SCHEME OF EXAMINATION

And

SYLLABI

For

BACHELOR OF VOCATION

In

(SOFTWARE DEVELOPMENT)

BRIDGE COURSE
LEVEL IV SKILL COMPONENT

And

1st SEMESTER to 2nd SEMESTER

Offered by

University School of Engineering and Technology

**GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY**

Guru Gobind Singh Indraprastha University
Sector 16-C, Dwarka, Delhi – 110078 [INDIA]
www.ipu.ac.in

Scheme and Syllabi for B. Voc. (Software Development), w. e. f. batch 2016-17, approved in the BOS of USET/USICT held on 19th July, 2016 & AC Sub-Committee Meeting of USET/USICT held on 27th July, 2016.

NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF B.VOC

1. **ET** stands for Engineering and Technology.
2. **AP** stands for Architecture and Planning
3. **V** stands for Vocation.
4. **MC** stands for Mobile Communication.
5. **SD** stands for Software Development.
6. **AE** stands for Automobile.
7. **CE** stands for Consumer Electronics.
8. **PT** stands for Printing Technology.
9. **CT** stands for Construction Technology.
10. **RA** stands for Refrigeration & Air-Conditioning.
11. **PD** stands for Power Distribution Management.
12. **ID** stands for Interior Design.
13. **AA** stands for Applied Arts.
14. **CS** stands for Computer Science.
15. **MS** stands for Management Studies.
16. **EN** stands for Environmental Engineering
17. **PH** stands for Physics
18. **AS** stands for Applied Science.
19. **HS** stands for Humanities and Social Sciences.
20. **SS** stands for Social Services.
21. **L/T** stands for Lecture and Tutorial
22. **P** stands for Practical.
23. **S/D** stands for Drawing/Studio
24. **P/D** stands for Practical/Drawing

TITLE OF THE PROGRAMME
BACHELOR OF VOCATION IN SOFTWARE DEVELOPMENT

Preamble: Skills and knowledge are the driving forces of economic growth and social development for any country. Countries with higher and better levels of skills adjust more effectively to the challenges and opportunities of world of work. This programme is designed to cater the demands of professionally trained human resource in the field of Software Development. The programme is highly relevant for all those who want to pursue a professional career in software development.

Aim: The programme aims to build individual capacities and train persons with adequate employability skills. The programme structure attempts to blend appropriate technical knowledge and skills, personal and professional skills and substantive 'hands-on' and field / site experience required in the trade. Keeping in view the demands of the market and to provide flexible options for students the programme is designed in modular manner and allows entry and exit options at various levels. The learners will have flexibility to develop themselves according to their strengths and career interests.

Objective: The objective of this program is to prepare students to undertake careers involving skills and problem solving using programming techniques and technologies. Curriculum for this program covers most of the foundational aspects of IT Sector and also focus on the software developing skills.

Program Structure: The course is divided into Six semesters (from level V to level VII) and One bridge course will simultaneously conduct with level V in first year.

The program is designed in the following manner:

	Level-IV+ Level V		On Exit
Year-1	Sem-I + Bridge Course Level 4 Part 1	Sem-II + Bridge Course Level 4 Part 2	Diploma will be awarded
Year 2	Level VI		Advance Diploma will be awarded
	Sem- III	Sem- IV	
Year 3	Level VII		B.Voc Degree will be awarded.
	Sem- V	Sem- VI	

For more details Scheme of B.Voc IT(SD) can be referred.

Program outcome: The whole course is focused on the Skill of software development. After completing the course the student can opt for the career in the programming and software development.

- **Outcome of first year**

    If the student opts for the exit at this point then the Student will be awarded Diploma in IT (SD)

    Student can have employability opportunities in the following fields:

    - Office Assistant

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- Programming Assistant
- Technical Assistant
- Hardware Technician
- Computerized Accounting Operator
- DTP Operator

- **Outcome of second year**

  If the student opts for the exit at this point then the Student will be awarded Advance Diploma in IT (SD). In addition to the opportunities mentioned in 1st Year Exit the Student can have employability opportunities in the following fields:

  - Assistant Programmer
  - Network Maintenance Supervisor
  - Database Operator
  - Lab Instructor
  - Web Designer

- **Outcome of third year**

  At the End of third year the Student will be awarded degree in B.Voc IT (SD). In addition to the opportunities mentioned in 1st and 2nd Year Exit the Student can have employability opportunities in the following fields:

  - Programmer
  - ASP Developer
  - Server Administrator
  - Android Application Developer
  - Software Project Analyst
  - ERP Consultant
  - Software Tester
  - Animation Developer

Students will be awarded of Diploma:

1. Student shall be required to appear in examinations of all courses. However, to award the Diploma (Software Development) a student shall be required to earn a minimum of **60 credits.**

Students will be awarded of Advanced Diploma:

1. Student shall be required to appear in examinations of all courses. However, to award the Advanced Diploma (Software Development) a student shall be required to earn a minimum of **120 credits.**

Students will be awarded of B.Voc Degree:

1. Student shall be required to appear in examinations of all courses. However, to award the degree a student shall be required to earn a minimum of **180 credits.**

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BACHELOR OF VOCATION
BRIDGE COURSE FOR (10+2)/10+ITI STUDENTS
(FOR ALL ENGINEERING DISCIPLINES)
(FIRST SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L/T/P	Credits
ETVSD-401		Module-I*	6	6
ETVSD-403		Module-II*	6	6
TOTAL			**12**	**12**

No. of Hours: 12 x 15 Hours =180 Hours

BACHELOR OF VOCATION
BRIDGE COURSE FOR (10+2)/10+ITI STUDENTS
(FOR ALL ENGINEERING DISCIPLINES)
(SECOND SEMESTER EXAMINATION)

Paper Code	Paper ID	Paper	L/T/P	Credits
ETVSD-402		Module-III*	6	6
ETVSD-404		Module-IV*	6	6
TOTAL			**12**	**12**

No. of Hours: 12 x 15 Hours =180 Hours

*Non University Examination System (NUES)

NOTE I:

The institute is advised to teach/provide relevant skills through Module I to IV, which are pre-requisite for first year of B.Voc.

OR

Relevant qualification pack in alignment with NSQF Level IV may be taught by the institute, which is pre-requisite for B.Voc.

NOTE II:

Bridge course is to be taught during first year. Evaluation for bridge course modules will be in Non University Examination System (NUES) pattern. Each module will be of 100 marks.

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BACHELOR OF VOCATION
(SOFTWARE DEVELOPMENT)
FIRST SEMESTER EXAMINATION
(LEVEL-V)

Paper Code	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS					
ETVSD-501		Information Processing Skills	3	0	3
ETVSD-503		Programming Skills using C	3	0	3
ETVHS-519		Communication Skills (Common to all disciplines)	2	1	3
OPEN ELECTIVE-I (Select any one)					
ETVAS-507		Applied Mathematics	3	0	3
ETVCS-509		Data Analysis and Discrete Mathematics	3	0	3
ETVAS-511		Aptitude & Logical Reasoning	3	0	3
ETVME-501		Applied Mechanics	3	0	3
GENERAL ELECTIVE-I (Select any one)					
ETVHS-513		Human Values and Professional Ethics	2	0	2
ETVHS-515		Life Skills	2	0	2
ETVHS-517		Personality Development & Behavioural Science	2	0	2
PRACTICAL/VIVA VOCE (Select any one Lab based on OPEN ELECTIVE-I)					
ETVAS-557		Applied Mathematics Lab	0	3	3
ETVCS-553		Data Analysis and Discrete Mathematics Lab	0	3	3
ETVAS-555		Aptitude & Logical Reasoning Lab	0	3	3
ETVME-551		Applied Mechanics Lab	0	3	3
PRACTICAL/VIVA VOCE					
ETVSD-551		Information Processing Skills Lab	0	4	4
ETVSD-553		Programming Skills using C Lab	0	4	4
ETVSD-555		HTML Lab	0	2	2
ETVSD-557		Vocation Workshop-I (Computer Configuration and Maintenance)	0	3	3
TOTAL			**13**	**17**	**30**

NOTE:
There are five industrial trainings to be carried out by the student(s) in B.Voc course. Industrial Trainings I, III and V will be with weightage of two credits each. These trainings are to be carried out during winter vacations for the duration of two weeks. Industrial Trainings II and IV will be with weightage of four credits each. These trainings are to be carried out during summer vacations for the duration of four to six weeks. These training may be done from industry/Skill Knowledge Providers (SKPs) /Sector Skill Councils (SSCs) / Training Centers/Institutes. Student should submit training report during evaluation. Industrial Training done at the end of the semester will be evaluated in the subsequent semesters.

BACHELOR OF VOCATION
(SOFTWARE DEVELOPMENT)
SECOND SEMESTER EXAMINATION
(LEVEL-V)

Paper Code	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS					
ETVSD-502		C++ Programming Skills	3	0	3
ETVSD-504		Desktop Publishing	3	0	3
ETVEN-502		Environmental Science (Common to all disciplines)	3	0	3
OPEN ELECTIVE-II (Select any one)					
ETVEC-506		Basic Electronics	3	0	3
ETVAS-502		Applied Physics	3	0	3
ETVEC-504		Digital Electronics	3	0	3
ETVEE-508		Basics of Electrical Engineering	3	0	3
ETVME-510		Engineering Materials	3	0	3
PRACTICAL/VIVA VOCE (Select any one Lab based on OPEN ELECTIVE-II)					
ETVEC-556		Basic Electronics Lab	0	2	2
ETVAS-552		Applied Physics Lab	0	2	2
ETVEC-554		Digital Electronics Lab	0	2	2
ETVEE-558		Basics of Electrical Engineering Lab	0	2	2
ETVME-560		Engineering Materials Lab	0	2	2
PRACTICAL/VIVA VOCE (Select any one Lab for Vocation Workshop – II)					
ETVSD-556		Accounting Software Lab	0	4	4
		Visual Basic Programming Lab	0	4	4
PRACTICAL/VIVA VOCE					
ETVSD-552		C++ Programming Skills Lab	0	4	4
ETVSD-554		Desktop Publishing Lab	0	4	4
ETVEN-552		Environmental Science Lab / Field work (Common to all disciplines)	0	2	2
ETVSD-562		Project-I	0	6	3
ETVSD-564		Industrial Training-I	0	0	2
TOTAL			**12**	**22**	**33**

NOTE:
There are five industrial trainings to be carried out by the student(s) in B.Voc course. Industrial Trainings I, III and V will be with weightage of two credits each. These trainings are to be carried out during winter vacations for the duration of two weeks. Industrial Trainings II and IV will be with weightage of four credits each. These trainings are to be carried out during summer vacations for the duration of four to six weeks. These training may be done from industry/Skill Knowledge Providers (SKPs) /Sector Skill Councils (SSCs) / Training Centers/Institutes. Student should submit training report during evaluation. Industrial Training done at the end of the semester will be evaluated in the subsequent semesters.

NOTE FOR PROJECT:
The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.
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INFORMATION PROCESSING SKILLS

	L	T/P	C
Paper Code: ETVSD-501			
Paper: Information Processing Skills	3	0	3

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

Objectives & Pre-requisites: Student should have *Knowledge of basics of computer system. The objective is to understand the working of computer and techniques of MS office.*

Learning Outcomes: *The student after completing the course will be able to:*
- *Describe the computer terms and its components..*
- *Work on software package like MS office for advanced documentation, creating efficient presentation, handling worksheets and creating & manipulating tables in Access.*

UNIT- I:
Introduction: Generations of computers, Types of computers, Block diagram of computer, Basic components of a computer, Input and Output Devices.
Memory: RAM, ROM, EPROM, PROM, cache memory.
Secondary Storage Devices: Magnetic Tape, Hard Disk, Optical Disks, CD, DVD, Solid State Storage-Flash Memory, USB Drives, Memory Card Computer Software: Software, it's Need, Types of software-System software, Application software.
Types of Computer Languages: Machine Language, Assembly Language and High Level Language.
Viruses: Types of viruses, virus detection, prevention and cure
Number System: Decimal, Binary, Octal, Hexadecimal, and its conversions.
Internet: URL, Domain, Website, Browser, Search Engines, DNS Server.

[T1][T3][T4][No. of Hrs. 11]

UNIT- II:
MS Word: Application of MS Word, creating new Document/ opening an existing document, Formatting a document- setting paragraphs and spacing, using bullets and numbers, using different fonts faces, sizing of fonts, bold, italics, underline, using features find and replace, drawing Tables and Borders, inserting files, pictures, symbols, Use of spell checker, inserting headers, footers, using mail merge, various justifications, word count, changing of case, setting of page and using format painter, Reviewing a Document- inserting comments, Tracking changes, protecting documents.

[T2][T3] [No of Hrs. 11]

UNIT- III:
MS Excel: Application of MS Excel, Starting MS Excel, creating new Document/ opening an existing document, concept of worksheets, concept of cells, rows and columns, Formatting the worksheet- changing column and row width, formatting the individual cells, writing formulas to do mathematical and other functions, various inbuilt library functions.
Advanced Functions: IF construct and logical test, Statistical, trigonometric and other logical functions , Creating graphs and charts, printing charts, sorting and filtering data in list. View Option- Hide/Show, windows and its settings.

[T2][T3][No. of Hrs. 11]

UNIT- IV:
MS PowerPoint: Application of PowerPoint, Working environment-concept of slides, slide layout, templates, Different views for viewing slides in a presentation: normal, slide sorter, Insertion of multimedia elements, Text formatting, changing slide layout, changing slide colour scheme, Animation effects.
MS Access: Introduction to MS access, creating database file and tables, Insertion, deletion, modification, searching data in the tables.

[T2][T3][No. of Hrs. 12]

Text Books:
[T1]   E. Balagurusamy, "Fundamentals of Computers", Tata McGraw Hill.
[T2]   Lisa A. Bucki, John Walkenbach, Faithe Wempen, "Microsoft Office 2013 Bible", Wiley Publication.
[T3]   G.N. Kodanda Ramaiah, "IT Workshop", 2nd edition, Scitech.

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[T4]   Rajaraman, V., "Fundamental of Computers". Prentice Hall India, New Delhi.

Reference Books:
[R1]   Pradeep K. Sinha, Priti Sinha, "Computer Fundamentals". BPB Publications.
[R2]   Henery Lucas, "Information Technology for Management", 7th Edition, Tata McGraw Hill.
[R3]   P K Sinha, "Computer Fundamentals", BPB Publication.
[R4]   Leon and Leon, "Fundamentals of Information Technology", 2nd Edition, Vikas Publishing House.

PROGRAMMING SKILLS USING C

		L	T/P	C
Paper Code: ETVSD-503		3	0	3
Paper: Programming Skills Using C				

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5marks.

Objective: The objective of the paper is to make the students familiar with the basics of programming aspects, using C as the primary language. This course focuses on the programming constructs which are used in other languages as well. This is the introductory course on programming. So it does not require any perquisite.

UNIT- I
Concept of algorithms, Flow Chart, Programming using C: C character set, Tokens, identifiers, Variables, Constants, data type in C, simple I/O Function calls from library, arithmetic, relational and logical operations, **Conditional Structure:** if, else, switch, break, continue and goto.

[T1],[T2] [No. of hrs. 11]

UNIT- II
Concept of loops: for, while and do-while and nested loops.
Arrays: One and Two dimensional .Initialization and some basic operation on 1-D and 2-D array, Strings as array of character. Concept of Pointer, array and pointer relationship, pointer to array, array of pointers, pointer to functions.

[T1], [T2] [No. of hrs. 11]

UNIT-III
Functions: Concept of functions, Parameter passing techniques - call by value and call by reference, library functions.
Structure: Initialization of structure and their application, union.

[T2], [T1][No. of hrs. 11]

UNIT- IV
Files: Concept of files, Binary files, Text files, File Handling in C Using File Pointers, fopen( ), fclose( ), Input and Output using file pointers, Character Input and Output with Files,
String: String manipulation Functions and their application.

[T2], [T1][No. of hrs. 12]

Text Books:
 [T1]   Yashwant Kanetkar, "Test your C Skills", BPB Publications
 [T2]   Programming in ANSI C, E. Balagurusamy; Mc Graw Hill, 6th Edition.

Reference Books:
[R1]   Kernighan & Ritchie, "C Programming Language", The (Ansi C version), PHI, 2nd Edition
[R2]   K.R Venugopal, "Mastering C", TMH
[R3]   R.S. Salaria "Application Programming in C", Khanna Publishers, 4th Edition

COMMUNICATION SKILLS
(Common to All Disciplines)

Paper Code: ETVHS-519	L	T/P	C
Paper: Communication Skills	2	1	3

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: *Students should have studied General English up to secondary level and the subject aims at developing communication skills in writing, speaking as well as body language.*
Learning Outcomes: *The students should be able to communicate effectively to his/her superiors as well as juniors at work place in his/her professional field.*

UNIT-I
Recognizing and Understanding Communication Styles: What is Communication?, Passive Communication, Aggressive Communication, Passive-Aggressive Communication, Assertive Communication, Verbal and Non Verbal Communication, Barriers and Gateways to Communication.

[T1, T2][No. of Hrs. 11]

UNIT-II
Listening Skills: Types of Listening (theory /definition), Tips for Effective Listening Academic Listening-(lecturing), Listening to Talks and Presentations, Basics of Telephone communication
Writing Skills: Standard Business letter, Report writing, Email drafting and Etiquettes, Preparing Agenda and writing minutes for meetings, Making notes on Business conversations, Effective use of SMS, Case writing and Documentation.

[T1, T2][No. of Hrs. 11]

UNIT-III
Soft Skills: Empathy (Understanding of someone else point of view), Intrapersonal skills, Interpersonal skills, Negotiation skills, Cultural Aspects of Communication.

[T1, T2][No. of Hrs. 11]

UNIT-IV
Group Communication: The Basics of Group Dynamics, Group Interaction and Communication, How to Be Effective in Groups, Handling Miscommunication, Handling Disagreements and Conflicts, Constructive Criticism.

[T1,T2][No. of Hrs. 12]

Text Books:
[T1]   Mckay, M., Davis, M. & Fanning, P.(2008). Messages: The Communication Skills Book, New Harbinger Publications
[T2]   Perkins, P.S., & Brown, L. (2008). The Art and Science of Communication: Tools for effective communication in the workplace, John Wiley and Sons

Reference Books:
[R1]   Krizan et al (2010). Effective Business Communication, Cengage Learning.
[R2]   Scot, O. (2009). Contemporary Business Communication, Biztantra, New Delhi.
[R3]   Chaney & Martin (2009). Intercultural Business Communication, Pearson Education
[R4]   Penrose et al (2009). Business Communication for Managers, Cengage Learning.

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APPLIED MATHEMATICS
(Open Elective-I)

		L	**T/P**	**C**
Paper Code: ETVAS-507		3	0	3
Paper: Applied Mathematics				

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

UNIT- I

Successive differentiation: Leibnitz theorem for n^{th} derivative (without proof). Infinite series: Convergence and divergence of infinite series, positive terms infinite series, necessary condition, comparison test (Limit test), D'Alembert ratio test, Integral Test, Cauchy's root test, Raabe's test and Logarithmic test(without proof). Alternating series, Leibnitz test, conditional and absolutely convergence. Taylor's and Maclaurin's expansion(without proof) of function (e^x, log(1+x), cos x , sin x) with remainder terms ,Taylor's and Maclaurin's series, Error and approximation.

[T1], [T2][No. of hrs. 11]

UNIT- II

Asymptotes to Cartesian curves. Radius of curvature and curve tracing for Cartesian, parametric and polar curves.   Integration: integration   using   reduction   formula   for $\int_0^{\frac{\pi}{2}} sin^n\theta \, d\theta$, $\int_0^{\frac{\pi}{2}} cos^n\theta d\theta$, $\int_0^{\frac{\pi}{2}} sin^n\theta cos^m\theta d\theta$. Application of integration : Area under the curve, length of the curve, volumes and surface area of solids of revolution about axis only .Gamma and Beta functions.

[T1], [T2][No. of hrs. 11]

UNIT- III

Matrices: Orthogonal matrix, Hermitian matrix, Skew-Hermitian matrix and Unitary matrix. Inverse of matrix by Gauss-Jordan Method (without proof). Rank of matrix by echelon and Normal (canonical) form. Linear dependence and linear independence of vectors. Consistency and inconsistency of linear system of homogeneous and non homogeneous equations . Eigen values and Eigen vectors. Properties of Eigen values (without proof). Cayley-Hamilton theorem (without proof). Diagonlization of matrix. Quadratic form, reduction of quadratic form to canonical form.

[T1], [T2][No. of hrs. 11]

UNIT-IV

Ordinary differential equations: First order linear differential equations, Leibnitz and Bernaulli's equation. Exact differential equations , Equations reducible to exact differential equations. Linear differential equation of higher order with constant coefficients, Homogeneous and non homogeneous differential equations reducible to linear differential equations with constant coefficients. Method of variation of parameters. Bessel's and Legendre's equations (without series solutions), Bessel's and Legendre's functions and their properties.

[T1], [T2][No. of hrs. 12]

Text:
[T1]   B. S. Grewal, "Higher Engineering Mathematics", Khanna Publications.
[T2]   R. K. Jain and S.R. K. Iyengar, "Advanced Engineering Mathematics", Narosa Publications.

References:
[R1]   E. Kresyzig, "Advance Engineering Mathematics", Wiley publications
[R2]   G. Hadley, "Linear Algebra", Narosa Publication
[R3]   N.M. Kapoor, "A Text Book of Differential Equations", Pitambar Publication.
[R4]   Wylie R, "Advance Engineering Mathematics", Tata McGraw-Hill
[R5]   Schaum's Outline on Linear Algebra, Tata McGraw-Hill
[R6]   Polking and Arnold, "Ordinary Differential Equation using MATLAB", Pearson.

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DATA ANALYSIS AND DISCRETE MATHEMATICS
(Open Elective-I)

		L	T/P	C
Paper Code: ETVCS-509		3	0	3
Paper: Data Analysis and Discrete Mathematics				

Objectives: To understand the basics concepts of Discrete Mathematical Structures. To get the Knowledge about sets, relations and functions, basics of lattices and graphs. To get familiar with propositional logic.

UNIT-I
Overview of Data analysis Techniques: Simple Linear Regression Analysis, Multiple Linear Regression Model, Multi-Collinearity, Variable selection and Model Building, Logistic Regression Models
[T3] [No. of Hrs: 11]

UNIT-II
Sets: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.
Relations and Functions: Properties of Relations, Equivalence Relation, Partial Order Relation Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions, Hashing functions, Recursive function.
[T1][T2] [No. of Hrs: 11]

UNIT-III
Partial Order Relations And Lattices: Partial Order Sets, Representation of POSETS using Hasse diagram, Chains, Maximal and Minimal Point, Glb, lub, Lattices & Algebric Systems, Principle of Duality, Basic Properties, Sublattices, Distributed & Complemented Lattices.
Propositional Logic: Proposition, First order logic, Basic logical operation, truth tables, tautologies, contradictions, Algebra of Proposition, logical implications, logical equivalence, predicates, Universal and existential quantifiers.
[T1][T2] [No. of Hrs: 11]

UNIT-IV
Graphs: Types and operations (bipartite graph. Subgraph, distance of a graph, cut-edges & cut vertices, isomorphic and homomorphic graphs), degree of graphs, adjacent and incidence matrices, path circuit (Floyd's and Warshall algorithms), hamiltonian graph, graph colouring.
[T1][T2] [No. of Hrs: 12]

Text Book(s):
[T1]   Rosen, K.H., Discrete Mathematics and its Applications, McGraw Hill, (2006) 6 th ed.
[T2]   Kolman, Busby and Ross, "Discrete Mathematical Structure", PHI, 1996.
[T3]   Regression Analysis by Example by Samprit Chatterjee, Wiley

Reference Book(s):
[R1]   S.K. Sarkar, "Discrete Maths"; S. Chand & Co., 2000.
[R2]   Tremblay, J.P. and Manohar, R., Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, (2007).

APTITUDE & LOGICAL REASONING
(Open Elective-I)

	L	T/P	C
Paper Code: ETVAS-511			
Paper: Aptitude & Logical Reasoning	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives and Pre-requisites: At the end of the course the students will be able to (a) Interpret different data, (b) Establish relationship between numbers & (c)Solve different logical. To impart students with logical skills to solve problems easily.

UNIT-I
Data sufficiency, Measurement, Time and distance, Arithmetic, Relationship between numbers.

[T1][T2][No. of Hrs. 11]

UNIT-II
Basic mathematical relations and formula, Computation, Data interpretation.

[T1][T2][No. of Hrs. 11]

UNIT-III
Differences, Discrimination, Decision-making, Judgement, Problem-solving, Analogies, Analysis.

[T1][T2][No. of Hrs. 11]

UNIT-IV
Arithmetic reasoning, Relationship concept, Arithmetic number series, Similarities, Verbal and figure classification, Space visualization, Observation.

[T1][T2][No. of Hrs. 12]

Text Books:
[T1]   Arun Sharma, "How to prepare for Logical Reasoning for the CAT".
[T2]   A.K. Gupta, "Logical and Analytical Reasoning".

APPLIED MECHANICS
(Open Elective-I)

Paper Code: ETVME-501	**L**	**T/P**	**C**
Paper: Applied Mechanics	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives and Pre-requisites: The subject Applied Mechanics deals with basic concepts of mechanics like laws of forces, moments, friction, centre of gravity, laws of motion and simple machines which are required to the students for further understanding of other applied subjects. To introduce the concepts of rigid body mechanics for bodies at rest and in motion to students. To make the students appreciate the applications of basic laws of physics to a variety of problems. Inculcating and enhancing analytical skills to solve numerical problems. Upon the completion of course student should be able to understand the importance of mechanics in engineering and various concepts.

Learning outcomes: Students will be able to state the relevant laws and apply them to numerical problems. Students will be able to draw free-body diagrams for a given problem and get the required solution. Students will be able to visualize the applications of basic laws in solving numerical problems. Students will be able to correlate the concepts learnt in the relevant courses of higher classes.

UNIT-I:
Introduction- Concept of mechanics and applied mechanics – Explanation of mechanics and applied Mechanics, its importance and necessity, giving suitable examples on bodies at rest and in motion, explanation of branches of this subject.
Laws of Forces- Force and its effects. Units and measurement of force. Characteristics of force vector representation. Bow's notation. Types of forces, action and reaction, tension & thrust. Force systems: Coplanar and space force systems. Coplanar, concurrent and non -concurrent forces. Free body diagrams. Resultant and components of forces, concept of equilibrium; parallelogram law of forces. Equilibrium of two forces, super-position and transmissibility of forces, Newton's third law, triangle law of forces, different cases of concurrent coplanar, two forces systems, extension of parallelogram law and triangle law to many forces acting at one point-polygon law of forces, method of resolution into orthogonal components for finding the resultant, graphical methods, special case of three concurrent, coplanar forces, Lami's theorem.
[T1, T2, T3][No. of Hrs: 11]

UNIT-II:
Moments- Concept of moment, Varignon's theorem – statement only. Principle of moments – application of moments to simple mechanism. Parallel forces, like and unlike parallel forces, calculation of their resultant, concept of couple, moving a force parallel to its line of action, general cases of coplanar force system, general conditions of equilibrium of bodies under coplanar parallel forces.
Friction- Concept of friction, laws of friction, limiting friction and coefficient of friction, sliding friction and rolling friction, inclined plane.
[T1, T2, T3][No. of Hrs: 11]

UNIT-III:
Centre of Gravity and Centroid- Concept of gravity, gravitational force, Centroid and centre of gravity. Centroid for regular lamina and center of gravity for regular solids. Position of centre of gravity of compound bodies and centroid of composite area. CG of bodies and areas with portions removed.
Moment of Inertia of Plane Areas- Concept of Moment of Inertia and second moment of area and Radius of gyration, theorems of parallel and perpendicular axes, second moment of area of common geometrical sections: rectangle, triangle, circle (without derivations). Second moment of area for L, T and I sections. Section modulus without derivation.
[T1, T2, T3][No. of Hrs: 11]

UNIT-IV
Laws of Motion- Concept of momentum, Newton's laws of motion, their application, derivation of force equation from second law of motion, numerical problems on second law of motion, piles, lifts, bodies tied with

Scheme and Syllabi for B. Voc. (Software Development), w. e. f. batch 2016-17, approved in the BOS of USET/USICT held on 19th July, 2016 & AC Sub-Committee Meeting of USET/USICT held on 27th July, 2016.

string, Newton's third law of motion numerical problems, conservation of momentum, impulse and impulsive force (definition only).

Simple Lifting Machines- Concept of machine, mechanical advantage, velocity ratio and efficiency of a machine, their relationship, law of machine, simple machines (lever, wheel and axle, pulleys, jacks winch crabs only).

[T1, T2, T3][No. of Hours: 12]

Text Book(s):
[T1]   A.K.Tayal, "Engineering Mechanics: Statics and Dynamics", Umesh publications
[T2]   R.K. Rajput, "Applied Mechanics", Lakshmi Publications
[T3]   A. K. Upadhyay, "Applied Mechanics, Kataria Publications

References Book(s):
[R1]   Beer and Johnston, "Mechanics for Engineers (Statics and Dynamics)", McGraw Hill Co. Ltd.
[R2]   R. S. Khurmi, "Applied Mechanics", S. Chand publications
[R3]   Hibbeler R C, "Engineering Mechanics: Statics, Low Price Edition", Pearson Education
[R4]   Hibbeler R C, "Engineering Mechanics: Dynamics, Low Price Edition", Pearson Education
[R5]   Timoshenko, S.P., and Young, D.H., "Engineering Mechanics", McGraw Hill international
[R6]   V.S. Mokashi, "Engineering Mechanics Vol. I and II", Tata McGraw Hill Publishing Co. ltd., New

HUMAN VALUES AND PROFESSIONAL ETHICS
(General Elective-I)

		L	T/P	C
Paper Code: ETVHS-513		2	0	2
Paper : Human Values and Professional Ethics				

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: This introductory course input is intended

    a. *To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.*

    b. *To facilitate the development of a holistic perspective among students towards life, profession and happiness, based on the correct understanding of the Human reality and the rest of the Existence. Such a Holistic perspective forms the basis of value-based living in a natural way.*

    c. *To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.*

UNIT-1: Introduction to Value Education
1. Understanding the need, basic guidelines, content and process for value education.
2. Basic Human Aspirations: Prosperity and happiness
3. Methods to fulfil the human aspirations – understanding and living in harmony at various levels.
4. Practice Session – 1.

[T1], [R1], [R4][No. of Hrs. 07]

UNIT-2: Harmony in the Human Being
1. Co-existence of the sentient "I" and the material body–understanding their needs–Happiness & Conveniences.
2. Understanding the Harmony of "I" with the body–Correct appraisal of physical needs and the meaning of prosperity.
3. Programme to ensure harmony of "I" and Body-Mental and Physical health and happiness.
4. Harmony in family and society: Understanding Human-human relationship in terms of mutual trust and respect.
5. Understanding society and nation as extensions of family and society respectively.
6. Practice Session – 02

[T2], [R1],[R2][No. of Hrs. 08]

UNIT-3: Basics of Professional Ethics
1. **Ethical Human Conduct** – based on acceptance of basic human values.
2. **Humanistic Constitution and universal human order** – skills, sincerity and fidelity.
3. **To identify the scope and characteristics of people** – friendly and eco-friendly production system, Technologies and management systems.
4. Practice Session – 03.

[T1],[R4]][No. of Hrs. 07]

UNIT-4: Professional Ethics in practice
1. **Profession and Professionalism** – Professional Accountability, Roles of a professional, Ethics and image of profession.
2. **Engineering Profession and Ethics -** Technology and society, Ethical obligations of Engineering professionals, Roles of Engineers in industry, society, nation and the world.
3. **Professional Responsibilities –** Collegiality, Loyalty, Confidentiality, Conflict of Interest, Whistle Blowing
4. Practice Session – 04

[T1], [T2], [T3], [R3][No. of Hrs. 08]

Text Books:
[T1]   Professional Ethics, R. Subramanian, Oxford University Press.
[T2]   Professional Ethics & Human Values: Subhash Bhalchandra Gogate, Vikas publication
[T3]   Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

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[T4]   Professional Ethics & Human Values: S.B. Srivasthva, SciTech Publications (India) Pvt. Ltd. New Delhi.

References:
[R1]   Success Secrets for Engineering Students: Prof. K.V. SubbaRaju, Ph.D., Published by SMART student.
[R2]   Ethics in Engineering Mike W. Martin, Department of Philosophy, Chapman University and Roland Schinzinger, School of Engineering, University of California, Irvine.
[R3]   Human Values: A. N. Tripathy (2003, New Age International Publishers)
[R4]   Value Education website, http.//www.universalhumanvalues.info[16]
[R5]   Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press.
[R6]   Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books
        (2010, New Delhi). Also, the Teachers" Manual by the same author.

*PRACTICAL SESSIONS OF 14 HOME ASSIGNMENTS will be followed by the students pursuing this paper. (Ref: Professional Ethics & Human Values: S.B. Srivastava, SciTech Publications (India) Pvt. Ltd. New Delhi.)

CONTENT OF PRACTICE SESSION

Module 1: Course Introduction – Needs, Basic Guidelines, Content and Process of Value Education

PS-1: Imagine yourself in detail. What are the goals of your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcoming in your life? Observe and analyze them.

Expected Outcome:
The students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

PS-2: Now a days there is lot of voice about techno-genie maladies such as energy and natural resource depletion, environmental Pollution, Global Warming, Ozone depletion, Deforestation, etc. – all these scenes are man-made problems threatening the survival of life on the earth – what is root cause of these maladies and what is the way out in your opinion?
On the other hand there is rapidly growing danger because of nuclear proliferation, arm race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression and suicidal attempts, etc - what do you think the root cause of these threats to human happiness and peace – what could be the way out in your opinion?

Expected Outcome:
The students start finding out that technical education with study of human values can generate more solutions than problems They also start feeling that lack of understanding of human values is the root cause of all the problems and the sustained solution could emerge only through understanding of human values and value based living. Any solutions brought out through fear, temptation or dogma will not be sustainable.

PS-3:1.Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of following:
a)What is naturally acceptable to you in relationship – feeling of respect or disrespect?
b)What is naturally acceptable to you - to nurture or to exploit others? Is your living the same as your natural acceptance or different?
2.Out of three basic requirements for fulfillment of your aspirations, right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time and efforts you devote for each in your daily routine.

Expected Outcome:
1.   The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify the right or wrong, and referring to any external source life text or instrument or any other person cannot enable them to verify with authenticity, it will only develop assumptions.
2.   The students are able to see that their practice in living is not in harmony with their natural acceptance at most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.

3. The students are able to see that lack of right understanding leading to lack of relationship is the major cause of the problems in their family and the lack of physical facilities in most of the cases; while they have given higher priority to earning of physical facilities in their life ignoring relationship and not being aware that right understanding is the most important requirement for any human being.

Module 2: Understanding harmony in human being – Harmony in myself!

PS-4: Prepare the list of your desires. Observe whether the desires. Observe whether the desires are related with self "I" or body. If it appears to be related with the both, see which part of it is related to self "I" and which part is related to body.

Expected Outcome:
The students are able to see that they can enlist their desires and the desires are not vague, also they are able to relate their desires to "I" and "body" distinctly. If, any desire appears to be related with both, they are able to see that feeling is related to "I" while the physical facility is related to the body. They are also able to see that "I" and "body" are two realities, and most of their desires are related to "I" and not with the "Body"; while their efforts are mostly connected on the fulfillment of the need of the body assuming that it will meet the needs of "I" too.

PS-5:
1. {A}. Observe that any physical facilities you use, follows the given sequence with time; Necessary and tasteful – unnecessary & tasteful – unnecessary & tasteless.
   {B}. In contrast, observe that any feelings in you are either naturally acceptable or not acceptable at all. If, naturally acceptable, you want it continuously and if not acceptable, you do not want it at any moment.
2. List Down all your activities. Observe whether the activity is of "I" or of "body" or with the participation both "I" and "body".
3. Observe the activities with "I". Identify the object of your attention for different moments (over a period say 5 to 10 minute) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

Expected Outcome:
1. The students are able to see that all physical facilities they use are required for limited time in a limited quantity. Also they are able to see that cause of feeling, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable eve for a single moment.
2. The students are able to see that activities like understanding, desires, thoughts and selection are the activities of "I" only; the activities like breathing, palpitation of different parts of the body are fully the activities of the body. With the acceptance of "I", while activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs, etc. are such activities that require the participation of both "I" and "body"
3. The students become aware of their activities of "I" and start finding their focus of attention at different moments. Also they are able see that most of their desires are coming from outsides (through preconditioning or sensation) and are not based on their natural acceptance.

PS-6: 1.Chalk out the program to ensure that you are responsible to your body – for the nurturing, protection and right utilization of the body.
2.Find out the plants and shrubs growing in and your campus. Find out their use for curing different diseases.

Expected Outcome:
The students are able to list down activities related to a proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing the different diseases.

Module 3: Understanding harmony in the family and society - Harmony in Human – Human relationship

PS-7: Form small groups in the class and in that group initiate the dialogue and ask the eight questions related to trust. The eight questions are-

S.No.	Intention (Natural Acceptance)	S.No.	Competence
1.a.	Do I want to make myself happy?	1.b.	Am I liable to make myself always Happy?
2.a.	Do I want to make the other happy?	2.b.	Am I liable to make the other always happy?
3.a.	Does the other want to make him happy?	3.b.	Is the other able to make him always happy?
4.a.	Does the other want to make me happy? What is answer?	4.b.	Is the other able to make me always happy? What is answer?

Let each student answer the question for himself and everyone else. Discuss the difference between intention and competence.

Expected Outcome:
The students are able to see that the first four questions are related to our natural acceptance i.e. intention and the next four to our competence. They are able to note that the intention is always correct, only competence is lacking. We generally evaluate ourselves on the basis of our intention and other on the basis of their competence. We seldom look at our competence and other's intention as a result we conclude that I am a good person and other is a bad person.

PS-8:
1. Observe that on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasion you are disrespecting by way of under evaluation, over evaluation or otherwise evaluation.
2. Also observe whether your feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs.

Expected Outcome:
The students are able to see that respect is right evaluation and only right evaluation leads to fulfilment of relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect) like gender biasness, generation gap, caste conflicts, class struggle, and domination through poor play, communal violence, and clash of isms and so on so forth.
All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs.

PS-9:
1. Write a note in the form of a story, poem, skit, essay, narration, dialogue, to educate a child.
   Evaluate it in a group.
2. Develop three chapters to introduce "social science", its needs, scope and content in the primary education of children.

Expected Outcome:
The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

Module 4: Understanding harmony in the nature and existence – Whole existence as Co – existence -

PS-10: Prepare the list of units (things) around you. Classify them into four orders. Observe and explain the mutual fulfilment of each unit with other orders.

Expected Outcome:
The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to their orders today and need to take appropriate steps to ensure right participation (in term of nurturing, protection and right utilization) in the nature.

PS-11:
1. Make a chart for the whole existence. List down different courses of studies and relate them to different or levels in the existence.
2. Choose any one subject being taught today. Evaluate and suggest suitable modifications to make it appropriate and holistic.

Expected Outcome:
The students are confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are liable to make out how these courses can be made appropriate and holistic.

Module 5: Implication of the above Holistic Understanding of Harmony at all Levels of Existence.

PS-12: Choose any two current problem of different kind in the society and suggest how they can be solved on the basis of the natural acceptance of human values. Suggest the steps you will take in present conditions.

Expected Outcome:
The students are liable to present sustainable solutions to the problem in society and nature. They are also able to see that these solutions are practicable and draw road maps to achieve them.

PS-13:
1. Suggest ways in which you can use your knowledge of engineering / technology / management for universal human order from your family to world family.
2. Suggest one format of humanistic constitution at the level of nation from your side.

Expected Outcome:
The students are able to grasp the right utilization of their knowledge in their streams of technology / engineering / management to ensure mutually enriching and recyclable production systems.

PS-14: The course is going to be over now. Evaluate your state before and after the course in terms of-
- Thoughts
- Behaviour
- Work and
- Realization

Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it.

Expected Outcome:
The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for happy and prosperous society.

LIFE SKILLS)
(General Elective-I)

		L	T/P	C
Paper Code: ETVHS-515		2	0	2
Paper: Life Skills				

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: *Students should have studied subjects such as General languages, social studies and Moral education at school level. The objective of this subject is to prepare the students to become a good citizen and a professional useful to the society.*

Learning Outcomes: *The knowledge of this subject will give the student a value system which will help him in taking decisions in professional and social life for the benefit of society at large.*

UNIT-I
Introduction: Definition and importance of Life Skills, Livelihood Skills, Survival Skills, Life Skills Approach, Life Skills based education, Life Skills Training- Implementation Models
[T1,T2][No. of Hrs. 07]

UNIT-II
Learning and Performance, Cognitive Development, Maturation, Adult Learning, Approaches to Learning Pillars of Education and Life Skills- Four Pillars: Learning to Know, Learning to Do, Learning to Live Together, Learning to be learning throughout Life
[T1,T2][No. of Hrs. 08]

UNIT-III
Social Skills and Negotiation Skills: Self Awareness, Empathy, Effective Communication, Interpersonal Relationships
Thinking Skills: Nature, Element of Thought, Types, Concept Formation, Reasoning, Creative and Critical Thinking
[T1,T2][No. of Hrs. 08]

UNIT-IV
Coping Skills: Coping with Emotions, Coping with Stress, Integrated use of thinking skills, social skills and coping skills
[T1,T2][No. of Hrs. 07]

Text Books:
[T1]   Rajasenan, N.V. (2010). Life Skills, Personality and Leadership, Rajiv Gandhi National Institute of Youth Development, TamilNadu
[T2]   Duffy, Grover,K., Eastwood, A. (2008). Psychology for Living-Adjustment, Growth and Behaviour Today, Pearson Education

Reference Books:
[R1]   Debra McGregor, (2007), "Developing Thinking; Developing Learning - A Guide to Skills in Education", Open University Press, New York, USA
[R2]   Singh Madhu, (2003). "Understanding Life Skills, Background paper prepared for Education for All: The Leap to Equality"
[R3]   Nair. A. Radhakrishnan, (2010). "Life Skills Training for Positive Behaviour", Rajiv Gandhi National Institute of Youth Development, Tamil Nadu.
[R4]   Dahama O.P., Bhatnagar O.P, (2005). "Education and Communication for Development, (2nd Ed.)", Oxford& IBH Publishing Co. Pvt. Ltd. New Delhi

PERSONALITY DEVELOPMENT & BEHAVIOURAL SCIENCE
(General Elective-I)

		L	T/P	C
Paper Code: ETVHS-517		2	0	2
Paper: Personality Development & Behavioural Science				

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: Students should have studied subjects such as General languages, social studies and Moral education at school level. The objective of this subject is to prepare the students to become a good citizen and a professional useful to the society.

Learning Outcomes: The knowledge of this subject will give the student a value system which will help him in taking decisions in professional and social life for the benefit of society at large.

UNIT-I
Definition and Basics of Personality, Understanding Traits and Types of Personality, Analyzing strength and weakness (SW), Body Language

[T1, T2][No. of Hrs. 07]

UNIT-II
Business Etiquettes and Public Speaking: Business Manners. Body Language Gestures, Email and Net Etiquettes, Etiquette of the Written Word, Etiquettes on the Telephone, Handling Business Meetings; Introducing Characteristic, Model Speeches, Role Play on Selected Topics with Case Analysis and Real Life Experiences.

[T1, T2][No. of Hrs. 08]

UNIT-III
How to Make a Presentation, the Various Presentation Tools, along with Guidelines of Effective Presentation, Boredom Factors in Presentation and How to Overcome them, Interactive Presentation & Presentation as Part of a Job Interview, Art of Effective Listening.
Resume Writing Skills, Guidelines for a Good Resume, How to Face an Interview Board, Proper Body Posture, Importance of Gestures and Steps to Succeed in Interviews. Practice Mock Interview in Classrooms with Presentations on Self; Self Introduction – Highlighting Positive and Negative Traits and Dealing with People with Face to Face.

[T1, T2][No. of Hrs. 08]

UNIT-IV
Coping Management, Working on Attitudes: Aggressive, Assertive and Submissive Coping with Emotions, Coping with Stress

[T1, T2][No. of Hrs. 07]

Text Books:
[T1]   McGraw, S. J., (2008), "Basic Managerial Skills for All, Eighth Edition", Prentice Hall of India.
[T2]   The Results-Driven Manager (2005). Business Etiquette for the New Workplace: The Results-Driven Manager Series (Harvard Results Driven Manager)

Reference Books:
[R1]   Pease, A. & Pease, B. (2006)., "The Definitive Book of Body Language", Bantam Books.
[R2]   Scannell, E. & Rickenbacher,C. (2010)., "The Big Book of People Skills Games: Quick, Effective Activities for Making Great Impressions, Boosting Problem-Solving Skills and Improving Customer Service", Mcgraw Hill Education

APPLIED MATHEMATICS LAB
(Open Elective-I)

		L	T/P	C
Paper Code: ETVAS-557		0	3	3
Paper: Applied Mathematics Lab				

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Curve fitting using Method of Least squares.

2. Solution of algebraic and transcendental equation using Gauss- Seidal's iteration method.

3. Solution of algebraic and transcendental equation using Finite difference method.

4. Numerical integration using Trapezoidal Rule & Simpson's one third rule.

5. Solution of ordinary differential equations using Runge-Kutta method.

6. Calculation of probability using probability distributions.

7. Calculation of correlation coefficient.

8. Calculation of Numerical measures such as mean, variance, Skewness & Kurtosis.

9. Estimation of mean & variance using sampling & Hypothesis.

10. Calculation of Rank Correlation.

11. Analysis os samples using ANOVA.

DATA ANALYSIS AND DISCRETE MATHEMATICS LAB
(Open Elective-I)

	L	T/P	C
Paper Code: ETVCS-553			
Paper: Data Analysis and Discrete Mathematics Lab	0	3	3

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

[Following lab experiments will be conducted using SPSS/ Weka/ Rapidminer]

1. Illustration of Simple Linear Regression Analysis
2. Illustration of Multiple Linear Regression Model
3. Illustration of Multicollinearity
4. Illustration of Variable Selection and Model Building
5. Illustration of Logistic Regression Models
6. Discussion on the applicability of different graph-theoretic algorithm using three-four case studies (Theoretical)
7. Discussion on proof techniques using three-four illustrative examples

APTITUDE & LOGICAL REASONING LAB
(Open Elective-I)

	L	T/P	C
Paper Code: ETVAS-555	0	3	3
Paper: Aptitude & Logical Reasoning Lab			

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

Subject teacher has to proforma at least eight experiments based on the topic mentioned in the theory paper by using software packages.

APPLIED MECHANICS LAB
(Open Elective-I)

		L	T/P	C
Paper Code: ETVME-551		0	3	3
Paper: Applied Mechanics Lab				

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Verification of the laws of polygon of forces.
2. To verify the forces in the different members of a jib crane.
3. To verify the reaction at the supports of a simply supported beam.
4. To find out centre of gravity of regular and irregular laminas.
5. To verify the principle of moments using the bell crank lever apparatus
6. To determine the coefficient of static friction between two surfaces
7. To find moment of inertia of a flywheel
8. To find the mechanical advantage, velocity ratio and efficiency in the case of inclined planes.
9. To find the mechanical advantage, velocity ratio and efficiency in the case of Screw Jack
10. To find the mechanical advantage, velocity ratio and efficiency in the case of worm and worm wheel
11. To find the mechanical advantage, velocity ratio and efficiency in the case of single winch Crab.
12. Graphical solutions for the following problems a. Resultant of Coplanar Non Concurrent force system:
    i. One problem with resultant as a force
    ii. One problem with resultant as a couple b. Equilibrium of Coplanar Non Concurrent force system: one Problem c. Friction: One Problem

INSTRUCTIONAL STRATEGY

This is a gateway subject to remaining course. While imparting theoretical instructions, teachers are expected to demonstrate the various apparatus and related concepts to the students by correlating theory and practical. It is further recommended that more emphasis should be laid in conducting practical work by individual students.

INFORMATION PROCESSING SKILLS LAB

	L	**T/P**	**C**
Paper Code: ETVSD-551			
Paper: Information Processing Skills Lab	0	4	4

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Identify and list functions of various components of given computer.
2. Practical Based on Internet usage by using different search Engines. Explore the various settings of search Engine.
3. Practicing various features of MS word like formatting the document, finding and replacing words in document.
4. Design the resume for technical interview in the institute using table, font formatting, paragraph formatting in MS Word.
5. Write an invitation letter & send it to the friends using Mail Merge feature in MS Word.
6. Working features of MS excel like opening worksheet, using formulas, sorting and searching.
7. Create mark sheet of the school level examination depicting marks, total marks, percentage, distinction in subject, automated allotment of grades according to marks obtained in subjects.
8. Create a salary statement of employees of an organisation by using various functions and also calculate the deductions of PF/Tax.
9. Compare the sales and profit of an organisation for last 10 years and plot its graph.
10. Creating a presentation on any one of the topics learnt during 1st semester of B.VOC course using advanced features.
11. Practising advanced features of MS Powerpoint like animation, sound etc.
12. Working through features of MS Access like creating database file, Specifying rows and columns, inserting and deleting data, querying database.
13. Creating a student database depicting roll no, semester, name and marks in one subject. Querying database to find out names of all those getting more than 60 marks

PROGRAMMING SKILLS USING C LAB

Paper Code: ETVSD-553   **L**   **T/P**   **C**
Paper: Programming Skills Using C Lab   **0**   **4**   **4**

Note:-   *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Programs to illustrate the data types and simple arithmetic operators (i.e. area of a circle, conversion of Temperature units)

2. Programs to illustrate the conditional structure (i.e. largest of three numbers, simple calculator by switch – case)

3. Programs to illustrate the loop structure (find sum of a geometric series, find sum of first n natural numbers etc.)

4. Programs to illustrate 1- D array (i.e. find average of marks of a class in one subject)

5. Programs on function (i.e. to find the factorial of a number, to find the HCF of two nos).

6. Programs on function (to highlight the difference between call by value and call by reference)

7. Programs on library functions by using header files (i.e.

8.   string and char functions).

9. Programs to illustrate 2-D array (i.e. program for matrices addition, Subtraction, multiplication)

10. Programs on structure (i.e.An array of record contains information of employees of a company. Display all the data of those employees having salary > 20000.)

11. Programs on union (to illustrate the difference and similarity between structure and union).

12. Programs on binary file (i.e. Store records of a student in a Binary File "Student.dat" read the file and display the content of the file.)

13. Programs on text file (i.e., to count the no of Lowercase, Uppercase and special characters presents in a text file).

HTML LAB

		L	**T/P**	**C**
Paper Code: ETVSD-555				
Paper: HTML Lab		**0**	**2**	**2**

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Create your first web Page using HTML, Head and BODY tag.
2. Create a web page using different types of headings and paragraph tag.
3. Perform the following HTML tag:-
    a. < br>
    b. <hr>
    c. <center>
    d. <title>
    e. <head>
4. Create a web page illustrating text formatting tags.
5. Create a web page to demonstrate font, size and alignment variations.
6. Create a link using href tag.
7. Insert an image in your web page using <img> tag.
8. Create a web page illustrating Ordered List.
9. Create a web page illustrating Unordered List.
10. Create a web page having table to display student's information.
11. Create your Curriculum Vitae using Nested tables.
12. Using Table related tags align the images in your web page.
13. Write a HTML code to generate student registration form.

<u>**VOCATION WORKSHOP-I**</u>
(Computer Configuration and Maintenance)

Paper Code: ETVSD-557   **L**   **T/P**   **C**
Paper: Vocation Workshop-I   **0**   **3**   **3**

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

<u>List of Experiments:</u>

1. Study & Trouble Shooting of
   (I)   Devices on motherboard
   (II)   Key board & Mouse (Wired and Wireless)

2. Study & Trouble Shooting of
   (I)   CD, DVD.
   (II)   Pen Drive and Hard Disk.

3. Study & Trouble Shooting of:
   (I)   SMPS
   (II)   Monitor (CRT & TFT)

4. Troubleshooting & repair of following equipments:
   (I)   Dot Matrix, Laser, Inkjet Printer.
   (II)   Scanner

5. Troubleshooting & repair of following equipments:
   (I)   Web Cam
   (II)   DSL Modem
6. Assembling & disassembling of computer system.
7. Configuring the BIOS to set boot preference, security mode etc.
8. Formatting the system and Partitioning of Drive.
9. Installation of Operating systems: Windows 7 / Linux (Red Hat).

10. Installation of System Software (Device Drivers), Application software.

11. Installation of antivirus, its updation, setting for automatic scanning and removing virus.

12. Working on computer tools like system recovery module, setting Restore points and System recovery or restoration to a previous Restore point.

13. Working out disk fragmentation, disk cleaning, working with registry files.
14. Starting and stopping system services, activating and deactivating device driver services.
15. Configuration of Internet Properties (Internet Options) and Assigning IP address.
16. Transfer of Data from Handheld Devices (Like Mobile Phone) to Hard Drive and vice versa.

C++ PROGRAMMING SKILLS

	L	T/P	C
Paper Code: ETVSD-502	3	0	3
Paper: C++ Programming Skills			

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: The Student should have basic knowledge of computer operation and logic to develop concept of C++. To understand the basics of Object Oriented Programming and their applications by using C++.

Learning Outcomes: The student will gain knowledge of objects, Class, Data Abstraction, Encapsulation, inheritance, Polymorphism and Dynamic Binding. Will able to develop and construct programs using Bottom up design approach.

UNIT-I

Introduction: Structured Programming, Object Oriented Programming, Programming Methodology, Basic Concepts of OOPs. C++ Overview, C++ Character Set, C++ Tokens, Constants & Variables, Data Types, Structure of C++ Program. Operators & Expressions, Type Conversion, Control Structure: if, switch-case, while, do- while, for. Operators & References in C++: Scope resolution operator, Reference variable, New & Delete, Pointer member operators.

[T1, T2][No. of Hrs: 11]

UNIT-II

Introduction of Function: Declaration / Prototyping, Main function, Call by Value, Call by Reference, Call by Address, Inline Function, friend function.

Classes and Objects: Abstract data types, Classes, Objects, C++ class declaration, instantiation of objects, Array of Objects, Static Member function.

Constructors and Destructors: Parameterized constructors, Copy Constructor, Multiple Constructor, Destructor.

[T1, T2][No. of Hrs. 11]

UNIT-III

Inheritance: Inheritance, Types of Inheritance- Single, Multiple, Multilevel, Hierarchical, Hybrid, derivation – public, private & protected, Virtual Base Class, Constructor and Destructor in Inheritance.

Polymorphism: – Polymorphism, Types of Polymorphism- Compile time and runtime, Operator overloading, function overloading, parametric polymorphism

Pointer: Introduction, Pointer to Object, This Pointer, Pointer to derived Classes, Overriding inheritance methods-Virtual Function, Pure Virtual Function.

[T1, T2][No. of Hrs: 11]

UNIT-IV

Input-Output & Manipulator: Stream Classes, Unformatted Input/ Output, Formatted Input/ Output, Manipulators.

File Handling: Classes for File Streams, Opening & Closing of File, File Opening Modes, Checking End Of File, Working with Binary Mode.

Exception Handling: Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism.

[T1,T2,T3][No of Hrs: 12]

Text Books:
[T1]   R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
[T2]   E. Balaguruswamy, "Objected Oriented Programming with C++", TMH.
[T3]   A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.
[T4]   Hari Mohan Pandey, " Trouble Free C++", Ane Books Pvt. Ltd.

Reference Books:
[R1]   Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004.
[R2]   Schildt Herbert, "C++ Programming", 2nd Edition, Wiley DreamTech.
[R3]   D. Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
[R4]   Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
[R5]   Jibitesh Mishra, Muktikanta Sa, K. Madhu Sudhan "Object Oriented Programming using C++"- 2nd Edn,Scitech Publication.

Scheme and Syllabi for B. Voc. (Software Development), w. e. f. batch 2016-17, approved in the BOS of USET/USICT held on 19th July, 2016 & AC Sub-Committee Meeting of USET/USICT held on 27th July, 2016.

DESKTOP PUBLISHING

Paper Code: ETVSD-504   **L   T/P   C**
Paper: Desktop Publishing   **3   0   3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites: *Basic knowledge of computer operation is expected***.** *To prepare students having skills in the field of content designing or Desk top publishing where there is a great scope for them work in printing Press, News Paper houses, Publishing companies and Advertising Industries. Application software like Adobe Page maker and Corel draw are used for designing work Adobe Photoshop is a very popular image editing software and efficient working of these is absolutely essential to work in printing industry.*
Learning Outcomes: *Individuals who complete this program can start their own designing firm catering to project works like brochure designing, visiting cards, banners, flyers, magazines and newsletters etc.*

UNIT–I
D.T.P for Publications: Introductions to Printing, Types of Printing, Offset Printing, Transparent Printout, Use of Desk Top Publishing in Publications, Importance of D.T.P in Publication, Advantage of D.T.P in Publication, Laser printers – Uses, Types and Advantage in publication.
                                                                                                        [T1][No. of Hrs. 11]

UNIT–II
Introductions to Page Maker: Different page format / Layouts, News paper page format, Page orientations, Columns & Gutters, Printing in reduced sizes. PageMaker Icon and help, Tool Box, Styles, Menus etc., Different screen Views, Importing text/Pictures, Auto Flow, Columns.

Master Pages and Story Editor, Menu Commands and short-cut commands, Spell check, Find & Replace, Import Export etc., Fonts, Points Sizes, Spacing etc., Installing Printers, Scaling (Percentages).Use of D.T.P. in Advertisements, Books & Magazines, News Paper.
                                                                                                        [T2][No. of Hrs. 11]

UNIT – III Introduction to CorelDraw
Introduction to CorelDraw Use and importance in Designing, Introduction to Screen and Work Area .Introduction to Tools of CorelDraw, Managing Palettes ,Working with Images, Patterns and Textures ,Working with Shapes, Colours and Fills, Image Editing.
Page Setup and Designing, Using Styles and Templates, Working with Text, Formatting Text, Text Attributes. Designing Different Page Layouts, Column Layout, Working with Layers. Special Effect to Objects and Texts, Contour Tool, Layout for News Paper and Magazines.
Preparation of Visiting Cards & Invitation Cards, Logo Design and Brochure design.

                                                                                                        [T3][No. of Hrs. 11]

UNIT- IV Introduction of PhotoShop
Introduction to Adobe Photoshop & Documents, Various Graphic Files and Extensions, Various Colour Modes and Models. Introduction to Screen and Work Area, Photoshop Tools & Palettes , Using Brushes , Rubber Stamp Options , Using the Editing Tool ,The Smudge Tool, Selection Tools ,Use of Layers , Applying Filters ,Working with Images
                                                                                                        [T4][No. of Hrs. 12]

Text Books:
[T1] Desktop Publishing and Design: A Beginner's Guide Paperback – 2003by Roger C Parker (Author)
[T2] Adobe PageMaker 7.0 Ellenn Behoriam, Erika Kendra Prentice Hall, 01-Mar-2002
[T3] Special Edition Using CorelDRAW 9 Steve Bain, D. Scott Campbell Que, 1999
[T4] Adobe Photoshop 7.0 Adobe Press

References Books:
[R1]   Straight To The Point - PageMaker 7.0 Laxmi Publications, Ltd., 01-Jan-2009
[R2]   Adobe PageMaker 7.0 Classroom in a Book by Adobe Creative Team.
[R3]   Adobe Photoshop Elements 7.0 – Illustrated By Barbara Waxer, Lisa Tannenbaum
[R4].   Adobe Photoshop Elements 7 Classroom in a Book By Adobe Creative Team
[R5].   CorelDraw 10 for Windows By Phyllis Davis, Steve Schwartz, Steven A. Schwartz
[R6].   Bring it Home with CorelDRAW: A Guide to In-house Graphic Design Roger Wambolt Course
           Technology, 2012

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ENVIRONMENTAL SCIENCE
(Common to all disciplines)

		L	T/P	C
Paper Code: ETVEN-502		3	0	3
Paper: Environmental Science		3	0	3

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives and Pre-requisites:
The objective of this course is to make students environment conscious. They will be exposed through the fundamental concepts of environment and ecosystem so that they can appreciate the importance of individual and collective efforts to preserve and protect our environment. This course must raise various questions in student's mind that how our environment is inter dependent on various factors and how human being must care for their natural surroundings.

UNIT I: Environmental Studies: Ecosystems, Bio-diversity and its Conservation
(i)The Multidisciplinary Nature of Environmental Studies
Definition, scope and importance of Environmental Studies, Biotic and a biotic component of environment, need for environmental awareness.
(ii) Ecosystems
Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids. Introduction, types, characteristic features, struct ures and function of the following ecosystem:
(a) Forest ecosystem
(b) Grassland ecosystem
(c) Desert ecosystem
(d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).
(iii) Bio-diversity and its Conservation
Introduction to biodiversity - definition: genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity : Habitat loss, Poaching of wildlife, man-wildlife conflicts, rare endangered and threatened species(RET) endemic species of India, method of biodiversity conservation: *In-situ* and *ex-situ* conservation.

[T1], [R3] [No. of hrs. 11]

UNIT II: Natural Resources: problems and prospects
Renewable and Non-renewable Natural Resources; Concept and definition of Natural Resources and need for their management
• *Forest resources:* Use and over-exploitation, deforestation, case studies, timber extraction, mining, dams and their effects on forests and tribal people.
• *Water resources:* Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems, Water conservation, rain water harvesting, watershed management.
• *Mineral resources:* Uses are exploitation, environmental effects of extracting and using mineral resources, case studies.
• *Food resources:* World food problems, changes causes by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
• *Energy resources:* Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Urban problems related to energy, case studies.
• *Land resources:* Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

[T1], [R3] [No. of hrs. 11]

UNIT III: Environmental Chemistry and Pollution Control
(i) *Chemistry of Environment*
(a)Green Technology: Principles of Green technology, Zero Waste Technology, Green Chemistry & Its basic principles, Atom Economy, Green Methodologies, clean development mechanisms (CDM), concept of environmental impact assessment,
(b)Eco-Friendly polymers: Environmental degradation of polymers, Biodegradable, Photo-biodegradable polymers, Hydrolysis & Hydrobiodegradable, Biopolymers & Bioplastics: polylactic acid, polyhydroxybutyrate, polycaprolactone,. Concept of bioremediation.
(ii) *Environmental Pollution*
Definition, types, causes, effects and control measures of (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise pollution, (f) Thermal pollution, (g) Nuclear hazards. Pollution case studies. Solid waste and its management: causes, effects and control measures of urban and industrial waste.
***Chemical toxicology*-**Terms related to toxicity, impact of chemicals (Hg, As, Cd, Cr, Pb) on environment.

[T1], [R3] [No. of hrs. 11]

UNIT IV: Disaster Management, Social Issues, Human Population and the Environment
(i) *Disaster Management*
Disaster management: floods, earthquake, cyclone and land-slides, nuclear accidents and holocaust, *case studies.*
(ii) *Social Issues, Human Population and the Environment*
Sustainable development, Climate change, global warming, acid rain, ozone layer depletion, Environmental ethics: Issues and possible solutions, Consumerism and waste products, Wasteland reclamation. Population growth, problems of urbanisation, Environment Protection Act, 1986; Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and Control of Pollution) Act, 1974; Wildlife Protection Act, 1972; Forest Conservation Act, 1980; Environmental management, system standards-ISO 14000 series.

[T1] [No. of hrs. 12]

Text Books:
[T1]   E. Barucha, *Textbook of Environmental Studies for Undergraduate Courses*, Universities Press (India) Pvt. Ltd., 2005.
[T2]   S. Chawla, *A Textbook of Environmental Studies,* McGraw Hill Education Private Limited, 2012

References Books:
[R1]   G. T. Miller, *Environmental Science*, Thomas Learning, 2012
[R2]   W. Cunningham and M. A. Cunningham, *Principles of Environment Science: Enquiry and Applications*, Tata McGraw Hill Publication, N. Delhi, 2003.
[R3]   R. Rajagopalan, *Environmental Studies*: From Crisis to Cure, 2nd Edition, Oxford University Press, 2011.
[R4]   A.K. De, *Environmental Chemistry*, New Age Int. Publ. 2012,,
[R5]   A. Kaushik and C.P. Kaushik, Perspectives in Environment Studies, 4th Edition, New Age International Publishers, 2013
[R6]   Environmental Engineering by Gerard Kiely, Tata McGraw-Hill Publishing Company Ltd. New Delhi, 2010.

BASIC ELECTRONICS
(Open Elective-II)

Paper Code: ETVEC-506		L	T/P	C
Paper: Basic Electronics		3	0	3

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: Objective of the paper is to facilitate the student with the basics of electronic aspects that are required for his understanding and applications in their respective field of study. The pre-requisites are, to have a basic understanding of Applied Physics and Mathematics.

UNIT-I
Evaluation of Electronics: Introduction & Application Of Electronics, Energy Band Theory Of Crystals, Energy Band Structures In Metals, Semiconductors And Insulators, Theory Of Semiconductors: Classification Of Semiconductors, Conductivity Of Semiconductors, Carrier Concentration In Intrinsic & Extrinsic Semiconductors, Properties Of Intrinsic And Extrinsic Semiconductors, Variation In Semiconductors Parameters With Temperature, Fermi-Dirac Function, Fermi Level In A Semiconductor Having Impurities, Band Structure Of Open-Circuited P-N Junction, Drift And Diffusion Currents, Carrier Life Time, Continuity Equation (Elementary Treatment Only).
[T1][T2][T3][No. of Hours: 11]

UNIT – II
Theory of p-n Junction Diode: Diode Current Equation, Diode Resistance, Transition Capacitance, Diffusion Capacitance, (Elementary treatment only), Effect of Temperature on p-n Junction Diode, Switching Characteristics, Piecewise Linear Model,
Special Diodes: Zener Diode, Varactor Diode, Tunnel Diode, Photodiode, Light Emitting Diodes, Schottky Barrier Diode,
Applications of Diodes: Half-Wave Diode Rectifier, Full-Wave Rectifier, Clippers and Clampers (Elementary treatment only).
[T1][T2][T3][No. of Hours: 11]

Unit – III
Bipolar Junction Transistor: Introduction of transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-moll's model.
[T1][T2][T3][No. of Hours: 11]

Unit – IV
Application of BJT: CB, CE, CC configurations, hybrid model for transistor at low frequencies, Introduction to FETs and MOSFETs.
Fundamentals of Digital Electronics: Digital and analog signals, number systems, Boolean algebra, logic gates with simple applications, logic gates, karnaugh maps.
[T1][T2][T3][No. of Hours: 12]

Text Book(s):
[T1]   S. Salivahanan, N. Suresh Kr. & A. Vallavaraj, "Electronic Devices & Circuit", Tata McGraw Hill, 2008
[T2]   Millman, Halkias and Jit, "Electronic Devices and Circuits" McGraw Hill
[T3]   Boylestad & Nashelsky, "Electronic Devices & Circuits", Pearson Education, 10th Edition.

Reference Book(s):
[R1]   Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, VIth Edition
[R2]   Robert T. Paynter, "Introducing Electronic Devices & Circuits", Pearson Education, VIIth Edition, 2006

APPLIED PHYSICS
(Open Elective-II)

	L	**T**	**C**
Paper Code: ETVAS-502			
Paper: Applied Physics	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basic understanding of Applied Physics aspects that are required for his understanding of electronics and Electromagnetics.

UNIT-I
Interference: Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings.

Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra.

[T1][T2](No. of Hrs. 11)

UNIT-II
Polarization: Introduction, Uniaxial crystals, Double refraction, Nicol prism, Quarter and half wave plates, Theory of production of plane, circularly and elliptically polarized lights, Specific rotation, Laurents half shade polarimeter.

[T1][T2](No. of Hrs. 11)

UNIT-III
Electromagnetic Theory: Gradient, Divergence, Curl, Gauss' law, Ampere's Law, Continuity equation, Maxwell's equations (differential and integral forms), Significance of Maxwell's equations, Poynting Theorem, Electromagnetic wave propagation in dielectrics and conductors.

[T1][T2][No. of Hrs. 12]

UNIT-IV
Band Theory of Solids: Introduction, Kronig-Penney model: E-k diagram, Effective mass of an electron, Intrinsic semiconductors: Electron concentration in conduction band, Hole concentration in valence band, Extrinsic semiconductor: p-type and n-type semiconductors, Fermi level, Hall Effect: Hall voltage and Hall coefficient.

[T1][T2][No. of Hrs. 11]

Text Book(s):
[T1]   Arthur Beiser, 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009
[T2]   A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6th Edition, 2013.

Reference Book(s):
[R1]   A. Ghatak 'Optics' , TMH, 5th Edition, 2013
[R2]   G. Aruldhas 'Engineering Physics' PHI 1st Edition, 2010.
[R3]   Feynman " The Feynman lectures on Physics Pearson Volume 3 Millennium Edition, 2013
[R4]   Uma Mukhrji 'Engineering Physics' Narosa, 3rd Edition, 2010.
[R5]   H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], 1st Edition, 2009.

DIGITAL ELECTRONICS
(Open Elective-II)

Paper Code: ETVEC-504   **L   T/P   C**
Paper: Digital Electronics   **3   0   3**

INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks. 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the knowledge of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture.

UNIT- I
Number Systems and Codes:- Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.
Switching Theory: - Boolean Algebra- Postulates and Theorems, De' Morgan's Theorem, Switching Functions- Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.
Combinational Logic Circuits:- Review of basic gates- Universal gates, Adder, Subtractor ,Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Look-ahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.
[T2, T3][No. of Hrs. 12]

UNIT- II
Integrated circuits: - TTL and CMOS logic families and their characteristics. Brief introduction to RAM and ROM.
Sequential Logic Circuits: - Latches and Flip Flops- SR, D, T and MS-JK Flip Flops, Asynchronous Inputs.
Counters and Shift Registers:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters, Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.
[T2, T3][No. of hrs. 11]

UNIT- III
Synchronous Sequential Circuits: - State Tables State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.
Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and merger chart methods-concept of minimal cover table.
[T1][No. of hrs. 11]

UNIT- IV
Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partition-based design.
Fault Detection and Location: Fault models for combinational and sequential circuits, Fault detection in combinational circuits; Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.
[T1][No. of hrs. 11]

Text Book:
[T1]   Zyi Kohavi, "Switching & Finite Automata Theory", TMH, 2nd Edition
[T2]   Morris Mano, Digital Logic and Computer Design", Pearson
[T3]   R.P. Jain, "Modern Digital Electronics", TMH, 2nd Ed,

Reference Books:
[R1]   A Anand Kumar, "Fundamentals of Digital Logic Circuits", PHI
[R2]   Taub, Helbert and Schilling, "Digital Integrated Electronics", TMH

BASICS OF ELECTRICAL ENGINEERING
(Open Elective-II)

Paper Code: ETVEE-508		**L**	**T/P**	**C**
Paper: Basics of Electrical Engineering		**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: *To provide exposure to the students in respects of the basics of different aspects of electrical engineering with emphasis on constructional, measurement and applications of various types of instruments and equipments.*

UNIT – I: DC Circuits
Introduction of Circuit parameters and energy sources (Dependent and Independent), Mesh and Nodal Analysis, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer and Millman's Theorems, Star-Delta Transformation and their Applications to the Analysis of DC circuits.

[T1],[T2][No. of Hrs. 11]

UNIT – II: A.C. Circuits
A.C. Fundamentals, Phasor representation, Steady State Response of Series and Parallel R-L, R-C and R-L-C circuits using j-notation, Series and Parallel resonance of RLC Circuits, Quality factor, Bandwidth, Complex Power, Introduction to balanced 3-phase circuits with Star- Delta Connections.

[T1],[T2][No. of Hrs. 11]

UNIT – III: Measuring Instruments
Basics of measuring instruments and their types ,Working principles and applications of moving coil, moving iron (ammeter & voltmeter) and Extension of their ranges, dynamometer- type Wattmeter , induction-type Energy Meter , Two-wattmeter method for the measurement of power in three phase circuits, Introduction to digital voltmeter, digital Multimeter and Electronic Energy Meter.

[T1],[T2],[R2][No. of Hrs. 11]

UNIT – IV: Transformer and Rotating Machines
Fundamentals of Magnetic Circuits, Hysteresis and Eddy current losses, working principle, equivalent circuit, efficiency and voltage regulation of single phase transformer and its applications. Introduction to DC and Induction motors (both three phase and single phase), Stepper Motor and Permanent Magnet Brushless DC Motor.

[T1],[T2],[R2][No. of Hrs. 12]

Text Books:
[T1]   S.N Singh, "Basic Electrical Engineering" PHI India Ed 2012
[T2]   Chakrabarti, Chanda,Nath "Basic Electrical Engineering" TMH India", Ed 2012.

Reference Books:
[R1]   William Hayt "Engineering Circuit Analysis" TMH India Ed 2012
[R2]   Giorgio Rizzoni "Principles and Application of Electrical Engineering" Fifth Edition TMH India.

ENGINEERING MATERIALS
(Open Elective-II)

Paper Code: ETVME-510   L   T/P   C
Paper: Engineering Materials   3   0   3

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives and Pre-requisites: *To acquire proper knowledge about different construction materials and their applications. To have exposure about various construction materials as required in engineering. The students should learn the details of various construction materials such as stones, bricks and tiles, cement and cement based products, and lime, timber and wood based products, paint and varnishes metals and other miscellaneous materials and their applications.*
Learning outcomes: *Helps in making him as a better super visor at construction sites/ industries. Improved ability to identify and visualize various construction materials that are being used in construction and other industries. Enhanced knowledge of construction materials helps students in pursuing their careers in material testing field.* This subject helps in understanding the various subjects related to different vocational courses in later stages.

UNIT-I:
Building Stones: Classification of Rocks, Geological classification: Igneous, sedimentary and metamorphic rocks. Chemical classification: Calcareous, argillaceous and siliceous rocks. Physical classification: Un-stratified, stratified and foliated rocks; Requirements of good building stones, testing & identification of common building stones and their uses. Bricks and Tiles: Introduction to bricks, Raw materials for brick manufacturing and properties of good brick making earth, Classification of bricks as per IS: 1077, Testing of common building bricks as per IS: 3495. Compressive strength, water absorption, efflorescence test, Dimensional tolerance test. Types and use of- tiles for wall, roofing & flooring; ceramic tiles; Hollow masonry blocks; Fly ash bricks.

[T1, T2][No. of Hrs: 11]

UNIT-II:
Cement: Introduction, raw materials, manufacturing of ordinary Portland cement, flow diagram for wet and dry process. Properties and uses of ordinary Portland cement. Special cements and their uses. Storage of cement.
Lime:-Introduction: Lime as one of the cementing materials. Definition of terms; quick lime, fat lime, hydraulic lime, hydrated lime, lump lime. Calcinations and slaking of lime IS classification of lime. Definition- Properties and uses of Mortar. Types of mortar, cement & lime Mortar, Preparation of cement Mortar.

[T1, T2][No. of Hrs: 11]

UNIT III:

Timber and wood based products. Identification of different types of timber: Teak, Deodar, Shisham, Sal, Mango. Market forms of converted timber as per IS. Seasoning of timber: purpose, methods of seasoning. Defects and decay in timber,   Preservation of timber and methods of treatment,   Properties   and specifications of structural timber. Other wood based products, their brief description of manufacture and uses: Lamina board, Black board, fiber board. Hard board and gypsum board.

[T1, T2][No. of Hrs: 11]

UNIT IV:
Purpose and use of paints, Types, ingredients, properties and uses of oil paints, water paints and Cement paints. Types, properties and uses of varnishes, Trade name of different products. Metals: **-** uses of ferrous and non-ferrous metals**,** Commercial forms of ferrous and non-ferrous metals.   Plastics – Introduction and uses of various plastic products in buildings such as doors, water tanks and PVC pipes. Types uses and application of- Fiber Sheets, insulating materials, Materials used in interior decoration works like POP, Water proofing compounds, fire resisting materials.

[T1, T2][No. of Hours: 12]

Scheme and Syllabi for B. Voc. (Software Development), w. e. f. batch 2016-17, approved in the BOS of USET/USICT held on 19th July, 2016 & AC Sub-Committee Meeting of USET/USICT held on 27th July, 2016.

Text Book(s):
[T1]   Surendra Singh; "Engineering Materials; "New Delhi". Vikas Publishing House Pvt. Ltd.
[T2]   TTTI, Chandigarh "Civil Engineering Materials; "Tata McGraw Hill.

Reference Book(s):
[R1]   M.L.Gambhir and Neha Jamwal, "Building Materials", Tata McGraw Hill.
[R2]   Building Materials, P.C.Varghese, PHI Publications
[R3]   Engineering materials S.C. Rangwala, Charotar Publishing House
[R4]   Building Materials, Duggal, New Age Publication
[R5]   Kulkarni, GJ; "Engineering Materials; "Ahmedabad, Ahmedabad Book Depot.

BASIC ELECTRONICS LAB
(Open Elective-II)

	L	T/P	C
Paper Code: ETVEC-556	0	2	2
Paper: Basic Electronics Lab			

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Introduction to C.R.O, Function Generator& Bread Board Kit & to generate different types of waveform with the help of Function Generator & to calculate their frequency, amplitude AC & DC voltage.
2. Identification & testing of Active & passive components
3. To plot V-I characteristics of a semiconductor diode &
   Calculate Static & Dynamic Resistance
4. To Study the Reverse characteristics of Zener diode
5. To Study the Rectifier circuit.
   a) Half Wave Rectifier
   b) Centre Tapped Rectifier.
   c) Bridge Rectifier.
6. To Study the output waveforms of different Filter Ckts of Rectifier.
7. To Plot Input & Output characteristics CB transistor.
8. To Plot Input & Output characteristics of CE transistor.
9. Realization of basic gates.
10. Implementation of Boolean functions (two or three variables).
11. Few experiments mentioned above to be performed on P-spice.
12. To develop a working model of any electronic circuit.

APPLIED PHYSICS LAB
(Open Elective-II)

	L	T/P	C
Paper Code: ETVAS-552	0	2	2
Paper: Applied Physics Lab			

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. To determine the wavelength of sodium light by Newton's Rings.
2. To determine the wavelength of sodium light by Fresnel's biprism.
3. To determine the wavelength of sodium light using diffraction grating.
4. To measure small thickness of a piece of paper using Newton's Rings technique.
5. To determine the refractive index of a prism using spectrometer.
6. To determine the dispersive power of prism using spectrometer and mercury source.
7. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.
8. To find the wavelength of He-Ne laser using transmission diffraction grating.
9. To determine the numeral aperture (NA) of an optical fibre.
10. To determine the e/m ratio of an electron by J.J. Thomson method.
11. To measure time period of a waveform and calculate its frequency and wavelength using CRO.
12. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave signals from two signal generators.
13. To determine the frequency of A.C. mains by using Sonometer .
14. To determine the frequency of electrically maintained tuning fork by Melde's method.
15. Computer simulation (simple application of Monte Carlo): Brownian motion, charging & discharging of a capacitor.
16. To study the charging and discharging of a capacitor and to find out the time constant.
17. To study the Hall effect.
18. To determine the energy band gap of a semiconductor by four probe method/or by measuring the variation of reverse saturation current with temperature.
19. To study the V-I characteristics of Zener diode.
20. To measure surface tension of different liquids using capillary rise method.
21. To measure coefficient of viscosity by Stoke's method.

Text Book(s):
[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand

DIGITAL ELECTRONICS LAB
(Open Elective-II)

Paper Code: ETVEC-554   **L   T/P   C**
Paper: Digital Electronics Lab   **0   2   2**

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Realize all gates using NAND & NOR gates
2. Realize Half Adder, Full Adder, Half subtracter, Full subtracter
3. Realize a BCD adder
4. Realize a Serial Adder
5. Realize a four bit ALU
6. Realize Master-Save J K Flip-Flop, using NAND/NOR gates
7. Realize Universal Shift Register
8. Realize Self-Starting, Self Correcting Ring Counter
9. Realize Multiplexer and De-Multiplexer
10. Realize Carry Look ahead Adder / Priority Encoder
11. Simulation of PAL and PLA
12. Simulation Mealy and Moore State machines

BASICS OF ELECTRICAL ENGINEERING LAB
(Open Elective-II)

	L	T/P	C
Paper Code: ETVEE-558 | 0 | 2 | 2
Paper: Basics of Electrical Engineering | | |

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. To Design the circuit for a given load and selection of its various Components and instruments from the safety point of view
2. Study and applications of CRO for measurement of voltage, frequency and phase of signals.
3. Connection of lamp by
   (1)Single Switch Method.(2) Two-way Switch Method.
   OR
   Performance comparison of of fluorescent Tube & CFL Lamp.
4. To Verify Thevenin's & Norton's Theorem
   OR
   To Verify Superposition &Reciprocity Theorem.
   OR
   To Verify Maximum Power Transfer Theorem.
5. To Measure Power & Power Factor in a Single-Phase A.C Circuit using Three Ammeters or three Voltmeters.
6. To Measure Power & Power Factor in a Balanced Three Phase Circuit using Two Single Phase Wattcmeters.
7. To study of Resonance in a series R-L-C or Parallel R-L-C Circuits.
8. To perform open circuit and short circuit test on 1-phase transformer.
9. Starting, Reversing and speed control of DC shunt Motor
10. Starting, Reversing and speed control of 3-phase Induction Motor
11. To Study different types of Storage Batteries & its charging system.
12. .To Study different types of earthing methods including earth leakage circuit breaker (GFCI)

ENGINEERING MATERIALS LAB
(Open Elective-II)

	L	T/P	C
Paper Code: ETVME-560	0	2	2
Paper: Engineering Materials Lab			

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1) To determine the crushing strength of bricks
2) To determine the water absorption of bricks.
3) To conduct field tests on cement.
4) To determine fineness (by sieve method) of cement.
5) To determine normal consistency of cement.
6) To determine initial and final setting times of cement.
7) To determine soundness of cement.
8) To determine compressive strength of cement.
9) Field visit to study different types of cements that are used in construction industry
10) Field visit to study different types of bricks that are used in construction
11) Field visit to study use of timber in construction
12) A report on use of plastic materials for various purposes in buildings
13) Field visit to study different types of tiles used in construction industry
14) Field visit to study different type of paints used in buildings
15) A report on new and latest material being used in construction industry.

Teachers are expected to physically show various materials while imparting instructions. Field visits should be organized and active participation of students shall be encouraged.

ACCOUNTING SOFTWARE LAB

Paper Code: ETVSD-556   **L**   **T/P**   **C**
Paper: Accounting Software Lab   **0**   **4**   **4**

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Introduction to latest Accounting Software Package Such as Tally and its Installation.
2. Study of all the sections and options available on the Main Screen of the Accounting Package. Set Password for security.

3. Perform The following Operations
   i) Create a New Company
   ii) Configure the company settings.
   iii) Alter or Modify company information
   iv) Delete any existing company

4. Perform the following Ledger operations
   i) Create a Single Ledger
   ii) Create a Ledger under specific or Primary Group
   iii) Display the list of all Ledgers
   iv) Display the ledgers under specific group
   v) Delete a single ledger
   vi) Delete a ledger under specific group

5. Perform the following stock item operations
   i) Create a Single stock item
   ii) Create a group of stock item
   iii) Modify/Delete a single Stock item
   iv) Modify/Delete a Group stock item

6. Configure the following Inventory Features
   i) Integrate accounts and inventory
   ii) Set the features of Order Processing
   iii) Configure the features of invoicing
   iv) Set Sales and Purchase Management features.

7. Configure Statutory & Taxation Features
   i) Enable VAT
   ii) Enable TCS
   iii) Enable TDS
   iv) Enable Fringe Benefit Tax (FBT)
   v) Enable Excise Tax
   vi) Enable Service Tax

8. Maintain Accounts Books
   i) Maintain Cash Book
   ii) Maintain Bank Book

9. Maintain Vouchers
   i) Maintain Purchase Voucher
   ii) Maintain Sale Voucher
   iii) Maintain Journal Voucher
   iv) Maintain Payment voucher
   v) Maintain Sales voucher

      vi) Maintain Debit note voucher

      vii) Maintain Credit Note Voucher

10. Generate the following books
    (i)   Day book
    (ii)   Inventory Book

11. Generate the following Registers
    (iii)   Sales Register
    (iv)   Purchase Register

12. Generate the Reports on the followings
    i)   Balance Sheet
    ii) Profit & Loss Account
    iii) Stock Summary
    iv) Trial Balance
    v) Statement of Accounts

VISUAL BASIC PROGRAMMING LAB

		L	**T/P**	**C**
Paper Code: ETVSD-556				
Paper: Visual Basic Programming Lab		**0**	**4**	**4**

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Introduction to Visual Basic IDE by demonstrating various types of windows in IDE.
2. Programs to illustrate the various data types in, arithmetic and relation a operators in VB.
3. Programs to illustrate the conditional structure (i.e. largest of three numbers, simple Calculator by switch – case)
4. Programs to illustrate the loop structure (find sum of a geometric series, find sum of first n natural numbers etc.)
5. Small Programs to implement standard controls: Label, Frame, Checkbox, Combo Box, DirList Box Shape and Image with properties.
6. Small programs to implement standard controls: Picture Box, Text Box, Command Button, Option Button, List Box V Scrollbar and Drive List Box with properties.
7. Programs to illustrate 1- D array (i.e. find average of marks of a class in one subject)
8. Programs on user defined function and procedures (i.e. to print the first m Fibonacci Number, function to find the factorial of a number.)
9. Programs to illustrate built- in string functions :space( ) ,str( ) ,instr( ) ,len( ) , ltrim( ) etc. Numeric function: sgn( ) ,val( ) , rnd( ) etc. and time related functions.
10. Programs to implement mouse, keyboard, focus and scroll events.
11. Programs to implement the Menu Editor.
12. Programs to implement types of forms: Single Document Interface and Multiple Document Interface.

C++ PROGRAMMING SKILLS LAB

Paper Code: ETVSD-552	**L**	**T/P**	**C**
Paper: C++ Programming Skills Lab	**0**	**4**	**4**

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Design an employee class for reading and displaying the employee information, the getInfo() and display Info () methods will be used respectively. Where get Info () will be private method.
2. Design the class student containing get Data() and display Data() as two of its methods which will be used for reading and displaying the student information respectively. Where get Data() will be private method.
3. Design a class Complex for adding the two complex numbers and also show the use of constructor.
4. Design a class Geometry containing the methods area() and volume() and also overload the area() function.
5. Overload the operator + for adding the timings of two clocks, And also pass objects as an argument.
6. Overload the + for concatenating the two strings. For e.g "c" + "++" = c++
7. Design a class for single level inheritance using public and private type derivation.
8. Design a class for multiple inheritances.
9. Implement the concept of method overriding.
10. Show the use of virtual function
11. String operations for string length , string concatenation
12. String operations for string reverse, string comparison.
13. Show the implementation of exception handling
14. Show the implementation for exception handling for strings
15. Design a class File Demo open a file in read mode and play the total number of words and lines in the file.
16. Design a class to handle multiple files and file operations
17. Show the implementation of template class library for swap function.
18. Design the template class library for sorting ascending to descending and vice-versa

Scheme and Syllabi for B. Voc. (Software Development), w. e. f. batch 2016-17, approved in the BOS of USET/USICT held on 19th July, 2016 & AC Sub-Committee Meeting of USET/USICT held on 27th July, 2016.

DESKTOP PUBLISHING LAB

	L	T/P	C
Paper Code: ETVSD-554			
Paper: Desktop Publishing Lab	**0**	**4**	**4**

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Design Newspaper article in Multiple Columns in ADOBEPAGEMAKER.
2. Design a classified advertisement in ADOBE PAGEMAKER.
3. Perform experiments with the use of Master Pages in ADOBE PAGEMAKER.
4. Perform experiments with the use of import and export command in ADOBE PAGEMAKER.
5. Design Invitation Card in CORELDRAW.
6. Design a Logo in CORELDRAW
7. Design Greeting Card in CORELDRAW.
8. Design a Broucher in CORELDRAW
9. Design a Magazine Front Page in CORELDRAW.
10. Scan a BLACK& WHITE PHOTO and convert it into COLOR PHOTO in PHOTOSHOP.
11. Change dress color of a scanned photo using PHOTOSHOP.
12. Scan a PASSPORT SIZE PHOTO and apply various tools for finishing the photo in PHOTOSHOP.

Suggested Tool Kits: Adobe PageMaker 7, CorelDraw 9, Adobe Photoshop 7

ENVIRONMENTAL SCIENCE LAB/ FIELD WORK
(Common to All Disciplines)

	L	T/P	C
Paper Code: ETVEN-552			
Paper: Environmental Science Lab/ Field Work	0	2	2

Note:- *The required list of Experiments is provided as under. The example cited here are purely indicative and not exhaustive. Attempt shall be made to perform all experiments. However, at least 8 experiments should be done in the semester. More experiments may be designed by the respective institutes as per their choice.*

List of Experiments:

1. Determination of pH, conductivity and turbidity in drinking water sample.
2. Determination of pH and conductivity of soil/sludge samples.
3. Determination of moisture content of soil sample.
4. Determination of Total Dissolved Solids (TDS) of water sample.
5. Determination of dissolved oxygen (DO) in the water sample.
6. Determination of Biological oxygen demand (BOD) in the water sample.
7. Determination of Chemical oxygen demand (COD) in the water sample.
8. Determination of Residual Chlorine in the water sample.
9. Determination of ammonia in the water sample.
10. Determination of carbon dioxide in the water sample.
11. Determination of nitrate ions or sulphate ions in water using spectrophotometer.
12. Determination of the molecular weight of polystyrene sample using viscometer method.
13. Base catalyzed aldol condensation by Green Methodology.
14. Acetylation of primary amines using eco-friendly method.
15. To determine the concentration of particulate matter in the ambient air using High Volume Sampler.

P.S.: For better understanding of various aspects of environment visits to local areas, depending upon easy access and importance may be planned to any nearby river, forest, grassland, hills and students should write a report based on their observations.

Suggested Books:
[T1]   A. I. Vogel, G. H. Jeffery, *Vogel's Text Book of Quantitative Chemical Analysis*, Published by Longman Scientific & Technical, 5th Edition, 1989.
[T2]   dst.gov.in/green-chem.pdf (monograph of green chemistry laboratory experiments).
[T3]   S. Chawla, *Essentials of Experimental Engineering Chemistry*, Dhanpat Rai & Co., 3rd Edition, 2008.
[T4]   S. Rattan, *Experiments in Applied Chemistry*, Published by S.K.Kataria& Sons, 2nd Edition, 2003.
[T5]   W. Cunningham and M. A. Cunningham, *Principles of Environment Science: Enquiry and Applications*, Tata McGraw Hill Publication, N. Delhi, 2003.
[T6]   A. Kaushik and C. P. Kaushik, *Perspectives in Environment Studies*, 4th Edition, New Age International Publishers, 2013.