FACULTY OF VISUAL ARTS AND PERFORMING ARTS

SYLLABUS

FOR

BACHELOR OF VOCATION (B.Voc.)
DATA SCIENCE AND SOFTWARE ENGG.
(Semester: I – IV)

Session: 2019-20

GURU NANAK DEV UNIVERSITY,
AMRITSAR.

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BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER SYSTEM

Eligibility:
10+2 in any stream with 40% marks

**SCHEME**

**SEMESTER – I:**

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Paper</th>
<th>M. Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – I</td>
<td>Fundaments of Information Technology (<em>Theory</em>)</td>
<td>75</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Web Technologies (HTML/DHTML,CSS and Java Script) (<em>Theory</em>)</td>
<td>75</td>
</tr>
<tr>
<td>Paper – III</td>
<td>Programming Lab based on I.T.(MS-Office) (<em>Practical</em>)</td>
<td>75</td>
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<tr>
<td>Paper – IV</td>
<td>Programming Lab of HTML and DHTML (<em>Practical</em>)</td>
<td>75</td>
</tr>
<tr>
<td>Paper – V</td>
<td>Communication Skills in English – I</td>
<td>50</td>
</tr>
<tr>
<td>Paper – VI</td>
<td>Punjabi (Compulsory) / <strong>ਮੁੱਢਲੀ ਪੰਜਾਬੀ /</strong> Punjab History &amp; Culture (From Earliest Times to C 320)</td>
<td>50</td>
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<tr>
<td></td>
<td>* Drug Abuse: Problem, Management and Prevention (Compulsory Paper)</td>
<td>50</td>
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**SEMESTER – II:**

<table>
<thead>
<tr>
<th>Paper No.</th>
<th>Paper</th>
<th>M. Marks</th>
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<tbody>
<tr>
<td>Paper – I</td>
<td>PHP and MYSQL (<em>Theory</em>)</td>
<td>75</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Responsive Web Design using XML, HTML 5 (<em>Theory</em>)</td>
<td>75</td>
</tr>
<tr>
<td>Paper – III</td>
<td>Programming Lab based on PHP and MySQL (<em>Practical</em>)</td>
<td>50</td>
</tr>
<tr>
<td>Paper – IV</td>
<td>Programming Lab of XHTML 5 and JavaScript (<em>Practical</em>)</td>
<td>100</td>
</tr>
<tr>
<td>Paper – V</td>
<td>Communication Skills in English – II (Th.35+Pr.15)</td>
<td>50</td>
</tr>
<tr>
<td>Paper – VI</td>
<td>Punjabi (Compulsory) / <strong>ਮੁੱਢਲੀ ਪੰਜਾਬੀ /</strong> Punjab History &amp; Culture (C 320 TO 1000 B.C.)</td>
<td>50</td>
</tr>
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</tbody>
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Note: * Marks of this Paper will not be included in the Total Marks.
** (Special Paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
### Semester-III

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Subjects</th>
<th>Marks</th>
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<tr>
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<td><strong>General Education Component:</strong></td>
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<tr>
<td>Paper – I</td>
<td>Software Engineering <em>(Theory)</em></td>
<td>75</td>
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<tr>
<td>Paper – II</td>
<td>Object-Oriented Analysis and Design using UML <em>(Theory)</em></td>
<td>75</td>
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<td></td>
<td><strong>Skill Component:</strong></td>
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<tr>
<td>Paper – III</td>
<td>DBMS with Oracle <em>(Theory)</em></td>
<td>75</td>
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<tr>
<td>Paper – IV</td>
<td>Programming in core Java <em>(Theory)</em></td>
<td>75</td>
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<tr>
<td>Paper – V</td>
<td>Programming Lab on SQL, PL/SQL and UML design</td>
<td>75</td>
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<tr>
<td>Paper – VI</td>
<td>Programming Lab on JAVA</td>
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<td><strong>Total Marks:</strong></td>
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### Semester-IV

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<tr>
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<td><strong>General Education Component:</strong></td>
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</tr>
<tr>
<td>Paper – I</td>
<td>Software Testing <em>(Theory)</em></td>
<td>75</td>
</tr>
<tr>
<td>Paper – II</td>
<td>Software Quality Management <em>(Theory)</em></td>
<td>75</td>
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<tr>
<td></td>
<td><strong>Skill Component:</strong></td>
<td></td>
</tr>
<tr>
<td>Paper – III</td>
<td>Advanced Java Programming <em>(Theory)</em></td>
<td>75</td>
</tr>
<tr>
<td>Paper – IV</td>
<td>Software Lab on Software Testing Tools <em>(Practical)</em></td>
<td>25</td>
</tr>
<tr>
<td>Paper – V</td>
<td>Minor Project based on Java Programming <em>(Practical)</em></td>
<td>150</td>
</tr>
<tr>
<td>Paper – VI</td>
<td>ESL-221 * Environmental Studies</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td><strong>Total Marks:</strong></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

* Marks of Paper EVS will not be included in Grand Total.
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – I

PAPER – I: Fundamentals of IT

Time: 3 Hours

M. Marks: 75

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A
Introduction to Computers and its Applications:
- Computer as a system, basic concepts, functional units and their inter relation.
- Milestones in Hardware and Software.
- Batch oriented / on-line / real time applications.
- Application of computers.

Section-B
Word Processing Package:
- Opening, saving and closing an existing document; renaming and deleting files; Using styles and templates; Introduction to templates and styles; applying, modifying and creating new (custom) styles; using a template to create a document, creating a template, editing a template, organizing templates, examples of style use, Changing document views, Moving quickly through a document, Working with text: select, cut, copy, paste, find and replace, inserting special characters, setting tab stops and indents, Checking spelling and Grammar, Autocorrect, Using built-in language tools, word completion, Autotext, Formatting text: Using Styles, formatting paragraphs, formatting characters, autoformatting, creating lists; Formatting pages: Using layout methods, creating headers and footers, Numbering pages, Changing page margins,

Section-C
Word Processing Package:
- Adding comments to a document, Creating a table of contents, Creating indexes and bibliographies, Printing a document, Using mail merge, Tracking changes to a document, Using fields, Linking to another part of a document, Using master documents, Creating fill-in forms.

Presentation Software using Microsoft Office:
- Presentation overview, entering information, Presentation creation, opening and saving presentation, inserting audio and video.
Section-D

**Spreadsheet Package:** Introduction to Spreadsheets, sheets and cells; Opening and saving spreadsheet files; Working with sheets: inserting new sheet, deleting and renaming sheets, Viewing a spreadsheet: freezing rows and columns, splitting screen, Entering data: cell referencing, formatting cells, entering numbers, entering numbers as text, entering formulae, entering date and time, deactivating automatic changes, Speeding up data entry: using fill tool, fill series, defining fill series, Validating cell contents, Formatting data: formatting text, numbers, cells, Auto formatting cells and sheets, defining new auto format, Using conditional formatting, Hiding and showing data, Sorting records, Printing a spreadsheet document: using print ranges, page formats, inserting page breaks, headers and footers; Working with Graphs and Charts : Creating Embedded Chart, formatting chart: Changing chart types, adding Titles, Legends and Gridlines, Printing Charts; Adding database functions: defining database ranges, sorting, filtering and grouping database ranges; Evaluating data: using Data Pilot; Functions and Macros: using and editing existing macro, Creating Macros, Recording Macros, Running Macros.

**Reference Books:**
2. Introduction to Computers – N. Subramanian.
4. MS–Office _ BPB Publications.
6. Ebooks at OpenOffice.org
PAPER – II: Web Technologies
(HTML/DHTML, CSS and Java Script)

Time: 3 Hours

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A

Basic Terminology: Web Server; Web Client/Browser, Understanding how a Browser communicates with a Web Server, Website, Webpage, Static Website, Dynamic Website, Internet, Intranet, Extranet, WWW, URL.

Introduction to HTML/DHTML: HTML: Structure of an HTML program, Paragraph Breaks, Line Breaks; Emphasizing Material in a Web Page (Heading Styles, Drawing Lines); Text Styles (Bold, Italics, Underline); Other Text Effects (Centering (Text, Images etc.)

Lists: Unordered List, Ordered Lists, Definition lists, Adding Graphics to HTML Documents using the Border, Width, Height, Align, ALT, Attributes

Tables: Caption Tag, Width, Border, Cell padding, Cell spacing, BGCOLOR, COLSPAN and ROWSPAN Attributes.

Section-B


Section-C


Web Hosting: Understanding Domain Name & Web Space, Getting a Domain Name & Web Space (Purchase or Free), Uploading the Website to Remote Server, Introduction to Open Source Third party FTP Tools

Reference Books:
2. Bayross, Ivan: HTML, DHTML, Java Script by BPB, Latest reprint
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – I

Paper – III: (Programming Lab-I)

M. Marks: 75

Programming Lab based on I.T. (MS-Office)
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – I

Paper – IV: (Programming Lab-II)

M. Marks: 75

Programming Lab of HTML and DHTML.
Time: 3 Hours

Max. Marks: 50

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

The syllabus is divided in four sections as mentioned below:

Section–A

Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings.

Section–B

Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/expressions.

Activities:
- Comprehension questions in multiple choice format
- Short comprehension questions based on content and development of ideas

Section–C

Writing Skills: Guidelines for effective writing; writing styles for application, personal letter, official/business letter.

Activities:
- Formatting personal and business letters.
- Organising the details in a sequential order

Section–D

Resume, memo, notices etc.; outline and revision.

Activities:
- Converting a biographical note into a sequenced resume or vice-versa
- Ordering and sub-dividing the contents while making notes.
- Writing notices for circulation/boards

Recommended Books:
- *Oxford Guide to Effective Writing and Speaking* by John Seely.
- *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP
PAPER-VI: पंजीकृत (छठांतरी)

मात्रा : 3 पृष्ठ

कुल अंक : 50

भाषा-वूह अंक भाषा-भूमिका

मेंवाल-उत्तरे

अन्तर-अन्तर (विज्ञापन अन्तर).
(मि. मुक्ति स्वीकार के संबंध में संबंध में)
चालु रहने देगा पुरानीतंत्रिक, भव्यभूमिका।

(पृष्ठ 3 में 1 उपाधि, वि 1)

मेंवाल-ची

टिडियामब जाती (टिडियामब लेख-मंजिलाधी)
मंजिला. म.म.अभिनेता,
पंजीकृत पूर्वकाल, बिंदिशाल | (केंद्र 1 एं 6)
(लिखन जन साध, लिखत-साली)

मेंवाल-मी

(3) पक्षा पृष्ठा
(अ) पक्षा पृष्ठा वे पृष्ठा में पुनरुत्थल

मेंवाल-झी

(3) पंजीकृत पृष्ठा टिडियामब : टिडियामब बाह्य बाह्य बाह्य सबक अंतर देनीयार, सहक, सहयोगी, मूल-पृथ्वी।
(अ) शास्त्रीय शास्त्रीयता : अमान नाट टिडियामब तुप, अमान अंतर तुप-तुप तुप आउट, पंजीकृत तुपमाला देने पहचान-सिद्धांत।

भूपन-उद्भव अंतर विधिशाल साहित्य उपाधियां

1. पृष्ठा पुनरुत्थल देने वाला अंतर देना। वह अंतर दिखाई देने पृष्ठा पुनरुत्थल देना।
2. तिडियामबकारे देने वाला भूपन पृष्ठा दिखाई देना। वह अंतर दिखाई दिखाई पृष्ठा सत्यता देना।
3. विपक्ष पृष्ठा देने वाला अंतर देना।
4. वेतन मैट वाला अंतर देने वाला अंतर पृष्ठा देने वाला पृष्ठा देने वाला पृष्ठा देने वाला विधिशाल अंतर देना।
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – I

PAPER–VI: ਖੜ੍ਹਿਆ ਪ੍ਰਤੀਪਕਾ
(In lieu of Compulsory Punjabi)

ਮਾਤਾ : 3 ਪੇਟਿਂਨ

ਖੁਣ ਬਾਹੜ : 50

ਮੈਵਾਠਨੇ

ਪੈਟੀ ਅੰਵੇਦਨ, ਅੰਵਤ ਵਾਮ, ਪੈਟ ਸਿੰਘੀ ਦਲੇ ਹੰਟ ਅੱਠ ਪੈਟ ਦਾ ਹੰਟ ਅੱਠ ਸਾਲਵ (ਪੂਰਬੀ ਸਤ੍ਰ-ਪਹਾੜਾਂ)
ਪ੍ਰਾਪਤ (ਸਿੰਘੀ, ਸਿੰਘੀ, ਅਧਾਰ) : ਪ੍ਰਤੀਪਕਾ ਦਾ ਹੰਟ

ਮੈਵਾਠਨੀ

ਪ੍ਰਾਪਤ ਮਹਤੀ-ਘਟਦਾਤ : ਪੂਰਬੀ ਸਤ੍ਰ-ਪਹਾੜਾਂ
(ਮਾੜਾਲਵ ਮਹਤੀ, ਮੌਕਟ ਮਹਤੀ, ਪਿਵਾਲ ਮਹਤੀ, ਭੁਲ ਮਹਤੀ, ਭੋਰ ਮਹਤੀ ਅਨਾਂ ਪਹਾੜਾਂ)

ਮੈਵਾਠਨੀ

ਪੰਛੇ ਹਿੱਂ ਚਲਨੀ ਦੀ ਪ੍ਰਤੀਪਕਾ ਮਹਤੀਏਂ : ਘਾਣਾ, ਘਾਣਾ, ਕਿਸੇ-ਰੱਖੇ, ਪੈਟੀ ਅੱਠ ਪੈਟ ਪ੍ਰਿਨਟਾਂ ਅਧਿਐਨ ਟਾਲ ਪ੍ਰਤੀਪਕਾ।

ਮੈਵਾਠਨੀ

ਪ੍ਰਤੀਪਕਾ ਦੀ ਅਧਿਐਨਾਂ ਦੀ ਉਤਪਨਣਾ

1. ਪ੍ਰਤੀਪਕਾ ਦੀ ਜਾਣਾ ਮਹਤੀ। ਤੇ ਜਾਣਾ ਕਿਸੇ ਦੇ ਪ੍ਰਤੀਪਕਾ ਦੀ ਜਾਣਾ ਮਹਤੀ।
2. ਕਿਸੇਹੱਦੀਆਂ ਦੀ ਗੁਣ ਪ੍ਰਤੀਪਕਾ ਵਾਲੇ ਦੋ। ਤੇ ਜਾਣਾ ਕਿਸੇ ਦੀ ਗੁਣ ਪ੍ਰਤੀਪਕਾ ਵਾਲੇ ਦੋ।
3. ਜਾਣਾ ਪ੍ਰਤੀਪਕਾ ਦੀ ਮਹਤੀ। ਤੇ ਜਾਣਾ ਪ੍ਰਤੀਪਕਾ ਦੀ ਮਹਤੀ।
4. ਘਾਣਾ ਦੀ ਮਹਤੀ। ਤੇ ਜਾਣਾ ਪ੍ਰਤੀਪਕਾ ਦੀ ਮਹਤੀ।
PAPER–VI: Punjab History & Culture (From Earliest Times to C 320)

(Special Paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours

Max. Marks: 50

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section–A
1. Physical features of the Punjab and its impact on history.
2. Sources of the ancient history of Punjab

Section–B
3. Harappan Civilization: Town planning; social, economic and religious life of the Indus Valley People.

Section–C
5. Social, Religious and Economic life during Rig Vedic Age.

Section–D
7. Teachings and impact of Buddhism
8. Jainism in the Punjab

Suggested Readings:
PROBLEM OF DRUG ABUSE

Meaning of Drug Abuse:

Consequences of Drug Abuse for:
- Family: Violence.
- Society: Crime.
- Nation: Law and Order problem.

Management of Drug Abuse:
Medical Management: Medication for treatment and to reduce withdrawal effects.

Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
Social Management: Family, Group therapy and Environmental Intervention.
References:

BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – II

PAPER – I: PHP and MYSQL

Time: 3 Hours

M. Marks: 75

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A

Introduction to PHP: Evaluation of PHP, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression.
Function: What is a function, Define a function, Call by value and Call by reference, Recursive function, String Creating and accessing, String Searching & Replacing String, Formatting String, String Related Library function.

Section-B

Array: Anatomy of an Array, Creating index based and Associative array Accessing array, Element Looping with Index based array, Looping with associative array using each () and foreach(), Some useful Library function.
Handling Html Form with PHP: Capturing Form, Data Dealing with Multi-value filed, and Generating File uploaded form, redirecting a form after submission.

Section-C

Working with file and Directories: Understanding file& directory, Opening and closing, a file, Coping, renaming and deleting a file, working with directories, Creating and deleting folder, File Uploading & Downloading.
Session and Cookie: Introduction to Session Control, Session Functionality What is a Cookie, Setting Cookies with PHP. Using Cookies with Sessions, Deleting Cookies, Registering Session variables, Destroying the variables and Session.
Section-D

Database Connectivity with MySql: Introduction to RDBMS, Connection with MySql Database, Performing basic database Operation (DML) (Insert, Delete, Update, Select), Setting query parameter, Executing query- Join (Cross joins, Inner joins, Outer Joins, Self joins).

Exception Handling: Understanding Exception and error, Try, catch, throw. Error tracking and debugging.

Reference Books:
1. Steve Suehring: PHP6 and MYSQL Bible, Wiley India edition
2. Steven Holzner PHP: The complete Reference, Tata McGraw Hill
3. Kelvin Tetroi Programming PHP
PAPER – II: Responsive Web Design using XML, HTML 5

Time: 3 Hours

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A

Introduction to responsive web design and its tools

Section-B


XML Processor: Introduction, Introduction of XML Processor- Components of XML processor, Concept of DOM and SAX,

Section-C

Introduction of Java Script, JavaScript characteristics, Objects in Java Script, Dynamic HTML with Java Script.
XMLHttpRequest: Introduction, XMLHttpRequest, The XMLHttpRequest Object, Events for the XMLHttpRequest Object, Request Object for XMLHttpRequest, Response Object for XMLHttpRequest.
Section-D


Reference Books:

1. Responsive Web Design with HTML5 and CSS3 By Ben Frain
2. Introduction to Web Development Using HTML 5 By Kris Jamsa
3. Introducing HTML5 By Bruce Lawson, Remy Sharp
4. The Definitive Guide to HTML5 By Adam Freeman
5. HTML5 Canvas: Native Interactivity and Animation for the Web By Steve Fulton, Jeff Fulton
6. Beginning HTML5 and CSS3: The Web Evolved By Christopher Murphy, Richard Clark, Oliver Studholme, Divya Manian
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – II

Paper – III: (Programming Lab-I)

M. Marks: 50

Programming Lab based on PHP and MySQL
Paper – IV: (Programming Lab-II)

M. Marks: 100

Minor Project based on XHTML 5 and JavaScript
PAPER–V: COMMUNICATION SKILLS IN ENGLISH – II

Time: 3 Hours

Max. Marks: 50
Theory Marks: 35
Practical Marks: 15

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Course Contents:

SECTION–A
Listening Skills: Barriers to listening; effective listening skills; feedback skills.
Activities: Listening exercises – Listening to conversation, News and TV reports

SECTION–B
Attending telephone calls; note taking and note making.
Activities: Taking notes on a speech/lecture

SECTION–C
Speaking and Conversational Skills: Components of a meaningful and easy conversation; understanding the cue and making appropriate responses; forms of polite speech; asking and providing information on general topics.
Activities: 1) Making conversation and taking turns
2) Oral description or explanation of a common object, situation or concept

SECTION–D
The study of sounds of English,
Stress and Intonation,
Situation based Conversation in English,
Essentials of Spoken English.
Activities: Giving Interviews

PRACTICAL / ORAL TESTING

Marks: 15

Course Contents:-
1. Oral Presentation with/without audio visual aids.
2. Group Discussion.
3. Listening to any recorded or live material and asking oral questions for listening comprehension.

Questions:-
1. Oral Presentation will be of 5 to 10 minutes duration (Topic can be given in advance or it can be student’s own choice). Use of audio visual aids is desirable.
2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

Note: Oral test will be conducted by external examiner with the help of internal examiner.
PAPER-VI: पैग्मेंट (खंडभंगी)

माना: 3 पृष्ठें  
बंड भाग: 50

भाष-बूझ अंदे भाष-मूझबंध

मेलमार-हे

आउट प्रतिपाद (खण्डी घडा)
(साक्ष. मुखियत घी अठे दलितांमध्ये मुख्य घण्य)
वाह तालब देते प्राप्तीविविधती, आवश्यकता।
(हिंदू-हदु, भाजु धिउरत)

मेलमार-पी

स्वाधिकारार्थ (स्वाधिकार लेध-मूखूर्त)
मैद. म.स.आमेझ,  
पैग्मेंट माधिक पृथक, ज्ञातीता। (खंड 7 ते 12)
(साक्ष. प्रिवेट मैली)

मेलमार-मी

(३) मालन-बनन अंदे मालन उच्चता: पैग्मेंट, मूखले मूलक
(अ) मालन मुखाख

मेलमार-डी

(३) मैकडर उखना
(अ) भवनले अठे अभ्यास

तंब-टंब अंदे बहीनीभर ठडी उत्तरदिगं

1. भूमप भूजू ते दान बना टेस्ट. उत बना दिशें देइ भूमाप पड़े माटों।
2. दिनभारार्थी ते भूजू पृथक बनले गइ. उत बना दिच दित्र भूमाप जचभंगी तिने। फॉलों भूम तिमे ही बना दिच लीड सा मलण थिन।
3. उत्तर भूमाप दे दलचर बाँध उठा।
4. फूईन मंड वड़ डाण्य सेवत करें उं भूमाप दी लंद भांग दंग दंग चांद भूमाप दिच लड़ मलण थिन।
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BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – II

PAPER–VI: ਪ੍ਰਬੰਧਾਲੀ ਪ੍ਰਤੀਵਾਦ
(In lieu of Compulsory Punjabi)

ਸਮੂਹ: 3 ਕੇਟੇ

ਵਿਭਾਗ-ਖੱਬ

ਮੈਵਾਦਰ-ਦੇ

ਸਾਹਿਤ ਮੂਲੀਆਂ: ਪ੍ਰਬੰਧ ਅਦੇ ਲਗਦੇ
(ਤਾਜ, ਪ੍ਰਬੰਧ ਅਦੇ ਲਗਦੇ, ਵਿਲਿਖਾ, ਵਿਲਿਖਾ ਦੀਸੋਮੇਟ, ਦੀਸੋਮੇਟ, ਸਮੇਟ, ਪ੍ਰਬੰਧ ਅਦੇ ਦੀਸੋਮੇਟ)

ਮੈਵਾਦਰ-ਚੌਟ

ਪ੍ਰਬੰਧਾਲੀ ਘੱਟੋਂ ਕੈਦੇ : ਪ੍ਰਬੰਧਾਲੀ ਘੱਟਾਂ ਕੈਦੇ
(ਦੀਆਂ ਮਾਪਕਾਂ ਦਾਦੇ, ਮੈਵਾਦਰ ਦਾਦੇ ਅਦੇ ਕੈਦੇ ਦਾਦੇ (ਪ੍ਰਬੰਧ ਅਦੇ ਲਗਦੇ)
(ਐਲ) ਵਿਲਣਾਲਾ ਦਾਦੇ, ਪ੍ਰਬੰਧਾਲੀ ਦਾਦੇ ਅਦੇ ਲਗਦੇ ਦਾਦੇ (ਪ੍ਰਬੰਧ ਅਦੇ ਲਗਦੇ)

ਮੈਵਾਦਰ-ਸੀ

ਪੰਤਾ ਦਸਤਰ
ਸੈਕਟ ਦਸਤਰ

ਮੈਵਾਦਰ-ਬੀ

ਹੌਸ਼ੀ ਘੁਟਣ (ਪੁਹਤੂ ਅਦੇ ਘੁਟਣੀ)

ਅਧਾਰ ਅਦੇ ਪੁਹਤੂ

ਐਲ-ਬੀ ਅਦੇ ਪ੍ਰਬੰਧਾਲੀ ਘੁਟਣੀ ਉਪਲਿਆਂ

1. ਪ੍ਰਬੰਧ ਘੁਟਣੀ ਦੇ ਚਾਲ ਕਰਨਾ ਦੇਖੋ। ਉਹ ਕਰਨਾ ਦਿਖਾਈ ਦੇ ਪ੍ਰਬੰਧ ਯੂਨਿਟ ਲਗਦੇ।
2. ਵਿਲਣਾਲਾ ਦੇ ਲਗਦੇ ਪ੍ਰਬੰਧ ਕਰਨਾ ਦੇਖੋ। ਉਹ ਕਰਨਾ ਦਿਖਾਈ ਦੇ ਪ੍ਰਬੰਧ ਸਮਝਦੀ ਹੈ।
3. ਇਹ ਪ੍ਰਬੰਧ ਚਾਲ ਦੇ ਘਟਾਂ ਵਿੱਚ ਦੇਖੋ।
4. ਯੂਨਿਟ ਮੈਨ ਵਿੱਚ ਕਰਨਾ ਦੇਖੋ ਤਾਂ ਪ੍ਰਬੰਧ ਦੀ ਬੈਠਣ ਦੇ ਖੋਜ ਦੇ ਖੋਜ ਚਾਲ ਦੇ ਪ੍ਰਬੰਧ ਦੇ ਖੋਜ ਦੇ ਖੋਜ ਬਚਨ ਦੇਖੋ।
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – II

PAPER–VI: Punjab History & Culture (C 320 to 1000 B.C.)
(Special Paper in lieu of Punjabi compulsory)
(For those students who are not domicile of Punjab)

Time: 3 Hours  Max. Marks: 50

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section–A

1. Alexander’s Invasion and its Impact
2. Punjab under Chandragupta Maurya and Ashoka.

Section–B

3. The Kushans and their Contribution to the Punjab.
4. The Panjab under the Gupta Empire.

Section–C

5. The Punjab under the Vardhana Emperors
6. Socio-cultural History of Punjab from 7th to 1000 A.D.

Section–D

7. Development of languages and Education with Special reference to Taxila
8. Development of Art & Architecture

Suggested Readings:

1. L. M Joshi (Ed), History and Culture of the Punjab, Art-I, Punjabi University, Patiala, 1989 (3rd Edition)
Time: 3 Hours
Max. Marks: 50

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section – A
Prevention of Drug abuse:
Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.

Section – B
School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

Section – C
Controlling Drug Abuse:
Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program

Section – D
References:

PAPER-I: SOFTWARE ENGINEERING

Time: 3 Hours

M. Marks: 75

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four
Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are
required to attempt five questions, selecting at least one question from each Section. The fifth
question may be attempted from any Section.

SECTION-A
Concept of a Project, Project Life Cycle Phases, Tools & Techniques of Project Management,
Roles & Responsibilities of a Project Manager, Feasibility Report, Types of Feasibility,
Financing Arrangements, Preparation of Cost Estimates, Project Implementation Schedule,
Evaluation of Project Profitability.

SECTION-B
Working & Design of Systems, System Design & Execution Plan, Work Breakdown Structure,
Project Procedure Manual, Planning, Scheduling & Monitoring, Project Direction & Co-
ordination, Communications in a Project, Project Control—Progress, Performance, Schedule &
Cost Control, Performance Indicators & Performance Improvement, Project Management
Environment.

SECTION-C
Introduction & Objectives of Software Specification & Requirement Analysis (SRS), Sof-
tware Specification Documents & Attributes, Software Development Life Cycle, Data Dictionary,

SECTION – D
Report Writing: Characteristics, Types, Structure, Importance & Style of Reports, Case Studies-
Designing Illustrative Reports. Project Management Software Tools: Features, Different
components of both licensed and Open Source Software.

Reference Books:
   Limited, 1988 (Recommended as a text-book for the syllabus contents-6)
   Edition), Metropolitan .
   East-West Press Pvt. Ltd.
   1992 (Pages 411-436).
8. Behforooz, Ali and Hudson Frederick, 1996. : Develop Communication Skills, MacMillian
   India Ltd. : Software Engineering Fundamentals, Oxford University
**BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)**

**SEMMETER – III**

**PAPER –II: OBJECT-ORIENTED ANALYSIS AND DESIGN using UML**

**Time: 3 Hours**

**M. Marks: 75**

**Instructions for the Paper Setters:-**

Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Section-A**

**Overview of Object Oriented Systems Development:** Two Orthogonal Views of the Software, Concept of Object Oriented Software, Importance of Object Oriented Software, Object Oriented Systems Development Methodology.

**Object Basics:** An Object Oriented Philosophy, Objects, Object Behavior, Object Oriented Properties, Association and Aggregation.


**Object Oriented Methodologies:** Introduction, Types of Object Oriented, Methodologies, Patterns, Unified Approach.

**Section-B**


Section-C

Object Analysis: Classification: Object Analysis, Classification Theory, Approaches for Identifying Classes, Class Responsibility Collaboration.


Object Oriented Design Process and Design Axioms: Design Process, Design Axioms, Corollaries, Design Patterns.


View Layer: User Interface Design as a Creative Process, Designing View Layer Classes, Purpose of a View Layer Interface, Prototyping the User Interface.

Section-D

UML: System sequence diagrams for use case model, Domain model: identifying concepts, adding associations, adding attributes, Interaction Diagrams, Introduction to GRASP design Patterns, Design Model: Use case realizations with GRASP patterns, Design Class diagrams in each MVC layer Mapping Design to Code, Design class diagrams for case study and skeleton code

State-Chart diagrams, Activity diagrams, Component Diagrams, Deployment diagrams, Object diagrams.

Advanced concepts in OOAD: Use case relationships, Generalizations Domain Model refinements, Architecture, Packaging model elements.
Reference Books:

1. Object-Oriented Analysis And Design With Applications, 3/E By Booch
2. Object Oriented Analysis and Design Using UML By D. Jeya Mala
3. Object-Oriented Analysis, Design and Implementation: An Integrated Approach By Brahma Dathan, Sarnath Ramnath
4. Object Oriented Analysis & Design By Atul Kahate
5. Applying UML and Patterns: An Introduction to Object-oriented Analysis and design By Craig Larman
6. Advanced Object-Oriented Analysis and Design Using UML By James J. Odell
7. ‘Applying UML and patterns’ by Craig Larman, Pearson
8. Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning
10. UML 2 Toolkit, by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: WILE\'-Dreamtech India Pvt. Ltd.
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – III

PAPER-III: DBMS WITH ORACLE

Time: 3 Hours M. Marks: 75

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A
Introduction to Data, Field, Record, File, Database, Database management system. Structure of database system, Advantage and disadvantage, levels of database system, Relational model, hierarchical model, network model, comparison of these models, E–R diagram, different keys used in a relational system, SQL.

Section-B
DBA, responsibilities of DBA, Relational form like INF, 2NF, 3NF, BCNF, 4th NF, 5th NF, DBTG.

Section-C
Understanding SQL-I: Data Types, Creating Tables, Creating a Table with data from Another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, Dropping a Column, Querying database tables, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a Table, Functions: Character Functions, Date Functions, Group Functions, Ordering the result of a Query Aggregate Functions, Grouping the Result of a Query.

Understanding SQL-II: Definition and Advantages of Views, Creating and Altering Views, Using Views, Querying Multiple Tables using Equi-Joins, Cartesian Joins, Outer Joins, Self-Joins, SET Operators: Union, Intersect, Minus; Introduction to Nested Queries, Define Transaction, COMMIT and ROLLBACK
Section-D


**Reference Books:**
1. Introduction to Database System by C.J. Date.
2. Database Management System by B.C. Desai.
3. Database Concept by Korth.
4. Simplified Approach to DBMS–Kalyani Publishers
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER - III

PAPER-IV: PROGRAMMING IN JAVA

Time: 3 Hours

M. Marks: 75

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A
Fundamentals of Java: Java Vs. C++, Byte Code, Java virtual machine, constants, variables, data types, operators, expressions, control structures, defining class, creating objects, accessing class members, constructions, method overloading. String handling. Inheritance: Basics, member access, using super to call super class constructors, creating a multi level hierarchy, method overriding, dynamic method dispatch, using abstract classes, using Final.

Section-B
Packages and Interfaces: Defining a package, understanding CLASSPATH, Access protection: Importing packages, Interfaces, Defining an Interface, Implementing Interfaces, Applying Interfaces, Variables in Interfaces. Exception Handling: Fundamentals, Exception types, Using Try and Catch, Multiple Try and Catch clauses, Nested Try statements, Built–in exceptions.

Section-C
Multi-threaded Programming: The Java Thread model, Thread priorities, Synchronizations, Messaging. The thread class and runnable interface, The Main Thread : Creating a Thread, Implementing Runnable, Extending Thread, Creating Multiple Threads, Thread Priorities; Synchronizations : Methods, Statements, Inter Thread Communication, Deadlock, Suspending, Resuming and Stopping Threads.

Section-D

Reference Books:
1. Schildt Herbert : Java
Paper – V
(Programming Lab-I)
M. Marks: 75
Programming Lab on SQL, PL/SQL and UML design

Paper – VI
(Programming Lab-II)
M. Marks: 25
Programming Lab on JAVA
PAPER-I: SOFTWARE TESTING

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A

Section-B

Section-C
Test Case Design Techniques (Error Guessing, Equivalence Partitioning, Boundary Value Analysis, Real Practice In The Industry ), Test Case (Characteristics Of Good Test Case ,Test Case Template , How To Write A Test Case/How To Ensure The Test Coverage Is Good , How To Identify whether It Is a Good Test Case Or Not , Review Process/Peer Review , Preparing Review Report , Examples On Writing Test Cases )

Section-D
Preparing bug report using defect tracking tool, Checking for duplicate defects, Test Link (Introduction to Test Link tool, How to manage test cases using test link tool). Analyse Complexity Of The Code. How to Install (Web Application, Client Server Application, Stand Alone Application)

Reference Books:
1. The Art of Software Testing By Glenford J. Myers, Corey Sandler, Tom Badgett
2. Software Testing: Principles and Practice, By Srinivasan Desikan, Gopalaswamy Ramesh
5. Practical Software Testing: A Process-Oriented Approach By Ilene Burnstein
PAPER-II: SOFTWARE QUALITY MANAGEMENT

Time: 3 Hours

M. Marks: 75

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A
Introduction To Software Quality
Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb’s approach – GQM Model.

Section-B
Software Quality Assurance

Quality Control and Reliability

Section-C
Quality Management System:

Section-D
Quality Standards

Reference Books:
6. ISO 9000-3 “Notes for the application of the ISO 9001 Standard to software development”.
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – IV

PAPER – III: ADVANCED JAVA PROGRAMMING

Time: 3 Hours  M. Marks: 75

Instructions for the Paper Setters:-
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

Section-A
Swing: Features, components, Swing vs AWT, swing containers, controls, using Dialogs, sliders, progress bars, tables, creating user interface using swing.

Section-B
Connectivity: Connectivity model, Java, SQL package, JDBC Exception classes, Database connectivity, Data manipulation and navigation, Using PreparedStatement, creating database applications Java RMI: Distributed object technologies, RMI architecture, creating RMI applications.

Section-C

Section-D
Java Beans: Component architecture, Components, Advantages of Beans, Bean Developer kit (BDK), JAR files, introspection, developing Beans, Using Bound properties, The Java Beans API, Introduction to EJB (Enterprise Java Beans), Types of EJB, Uses of EJB.

Reference Books:
4. Schildt, Herbert: The Complete Reference Java 2, TMH.
5. Ivan Bayross: Web Enabled Commercial Application Development using Java 2.0, BPB.
BACHELOR OF VOCATION (B.VOC.) (DATA SCIENCE AND SOFTWARE ENGG.)
SEMESTER – IV

Paper – IV
(Programming Lab-I)  
M. Marks: 25
 Programming Lab on Software Testing Tools

Paper – V
(Programming Lab-II)  
M. Marks: 150
 Minor Project based on Java Programming
**Teaching Methodologies**
The Core Module Syllabus for Environmental Studies includes classroom teaching and field work. The syllabus is divided into 8 Units [Unit-I to Unit-VII] covering 45 lectures + 5 hours for field work [Unit-VIII]. The first 7 Units will cover 45 lectures which are classroom-based to enhance knowledge skills and attitude to environment. Unit-VIII comprises of 5 hours field work to be submitted by each candidate to the Teacher-in-charge for evaluation latest by 15 December, 2019.

**Exam Pattern:**
- **End Semester Examination** - 75 marks
- **Project Report/Field Study** - 25 marks [based on submitted report]
- **Total Marks** - 100

The structure of the question paper being:

**Part-A**, Short answer pattern with inbuilt choice - 25 marks
Attempt any five questions out of seven distributed equally from Unit-I to Unit-VII. Each question carries 5 marks. Answer to each question should not exceed 2 pages.

**Part-B**, Essay type with inbuilt choice - 50 marks
 Attempt any five questions out of eight distributed equally from Unit-I to Unit-VII. Each question carries 10 marks. Answer to each question should not exceed 5 pages.

**Project Report / Internal Assessment:**

**Part-C**, Field work – 25 marks [Field work equal to 5 lecture hours]
The candidate will submit a handwritten field work report showing photographs, sketches, observations, perspective of any topic related to Environment or Ecosystem. The exhaustive list for project report/area of study are given just for reference:

1. Visit to a local area to document environmental assets: River / Forest/ Grassland / Hill / Mountain / Water body / Pond / Lake / Solid Waste Disposal / Water Treatment Plant / Wastewater Treatment Facility etc.
2. Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
3. Study of common plants, insects, birds
4. Study of tree in your area with their botanical names and soil types
5. Study of birds and their nesting habits
6. Study of local pond in terms of wastewater inflow and water quality
7. Study of industrial units in your area. Name of industry, type of industry, Size (Large, Medium or small scale)
8. Study of common disease in the village and basic data from community health centre
9. Adopt any five young plants and photograph its growth
10. Analyze the Total dissolved solids of ground water samples in your area.
11. Study of Particulate Matter (PM$_{2.5}$ or PM$_{10}$) data from Sameer website. Download from Play store.
12. Perspective on any field on Environmental Studies with secondary data taken from Central Pollution Control Board, State Pollution Control Board, State Science & Technology Council etc.
Unit-I
The multidisciplinary nature of environmental studies
Definition, scope and importance, Need for public awareness  
(2 lectures)

Unit-II
Natural Resources: Renewable and non-renewable resources:
Natural resources and associated problems.
(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
• Role of an individual in conservation of natural resources.
• Equitable use of resources for sustainable lifestyles.  
(8 Lectures)

Unit-III
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, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)  
(6 Lectures)

Unit-IV
Biodiversity and its conservation
• Introduction – Definition: genetic, species and ecosystem diversity
• Biogeographical 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
• Endangered and endemic species of India
• Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity  
(8 Lectures)
Unit-V

Environmental Pollution:
Definition:
- Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear pollution
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

(8 Lectures)

Unit-VI

Social Issues and the Environment
- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Protection Act, 1986
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and control of Pollution) Act, 1974
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

(7 Lectures)

Unit-VII

Human Population and the Environment
- Population growth, variation among nations
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

(6 Lectures)
Field Work
- Visit to a local area to document environmental assets River / forest / grassland / hill / mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems - pond, river, hill slopes, etc

(Field work equal to 5 lecture hours)

References:
2. Down to Earth, Centre for Science and Environment, New Delhi.