Scheme & Syllabus of

Bachelor of Vocational Studies (B.Voc.)

Electronics & Information Technology

Batch 2025

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**
EMC-101-25	**Entrepreneurship Setup and Launch**	**0**	**4**	**60**	**40**	**100**	**2**
***The department of Higher Education and Languages, Government of Punjab endeavor to AI-powdered entrepreneurship learning platform on the said course. The Institute /Campus shall appoint an assistant professor as faculty coordinator.**							
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**	**10**	**480**	**520**	**1000**	**32**

***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**

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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

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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-2020

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-2020

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.

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

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-2020

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.

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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.

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EMC-101	L	T	P
Entrepreneurship Setup and Launch	**0**	**0**	**4**

Introduction:
This semester lays the foundation for the learner to understand what entrepreneurship is, beyond just starting a business. It introduces key ideas like problem-solving, value creation, and self-awareness. The learner will begin exploring basic business concepts while discovering their own interests and strengths.

Learners Objective:

1. Understand the core concepts of entrepreneurship through relatable, real-life examples.
2. Begin to see themselves as problem-solvers and creators.
3. Learn about business paths and choose one to try based on interest or local fit.
4. Launch a micro-hustle (online or offline) to earn their first income.
5. Build confidence and self-belief by doing.

Outcome: By the end of this semester, learners will start a simple business activity, earn their first income, and build belief in their ability to do business.

Guiding Principles/Approach:

This syllabus is built on principles of **experiential learning, growth mindset development**, and **identity-first learning**. Drawing from learning science and behavior design, the course shifts students from passive learning to *active doing*, where they try out small business activities in real contexts. The design helps students not just learn entrepreneurship but begin to see themselves as entrepreneurs. Emphasis is placed on *small wins, peer collaboration, and locally relevant opportunities* to ensure learning feels achievable and connected to their realities. The curriculum focuses on conceptual understanding without heavy theory, combining *practical action, reflection, and collaboration. By making progress visible and success feel possible, it plants the seeds of self-reliance, initiative, and long-term motivation.*

Semester Syllabus:

Format: 12 weeks, 4 hours/week | 2 credits
Revenue Target: ₹10,000

Week	Learning Goal	Measurable Outcome
1	Understand what entrepreneurship is and who can be an entrepreneur	Students define entrepreneurship in their own words and list 2 entrepreneurs from their local area or community
2	Connect personal identity to entrepreneurship (strengths, interests, struggles)	Students create a "value map" showing how a skill/interest/problem from their life could become a business opportunity

3	Learn about 5 business paths: content creation, drop-shipping, cloud kitchen/food business, gig economy and local services	Students explore 1–2 examples from each domain and share one they're most curious to try and why
4	Choose a path and generate a basic business idea	Students write down a clear offer (what, for whom, why) and one way to reach their customer
5	Take first real action: message, post, pitch, or sell	Students reach out to or serve 1 real potential customer and record what happened
6	Reflect on first attempt and share with peers	Students share their result, a challenge faced, and one idea to improve next time
7	Improve and try again: aim for first ₹100	Students apply a change, try again, and aim to make their first ₹100 or get meaningful response
8	Learn how to identify and understand your target customer	Students talk to 2 potential customers or observe them and list 3 insights about their needs
9	Learn how to serve your target audience better	Students improve one part of their offer (product, delivery, messaging, or interaction) based on customer feedback or need
10	Explore core entrepreneurial values (resilience, honesty, effort)	Students reflect on 1 value they're building and show it in a business task or peer story
11	Focus on earning and staying consistent	Students complete a second earning task and track their consistency (e.g., same product or message for 3 days)
12	Reflect on earnings, grit, and how to keep going	Students record total earnings, one resilience moment, and one support system or habit they'll continue with

Weekly Component:

Component	Duration	Description
Learning Module	~1.5 hrs	- Introduces key concepts in a simple and engaging way - Includes, examples, and 1–2 interactive discussions or quizzes
Action Lab	~2 hrs	- Hands-on task on the weekly concept - Includes step-by-step guidance, templates, and worksheets - Ends with a submission (e.g., video, reflection, or proof of action)
Resources	Self-paced	- Supplementary videos, short readings, real- life stories, and tools to deepen understanding at their own pace

Evaluation Criteria

Evaluation Component	Description	Weightage
Weekly Task Completion	Timely submission of weekly tasks including reflections, activities, quizzes etc.	40%
Target Completion	Performance-based evaluation on hitting **revenue or profit targets** (e.g., generating ₹10,000 revenue)	30%
Final Project	A comprehensive project based on the semester's theme	30%

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Week 1: What is Entrepreneurship? Who Can Be an entrepreneur?

INTRODUCTION: Could *You* Be an entrepreneur?

When people hear "entrepreneur," they often think it means having a company, investors, or an MBA. Some even believe it's only for toppers or those with high grades. But entrepreneurship is more about mindset than qualifications: it's about seeing a problem and doing something about it. Like someone who starts selling snacks because their school canteen is always shut, or a friend who fixes broken chargers for others. If you've ever spotted a need and thought, "I can solve this," - you've already taken your first step.

Component 1: Learning Module (~1.5 hours) Unit 1:

What is Entrepreneurship?

1. *Solving problems or creating value in exchange for money.*
2. Entrepreneurship is not just about starting a company: it's about initiative, resourcefulness, and value creation.
3. Different types of entrepreneurs: small shop owners, street vendors, YouTubers, local tailors, mechanics, and more.
4. Entrepreneurs build opportunities instead of waiting for them.

Simple Slide/Visual Aid Tip:

A circle that says "Problem", an arrow pointing to "Solution", then an arrow to "Earn". That's entrepreneurship.

<A video that visually shows how entrepreneurship starts with spotting a problem (e.g., long food lines), creating a solution (e.g., pre-order lunch service), and earning from it: illustrating the simple flow: Problem → Solution → Earn>

MCQ 1

Q: What best describes entrepreneurship?

A. Getting a job in a company
B. Solving problems for others and earning from it ☑
C. Studying business in college
D. Buying expensive things

Feedback:

1. *Correct! Entrepreneurs solve problems or offer value and get paid for it.*
2. *Not quite! Entrepreneurship is about creating something useful, not just getting a job or studying.*

Unit 2: Who Can Be an entrepreneur?

Entrepreneurship starts with spotting a problem, finding a solution, and creating value. Today, anyone with a phone and an internet connection can start a business: money helps, but mindset and initiative matter more at the start.

You just need:

1. A problem to solve
2. A simple skill or product
3. The courage to start small

Examples Carousel (Swipeable cards)

1. **Pooja (India)** – Sells handmade rakhis on Instagram, learned designing on YouTube.

***Problem she saw**: Expensive or generic rakhis in the market; no personal touch.*

2. **Luis (Mexico)** – Repairs used phones in his garage, now has loyal customers.

***Problem he saw**: Many people couldn't afford new phones or didn't trust local repair shops.*

3. **Sana (Kolkata)** – Started tiffin delivery from her home kitchen, now earns ₹500/day.

***Problem she saw**: Office workers struggled to find affordable, homemade meals.*

4. **Sal Khan (USA)** – Started Khan Academy with YouTube lessons to help his cousin.

***Problem he saw**: His cousin needed help with math, but good learning resources were hard to access.*

MCQ

Q: Which of these can be a form of entrepreneurship?

A. Making reels on skincare tips and selling homemade face packs ✅
B. Buying new clothes from malls
C. Studying engineering
D. Playing games without sharing or streaming

Feedback:

1. *Correct! Sharing useful tips + selling a product = solving a need!*
2. *Try again! Entrepreneurship is about creating value and helping others.*

Reflection Prompt

1. If you had to earn ₹100 this week, what would you do?

Component 2: Action Lab (~2 hours) Task

Find & Learn from 2 Entrepreneurs Near You

Steps (Checklist):

1. Look around your neighborhood or online: find 2 people who earn through their own work
2. Ask or observe:

a) What do they do?
b) How do they earn?
c) What makes them entrepreneurial?

3. Use the **Entrepreneur Tracker Template** (available in the resources tab)

Final Deliverable

Learner submits:

1. A short definition of entrepreneurship (in their words)
2. 2 entries from the Entrepreneur Tracker (name, what they do, what learner learned)

→ Submitted in the submissions tab.

Supplementary Resources (Optional)

1. Danny O'Neill - Getting started | Entrepreneurship | Khan Academy
2. The Better India – Stories of local entrepreneurs

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Week 2: Can I Be an entrepreneur?

INTRO – What Makes an entrepreneur?

You don't need a suit, a degree, or a lot of money to be an entrepreneur.
You need one thing: a mindset. Entrepreneurs notice problems around them: and do something about it. From the boy fixing bikes outside his house to the girl teaching dance on Instagram, they all started small. What matters most is not what you have: it's how you think and act.

Component 1: Learning Module (~1.5 hours)

Unit 1: What Makes an entrepreneur?

Key Concepts:

1. **Entrepreneurs are driven by curiosity:** they ask questions, explore possibilities, and seek better ways to do things.
2. **They take initiative:** they act, experiment, and create using limited resources with creativity and courage
3. **They learn by doing:** embracing mistakes as stepping stones to progress.
4. **They take full ownership:** one day they're the marketer, the delivery person, and the customer support, all in one.
5. **They are resilient:** they persist through challenges, adapt to change, and keep moving forward with purpose.

Real-Life Examples:

1. Nithin & Nikhil Kamath (Zerodha) – Started India's largest stock brokerage without formal degrees or external funding, just deep curiosity about stock markets and a desire to simplify investing.
2. *Qualities: Took initiative early and stayed persistent through challenges.*
3. Prajakta Koli (MostlySane) – Started by making comedy sketches about everyday Indian life: family, school, relationships: and became one of India's top digital creators.
4. *Qualities: Stayed consistent, adapted over time, and built strong audience trust.*
5. Tilak Mehta (Paper n Parcels) – As a teenager, launched a courier startup using Mumbai's dabbawala network for delivery.
6. *Qualities: Thought creatively and acted with confidence at a young age.*

***

Unit 2: Start Small: Build Ideas from What You Know

In the last unit, you learned that entrepreneurs don't just have ideas: they act, solve problems, and use what they have.
But the big question now is:

"What can I offer?"

That's where the Value Map comes in. It helps you take your first step toward thinking and acting like an entrepreneur: in your own way.

What is a Value Map?

A Value Map connects three simple things:

A. **What people around you need**

→ *Look around: is there something people often struggle with or something that could be better?*

B. **What you *enjoy* or are *willing to try***

→ *You don't need to be an expert. Start with small things you like doing: talking to people, fixing, organizing, helping, designing, or learning something new.*

→ *Even if you're just curious about something: that's enough to begin.*

C. **What solution you can create**

→ *Use what you enjoy or are learning to try solving a real need around you: even in a small way*

Visuals:

3 overlapping circles:

1. "People Need"
2. "I Can"
3. "My Offer"

Examples:

1. **People Need → Affordable meals**

I Can → Cook + have access to home kitchen My Offer → ₹40 tiffin service

2. **People Need → Study tips in Punjabi I Can → Speak clearly + love teaching**

My Offer → 3-minute video tips on Instagram

MCQ

Q: What's the first step to being an entrepreneur?

A. Waiting for the perfect idea
B. Solving a problem with your skills ✅
C. Buying a shop
D. Studying for years

Feedback:

1. *Correct! Entrepreneurs start by solving small problems using what they already have.*
2. *Try again! It's not about waiting: it's about starting.*

Reflection Prompt

1. If someone gave you ₹500 and asked you to earn from it, what would you do?

Component 2: Action Lab (~2 hours)

Task: Create Your Personal Value Map Steps (checklist in app):

1. Think of 2–3 problems people face around you (hunger, phone repair, boredom, etc.)
2. List your own skills, interests, or resources.
3. Match each problem with something you could offer.
4. Use the **Value Map Template in the resources** to organize your ideas.

Final Deliverable (Submitted in App):

1. Your completed **Value Map** (in 3 columns: Need, Skill, Offer)
2. Highlight **1 idea** you'd like to explore for your future hustle

Supplementary Resources (Optional)

1. "Start with Why" by Simon Sinek
2. 10 Characteristics of Successful Entrepreneurs | Business: Explained

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

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-2020

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-2020

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-2020

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-2020

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-2020

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- 304304-20

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.

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

5th Semester Scheme and Syllabus

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 with Python**	**3**	**0**	**40**	**60**	**100**	**3**
BVET 505-20	**Digital Marketing Lab**	**0**	**3**	**30**	**20**	**50**	**1.5**
BVET 506-20	**Python Programming Laboratory**	**0**	**3**	**30**	**20**	**50**	**1.5**
On-Job Training / Qualification Pack(QP)*							
BVET 507-20	**Test Engineer (SSC/Q1301)** Technical Writer (SSC/Q0505) **O r Any one of the QP's can be opted as offered in 5th Semester**	**On Job Training (OJT) in Collaboration with MoU industry**		**200**	**200**	**400**	**15**
Total		**12**	**6**	**420**	**480**	**900**	**30**

Course Code: **BVET 501-20**
Course Name: **Data Structures**

Program: **B. Voc.**	L:**3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **5th**	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 operations like searching, insertion, deletion, traversing on linear Data Structures.
CO 2	Understand operations like searching, insertion, deletion, traversing on various non linear Data Structures

CO3	Write algorithms for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
CO4	Apply appropriate Data Structure as per specific problem definition

Detailed Contents	**Contact Hours**
Unit 1: Introduction Basic Terminologies, Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc. Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Mathematical notations and Functions	9
Unit 2: Arrays and Pointers Concept of Arrays, Formula for calculating the location of [column] in single dimensional array, Formula for calculating the location of [row, column] in two dimensional array, Operations on arrays with Algorithms (searching, traversing, inserting, deleting), Introduction to pointers and dynamic memory allocation	8
Unit 3: Linked Lists Singly linked lists: Representation in memory, Algorithms of several operations. Traversing, Searching, Insertion into, Deletion from linked list; Doubly linked list: operations on it and algorithmic analysis; Circular Linked Lists: all operations their algorithms and the complexity analysis.	8
Unit 4: Stacks, Queues and Recursion Introduction to stacks, Representation of stacks, Implementation of stacks, Applications of stacks, Introduction to queues, Implementation of queues, Circular Queues., De-queues, Recursion, Sorting and Searching	8

Text Books:

1. Data Structure using C, Manoj Kumar Jambla, Eagle Publishing House, Jalandhar
2. Data structures – Schaum's Outline Series, Lipschutz, McGraw Hill Education Pvt Ltd , New Delhi
3. Data Structur, R S Salaria, Khanna Book Publishing Co. (P) Ltd., New Delhi
4. Data Structures, Sanjiv Sofat, Khanna Publishers, New Delhi
5. Expert Data Structures with C, R.B. Patel, Khanna Publishers, New Delhi.

Reference Books:

1. Algorithms, Data Structures, and Problem Solving with C++, Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company
2. How to Solve it by Computer, 2nd Impression by R. G. Dromey, Pearson Education.

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

Course Code**: BVET 502-20**
Course Name**: Mobile Technologies**

Program: **B. Voc.**	L:**3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **5th**	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	To identify various issues in different mobile communication technologies.
CO 2	To understand radio propagation in mobile communication.
CO3	Understanding the concept of spread spectrum and access techniques in mobile technologies.
CO4	To study various generations of wireless cellular networks including GSM and CDMA.

Detailed Contents	Contact Hours
Unit 1: Introduction to Mobile Communication Introduction, Mobile Technology Development, Cellular Concept, Frequency Reuse, Channel Assignment Strategies, Handoff Process, Interference and System Capacity, Co-Channel Interference, Adjacent Channel interference, Cell Cluster, Cell Size, Cell Splitting, Sectoring, Microcell Zone Concept.	9
Unit 2: Mobile Radio Propagation Introduction, Basic Methods of Propagation, Outdoor Propagation Models, Multi-Path and Small-Scale Fading, Different Modulation Techniques (BPSK, QPSK, Offset – QPSK, BFSK, AM and FM, GMSK.	8
Unit 3: Spread Spectrum and Multiple Access Techniques Introduction, Direct Sequence and Frequency Hopping Systems, Hybrid Systems, Multiple Access Techniques.	8
Unit 4: Various Generations of Wireless Networks First-Generation, Second-Generation Networks, 2.5 G Mobile Networks, Third Generation Networks, GSM Architecture, GSM Frame Structure, Circuit Switching, Packet Switching, how a Mobile Call is Actually Made? CDMA.	8

Text Books:

1. Mobile Communication, Johen Schiller, Pearson Education.
2. Principles of Mobile Computing, U. Hansman and L. Merck, Springer.
3. Computer Networks, A. S. Tanenbaum, Pearson Education
4. Mobile Computing , Raj Kamal, Oxford University Press

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

Reference Books:

1. Wireless Communication and Networking, Vijay K. Garg, M K Publishers.

Course Code: **BVET 503-20**
Course Name: **Digital Marketing**

Program: **B. Voc.**	L:**3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **5th**	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 core concepts of digital marketing and the role of digital marketing in business.
CO 2	Hands on experience in using Analytics Tools eg: Google Analytics for report extraction and campaign measurement.
CO3	Understanding of the opportunities for deploying emerging digital marketing media and techniques.
CO4	Successfully implement online campaigns for your business and marketing problems within the organization by learning AdWords Campaign Management.

Detailed Contents	Contact Hours
Unit 1: Introduction to Digital Marketing Defining Digital Marketing , Setting Digital Marketing Objectives, Set of activities of digital marketing: Search Engine Optimization, SEO, Search Engine Marketing – Google AdWords, Social Media Marketing: Facebook, LinkedIn, YouTube, Display Advertising – Contextual, Behavioral, Targeted, Content Marketing & Blogging, Lead Generation.	9
Unit 2: Search Engine Optimization SEO introduction and essential guidelines for website owner, designer, blogger and content writer, Keyword Research, Brainstorming, Google Suggest, Related Searches, Google Keyword Planner, Tools & Trends, Organizing the keywords, Writing Headlines with examples, Writing Summary, SEO for Images, Structuring the Content, URL Structure, Plan of Site's Hierarchy, Internal Linking, Site Navigation, Website Speed Testing, Links from YouTube Videos, Users' Engagement , Links to Related Stories , Enable Social Sharing , Embedding videos , Enabling site search feature.	8
Unit 3: Google AdWords and Analytics Setting up Google AdWords Campaigns, Content Structuring, Understanding Quality Score, Finding and selecting the right Keywords, Keywords Matching Options, Organizing Ad Groups, Creating Effective Ads, Optimizing Landing	8

Pages, Bid Management, Negative Keywords Analytics, Remarketing Campaigns, YouTube Video Ad Campaigns, Understanding Dashboard, Audience, Advertising, Traffic Source, Content Conversions, Taking decisions based on Analytics Reporting.	
Unit 4: Social Media Marketing Social Media Marketing Strategy, Setting up Goals, Popular Social Media Networks, Knowing your Audience, Google Alerts, competitions and industry trends using Twitter, Hashtags, Facebook / Instagram / LinkedIn- Setting up a Facebook Business Page, Facebook Graph Search – SEO for Facebook, Promoting your Page, Boost Post, Facebook/Instagram Advertising using 130 Facebook Ads Manager, Remarketing/Retargeting using Facebook Custom Audiences, LinkedIn Advertising,, Measuring Success- Fans, Likes, Comments & Share, Track performance using Google Analytics, Tracking your emails, Viral Videos, Tips and Tools	8

Text Books:

1. Digital Marketing, Vandana Ahuja, Oxford Publication
2. Fundamentals of Digital Marketing, Puneet Bhatia, Pearson.
3. Digital Marketing for Dummies, Ryan Deiss & Russ henneberry, Wiley Publications

Reference Books:

1. Epic Content Marketing, Joe pulizzi, Mcgraw Hill Education
2. Youtility, Jay Baer, New York Times Publishers

Course Code: **BVET- 504-20**
Course Name: **Computer Programming Using Python**

Program: **B. Voc.**	L:**3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **5th**	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	Familiar with Python environment, data types, operators used in Python.
CO 2	Learn the use of control structures and numerous native data types with their methods.
CO3	Design user defined functions, modules, and packages and exception handling methods.
CO4	Create and handle files in Python and learn Object Oriented Programming Concepts

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

Detailed Contents	**Contact Hours**
Unit: 1 **Introduction to Python Programming Language:** Programming Language, History and Origin of Python Language, Features of Python, Limitations, Major Applications of Python, Getting, Installing Python, Setting up Path and Environment Variables, Running Python, First Python Program, Python Interactive Help Feature, Python differences from other languages. **Python Data Types & Input/Output:** Keywords, Identifiers, Python Statement, Indentation, Documentation, Variables, Multiple Assignment, Understanding Data Type, Data Type Conversion, Python Input and Output Functions, Import command. **Operators and Expressions:** Operators in Python, Expressions, Precedence, Associativity of Operators, Non Associative Operators.	9
Unit: 2 **Control Structures:** Decision making statements, Python loops, Python control statements. **Python Native Data Types:** Numbers, Lists, Tuples, Sets, Dictionary, Functions & Methods of Dictionary, Strings (in detail with their methods and operations).	8
Unit: 3 **Python Functions:** Functions, Advantages of Functions, Built-in Functions, User defined functions, Anonymous functions, Pass by value Vs. Pass by Reference, Recursion, Scope and Lifetime of Variables. **Python Modules:** Module definition, Need of modules, Creating a module, Importing module, Path Searching of a Module, Module Reloading, Standard Modules, Python Packages.	8
Unit: 4 **Exception Handling:** Exceptions, Built-in exceptions, Exception handling, User defined exceptions in Python. **File Management in Python:** Operations on files (opening, modes, attributes, encoding, closing), read() & write() methods, tell() & seek() methods, renaming & deleting files in Python, directories in Python.	8

Text Books:

1. Programming in Python, Pooja Sharma, BPB Publications, 2017.
2. Core Python Programming, R. Nageswara Rao, 2nd Edition, Dreamtech.

Reference Books:

1. Python, The complete Reference, Martin C. Brown, Mc Graw Hill Education.
2. Python in a Nutshell, A. Martelli, A. Ravenscroft, S. Holden, OREILLY.

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

Course Code: **BVET- 505-20**
Course Name: **Digital Marketing Laboratory**

Program: **B. Voc.**	L:0 T: 0 P: **3**
Branch: **Electronics & Information Technology**	Credits: **1.5**
Semester: **5th**	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**
CO 1	Identify core concepts of digital marketing and the role of digital marketing in business.
CO 2	Hands on experience in using Analytics Tools eg: Google Analytics for report extraction and campaign measurement.
CO3	Understanding of the opportunities for deploying emerging digital marketing media and techniques.
CO4	Successfully implement online campaigns for your business and marketing problems within the organization by learning AdWords Campaign Management.

Task 1	Create SEO Friendly Web Pages and Submit Website in various search Engines
Task 2	Build a Network of Partner Websites to Get Influence on the SERP and Jump up to 30+ Positions
Task 3	Develop a Facebook Customized Page Tab
Task 4	Create and Write a blog
Task 5	Make a video and Youtube Channel
Task 6	Create Google Adword Account and make use of Keyword Planner
Task 7	Create and Use Google Analytics Account
Task 8	Create “refer-a-friend” or “bookmark this page” links on your site
Task 9	Create Google Map on Places for Business
Task 10	Understanding various SEO Tools like woorank, seositecheckup, seoquake, similarweb, siteliner.
Task 11	Creating XML Sitemap and robot.txt files

Text Books:

1. Digital Marketing, Vandana Ahuja, Oxford Publication
2. Fundamentals of Digital Marketing, Puneet Bhatia, Pearson.
3. Digital Marketing for Dummies, Ryan Deiss & Russ henneberry, Wiley Publications

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

Course Code: **BVET- 506-20**
Course Name: **Python Programming Laboratory**

Program: **B. Voc.**	L:0 T: 0 P: **3**
Branch: **Electronics & Information Technology**	Credits: **1.5**
Semester: **5th**	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**
CO 1	Identify basic functions, operators in Python programming
CO 2	Hands on experience in using general commands in python programming
CO3	Hands on experience in using strings & expressions in python programming
CO4	Develop programs using files and libraries in python

Task 1	Find the largest and smallest numbers in a list
Task 2	Find the third largest number in a list.
Task 3	Test for primarily.
Task 4	Find whether a string is a palindrome or not.
Task 5	Given two integers x and n, compute xn
Task 6	Compute the greatest common divisor and the least common multiple of two integers
Task 7	Test if a number is equal to the sum of the cubes of its digits. Find the smallest and largest such numbers.
Task 8	Write a program to create, concatenate and print a string and accessing substring from a given string.
Task 9	Write a python program to create, append and remove lists in python.
Task 10	Write a program to demonstrate working with dictionaries in python.
Task 11	Write a python program to convert temperature to and from Celsius to fahrenheit.

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

6th Semester Scheme and Syllabus

Course Code	Course Title	Load Allocation		Marks Distribution		Total	Credits
		L	P	Internal	External		
BVET 601-20	**Optical Fiber Communication**	**3**	**0**	**40**	**60**	**100**	**3**
BVET 602-20	**Introduction to Robotics**	**3**	**0**	**40**	**60**	**100**	**3**
BVET 603-20	**Internet of Things**	**3**	**0**	**40**	**60**	**100**	**3**
BVET 604-20	**Web Development with PHP**	**3**	**0**	**40**	**60**	**100**	**3**
BVET 605-20	**Web Development with PHP Laboratory**	**0**	**2**	**30**	**20**	**50**	**1**
BVET 606-20	**Project work & Report Writing**	**0**	**4**	**30**	**20**	**50**	**2**
On-Job Training / Qualification Pack(QP)*							
BVET 607-20	**Test Engineer (SSC/Q1301)** Technical Writer (SSC/Q0505) **O r Any one of the QP's can be opted as offered in 6th Semester**	**On Job Training (OJT) in Collaboration with MoU industry**		**200**	**200**	**400**	**15**
Total		**12**	**6**	**420**	**480**	**900**	**30**

Course Code: **BVET 601-20**

Course Name: **Optical Fiber Communication**

Program: **B. Voc.**	L:**3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **6th**	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	Students will be able to understand the basics of Optical Communication and Optical fibres.
CO 2	Students will be able to understand the various types of losses in optical fibers.
CO3	Explain and demonstrate characteristics of optical sources.

CO4	Explain and demonstrate characteristics of optical detectors.

Detailed Contents	**Contact Hours**
Unit 1: Introduction Basic communication systems, optical frequency range, advantages Of optical fibre communication, application of fibre optic communication, Electromagnetic spectrum used, Principle of light penetration, reflection, critical angle. Constructional details of various optical fibers, multimode and mono-mode fibers, step index and graded index fibers, acceptance angle and types of optical fiber cables, Optical Fibers cable connectors and splicing techniques.	11
Unit 2: Losses in Optical Fiber Cable Absorption Losses: Scattering Losses, Radiation losses, Connector losses, Bending loses. Dispersion: Types and its effect on data rate.	6
Unit 3: Optical Sources Characteristics of light used in optical communication, principle of operation of LED, different types of LED structures used and their brief description, Injection laser diode, principle of operation, different injection laser diodes, comparison of LED and ILD.	8
Unit 4: Optical Detectors Characteristics of photo detectors used in optical communication; PIN diode and avalanche photo diode (APD), Noise in detectors.	8

RECOMMENDED BOOKS

1 Optical fiber Communication by John M Senior, Prentice Hall of India, New Delhi
2. Optical fiber Communication by J. Gower, Prentice Hall of India, New Delhi
3. Optical fiber Communication by Gerd Keiser, McGraw Hill International Editions
4. Optical Communications – Components and Systems by JH Franz and VK Jain, Narosa Publishing House, New Delhi
5. Optical Fiber Communication by Sangar and Sahdev, Uneek Publications, Jalandhar

Course Code: **BVET 602-20**
Course Name: **Introduction to Robotics**

Program: **B. Voc.**	L:**3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **6th**	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 a Robot for a specific application.

CO 2	Interface various Servo and hardware components with Controller based projects.
CO3	Identify parameters required to be controlled in a Robot.
CO4	Maintain various Robotic control features.

Detailed Contents	**Contact Hours**
Unit 1: Basic Components of Robotics Systems Definition, need, brief history, Basic Robot terminology configuration and its working, Basic structure of a Robot and Classification, Linear and rotary motion and its devices. Robot configurations.	7
Unit 2: Servo Mechanism and Motion Systems ROBOTIC Controls, Servo and non servo control systems – Types, basic principles and block diagram , Types, working and applications of various controls, electrical hardware, programming languages used, Robot as work cell controller-PLC , Robot path control , Controller programming ,Actuators: DC servo motors, Stepper motor, Hydraulic and pneumatic drives , Feedback devices , Microprocessor based control system .	10
Unit 3: Sensors and Actuators Concept of general measurement system and difference between Mechanical and electrical/ electronics instruments , Measurement of Pressure, Measurement of Flow, Measurement of Speed, Electrical method for moisture measurement , Basic requirement of Sensors, Functions.	8
Unit 4: Programming and Application in Manufacturing Methods of robot programming, Types, features and applications of various programming languages, Simulation for robot movements , Common troubles and remedies in robot operation ,General safety norms, aspects and precautions in robot handling .	8

RECOMMENDED BOOKS

1. S. R Deb, Robotic Technology and Flexible Automation, Tata Mc Hill
2. Saeed B. Niku Introduction to Robotics, Wiley India
3. M.P.Groover, ―Industrial Robotics - Technology, Programming and Applications, McGraw-Hill, 2001.
4. Ghosal, A., Robotics: Fundamental Concepts and Analysis, Oxford University Press, 2nd reprint, 2008.
5. Fu, K., Gonzalez, R. and Lee, C.S. G., Robotics: Control, Sensing, Vision and Intelligence¸ McGraw- Hill, 1987

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

Course Code: **BVET 603-20**
Course Name: **Internet of Things**

Program: **B. Voc.**	L:**3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **6th**	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 and design the new models for market strategic interaction.
CO 2	Design business intelligence and information security
CO3	Analyze various protocols for IoT .
CO4	Analyze and design different models for network dynamics.

Detailed Contents	Contact Hours
Unit 1: IoT & Web Technology The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Security, Privacy & Trust.	7
Unit 2: M2M to IoT – A Basic Perspective & Architecture Introduction, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies, Building Architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations.	9
Unit 3: IoT -State of the Art and security Introduction, State of the art, IoT reference Model, IoT Reference Architecture,Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities.	9
Unit 4: IoT Applications for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, IoT for Retailing Industry, IoT For Oil and Gas Industry	8

RECOMMENDED BOOKS:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
2. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013.
3. Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011.

4. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.

Course Code: **BVET 604-20**
Course Name: **Web Development using PHP**

Program: **B. Voc.**	L:**3** T: 0 P: 0
Branch: **Electronics & Information Technology**	Credits: **3**
Semester: **6th**	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	Compare and contrast the use of various markup languages.
CO 2	Perform various logical operations in PHP.
CO3	Perform database connectivity using PHP.
CO4	Design a simple HTML form using AJAX technologies

Detailed Contents	Contact Hours
Unit 1: XML Basics The History of XML;The Origins of XML; Comparison of XML And HTML Components of XML; Anatomy of an XML Document : A Sample XML Document,; XML Declaration; The Root Element ; An Empty Element; Attributes, Markup Delimiters; Element Mark Up; Attribute Mark Up, Style sheets.	8
Unit 2: PHP Introduction, syntax, variables, statements, operators, decision making, loops, arrays, strings, forms, get and post methods, functions, Introduction to cookies, storage of cookies at client side, Using information of cookies, Creating single or multiple server side sessions, Timeout in sessions, Event management in PHP, introduction to content management systems based on PHP.	8
Unit 3: PHP and MySQL Introduction to MySQL, connecting to MySQL database, creation, insertion, deletion and retrieval of MySQL data using PHP, PHP and XML, XML parsers, XML DOM, Introduction to NoSQL and use of new databases (MongoDb, Hbase) .	11
Unit 4: AJAX & JAVA script Introduction, HTTP request, AJAX Server Script, Introduction to JavaScript: JavaScript in Web Pages (Netscape and JavaScript, Database Connectivity, Client	6

side JavaScript, Capturing User Input); Advantages of JavaScript (an Interprete) AJAX Database	

RECOMMENDED BOOKS

1. XML How to Program by Deitel, Deitel, Nieto, and Sandhu; Pearson Education.
2. Java 2: The Complete Reference by Herbert Scheldt; BPB
3. Web Enabled Development Application by Ivan Bayross : Commercial; TMH
4. HTML, CSS, JavaScript,Perl, Python and PHP by Schafer Textbooks; Wiley India.

Course Code: **BVET- 605-20**

Course Name: **Web Development with PHP Laboratory**

Program: **B. Voc.**	L:0 T: 0 P: **2**
Branch: **Electronics & Information Technology**	Credits: **1**
Semester: **6th**	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
CO 1	Able to understand how XML documents work on the web
CO 2	PHP Basic syntax for variable types and calculations
CO 3	Able to use PHP built-in functions and creating custom functions
CO 4	Able to receive and process form submission data

Task 1	Develop a XML/HTML script or page of your choices as per the topics covered in the syllabus.
Task 2	Develop an XML Document to store information about patients in a hospital.
Task 3	Write a XML/XHTML code to provide a form that collects names and telephone numbers.
Task 4	Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list.
Task 5	Write the PHP script to count the digits/numbers in a string and display that number.
Task 6	Write a PHP script that computes the total cost of the ordered objects in a house after adding basic VAT and buyer's information.
Task 7	Write the XML code to accept from the user name, phone no, mail-id, stored in database.
Task 8	Retrieve the above information from database using a separate PHP script.
Task 9	Write a PHP Script to check whether the given number is Palindrome or not.
Task 10	Write a program to design a simple calculator using PHP.

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Task 11	Design the web pages required for an online book store web site. 1) HOME PAGE 2) LOGIN PAGE 3) CATOLOGUE PAGE 4) REGISTRATION PAGE

Course Code: **BVET 606-20**
Course Name: **Project Work & Report Writing**

Program: **B. Voc.**	L:0 T: 0 P: **4**
Branch: **Electronics & Information Technology**	Credits: **2**
Semester: **6th**	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**

The object of Project Work is to enable the student to extend further the investigative study taken up during the course, either fully theoretical/practical or involving both theoretical and practical work, under the guidance of a Supervisor from the Department alone or jointly with a Supervisor drawn from R&D laboratory/Industry. This is expected to provide a good training for the student(s) in R&D work, Programming skills and technical leadership. The student has to submit the Report in the Department after completing the Project work.