reverence, Glory, Gratitude and Love. Comprehensive Human Goal: The Five Dimensions of Human Endeavour. Harmony in Nature: The Four Orders in Nature. The Holistic Perception of Harmony in Existence.	8
Unit 4: Social Ethics The Basics for Ethical Human Conduct. Defects in Ethical Human Conduct. Holistic Alternative and Universal Order. Universal Human Order and Ethical Conduct. Human Rights violation and Social Disparities.	6
Unit 5: Professional Ethics Value based Life and Profession. Professional Ethics and Right Understanding. Competence in Professional Ethics. Issues in Professional Ethics – The Current Scenario.	5

Text Books:

1. A.N Tripathy, New Age International Publishers, 2003.
2.Bajpai. B. L, New Royal Book Co, Lucknow, Reprinted, 2004
3.Bertrand Russell Human Society in Ethics & Politics
4. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: BVET- 305-20

Course Name: **Communication Lab**	L: **0** T: 0 P:3
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 4th	
Theory/Laboratory: **Laboratory**	Status (Elective/Core): **Core**
Internal max. marks: 30	External max. marks: 20
Total marks: 50	

Course Outcomes:

CO#	Course Outcomes
CO 1	Explain the concept and need of modulation and demodulation.
CO 2	Measure the modulation index of the Amplitude Modulated wave
CO3	Measure the frequency deviation of FM wave for different modulating signals
CO4	Use different types of Pulse Modulation Techniques (PAM, PPM, PWM, PCM) and Delta Modulation.
CO5	Use different types of modulators and demodulators

Task 1	a) To observe an AM wave on CRO produced by a standard signal generator using internal and external modulation. b) To measure the modulation index of the wave obtained in above practical.
Task 2	To obtain an FM wave and measure the frequency deviation for different modulating signals.
Task 3	To obtain modulating signal from an AM detector circuit and observe the pattern for different RC time constants and obtain its optimum value for least distortion.
Task 4	To obtain modulating signal from FM detector.
Task 5	To observe the sampled signal and compare it with the analog input signal. Note the effect of varying the sampling pulse width and frequency on the sampled output.
Task 6	To observe and note the pulse amplitude modulated signal (PAM) and compare them with the corresponding analog input signal.
Task 7	To observe PPM and PWM signal and compare it with the analog input signal
Task 8	To feed an analog signal to a PCM modulator and compare the demodulated signal with the analog input. Also note the effect of low pass filter at the demodulated output.

Text Books:

1. Electronics Communication System by Kennedy, Tata McGraw Hill Education Pvt Ltd, New Delhi.
2. Radio Engineering by GK Mittal, Khanna Publishers, New Delhi.
3. Principles of Communication Engineering by DR Arora, Ishan Publications, Ambala.

IK Gujral Punjab Technical University Jalandhar
B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: **BVET 401-20**

Course Name: **Medical Electronics**	L: **3** T: 0 P: 0
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 4th	Contact hours: 33
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO #	Course outcomes
CO 1	Understanding various medical electronics equipment and their uses
CO 2	Using electrodes and transducers for various purposes
CO 3	Maintaining various electronics patient monitoring systems
CO 4	Measuring current leakage with the help of safety analyzer

Detailed Contents	Contact hours
Unit-I Introduction: Overview of Medical Electronics Equipment, classification, application and specifications of diagnostic, therapeutic and clinical laboratory equipment, method of operation of these instruments.	9
Unit-II Electrodes and Transducers: Bioelectric signals, Bio electrodes, Electrode tissue interface, Types of Electrodes, Electrodes used for ECG, EEG, Typical signals from physiological parameters, pulse sensor, respiration sensor.	8
Unit-III Patient Monitoring Systems: Heart rate measurement, Pulse rate measurement, Respiration rate measurement, Blood pressure measurement, Principle of defibrillator and pace mark.	8
Unit-IV Safety Aspects of Medical Instruments: Gross current shock, Micro current shock, Special design from safety consideration, Safety standards.	8

Text Books:

1. Handbook of Biomedical Instrumentation, R S Khandpur,Tata McGraw Hill Education Pvt Ltd.
2. Biomedical Instrumentation, Cromwell, PHI Publishers.
3. Modern Electronics Equipment, R S Khandpur, TMH, New Delhi

Reference Books:

1. Fundamentals of Biomedical Research, Vikas Dhikav, CBS Publishers & Distributors Pvt Ltd.
2. Introduction to Biomedical Engineering, Michael M. Domach, Pearson Prentice Hall Publishers

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: **BVET 402-20**

Course Name: **Introduction to Microprocessors**	L: **3** T: 0 P: 0
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 4th	Contact hours: 33
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO #	Course outcomes
CO1	Students will be able to understand pin diagram and architecture of microprocessor.
CO2	Students will be able to understand the architecture of various controllers in a computer system.
CO3	Students will be able to understand assembly level programs.
CO4	Interface & interact with different peripherals and devices.

Detailed Contents	Contact hours
Unit-I **Introduction to Microprocessors:** Historical Background of Microprocessors, Applications of Microprocessors, Introduction to 8085, Architecture of 8085, Pin diagram of 8085.	8
Unit-II Instruction Cycle, Timing Diagrams of Memory Read/Write Operations, I/O read and write operations, Addressing Modes, Introduction to RISC & CISC Processors. Programming techniques, counters and time delays; stack and subroutines; interrupts.	10
Unit-III **8086 Microprocessor:** 8086 internal architecture, 8086 system configuration and timing, minimum and maximum mode, memory segmentation.	7
Unit-IV **Microprocessor system peripheral and interface:** Introduction to interfacing, 8155, 8255, 8279, DMA controller.	8

Text Books:

1. Microprocessor Architecture, Programming and Applications with 8085, Ramesh. S. Gaonkar, Fourth Edition, Penram International Publishing.
2. Fundamentals of Microprocessors and Microcomputers, B. Ram, Fourth Edition, Dhanpat Rai Publications.

Reference Books:

1. The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium Pro Architecture, Programming and Interfacing, B. Brey, Fifth Edition, Prentice Hall International.
2. Douglas Hall, Microprocessors Interfacing, Tata McGraw Hill.

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: **BVET 403-20**

Course Name: **Operating Systems**	L: **3** T: 0 P: 0
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 4th	Contact hours: 33
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO #	Course outcomes
CO1	Discuss the evaluation of operating systems.
CO2	Explain different resource managements performed by operating system.
CO3	Describe the architecture in terms of functions performed by different types of operating systems.
CO4	Analyze the performance of different algorithms used in design of operating system components.

Detailed Contents	Contact hours
Unit-I **Fundamentals of Operating system:** Introduction to Operating system, Functions of an operating system. Operating system as a resource manager. Structure of operating system (Role of kernel and Shell). Views of operating system. Evolution and types of operating systems.	7
Unit-II **Process & Thread Management:** Program vs. Process; PCB, State transition diagram, Scheduling Queues, Types of schedulers, Concept of Thread, Benefits, Types of threads, Process synchronization. **CPU Scheduling:** Need of CPU scheduling, CPU I/O Burst Cycle, Preemptive vs. Non-pre-emptive scheduling, Different scheduling criteria's, scheduling algorithms (FCSC, SJF, Round-Robin, Multilevel Queue)	10
Unit-III **Memory Management:** Introduction, address binding, relocation, loading, linking, memory sharing and protection; Paging and segmentation; Virtual memory: basic concepts of demand paging, page replacement algorithms.	8
Unit-IV **I/O Device Management:** I/O devices and controllers, device drivers; disk storage. **File Management:** Basic concepts, file operations, access methods, directory structures and management, remote file systems; file protection.	8

Text Books:

1. Operating System Principles by Abraham Silberschatz and Peter Baer Galvin, Seventh Edition, Published by Wiley-India
2. Principals of Operating System by Naresh Chauhan, Published by OXFORD University Press, India.

Reference Books:

1. Operating Systems by Sibsankar Haldar and Alex A. Aravind, Published by Pearson Education.
2. Operating system by Stalling, W., Sixth Edition, Published by Prentice Hall (India)

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code**: BVET 404-20**

Course Name: **Entrepreneurship Development**	L: **3** T: 0 P: 0
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 4th	Contact hours: 33
Theory/Laboratory: **Theory**	Status (Elective/Core): **Core**
Internal max. marks: 40	External max. marks: 60
Total marks: 100	

Course Outcomes:

CO #	Course outcomes
CO1	Describe the concept and theories of entrepreneurship and its role in economic development of nation.
CO2	Develop business plan and identify the reasons of failure of business plans
CO3	Illustrate the steps in starting MSME.
CO4	Comprehend government policies and regulatory framework available in India to facilitate the process of entrepreneurial development.

Detailed Contents	Contact hours
Unit-I Definition and Concept of Entrepreneurship, Theories of Entrepreneurship, Myths about Entrepreneurship, Entrepreneurial Traits and Motivation, Role of Entrepreneurship in economic development. Types of Entrepreneurs. Barriers in the way of Entrepreneurship. Entrepreneurship Development (ED) Cycle.	8
Unit-II Creativity and Business Ideas, Blocks to creativity. Business Plans and reasons of failure of business plans. Micro-Small-Medium (MSME) Enterprise – Definition – Characteristics- Objectives- Advantages- Disadvantages-Role in developing countries, Problems- steps for starting- – Government Policies.	8
Unit-III EDP in India – Phases of Entrepreneurial programs – Government Policies- Administrative Frame work – Policy instruments – Statutory Boards – Industrial Estates –Industrial clusters – Incentives and subsidies – Advantages - Needs & Problems – Promotional agencies. Business Incubators & Start-ups.	8
Unit-IV Financing Options - Bridge capital, Seed capital assistance, Margin money scheme, Industrial Sickness, Causes-Remedies- An overview on the roles of institutions/schemes in entrepreneurial development- SIDBI, Commercial Banks. Other financing options- venture capital, lease funding, Angel Investors. Revival, Exit and End to a venture.	9

Text Books:

1. Kumar, Arya(2018), “Entrepreneurship”, Pearson, New Delhi.
2. Gopal, V.P.Nanda (2015), “Entrepreneurial Development”, Vikas Publishing, New Delhi.

Reference Books:

1. Desai, Vasant, “Dynamics of Entrepreneurial Development & Management”, Himalaya Publishing House.
2. Khanka, S S, Entrepreneurial Development, S.Chand & Co.,New Delhi.

IK Gujral Punjab Technical University Jalandhar

B. Voc. (Electronics & Information Technology), Batch-2020

Course Code: **BVET 405-20**

Course Name: **Microprocessors Lab**	L: **0** T: 0 P:3
Program: **B.Voc.**	
Branch: **Electronics & Information Technology**	Credits: 3
Semester: 4th	
Theory/Laboratory: **Laboratory**	Status (Elective/Core): **Core**
Internal max. marks: 30	External max. marks: 20
Total marks: 50	

Course Outcomes:

CO #	**Course outcomes**
CO1	Write programs for common arithmetic operations using 8085.
CO2	Write programs for transfer, sort block of data with 8085.
CO3	Learn about 8086 microprocessor kit.
CO4	Write programs for controlling stepper and DC motors using Microprocessor.

Task 1	Study of 8085 Microprocessor Kit.
Task 2	Write a program to add two 8-bit number using 8085.
Task 3	Write a program to subtract two 8-bit number using 8085.
Task 4	Write a program to multiply two 8 bit numbers by repetitive addition method using 8085.
Task 5	Write a program to generate Fibonacci series using 8085.
Task 6	Write a program to multiply two 8 bit numbers by rotation method using 8085.
Task 7	Write a program to sort series using bubble sort algorithm using 8085.
Task 8	Study 8086 Microprocessor kit
Task 9	Write a program to control the operation of stepper motor using 8085/8086 microprocessors and 8255 PPI.
Task 10	Write a program to control speed of DC motor using 8085/8086 microprocessors and 8255 PPI.

Books:

1. Microprocessor Architecture, Programming and Applications with 8085, Ramesh. S. Gaonkar, Fourth Edition, Penram International Publishing.
2. Fundamentals of Microprocessors and Microcomputers, B. Ram, Fourth Edition, Dhanpat Rai Publications.