

# FACULTY OF ENGINEERING & TECHNOLOGY

## SYLLABUS

### FOR

## MASTER OF COMPUTER APPLICATIONS

(5 YEARS INTEGRATED PROGRAMME)

*(Credit Based Evaluation and Grading System)*

(Semester: I – IV)

*(Credit Based Continuous Evaluation Grading System)*

(Semester V – VI)

## MASTER OF COMPUTER APPLICATIONS

(5 YEARS & 6 MONTHS INTEGRATED PROGRAMME)

(SEMESTER: VII – XI)

(Credit Based Continuous Evaluation Grading System)

Session: 2019-20



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**GURU NANAK DEV UNIVERSITY**  
**AMRITSAR**

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- (ii) Subject to change in the syllabi at any time.  
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*MCA (5 Years Integrated Programme) Semester System  
(Credit Based Evaluation and Grading System)*

**SCHEME**

		<b>Semester-I</b>				
<i>Sr. No.</i>	<i>Subject Code</i>	<i>Subject</i>	<b>Credits</b>			<b>Marks</b>
			<b>L</b>	<b>T</b>	<b>P</b>	
1.	CSL110	Programing Language–I	3	1	0	100
2.	CSL111	Personal Computing – Operating Systems & Software	3	1	0	100
3.	ECL191	Electronics Fundamentals	3	1	0	100
4.	MTL111	Mathematics–I	3	1	0	100
5.	CSP112	Programing Lab–I	0	0	2	100
6.	ENL101	Communicative English–I	2	0	0	100
7.		Elective–I	2	0	0	
		<b>Sub Total:</b>	<b>16</b>	<b>4</b>	<b>2</b>	
		<b>Grand Total:</b>	<b>22</b>			
		<b>List of Semester–I</b>				
1.	PBL121	Punjabi (Compulsory) <b>OR</b>	2	0	0	100
2.	*HSL101	Punjab History & Culture (1450-1716) <b>OR</b>	2	0	0	100
3.	*PBL122	ਮੁੱਢਲੀ ਪੰਜਾਬੀ	2	0	0	100
4.	**SOA101	Drug Abuse: Problem, Management and Prevention (Compulsory)	3	0	0	100

**Note:**

1. \* Special Paper in lieu of Punjabi Compulsory, For those students who are not domicile of Punjab
2. \*\* Credits will not be included in SGPA, Student can opt this Paper whether in 1<sup>st</sup> or 2<sup>nd</sup> Semester.

*MCA (5 Years Integrated Programme) Semester System  
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		<b>Semester-II</b>	Credits			Marks
1.	CSL121	Numerical Methods	3	1	0	100
2.	CSL122	Data Base Management System	3	1	0	100
3.	CSL123	Data Structure & File Processing	3	1	0	100
4.	CSL124	Object Oriented Programming C++	3	1	0	100
5.	CSP120	Programing Lab-II	0	0	2	100
6.	ENL151	Communicative English-II	2	0	0	
7.		Elective-II	2	0	0	
<b>Sub Total:</b>			<b>16</b>	<b>4</b>	<b>2</b>	
<b>Grand Total:</b>			<b>22</b>			
		<b>List of Semester-II</b>				
1.	PBL131	Punjabi (Compulsory) <b>OR</b>	2	0	0	100
2.	*HSL102	Punjab History & Culture (1717-1947) <b>OR</b>	2	0	0	100
3.	*PBL132	ਮੁੱਢਲੀ ਪੰਜਾਬੀ	2	0	0	100
4.	**SOA102	Drug Abuse: Problem, Management and Prevention (Compulsory)	3	0	0	100

**Note:**

1. \* Special Paper in lieu of Punjabi Compulsory, For those students who are not domicile of Punjab
2. \*\* Credits will not be included in SGPA, Student can opt this Paper whether in 1<sup>st</sup> or 2<sup>nd</sup> Semester.
3. PSL-053 ID Course Human Rights & Constitutional Duties (Compulsory Paper) Students can opt. in any semester except Semester 1<sup>st</sup>. This ID Paper is one of the total ID Papers of this course.

*MCA (5 Years Integrated Programme) Semester System  
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<i>Sr. No.</i>	<i>Sub Code</i>	<i>Subject</i>	<b>L</b>	<b>T</b>	<b>P</b>	
<b>Semester-III</b>						<b>Marks</b>
1.	CSL210	Operating System	3	1	0	100
2.	CSL212	Information Systems	3	1	0	100
3.	CSL213	Object Oriented Programming In Java	3	1	0	100
4.	CSL215	Computer Organization and Architecture	3	1	0	100
5.	CSP214	Programming Lab-III	0	0	2	100
6.	*ESL220	Environmental Studies	4	0	0	100
7.		Interdisciplinary Course-I	4	0	0	100
8.	MTL211	Computer Based Optimization Techniques	3	1	0	100
		<b>Sub Total:</b>	<b>23</b>	<b>5</b>	<b>2</b>	<b>700</b>
		<b>Grand Total:</b>	<b>30</b>			

\* Credits of ESL-220 will not be included in SGPA.

<b>Semester-IV</b>						
1.	CSL220	Data Communications	3	1	0	100
2.	CSL222	Theory of Computer Science	3	1	0	100
3.	CSL223	RDBMS Using ORACLE (SQL, PL/SQL)	3	1	0	100
4.	CSL225	Microprocessor And Its Applications	3	1	0	100
5.	CSL226	Software Engineering	3	1	0	100
6.	CSP224	Programming Lab-IV	0	0	2	100
7.		Interdisciplinary Course -II	4	0	0	100
		<b>Sub Total:</b>	<b>19</b>	<b>5</b>	<b>2</b>	<b>700</b>
		<b>Grand Total:</b>	<b>26</b>			

*MCA (5 Years Integrated Programme) Semester System  
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<b>Sr. No.</b>	<b>Sub Code</b>	<b>Subject</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Semester-V</b>					
1.	CSL310	Computer Graphics	3	1	0
2.	CSL311	Artificial Intelligence	3	1	0
3.	CSL312	Compiler Design	3	1	0
4.	CSL313	Advanced Java Technologies	3	1	0
5.		Interdisciplinary Course-III	4	0	0
6.	CSP315	Programming Lab-V	0	0	2
		<b>Sub Total:</b>	<b>16</b>	<b>4</b>	<b>2</b>
		<b>Grand Total:</b>	<b>22</b>		

<b>Semester-VI</b>					
1.	CSE320	Major Project-I	<b>0</b>	<b>0</b>	<b>22</b>

*MCA (5 Years Integrated Programme) Semester System  
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<b>Semester-VII</b>						
<b>Sr. No.</b>	<b>Sub Code</b>	<b>Subject</b>	<b>Credits</b>			Marks
			<b>L</b>	<b>T</b>	<b>P</b>	
1.	CSL450	Design And Analysis Of Algorithms	4	0	0	100
2.	CSL452	System Software	4	0	0	100
3.	CSL453	System Simulation	4	0	0	100
4.	CSL455	Design of Programming Languages	4	0	0	100
5.	CSP454	Programming Lab-VII	0	0	2	100
6.		Interdisciplinary IV	4	0	0	100
		<b>Sub Total:</b>	<b>20</b>	<b>0</b>	<b>2</b>	<b>600</b>
		<b>Grand Total:</b>	<b>22</b>			
<b>Semester-VIII</b>						
1.	CSL462	Network Operating Systems	4	0	0	100
2.	CSL465	Distributed Systems	4	0	0	100
3.	CSL469	Web Technologies	4	0	0	100
4.	CSL479	Data Communication-II	4	0	0	100
5.		Interdisciplinary V	4	0	0	100
6.	CSP464	Programming Lab-VIII	0	0	2	100
		<b>Sub Total:</b>	<b>20</b>	<b>0</b>	<b>2</b>	<b>600</b>
		<b>Grand Total:</b>	<b>22</b>			

*MCA (5 Years Integrated Programme) Semester System  
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<b>Semester-IX</b>						
<b>Sr. No.</b>	<b>Sub Code</b>	<b>Subject</b>	<b>Credits</b>			<b>Marks</b>
			<b>L</b>	<b>T</b>	<b>P</b>	
1.	CSL532	Advanced Software Engineering	4	0	0	100
2.	CSL535	Soft Computing	4	0	0	100
3.	CSL536	Data Warehousing and Data Mining	4	0	0	100
4.	CSL537	Digital Image Processing	4	0	0	100
5.	CSP536	Programming Lab-IX	0	0	2	100
<b>Sub Total:</b>			<b>16</b>	<b>0</b>	<b>2</b>	
<b>Grand Total:</b>			<b>18</b>			<b>500</b>
<b>Semester-X</b>						
1.	CSL542	Advanced Computer Architecture	4	0	0	100
2.	CSL579	Big Data & Business Analytics	4	0	0	100
3.	CSL589	Cyber Ethics	4	0	0	100
4.	CSL599	Computational Problem Solving Using Python	4	0	0	100
5.	CSL549	Mobile Computing	4	0	0	100
6.	CSP546	Programming Lab-X	0	0	2	100
<b>Sub Total:</b>			<b>20</b>	<b>0</b>	<b>2</b>	
<b>Grand Total:</b>			<b>22</b>			<b>600</b>

<b>Semester-XI</b>						
<b>Sr. No.</b>	<b>Sub Code</b>	<b>Subject</b>	<b>Credits</b>			<b>Marks</b>
			<b>L</b>	<b>T</b>	<b>P</b>	
1.	CSD690	Major Project	0	0	22	500

**CSL110: PROGRAMMING LANGUAGE–I**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT–I**

Introduction to Computer Programming, Program Development life cycle, algorithms, flow chart, decision table & pseudo code

**UNIT–II**

Introduction to C language, data types, Operators and Expression, Input/output Functions, Structured programming elements, Control statements: Branching, Jumping, Looping Arrays.

**UNIT–III**

Pointers, Functions: Inbuilt Functions, User defined Functions, Recursion, Storage Classes in C, dynamic memory management.

**UNIT-IV**

Strings, Structure and union, Reference variables, basics of searching and sorting techniques, File handling in C

**References:**

1. R.S. Salaria: Applications Programming in C, Khanna Book Publishing Co. (P) Ltd., Delhi.
2. Byron Gotterfied: Programming in C, Tata McGraw Hill Publishing Company Ltd., Delhi.
3. Yashvant Kanetkar: Let Us C, BPB Publications, Delhi.



**CSL111: PERSONAL COMPUTING – OPERATING SYSTEMS & SOFTWARE**

**Credits**

<b>L</b>	<b>T</b>	<b>P</b>
<b>3</b>	<b>1</b>	<b>0</b>

**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**DISK OPERATING SYSTEM:**

The basic fundamentals of DOS, Disk organization, understanding DOS prompt and Shell Screen using keyboard & mouse, Internal commands, Batch files, Using the screen editor, Printing images, ASCII files, Indirect Printing and spooling, Communicating with other devices, Parallel vs Serial communication, Optimizing DOS, CONFIG.SYS & AUTOEXEC.BAT files, Freeing up memory at boot time, Managing Extended and Expanded memory, RAM Disk, Disk Caching, Defragmentation.

**UNIT-II**

**WINDOWS:** Window Fundamental: Types of windows, anatomy of windows, Windows Explorer, customizing windows, installing a printer, using clipboard, using paintbrush, Control Panel, Taskbar Setting.

**MS-WORD:** Fundamentals of MS-Word, Menus, Toolbars, Ruler, Scroll Bars, Status Bar, Creating, Saving, Importing, Exporting and Inserting files, Formation, Indents / Outdents, Lists, Tabs, Styles, Working with Frames, Columns, Pictures, Chart Graphs, Forms, Tools, Equations and Macros.

**UNIT-III**

**MS-EXCEL:** Worksheet overview, Row, Columns, Cell, Menus, Creating worksheets, opening and saving worksheets, Formatting, Printing, Charts, Window, Establishing worksheet links, Macros, Database, Tables, Using files with other programs.

#### **UNIT-IV**

**MS-POWERPOINT:** PowerPoint Basics, Create Presentation, Insert and Modify text, Work with Graphics and Media, Final Presentations

**Disk Management Tools:** PC Tools, Norton Utilities, Norton Disk Doctor, Virus detection, prevention and cure utilities.

#### **References:**

1. Robbins Judd: Mastering DOS 6.0 & 6.2, BPB Publications, 1994
2. DOS Quick Ref. Manual Vol. II, BPB Publications.
3. Gurvinder Singh & Rachhpal Singh, Window Based Computer Courses, Kalyani Publishers.
4. Crawford & Russel: Getting Ready for Windows 95, BPB Publications
5. Russel A. Stuluz. Learn Excel for Windows in a Day, BPB Publications
6. Russel A. Stuluz. MS Word 6.0 for Windows in a Day, BPB Publications
7. Mansfield: Mastering Word 6.0 for Windows, BPB Publications

**ECL191: ELECTRONICS FUNDAMENTALS**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
<b>3</b>	<b>1</b>	<b>0</b>

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

Elementary electrical circuit theory: Ideal voltage and current sources. Resistance and Ohm's law. Series and parallel resistance. Kirchhoff's law and solution of simple resistive networks. Maximum power transfer condition for a battery. Thevenin's theorem and simple application. Norton's theorem statement only. Functions and use of a multimeter. Capacitor and its properties. Charging a capacitor with constant current.

**UNIT-II**

Characteristics of an RC circuit (qualitative only) . nodifferential equation). Time constant to fan RC circuit. Properties of a pure inductor (IOPds).  
Periodic waves. Use oscillo scope to view periodic wave forms (concept only). Concept to of phase frequency and amplitude. Alternating current. Impedance of resistor. Capacitor and inductor in series (algebraic expression only). Resonance in an LC series circuit, frequency response.  
Resonance in LC parallel circuit frequency response. Diode & Triode. Properties and limitations of a real semiconductor diode and triode.

**UNIT-III**

Rectification by diode bridge filtering concepts. Component! > and fonction of an unregulated DC power supply. Zener diode and its use 5MPS. Concept of transistor. IC. VLSI etc.  
Amplifier Concepts: Ideal voltage and Current amplifier. Amplifiers cascade. Voltage and power gain Gain B Feedback concept Operational amplifier in summing amplifier configuration. Voltage follower. An Af amplifier using operational amplifier. Frequency response of an audio amplifier.

#### **UNIT-IV**

Electronic components and assembly using a printed circuit board. Elementary concept of Integrated circuits. Typical characteristics and use of an IC power amplifier.

Principles of Radio. FM & AM. Concept of tuning. Block diagram of a Radio. Frequency Bands used for Radio, TV and satellite communication

Principles of Ups, Inverters. Grounding.

#### ***References Books:***

1. Integrated Electronics, Milman, and Halkias. Tala Mcgraw Hill,2007.
2. Electronic Devices & Circuits Theory by Boylested, Pearson Education.
3. Electronic Devices by Floyd. Pearson Education.
4. Electronics Devices & Circuits by J.B. Gupta, Katson.

**MTL111: MATHEMATICS–I**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
<b>3</b>	<b>1</b>	<b>0</b>

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT–I**

**Matrices and Determinants:** Introduction and definition of matrix, types of matrices, matrix addition and scalar multiplication transpose and inverse of matrix, solution of system of linear equations, definition and properties of determinants (statements only), characteristics polynomial, eigen values, nature of eigen values, certain types of matrices, Cayley–Hamilton theorem. Canonical forms of matrices.

**UNIT–II**

**Logic, Lattice and Boolean Algebra:** Logic operators like AND, OR, NOT, etc. truth tables, logical identities, theory of inference and deduction, mathematical induction, predicate calculus predicates and quantifiers. Lattice as a partial ordered set, properties of lattice, Boolean algebra, representation and minimization of Boolean algebra, finite state machine.

**UNIT–III**

**Probability and Statistics:** Mathematical and statistical probability, axiomatic approach to probability, law of addition of probability, dependence of events, Baye's theorem.

#### **UNIT-IV**

Origin and development of statistics, definition and scope of statistics, frequency distribution, graphical representation of frequency distribution.

#### **Probability and Statistics:**

Measures of central tendency, requisites for an ideal measure of central tendency, measure of dispersion, coefficient of dispersion, moments, skewness, kurtosis. Coefficient of co–relation, effect of change of origin in scale, rank co– relation coefficient, lines of regression, curve of regression, angle between the lines of regression.

#### **Books Recommended:**

1. Trembley, J.P. and Manohar R.P., Discrete Mathematical statistics with Application to Computer Science.
2. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics.
3. Allan Doerr: Applied Discrete Structures for Computer Science.

**CSP112: PROGRAMING LAB-I**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
<b>0</b>	<b>0</b>	<b>2</b>

***Total Marks: 100***

Programming assignments on C, Software Operating System and Personnel Computing  
Programming Languages-I

**ENL-101: COMMUNICATIVE ENGLISH-I****Credits: 02 (L= 2, T=0, U=0)****Total Marks: 100****Mid Semester Examination: 20% weightage****End Semester Examination: 80% weightage**

**Objective:** To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

**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.

**Prescribed Text Books:**

- *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.
- *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

**Section–A**

“Word List”, “Correct Usage of Commonly used words and Phrases” from the chapter “Vocabulary” given in *The Written Word* by Vandana R. Singh.

**Section–B**

Letter- writing as prescribed in *The Written Word* by Vandana R. Singh.

Report writing as prescribed in *The Written Word* by Vandana R. Singh.

**Section–C**

Section 1 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

**Section–D**

Section 2 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.



**PBL 121: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ - I**

**Credit: 2-0-0**  
**Total Marks: 100**

**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**ਸੈਕਸ਼ਨ-ਦੇ**

- I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :  
(ੳ) ਭਾਈ ਵੀਰ ਸਿੰਘ  
(ਅ) ਧਨੀ ਰਾਮ ਚਾੜ੍ਹਕ  
(ੲ) ਪ੍ਰੋ. ਪੁਰਨ ਸਿੰਘ  
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)
- II. ਗੁਰਮੁਖੀ ਐਰਥੋਗਰਾਫੀ ਦੀ ਜੁਗਤ (ਪੋਤੀ, ਮੁਹਾਰਨੀ, ਬਿੰਦੀ, ਟਿੱਪੀ ਤੇ ਅੱਧਕ); ਵਿਸਰਾਮ ਚਿੰਨ੍ਹ, ਸ਼ਬਦ ਜੋੜ (ਸੁਧ-ਅਸੁਧ)

**ਸੈਕਸ਼ਨ-ਬੀ**

- I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :  
(ੳ) ਫਿਰੋਜ਼ਦੀਨ ਸਰਫ  
(ਅ) ਪ੍ਰੋ. ਮੋਹਨ ਸਿੰਘ  
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)
- II. ਲੇਖ ਰਚਨਾ (ਜੀਵਨੀ-ਪਰਕ, ਸਮਾਜਕ ਅਤੇ ਚਲੰਤ ਵਿਸ਼ਿਆਂ ਉੱਤੇ) : 10 ਲੇਖ ਲਿਖਵਾਉਣੇ  
(ਕਲਾਸ ਵਿਚ ਅਤੇ ਘਰ ਲਈ ਅਭਿਆਸ)

**ਸੈਕਸ਼ਨ-ਸੀ**

- I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :  
(ੳ) ਨੰਦ ਲਾਲ ਨੂਰਪੁਰੀ  
(ਅ) ਅਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ  
(ੲ) ਡਾ. ਹਰਿਭਜਨ ਸਿੰਘ  
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)
- II. ਸ਼ੁੱਧ, ਅਸ਼ੁੱਧ : ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿੱਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ  
(15 ਪੈਰ੍ਹਿਆਂ ਦੇ ਸ਼ੁੱਧ ਅਸ਼ੁੱਧ ਅਭਿਆਸ ਕਰਵਾਉਣੇ)

**ਸੈਕਸ਼ਨ-ਡੀ**

- I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ :  
(ੳ) ਸਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ  
(ਅ) ਸੁਰਜੀਤ ਪਾਤਰ  
(ਕਵੀ ਦਾ ਜੀਵਨ, ਕਵਿਤਾ-ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਾਵਿ-ਕਲਾ)
- II. ਅਖਬਾਰੀ ਇਸਤਿਹਾਰ : ਨਿੱਜੀ, ਦਫ਼ਤਰੀ ਤੇ ਸਮਾਜਕ ਗਤੀਵਿਧੀਆਂ ਨਾਲ ਸੰਬੰਧਤ

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

- ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
- ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
- ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
- ਪੈਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**HSL–101: Punjab History & Culture (1450-1716)**  
**(Special paper in lieu of Punjabi Compulsory)**  
**(For those students who are not domicile of Punjab)**

**Credits: 2-0-0**  
**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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. Land and the People.
2. Bhakti Movement

**Section-B**

3. Life and Teaching of Guru Nanak Dev.
4. Contribution of Guru Angad Dev, Guru Arjun Dev, Guru Amar Das and Guru Ram Das.

**Section-C**

5. Guru Hargobind.
6. Martyrdom of Guru Teg Bahadur

**Section-D**

7. Guru Gobind Singh and the Khalsa.
8. Banda Singh Bahadur: Conquests and Execution.

**Suggested Reading:**

1. Kirpal Singh (Ed.), *History and Culture of the Punjab, Part-ii, Punjabi University, Patiala, 1990.*
2. Fauja Singh (Ed.), *History of Punjab, Vol, III Punjabi University, Patiala, 1987.*
3. J.S. Grewal, *The Sikhs of the Punjab, Cup, Cambridge, 1991.*
4. Khushwant Singh, *A History of the Sikhs, Vol. I, OUP, New Delhi, 1990.*

**PBL-122: ਮੁੱਢਲੀ ਪੰਜਾਬੀ**  
(In lieu of Punjabi Compulsory)

**Credits: 2-0-0**  
**Total Marks: 100**

**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**ਪਾਠ-ਕ੍ਰਮ**

**ਸੈਕਸ਼ਨ-ਏ**

ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ,  
ਮਾਤ੍ਰਾਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ-ਪਛਾਣ)  
ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) : ਪਛਾਣ ਤੇ ਵਰਤੋਂ

**ਸੈਕਸ਼ਨ-ਬੀ**

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਮੁੱਢਲੀ ਜਾਣ-ਪਛਾਣ  
ਸਾਧਾਰਨ ਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ  
ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ

**ਸੈਕਸ਼ਨ-ਸੀ**

ਸ਼ੁੱਧ ਅਸ਼ੁੱਧ : ਦਿੱਤੇ ਪੈਰੇ ਵਿੱਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ।  
ਸਮਾਨਾਰਥਕ ਤੇ ਵਿਰੋਧਾਰਥਕ ਸ਼ਬਦ

**ਸੈਕਸ਼ਨ-ਡੀ**

ਹਫਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਮ, ਇਕ ਤੋਂ ਸੌ ਤੱਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿੱਚ।

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ।  
ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

**DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION  
(Student can opt this Paper in 1<sup>st</sup> or 2<sup>nd</sup> Semester)**

**SOA: 101–PROBLEM OF DRUG ABUSE**

**Time: 3 Hours**

**Credit 3-0-0  
Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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**

**Meaning of Drug Abuse:**

- 1) Meaning, Nature and Extent of Drug Abuse in India and Punjab.
- 2) Consequences of Drug Abuse for:
 

Individual	:	Education, Employment, Income.
Family	:	Violence.
Society	:	Crime.
Nation	:	Law and Order problem.

**Section – B**

**Management of Drug Abuse:**

- (i) Medical Management: Medication for treatment and to reduce withdrawal effects.
- (ii) Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
- (iii) Social Management: Family, Group therapy and Environmental Intervention.

**Section – C**

**Prevention of Drug Abuse:**

- (i) Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.
- (ii) School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

**Section – D**

**Controlling Drug Abuse:**

- (i) Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program
- (ii) Legislation: NDPs act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

**References:**

1. Ahuja, Ram (2003), *Social Problems in India*, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. *The Drug Crime Connection*. Beverly Hills: Sage Publications.
4. Kapoor. T. (1985) *Drug epidemic among Indian Youth*, New Delhi: Mittal Pub.
5. Kessel, Neil and Henry Walton. 1982, *Alcoholism*. Harmond Worth: Penguin Books.
6. Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.
7. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
8. Ross Coomber and Others. 2013, *Key Concept in Drugs and Society*. New Delhi: Sage Publications.
9. Sain, Bhim 1991, *Drug Addiction Alcoholism, Smoking obscenity* New Delhi: Mittal Publications.
10. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab: A Sociological Study*. Amritsar: Guru Nanak Dev University.
11. Singh, Chandra Paul 2000. *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.
12. Sussman, S and Ames, S.L. (2008). *Drug Abuse: Concepts, Prevention and Cessation*, Cambridge University Press.
13. Verma, P.S. 2017, “*Punjab’s Drug Problem: Contours and Characteristics*”, Economic and Political Weekly, Vol. LII, No. 3, P.P. 40-43.
14. World Drug Report 2016, United Nations office of Drug and Crime.
15. World Drug Report 2017, United Nations office of Drug and Crime.

**CSL121: NUMERICAL METHODS**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
<b>3</b>	<b>1</b>	<b>0</b>

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Introduction**

Numerical Methods, Numerical methods versus numerical analysis, Errors and Measures of Errors.

Non-linear Equations, Iterative Solutions, Multiple roots and other difficulties, Interpolation methods. Bi-section Method, False position method, Newton Raphson-method.

**UNIT-II**

Simultaneous solution of equations, Gauss Elimination Method Gauss Jordan Method, Gauss Seidel Method, Bi-section Method, False position method, Newton Raphson-method.

**UNIT-III**

Interpolation and Curve Fitting, Lagrangian Polynomials, Newton's Method: Forward Difference Method, Backward Difference Method Divided Difference Method.

**UNIT-IV**

Numerical Integration and Different Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule. Numerical differentiation by Polynomial Fit, Correlation and Regression Analysis.

**Reference:**

1. R.S. Salaria: Computer Oriented Numerical Methods, Khanna Publishing Company (P) Ltd., New Delhi.
2. V. Rajaraman: Computer Oriented Numerical Methods, Prentice Hall of India Pvt. Ltd., New Delhi.

**CSL122: DATA BASE MANAGEMENT SYSTEM**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
<b>3</b>	<b>1</b>	<b>0</b>

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Overview:** Database, Database Management System, Advantages and disadvantages of DBMS, DDL, DML, Data Dictionary, Database System Structure, DBA, responsibilities of DBA.

**UNIT-II**

Three level ANSI-SPARC Architecture, Schemas, Mapping, instances and Database Independence. Entity-Relationship model, Relational Model, Keys, Integrated constraints.

**UNIT-III**

Relational Algebra, Relational Calculus, Introduction to SQL, Normalization: 1NF, 2NF, 3NF, BCNF. Concurrency Control and its management,

**UNIT-IV**

Security and recovery of database. Basic concepts of object-oriented DBMS, Comparison of RDBMS and OODBMS. Case study – MYSQL

**References:**

1. Silberschatz, Korth, Sudershan “Database System Concepts” 4th Ed. McGraw Hill
2. Connolly & Begg “Database Systems – A Practical Approach to Design, Implementation and Management, 3<sup>rd</sup> Ed. Pearson Education.
3. Parteek Bhatia and Gurvinder Singh, “Simplified Approach to DBMS”, Kalyani Publishers.
4. Elmarsi & Navathe “Fundamentals of Database Systems” 4<sup>th</sup> Ed. Pearson Education.
5. C.J.Date “Introduction to Database System”.

**CSL123: DATA STRUCTURES AND FILE PROCESSING**

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Basic Data Structures**

Introduction to elementary Data Organization and its operations, complexity of Algorithms and Time space trade off, string processing, Arrays, Stacks, Linked Lists.

**Searching Techniques**

Linear and Binary Search

**UNIT-II**

**Queues:** Description of queue structure, implementation of queue using arrays and linked lists, description of priorities queues. Applications of queues – Operating system simulations

**Graphs:** Description of graph structure, implementing graphs in memory using adjacency matrix or adjacency lists, various graphs traversing algorithms, finding shortest path between two nodes, Dijkstra's shortest path algorithm., finding biconnected component, strongly connected component and finding cycles in the graphs.

**UNIT-III**

**Trees:** Description of tree structure and its terminology, binary search tree, implementing binary search tree using linked lists, various operations on binary search trees, AVL Trees, Threaded Binary Trees, B-Trees, B+ trees

**Sorting Techniques**

Bubble Sort, selection sort, insertion sort, quick sort, merge sort, heap sort.



#### **UNIT-IV**

##### **File Organization**

Concept of field, record, file, blocking and compaction.

##### **File Organization Techniques**

Sequential indexed, indexed sequential, Direct, Hashing, Concept of master and transaction files.

##### **Text / References:**

1. Data Structure – Seymour Lipschutz, Schaum Outline Series.
2. File Structures & Data Structures by E.Loomis
3. Data Structures by Trabley & Soreuson.

**CSL124: OBJECT ORIENTED PROGRAMMING C++**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
<b>3</b>	<b>1</b>	<b>0</b>

**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Getting Started:**

Introduction. A brief history of C++, Variable, Constant, Expression, Statements, Comments and keywords of C++,

**Operator:** Arithmetic, Relational, Logical, Assignment, Increment/Decrement, Conditional, Precedence of Operators., Data type, Type conversion, library function.

**Input/Output Statements:** Inputting using cin and outputting using cout statements, Preprocessor directives

**Basic Program construction:** A complete C++ program: invoking Turbo C++, naming your program, using the editor, saving your program, compiling and linking, running the program

**Errors:** Compiler, linker and runtime.

**Other IDE features:** Compiling and linking, shortcut exiting from IDE, examining files, opening an existing file, DOS shell.

## UNIT-II

### **Decision Making and Looping statement**

If statement, if....else statement, nesting of if statement, switch statement, conditional operator statement. While loop, do loop, for loop, nesting of loops, break and continue statement, go to statement.

### **Arrays:**

Defining an array, array type, array elements, Accessing & initializing array, Programming of C++ with array, String handling, array of strings

### **Functions**

What is a function? Declaring and defining function, Local, global variables, execution of function, Passing argument to function, Return values, Reference arguments, Overloading functions, Inline function and default parameter, Variable and storage classes.

## UNIT-III

### **Object Oriented Programming**

Objects & Classes, Constructor & Destructor

**Operator Overloading:** Overloading unary operators, Overloading binary operators, Data conversion, Pitfalls operator overloading and conversion

**Inheritance:** Derived class and Base Class, Derived Class Constructors, Overriding member functions, class hierarchies, Public & Private inheritance, Levels of inheritance **Polymorphism:** Problems with single inheritance, Multiple inheritance.

## UNIT-IV

**Structures:** A simple structure, specifying the structure, defining a structure variable  
Accessing Structure member

Other structure features, Structure within structure, Structure and classes, Arrays of structure

**Pointers:** Addresses and pointers, Pointers and Arrays, Pointers and Functions, Pointers and Strings, Pointer to objects, Pointer to pointers.

**Files & Streams:** Overview of streams, String I/O, character I/O, Object I/O, I/O with multiple objects, File Pointers, Disk I/O with member functions, Redirections, Error handling, Command–line Argument

### **Books:**

1. C++ & Graphics by Vijay Mukhi's
2. Turbo C++ by Robert Lafore
3. Mastering C++
4. C++ Programming language by Saucham's outline series

**CSP120: PROGRAMMING LABORATORY–II****Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
<b>0</b>	<b>0</b>	<b>2</b>

Based on C++ Programming language,

Based on numerical methods and statistical techniques using C/C++

Implementation of Data Structures using C++

DBMS – MYSQL: Introduction to SQL & Database Administration

## COMMUNICATIVE ENGLISH–II

Subject Code- ENL-151

Credits: 02 (L= 2, T=0, U=0)  
Total Marks: 100

Mid Semester Examination: 20% weightage

End Semester Examination: 80% weightage

### 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.

**Objective:** To introduce students to the skills and strategies of reading and writing by identifying organizational patterns, spotting classification systems and understanding associations between ideas. This course will prepare students to read a variety of texts and also to communicate more effectively through writing. The course will also pay special attention to vocabulary building.

### Prescribed Text books:

- *The Written Word* by Vandana R. Singh, Oxford University Press, New Delhi.
- *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

### SECTION–A

Practical question on Note Making, Summarizing and Abstracting as given in *The Written Word* by Vandana R. Singh

### SECTION–B

Practical question on Paragraph writing as prescribed in *The Written Word* by Vandana R. Singh

### SECTION–C

Theoretical questions based on ABC of Good Notes as prescribed in *The Written Word* by Vandana R. Singh.

Section C from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

### SECTION–D

Practical question on Essay writing from *The Written Word* by Vandana R. Singh  
Section 4 from *Making Connections: A Strategic Approach to Academic Reading* by Kenneth J. Pakenham, Second Edition.

**PBL 131: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ-II**

**Credit: 2-0-0**  
**Total Marks: 100**

**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**ਸੈਕਸ਼ਨ-ਦੇ**

- I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :  
(ੳ) ਨਾਨਕ ਸਿੰਘ : **ਭੂਆ**  
(ਅ) ਗੁਰਮੁਖ ਸਿੰਘ ਮੁਸਾਫਿਰ : **ਬਾਗੀ ਦੀ ਧੀ**  
(ੲ) ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ : **ਪੇਮੀ ਦੇ ਨਿਆਣੇ**  
(ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਕਹਾਣੀ ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ)
- II. ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਧਾਤੂ/ਮੂਲ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਵਿਉਂਤਪਤ ਅਤੇ ਰੁਪਾਂਤਰੀ), ਸਮਾਸ।  
**ਸੈਕਸ਼ਨ-ਬੀ**

- I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :  
(ੳ) ਸੁਜਾਨ ਸਿੰਘ : **ਬਾਗਾਂ ਦਾ ਰਾਖਾ**  
(ਅ) ਕਰਤਾਰ ਸਿੰਘ ਦੁੱਗਲ : **ਤੈਂ ਕੀ ਦਰਦ ਨਾ ਆਇਆ**  
(ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਕਹਾਣੀ ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ)
- II. ਪੈਰ੍ਹਾ ਰਚਨਾ : ਕਲਾਸ ਵਿਚ 10 ਵਿਸ਼ਿਆਂ (ਸਭਿਆਚਾਰ, ਧਾਰਮਕ ਅਤੇ ਰਾਜਨੀਤਕ) 'ਤੇ ਪੈਰ੍ਹਾ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ।

**ਸੈਕਸ਼ਨ-ਸੀ**

- I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :  
(ੳ) ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ : **ਧਰਤੀ ਹੇਠਲਾ ਬੋਲਦ**  
(ਅ) ਨਵਤੇਜ ਸਿੰਘ : **ਦੂਜੀ ਵਾਰ ਜੇਬ ਕੱਟੀ ਗਈ**  
(ੲ) ਪੇਮ ਪ੍ਰਕਾਸ਼ : **ਲੱਛਮੀ**  
(ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਕਹਾਣੀ ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ)
- II. ਮੁਹਾਵਰੇ ਤੇ ਅਖਾਣ (ਅਖਾਣ ਤੇ ਮੁਹਾਵਰਾ ਕੋਸ਼ ਵਿਚ) 200 ਮੁਹਾਵਰਿਆਂ ਅਤੇ 100 ਅਖਾਣਾਂ ਨੂੰ ਵਾਕਾਂ ਵਿਚ ਵਰਤਣ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ (ਕਲਾਸ ਵਿਚ ਤੇ ਘਰ ਲਈ)।  
**ਸੈਕਸ਼ਨ-ਡੀ**

- I. **ਦੋ ਰੰਗ** (ਸੰਪਾ. ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿੱਲੋਂ, ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ :  
(ੳ) ਅਜੀਤ ਕੌਰ : **ਬੁੱਤ ਸ਼ਿਕਨ**  
(ਅ) ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ : **ਬੱਸ ਕੰਡਕਟਰ**  
(ਕਹਾਣੀਕਾਰ ਦਾ ਜੀਵਨ, ਕਹਾਣੀ ਸਾਰ, ਵਿਸ਼ਾ-ਵਸਤੂ, ਕਹਾਣੀ ਕਲਾ)
- II. ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸੰਬੰਧਕ

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹੁਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**HSL–102: Punjab History & Culture (1717-1947)**  
**(Special paper in lieu of Punjabi Compulsory)**  
**(For those students who are not domicile of Punjab)**

**Credits: 2-0-0**  
**Total Marks: 100**

**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**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. Sikh Struggle for Sovereignty.
2. Ranjit Singh: Conquests, Administration and the Anglo-Sikh Relations.

**Section-B**

3. Anglo-Sikh Wars and the Annexation.
4. The Punjab under the British: New Administration, Education and social Change.

**Section-C**

5. Economic Changes: Agricultural
6. Socio-Religious Reform Movements.

**Section-D**

7. Role of Punjab in the Freedom Struggle.
8. Fairs and Festivals.

**Suggested Readings:**

1. Kirpal Singh (Ed.), *History and Culture of the Punjab*, Part-II, Punjabi University, Patiala, 1990.
2. Fauja Singh (Ed.), *History of Punjab*, Vol, III, Punjabi University, Patiala, 1987.
3. J.S. Grewal, *The Sikhs of the Punjab, Cup, Cambridge, 1991*.
4. Khushwant Singh, *A History of the Sikhs*, Vol. I, OUP, New Delhi, 1990.

**PBL-132: ਮੁੱਢਲੀ ਪੰਜਾਬੀ**  
(In lieu of Punjabi Compulsory)

**Credits: 2-0-0**  
**Total Marks: 100**

**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**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.

ਪਾਠ-ਕ੍ਰਮ

ਸੈਕਸ਼ਨ-ਏ

ਸਬਦ ਸ੍ਰਣਾਆ : ਪਛਾਣ ਅਤੇ ਵਰਤ

(ਨਾਂਵ, ਪੜਨਾਂਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ, ਕਿਰਿਆ ਵਸ਼ਸ਼ਣ)

ਸੈਕਸ਼ਨ-ਬੀ

ਨਤ ਵਰਤ ਦਾ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲਾ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਸਤ-ਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਨਾਲ ਸਬੰਧਤ ।

ਸੈਕਸ਼ਨ-ਸੀ

ਪੰਜਾਬੀ ਵਾਕ-ਬਣਤਰ

ਸਾਧਾਰਨ-ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤ)

ਸੰਯੁਕਤ-ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤ)

ਮਿਸ਼ਰਤ-ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤ)

ਸੈਕਸ਼ਨ-ਡੀ

ਪਰ੍ਹਾ ਰਚਨਾ

ਸੰਖੇਪ ਰਚਨਾ

**ਅੰਕ-ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਭਾਗ ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਭਾਗ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ ਬਰਾਬਰ ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ-ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।



**DRUG ABUSE: PROBLEM, MANAGEMENT AND PREVENTION**  
**(Student can opt this Paper in 1<sup>st</sup> or 2<sup>nd</sup> Semester)**

**SOA–101: PROBLEM OF DRUG ABUSE**

**Time: 3 Hours**

**Credit 3-0-0**  
**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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**

**Meaning of Drug Abuse:**

- 1) Meaning, Nature and Extent of Drug Abuse in India and Punjab.
- 2) Consequences of Drug Abuse for:
 

Individual	:	Education, Employment, Income.
Family	:	Violence.
Society	:	Crime.
Nation	:	Law and Order problem.

**Section – B**

**Management of Drug Abuse:**

- i. Medical Management: Medication for treatment and to reduce withdrawal effects.
- ii. Psychiatric Management: Counselling, Behavioural and Cognitive therapy.
- iii. Social Management: Family, Group therapy and Environmental Intervention.

**Section – C**

**Prevention of Drug Abuse:**

- i. Role of family: Parent child relationship, Family support, Supervision, Shaping values, Active Scrutiny.
- ii. School: Counselling, Teacher as role-model. Parent-teacher-Health Professional Coordination, Random testing on students.

**Section – D**

**Controlling Drug Abuse:**

- i. Media: Restraint on advertisements of drugs, advertisements on bad effects of drugs, Publicity and media, Campaigns against drug abuse, Educational and awareness program
- ii. Legislation: NDPs act, Statutory warnings, Policing of Borders, Checking Supply/Smuggling of Drugs, Strict enforcement of laws, Time bound trials.

**References:**

1. Ahuja, Ram (2003), *Social Problems in India*, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. *The Drug Crime Connection*. Beverly Hills: Sage Publications.
4. Kapoor. T. (1985) *Drug epidemic among Indian Youth*, New Delhi: Mittal Pub.
5. Kessel, Neil and Henry Walton. 1982, *Alcoholism. Harmond Worth: Penguin Books*.
6. Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.
7. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
8. Ross Coomber and Others. 2013, *Key Concept in Drugs and Society*. New Delhi: Sage Publications.
9. Sain, Bhim 1991, *Drug Addiction Alcoholism, Smoking obscenity* New Delhi: Mittal Publications.
10. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab: A Sociological Study*. Amritsar: Guru Nanak Dev University.
11. Singh, Chandra Paul 2000. *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.
12. Sussman, S and Ames, S.L. (2008). *Drug Abuse: Concepts, Prevention and Cessation*, Cambridge University Press.
13. Verma, P.S. 2017, “*Punjab’s Drug Problem: Contours and Characteristics*”, Economic and Political Weekly, Vol. LII, No. 3, P.P. 40-43.
14. World Drug Report 2016, United Nations office of Drug and Crime.
15. World Drug Report 2017, United Nations office of Drug and Crime.

**CSL210: OPERATING SYSTEM**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**Objectives**

To enable the students to have understanding of the role & importance of Operating system in computing.

**SECTION – A**

**Basic Contents:** History & evolution of operating system, OS as resource manager, Various views of OS.

**Process Management:** State of Processes, Process scheduling, Race conditions, deadlocks, Bankers Algorithm, Precedence Graphs, Semaphores, Monitors.

**SECTION – B**

**Memory Management:** Basic Memory Management Schemes, Partition Memory Management, Demand Paged Memory Management, Segmented Memory Management, Swapping, Hierarchy of Memory.

**Device Management:** Dedicated Devices, Shared Devices, Virtual Devices, Channels, I/O Traffic Controller, I/O scheduler, I/O device handlers.

**SECTION – C**

**Information Management:** Simple File System, Symbolic File System, Logical File System, Physical File System, Security of Files Systems.

**SECTION – D**

**Case Studies**

Network Operating Systems, Windows 8, Windows 10, UNIX/ LINUX, Mobile Operating Systems.

**References:**

1. Madnick & Donovan: Operating System, McGraw Hill, 1973.
2. P.B. Henson: Architecture of concurrent programs, Prentice Hall, 1977.
3. J.L. Peterson, A.Silberchatz: Operating System Concepts, Addison Wesley, 1983.
4. A.C. Shaw: Logic Design of Operating System, Prentice Hall, 1974.
5. M.J. Bach, Design of UNIX Operating System, PHI, 1986
6. A.S.Tanenbaum: Operating System: Design and Implementation, PHI, 1989.
7. Richard Fox: Linux with Operating System Concepts, CRC Press, 26-Aug-2014.

**CSL212: INFORMATION SYSTEMS**

**Credits**

<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**SECTION – A**

**An Introduction to Information System:** Information Concepts, System Concepts, Business Information Systems, Information Systems in society, business and Industry, Ethical and Social issues, Global Challenges in Information Systems

**Information Systems in Organizations:** organizations and Information systems, competitive Advantage, careers in Information System

**SECTION – B**

**Management Information System:** Fundamental types of Management, Information Systems, Management Decision, Pitfalls in MIS Development Making Process  
 Building and Maintaining Information Systems, Information System Security and Control

**SECTION – C**

**Decision Support Systems (DSS):** Conceptual Foundations of DSS, Concepts of DSS, DSS Software, Strategies for DSS, Group Support Systems, Executive Support System (ESS)

**Machine Learning:** Introduction, Designing a Learning System, Perspective and Issues in Machine Learning, Concept learning, General-to-Specific Ordering of Hypotheses, Candidate-Elimination, Supervised learning, Applications of Machine Learning

**SECTION – D**

**Knowledge Management systems:** Fundamentals of Knowledge Based Decision Support; Artificial Intelligence and Expert systems, Expert System & its integration with DSS.

Other Information Systems like Supply chain management, Customer Relationship Management (CRM), Electronic Commerce and Mobile Commerce

**References:**

1. Principles of Information Systems: A Managerial Approach, Ralph Stair and George Reynolds, Cenage Learning, 2008
2. Management Information Systems, Laudon C. Kenneth & Laudon P. Janes, Pearson Education, 2002.
3. Decision Support Systems & Intelligent Systems Turban Ejraini & Aronson E. Jay, Pearson Education, 2001.
4. Information Systems for Modern Management, Mudrick R.G., Ross, J.E. & Glegge, J.R., 3rd Edition, Prentice Hall of India, 1987.
5. Information Systems, Alter Steven, 3rd Edition, Pearson Education, 2000.
6. Introduction to Machine Learning, Ethem Alpaydin, 3RD Edition, 2015, PHI Learning Pvt. Ltd- New Delhi
7. Machine Learning, Tom M. Mitchell, McGraw Hill Education; First edition, 2013
8. Machine Learning for Big Data: Hands-On for Developers and Technical Professionals, Jason Bell, Wiley, 2014.

**CSL213: OBJECT ORIENTED PROGRAMMING IN JAVA**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**SECTION – A**

**Evolution of Java**

Importance of JAVA to Internet, Features of JAVA, Bytecode, Object Oriented Approach.

**Data Types, Variables and Arrays**

Data types, Declaration of Variable, Type Conversion and Casting, One Dimensional and Multidimensional arrays, String handling.

**SECTION – B**

**Operators and Control Structures**

Arithmetic, Bitwise, Relational, Boolean, Assignment Operators, Operator precedence, Selection Statements, Iteration Statements, Jump statements.

**Classes**

Class Fundamentals, Declaring objects, introducing methods, constructors, this keyword, Overloading constructors, Recursion, Nested and Inner classes.

**SECTION – C**

**Inheritance**

Basics, Creating Multilevel hierarchy, Method Overriding, Abstract Classes.

**Packages and Interface**

Packages, Access Protection, Importing Packages, Interfaces, Defining, Implementing, Applying Interfaces, Extending Interfaces

## **SECTION – D**

### **Exception Handling**

Fundamentals, Exception Types, uncaught exceptions, try and catch,

### **Input / Output**

Stream, InputStream and OutputStream, InputStream and OutputStream hierarchies.

### **References:**

1. Patrick Naughton & Herbert Schildt: The Complete Reference Java 2, Tata McGraw Hill Edition.
2. Balagurusamy: Programming in JAVA, Tata McGraw Hill, 2004.

**CSL215: COMPUTER ORGANIZATION AND ARCHITECTURE**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**SECTION – A**

**Digital Fundamentals:** Digital Logic Circuits: Digital Computers, Logic gates, Boolean Algebra, Map Simplification, Combinational Circuits, Sequential Circuits.

**Digital Components** – Decoders, Encoders, Multiplexers, Register, Shift registers, Binary counters, Memory Unit.

**SECTION – B**

**Data Representation** – Data types, complements, Fixed-point representation, Floating pt. Representation, Error detection codes.

**Basic Computer Organization** - Design, Register Transfer Language & Operations, Various Arithmetic, Logic & Shift micro-operations, instruction codes, computer registers, instructions, timing & control, instruction cycle, design of a complete basic computer & its working.

**SECTION – C**

**Programming & controlling the basic computer** – Machine & Assembly Language.

**CPU Architecture** – General register & stack organization, instruction formats and addressing modes, RISC & CISC.



**SECTION – D**

**Memory Organization** – Memory hierarchy, Main auxiliary, Cache memory, Virtual memory, Paging and Segmentation.

**Reference:**

1. Morris Mano: Computer System Architecture, PHI
2. Hayes, J.P.: Computer Architecture & Organization, McGraw Hill.
3. Stone: Introduction to Computer Architecture, Galgotia
4. Tanenbaum: Structured Computer Organization, PHI

**CSP214: PROGRAMMING LAB-III (USING JAVA)****Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
0	0	2

**Practical based on Java**

**MTL211: COMPUTER BASED OPTIMIZATION TECHNIQUES**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Mid Semester Examination: 20% weightage**  
**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**SECTION – A**

**Linear Programming:** Mathematical formation of linear programming problem. Solution by graphical and simplex method, Two Phase & Big M- method, Revised simplex method, Dual Simplex Method. Transportation and assignment problems, Travelling Salesmen Problems Optimality, Degeneracy & unbalanced.

**SECTION – B**

**Integer, Dynamic and Goal Programming:** Integer programming problem, Branch and bound techniques, Dynamic programming: Recursive equation approach, Characteristics, Tabular Method Deterministic & Probabilistic.

**SECTION – C**

Goal programming: Model Formulation, Weighted goals, Graphical Method, Interpretation & Optimal modified simplex solutions.

**SECTION – D**

**Non-Linear Programming:** General Non-LPP, Optimizing Non-Linear functions, Search & Gradient Methods, Graphical solution, Quadratic programming.

**BOOKS RECOMMENDED:**

1. Kapoor, V.K.: Operation Research, Sultan Chand & Co., New Delhi.
2. Manmohan Gupta, P.K.: Operation Research, Sultan Chand & Co., New Delhi.
3. Pronsens, Richard: Theory and Problems of Operation Research, McGraw Hill, 1983.

**ESL–220: ENVIRONMENTAL STUDIES**

**Credits: 4-0-0**

**Teaching Methodologies**

The Core Module Syllabus for Environmental Studies includes class room teaching and field work. The syllabus is divided into 8 Units [Unit-1 to Unit-VII] covering 45 lectures + 5 hours for field work [Unit-VIII]. The first 7 Units will cover 45 lectures which are class room 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-1 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-1 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 hand written 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 areas 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<sub>2.5</sub> or PM<sub>10</sub>) 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)**

### **Unit-VIII**

#### **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:**

1. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
2. Down to Earth, Centre for Science and Environment, New Delhi.
3. Heywood, V.H. & Waston, R.T. 1995. Global Biodiversity Assessment, Cambridge House, Delhi.
4. Joseph, K. & Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
5. Kaushik, A. & Kaushik, C.P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
6. Rajagopalan, R. 2011. Environmental Studies from Crisis to Cure. Oxford University Press, New Delhi.
7. Sharma, J. P., Sharma. N.K. & Yadav, N.S. 2005. Comprehensive Environmental Studies, Laxmi Publications, New Delhi.
8. Sharma, P. D. 2009. Ecology and Environment, Rastogi Publications, Meerut.
9. State of India's Environment 2018 by Centre for Sciences and Environment, New Delhi
10. Subramanian, V. 2002. A Text Book in Environmental Sciences, Narosa Publishing House, New Delhi.

**CSL220: DATA COMMUNICATIONS**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**SECTION – A**

Introduction to computer networks, LAN, MAN, WAN and network topologies, Concepts of Layer protocols and layer interfaces, OSI reference model and TCP/IP reference model.

**SECTION – B**

Transmission Media, Communication Satellites, Multiplexing.

Circuit Switching and Packet Switching and Message Switching.

**SECTION – C**

Data Link Layer Design Issues: Framing, Error Control and Flow control.

LAN Protocols: Ethernet, Token bus, and Token ring.

**SECTION – D**

Comparison of Virtual-Circuit and Datagram subnets, Concepts of routing and congestion control, Simple routing algorithms.

**References:**

1. Tanenbaum A.S.: Computer Networks, 4<sup>th</sup> Ed., Pearson Education
2. Fourozan: Data communications, Tata McGraw Hill
3. Lehnert: Internet 101, 1<sup>st</sup> Ed., Pearson Education
4. Stevens TCP/IP Illustrated, Vol. 1, Pearson Education.



**CSL226: SOFTWARE ENGINEERING**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**SECTION – A**

**Introduction**

Principles of Software Engineering, Objectives of Software Engineering, Process & Product, Software Process Models – Waterfall. Prototyping, Iterative, Time boxing, Important Software Processes – Project Management Process, Software Configuration Management Process

**SECTION – B**

**Requirements' Analysis & Design**

Requirement Analysis – Need, Importance, Process, Tools and Requirement Specification. Software Design Principles, Coupling & Cohesion, Function-Oriented Design, Detailed design, Quality of Design (Cyclomatic Complexity, Data Bindings)

**SECTION – C**

**Coding & Testing**

Common Coding Errors, Coding Process, Testing Fundamentals, Software Quality Models – Product Models (McCabe's Quality Model, McCall's Quality Model), Process Models (Capability Maturity Model)

## **SECTION – D**

### **Software Maintenance**

Introduction, significance, types of maintenance, a case study to identify different types of maintenance using change logs of a (open source) software project.

### **References:**

1. Pressman: Software Engineering – A Practitioner’s Approach, Tata McGraw Hill, 2014.
2. Pankaj Jalote: An Integrated Approach to System Software Engineering, Narosa Publications.
3. Ghezzi, Carlo: Fundamentals of Software Engineering, 2<sup>nd</sup> Edition, Pearson, 2002
4. Sommerville, Ian: Software Engineering, 10<sup>th</sup> Edition, Pearson, 2015.

**CSL222: THEORY OF COMPUTER SCIENCE**

Credits		
L	T	P
3	1	0

**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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 Definitions**

**Operations on Languages:** Closure properties of Language classes, Context Free Language: Chomsky & Greibach Normal forms, Linear Grammars and Regular Language, Regular Expressions, Context Sensitive Languages

**SECTION – B**

The Kuroda normal Form, One sided context Sensitive Grammars, LR (k) Grammars

**Unrestricted Languages:** Normal form and Derivation Graph, Automata & their Languages

**SECTION – C**

Finite Automata , Pushdown Automata, 2-pushdown Automata

Turing machines, the equivalence of the automata and appropriate grammars, the Dyck Language.

**SECTION – D**

**Undecidability:** Recursive and Recursively Enumerable Languages, Rice Theorem, Post's Correspondence Problem.

**References:**

1. A.V. Aho, J.E: Hopcroft and J.D. Ullman, Introduction to Automata Languages and Computations. Addison Wesley, 1980.
2. Mishra Kolop: Ahandrasekaran, Theory of Computer Science (Automata, Languages & Computation); PHI, 2002.
3. H.R. Lewis and C.H. Papdimitrou, Elements of the Theory of Computation, Prentice Hall Inc., 1981.
4. V.J. Rayward Smith, 'A First Course on Computability, Blackwell Scientific Publications, Oxford, 1986.
5. M.Davis and E.J. Weyuker, Computability, Complexity and Languages, Academic Press, 1982.
6. D.Gries, Science of Programming, Springer Verlag, New York, 1981.

**CSL223: RDBMS USING ORACLE (SQL, PL/SQL)**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**SECTION – A**

Concept of functional dependencies, multivalued dependencies, 1NF, 2NF, 3NF, BCNF, Higher Normal Forms, Database system architecture, data independence, normalization & normal forms.

**SECTION – B**

**Managing Databases**

Creating, defining and modifying table structure, Data constants, Oracle functions, Joins, subqueries, indexes, views, sequences, Granting & revoking permissions.

**SECTION – C**

**PL/SQL**

Introduction, execution environment, syntax, block structure, Oracle transactions.

**SECTION – D**

**Advance concepts of PL/SQL**

Cursors- implicit and explicit, stored procedures – syntax for creating procedure, an application using procedure, stored functions – syntax, applications, Triggers – row, statement before after combination, packages.

**References:**

1. Programming using SQL and PL/SQL – Ivan Bayross, BPB Publications, 2006.
2. Oracle Complete reference – Herbert Schidlt, Oracle Press, 2006.
3. Database Systems – Korth, McGraw Hill, 2006.
4. Database Systems – Elmasari Navathe, Addison Wesley Publishing Company, 2006.

**CSL225: MICROPROCESSOR AND ITS APPLICATIONS**

Credits		
L	T	P
3	1	0

**Total Marks: 100**

**Mid Semester Examination: 20% weightage**

**End Semester Examination: 80% weightage**

**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.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**SECTION – A**

**Introduction:** Introduction to Microprocessor, Microcontroller and Microcomputer.

**Architecture of a Microcomputer:** General Architecture of a microcomputer system. Microprocessor unit, input unit, output unit, memory unit and auxiliary storage unit.

**Architecture of 8086/ 8088 Microprocessor:** internal architecture of the 8086 / 8088 microprocessor, Description of various pins, configuring the 8086/8088 microprocessor for minimum and maximum mode systems, system clock, bus cycle.

**SECTION – B**

**Memory Interface of 8086/8088 Microprocessor**

Address space and data organization, hardware organization of memory address space, memory bus status code, memory control signals, read/write bus cycles, program and data storage memory, dynamic RAM system.

**SECTION – C**

**Input/Output Interface of the 8086/8088 Microprocessor**

I/O interface, I/O address space and data transfer, I/O instructions, Output ports, 8255A Programmable Peripheral Interface (PPI), Serial communication interface (USART and UART) – the RS-232 C interface.

**Interrupt Interface of 8086/8088 Microprocessor**

Types of Interrupt, Interrupt Vector Table (IVT).

### **SECTION – D**

**8086/8088 assembly language programming:** General structure of an assembly language program, steps in the development of an assembly language program, addressing modes, Instruction set : data movement instructions, arithmetic instructions, logical instructions, shift and rotate instructions, jumping and looping instructions, string processing, interrupt instructions and stack operations.

#### **References:**

1. Walter Triebel: The 8086 Microprocessor – Architecture, Software and Interfacing Techniques, PHI, Delhi.
2. Walter Triebel: The 8088 Microprocessor – Architecture, Software and Interfacing Techniques, PHI, Delhi.
3. Douglas V. Hall: Microprocessors and Interfacing – Programming and Hardware, Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Peter Abel: IBM PC Assembly Language and Programming, PHI, Delhi.

**CSP224: PROGRAMMING LAB-IV**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
0	0	2

**Total Marks: 100****Practical based on RDBMS (Relational Database Management Systems)**

### CSL310: COMPUTER GRAPHICS

**Total Marks: 100**

Credits		
L	T	P
3	1	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

#### UNIT-I

**Elements of Computer Graphics:** Introduction to computer graphics; graphics display devices; interactive control devices; output devices; display processors.

**2D Graphics**

**Elementary Drawing Algorithms:** Line drawing using direct method, simple DDA, integer DDA, incremental method, and Bresenham's algorithm; Circle drawing using incremental method and Bresenham's algorithm, drawing arcs, sectors, etc. Flood Fill Algorithms, Boundary Fill Algorithms

#### UNIT-II

**Geometric Transformations:** Translation, rotation, scaling, reflection and shear; concept of homogenous coordinates, Building composite transformations.

**Viewing Transformations:** Concept of windows & viewport, window-to-viewport mapping, clipping operations – point clipping, line clipping algorithms (Cohen – Sutherland, mid-point subdivision), Sutherland – Hodgman polygon clipping algorithm.

#### UNIT-III

**3D Graphics**

**Drawing 3D Shapes:** Coordinate systems, representation of 3D shapes, designing curves and surfaces (Hermite, Bezier, and B-Spline).

**Geometric Transformations:** Translation, rotation, scaling and reflection.

**Projective Transformations:** Parallel projections – orthographic, axonometric (isometric, diametric and trimetric), oblique projections; and perspective projections (one, two and three vanishing points).

**Viewing Transformations:** Viewing a 3D object, 3D clipping (extension of specified 2D algorithms to handle 3D objects).



#### **UNIT-IV**

**Hidden line/surface Removal:** Back face removal, z-buffer algorithm, Painters (depth sort) algorithm, subdivision algorithms – Warnock’s algorithm, scan line algorithms – scan line z-buffer algorithm.

**Rendering:** Introduction, a simple illumination model, shading – Gouraud shading & Phong shading, ray tracing, shadows, textures.

#### **References:**

1. David F. Rogers: Procedural Elements for Computer Graphics, McGraw Hill Book Company.
2. Adams & David F. Rogers: Mathematical Elements of Computer Graphics, McGraw Hill Book Company.
3. Roy A. Plastock, Gordon Kalley: Computer Graphics, McGraw Hill Book Company.
4. Donald Hearn & M. Pauline Baker: Computer Graphics, Prentice Hall of India Private Ltd.

### **CSL311: ARTIFICIAL INTELLIGENCE**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

#### **UNIT-I**

**Knowledge**

Introduction and Importance of Knowledge, Knowledge based systems, Knowledge Representation, First Order Predicate Logic (FOPL).

**Natural Language Processing (NLP)**

Introduction ,overview of linguistics, Grammars and Languages, Basic Parsing Techniques, syntactic Processing, Semantic Analysis, Natural Language Generation , Natural Language Systems.

#### **UNIT-II**

**Pattern Recognition**

Introduction, Recognition and Classification Process, Learning Classification patterns, recognizing and understanding speech.

#### **UNIT-III**

**Expert System**

Introduction, Rule-Based Architectures, Nonproduction system architectures, Expert System Shells, Knowledge acquisition and Validation.

**Learning**

Introduction, Role of Learning, Types of Learning , General Learning Model, Performance Measures.

#### **UNIT-IV**

##### **Machine Learning**

Introduction, linear classification, perceptron update rule, Perceptron convergence, generalization, Maximum margin classification, Classification errors, regularization, logistic regression, Linear regression, estimator bias and variance, active learning, Support vector machine (SVM)

##### **References :**

1. Dan W. Patterson, '*Introduction to Artificial Intelligence and Expert Systems*', Prentice-Hall India Private Limited, 2006.
2. Rich Knight, '*Artificial Intelligence*', Tata McGraw Hill, 2007.
3. P H. Winston, '*Artificial Intelligence*', (3<sup>rd</sup> Edition), Addison Wesley, 2006.
4. E Charniak and D Mcdermott, '*Introduction to Artificial Intelligence*', Addison Wesley, 2004
5. Bishop, Christopher. *Neural Networks for Pattern Recognition*. New York, NY: Oxford University Press, 1995. ISBN: 9780198538646.
6. Duda, Richard, Peter Hart, and David Stork. *Pattern Classification*. 2nd ed. New York, NY: Wiley-Interscience, 2000. ISBN: 9780471056690.

## CSL312: COMPILER DESIGN

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

### UNIT-I

**Pre-requisites**

Concepts of Programming Languages and Finite Automata.

**Preliminaries**

Basics of Compilers, Lexical Analysis.

**Syntax Analysis**

Parsers, top-down parsers, bottom-up parsers.

### UNIT-II

**Symbol Table Handling**

Symbol table contents, operations on Symbol Tables, Organizations of Symbol Tables.

**Syntax-Directed Translation:** Syntax-Direction definitions, Evaluation of SDD, Dependency graphs.

### UNIT-III

**Storage Management**

Static Storage Management, Dynamic Storage Management.

**Code Generation**

Code Generator, Code generation of simple programming constructs.

#### **UNIT-IV**

##### **Code Optimization**

Local optimization, Machine independent optimizations.

**Introduction to Compiler**-Compilers, incremental compilers, Case study : YACC.

##### **References:**

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: *Compiler, Principles, Techniques and Tools*, Addison Wesley, 2006.
2. Tremblay J.P., Sorenson P.G., *The Theory and Practice of Compiler Writing*, Mc-Graw Hill, 2007.
3. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman: *Principles of Compiler Design*, Narosa Publishing House, 2007.

**CSL313: ADVANCED JAVA TECHNOLOGIES**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
3	1	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

Multithreading: Creating Threads, Thread Life Cycle, Synchronization, Thread Communication, Thread Priorities.  
AWT Components.

**UNIT-II**

Swing Components.

Applets: Life cycle of an applet, passing parameters to an applet, Event Handling

**UNIT-III**

Networking: Internet Addressing, TCP/IP Client Sockets, URL, URL connection, TCP/IP Server Sockets, Datagram

JAVA Database Connectivity (JDBC): Merging data from Multiple tablets, joining, Manipulation: Database with JDBC, Prepared Statements, Transaction processing.

**UNIT-IV**

Servlets: Overview & Architecture, Life Cycle, Handling HTTP get request, Handling HTTP post requests session tracking, cookies.

Java Server Paves (JSP): Introduction to JSP

**References :**

1. The Complete Reference – JAVA 2 by Ptrick Naughton & Herbert Schildt TMH Publications, 2007.
2. The Java Tutorial Continued by Compione , Walrath, Huml SUN JAVA Tutorial Team .Addison Wessley, 2007.
3. Java2 Black Book Steven Holzner OT Dreamtech Press, [www.idgbooksindia.com](http://www.idgbooksindia.com), 2007.

**CSP315: PROGRAMMING LAB-V****Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
0	0	2

**Practical based on**

Advanced Java  
Computer Graphics

**CSE320: MAJOR PROJECT-I****Total Marks: 600**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
0	0	22

Ist synopsis (containing mainly literature survey corresponding to the problem taken up for the project work and line of attack to solve the problem) within one month (upto 31st March) of joining the training

IInd synopsis (containing essentially the progress of work in comparative details) with in three months (upto 15th May) of joining the training.

Final report submission: upto 30th June



**CSL-450: DESIGN AND ANALYSIS OF ALGORITHMS**

**Total Marks: 100**

<b>CREDITS</b>		
<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**A Revision of Algorithm concepts:** Asymptotic notation, Design of efficient algorithms, complexity analysis of sorting and searching Algorithms, Complexity analysis of Iterative and Recursive algorithm.

**Design Strategies:** Brute Force Method, Divide-and-conquer.

**UNIT-II**

**Greedy Method:** Knapsack problem, Huffman coding, Job Sequencing with Deadline, Optimal Merge Pattern, Prim's Algorithm and Kruskal's Algorithm.

**Dynamic Programming:** Matrix Chain multiplication, 0/1 knapsack problem, Longest Common Subsequence, Travelling Salesman problem, Multistage Graph, All pair shortest path, optimal binary search trees.

**UNIT-III**

**Back-tracking:** 8 Queen's problem, Hamiltonian Circuit, Graph Coloring, Sum of subset.

**Branch-and-bound:** Assignment Problem, Knapsack problem, Travelling Salesman problem.

#### **UNIT-IV**

**Algorithms on Graphs:** Depth/Breadth First search, Dijkstra Algorithm and Bellman Ford Algorithm

**Problem Classes:** P, NP, NP-Hard and NP- Complete.

#### **References:**

1. Cormen T.H., Leiserson C.E., Rivest R.L., Introduction to Algorithms, PHI, 2000.
2. Horowitz E., Sahni S., Rajasekaran S., Computer Algorithms, Galgotia Publications, 1999.
3. Aho A.V., Hopcroft J.E. Ullman J.D., The Design and Analysis of Computer Algorithms, Pearson Education Asia, 1998, 1974
4. Knuth D.E., The Art of Computer Programming, Volume 1 (Fundamental Algorithms), Narosa Publishing House, 1973
5. Knuth D.E., The Art of Computer Programming, Volume 3 (Sorting and Searching), Addison–Wesley, 1973.

**CSL455: Design of Programming Languages**

**Total Marks: 100**

Credits		
L	T	P
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

Study of Programming Languages: Brief History, Feature of a good language

Programming Language Processor: Translator and software simulator computer, syntax semantics and virtual computers.

Specifications and Implementation of Elementary and Structured Data Types. Type equivalence, checking and conversion. Vectors and Arrays, Lists, Structures, Sets, Files.

**UNIT-II**

Abstraction, encapsulation and information hiding subprograms, type definitions, abstract data types

Sequence control with Expressions, Conditional Statements, Loops, Exception handling. Subprogram definition and activation, simple and recursive subprogram, subprogram environment.

**UNIT-III**

Scope – Static and Dynamic, Block structures, Local Data and Shared Data, Parameters and Parameter Transmission. Local and Common Environments, Tasks and Shared Data.

Static and Stack-Based Storage management. Fixed and Variable size heap storage management, Garbage Collection.

**UNIT-IV**

Syntax and Translation: Syntactic elements of a language, stages in translation, formal definition of syntax

Operating and Programming Environment: Batch processing, interactive, embedded, programming environments

**Text/References:**

1. Programming languages: design and implementation, Terrence W. Pratt., Pearson
2. Programming languages: concepts and constructs, Ravi Sethi, ISBN 9780201590654.
3. Programming Language Pragmatics, Scott, ELSEVIER

**CSL-452: SYSTEM SOFTWARE**

**Total Marks: 100**

**CREDITS**

L	T	P
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Introduction to System Software**

Evolution of System Software, components of system software, Translators, loaders, interpreters, compiler, assemblers.

**Assemblers**

Overview of assembly process, design of one pass and two assemblers.

**UNIT-II**

**Macroprocessors**

Macro definition and expansion, concatenation of macro parameters, generations of unique labels, conditional macro expansion, Recursive macro expansion.

**UNIT-III**

**Compilers**

Phases of compilation process, lexical analysis, parsing, storage management optimisation. Incremental compilers, cross compilers, P code compilers.

**UNIT-IV**

**Loaders and Linkage editors**

Basic loader functions. Relocation, program linking, linkage, editors, dynamic linking, bootstrap loaders.

Operating System, Text Editor, Interactive debugging systems.

**Other System Software**

**References :**

1. Leland L. Beck : System Software, An introduction to system programming, Addison Wesley.
2. D.M. Dhamdhare : Introduction to System Software, Tata McGraw Hill.
3. D.M. Dhamdhare : System Software and Operating System, Tata McGraw Hill, 1992.
4. Madrich, Stuarde : Operating Systems, McGraw Hill, 1974.
5. Stern Nancy Assembler Language Programming for IBM and IBM compatible computers, John Wiley, 1991.

**CSL-453: SYSTEM SIMULATION**

**Total Marks: 100**

<b>CREDITS</b>		
<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Introduction** : Concept of a system, stochastic activities, continue and discrete system, system modeling, mathematical modeling, principle used in modeling.

**Simulation of Systems** : Concepts of simulation of continuous systems with the help of two examples; use of integration formulas; concepts of discrete system simulation with the help of two examples, Generation of random numbers, Generation of non-uniformly distributed numbers.

**UNIT-II**

**Simulation of Queuing Systems** : Rudiments of queuing theory, Simulation of Single-Server queue, two-server queue, general queues.

**UNIT-III**

**Simulation in Inventory Control and Forecasting:** Elements of inventory theory, inventory models, Generation of Poisson and Erlang variants, forecasting and regression analysis.

**Design and Evaluation of Simulation Experiments:** Experimental layout and validation.

**UNIT-IV**

**Simulation Languages:** Continuous and discrete simulation languages, Block-Structured continuous simulation languages, expression based languages, discrete system simulation languages, Simscript, GPSS, SIMULA, factors in selection of a discrete system simulation languages.

**References :**

1. Narsingh Deo, "System Simulation with Digital Computer", Prentice-Hall of India Pvt. Ltd. - 1993.
2. Gordon, "System Simulation", Prentice Hall of India Pvt. Ltd. - 1993

**CSP-454: PROGRAMMING LAB-VII****Total Marks: 100****CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
0	0	2

Practical based on Design and Analysis of Algorithms.

Examples on : Sorting and Searching Algorithm, Brute Force Method, Divide and Conquer Technique, Greedy Method, Dynamic Programming, Backtracking method, Branch and Bound Method, Graph Problems.

Programming Languages

System Software

### **CSL465: DISTRIBUTED SYSTEMS**

**Total Marks: 100**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

Goals:

- To understand how large-scale computational systems are built
- To study the key design principles of distributed systems to understand the challenges of large systems.
- To realize the importance of coordination in distributed systems.
- To learn to create secure and reliable systems

Pre-requisites: Operating System, Computer System Architecture, Computer Networks

#### **Unit -I**

Distributed Systems – Basic characteristics, benefits over centralized systems, challenges, Design Issues, fallacies; System Models – physical, architectural, and fundamental, client-server and peer to peer systems; Role of middleware;

#### **Unit-II**

communication - message passing and distributed shared memory; Inter process communication – direct, multicast, indirect, RPC, RMI, IPC in Unix.

#### **Unit-III**

Operating System support; Time and Global states; Coordination and agreement; Distributed transactions and concurrency control; Replication;

Security challenges – perimeter defence, authentication schemes, access control technologies;

#### **Unit-IV**

Reliable distributed computing – why do systems fail, how to overcome failures; Computing in the clouds, Google as a case study.

#### **Prescribed Text:**

Distributed Systems, Concepts and Design, by Coulouris, Dollimore, and Kindberg, 5th ed., 2012.

#### **References:**

1. Andrew S. Tanenbaum, Distributed Operating Systems, ACM Press.
2. Jie Wu, Distributed Systems, CRC Press.
3. HagitAttiya, Jennifer Welch, Distributed Computing: Fundamentals, Simulations and Advanced Topics, McGraw-Hill.
4. Kai Hwang, Geoffrey Fox, Jack Dongarra, Distributed Computing and Cloud Computing – from parallel processing to Internet of Things, Morgan Kaufmann, Elsevier, 2012.
5. Kenneth P. Birman, Guide to Reliable Distributed Systems, Springer, 2012.
6. MukeshSinghal and NiranjanShivaratri, Advanced Concepts in Operating Systems, McGraw-Hill.
7. Nancy Lynch, Distributed Algorithms, Morgan Kaufmann.
8. SapeMullender (ed.), Distributed Systems, Addison-Wesley.



**CSL-469: WEB TECHNOLOGIES**

**CREDITS**

L	T	P
4	0	0

**Total Marks: 100**

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

Web Essentials, Markup languages, CSS

Basics of Client side programming, Java script language, java script objects, host objects, Browsers and DOM

**UNIT-II**

Basics of Server side programming, Java servlets- Life cycle, Servlet API, Reading Servlet parameters, Handling HTTP requests and responses, Cookies and Session Tracking  
ASP/JSP, Basics of ASP/JSP objects, simple ASP and JSP pages

**UNIT-III**

Representing Web data, Data base connectivity, JDBC, Dynamic web pages, XML, DTD, XML schema, DOM, SAX, XQuery, Building web applications, cookies, sessions, open source environment

**UNIT-IV**

Introduction to PHP, basics, PHP File handling, file upload, cookies, error handling, PHP MySQL introduction

Middleware technologies, Ecommerce architecture and technologies, Ajax, Advanced web technologies and tools

**Case Studies:** PHP and MySQL case studies.

**References:**

1. Jeffery C Jackson, "Web Technology- A Computer Science perspective", Pearson Education, 2007.
2. Chris Bates, "Web Programming- Building Internet Applications", Wiley India, 2006.
3. Achyut S Godbole and Atul Kahate, "Web technologies", Tata McGraw Hill.

**CSL-462  
Network Operating Systems**

**Total Marks: 100**

**CREDITS**

L	T	P
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

Introduction of various Network Operating Systems ( Windows 9x/XP/2000, Unix, Sun Solaris)  
Introduction to Windows NT server, Window NT features, Hardware requirements, planning the network, Windows NT network security model, special purpose servers, licensing.

**UNIT-II**

Planning storage strategies, options, working with disk administrator and backup.  
Networking and Network protocols Configuration of Windows NT.

**UNIT-III**

Windows NT services Architecture and security Architecture, planning and managing group and user accounts File services

**UNIT-IV**

Distributed file system, remote administration, remote access services, Internet & Intranet.  
Printing and supporting network clients, performance tuning.

**Text / References :**

1. Mcse: NT Server 4 Guide - Mathew Strebe, Charles Perkins From Bpb Publications.
2. Mastering Windows NT Server 4 - Mark Mainasi, Christa Andrerson, Elizabeth.
3. Computer Networks & Distributed Processing By Martin, PHI.
4. Internet Working With TCP/IP Vol. I, II & III By Comer & Stevens, Phi.
5. Electronic Mail: An Introduction To X 400 Message Handling Standards By Sara Redicans, Mcgraw Hill.
6. Internet The Complete Reference By Harley Hahn, Mcgraw Hill.
7. Ibm Token-Ring Networking Handbook By George.C.Saclett, Mcgraw Hill.
8. Fddi Networking : Planning, Installation And Management By Martin A. Nemzow, Mcgraw Hill.

**CSL-479: DATA COMMUNICATION – II**

**Total Marks: 100**

**Credits**  
**L T P**  
4 0 0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Internet Protocol:** Internetworking, Logical Addressing- Classful and Classless, IPv4 and IPv6, ICMP, ARP, RARP, DHCP

**Network Layer:** Concepts of Routing and Congestion control, Simple routing algorithms.

**UNIT-II**

**Network Trouble Shooting:** Using Ping, Trace route, IP Config, Netstat, nslookup

**Transport Layer:** Addressing, Process-to-Process Delivery, Transmission Control Protocol (TCP) and User Datagram Protocol (UDP), Error and Flow Control

**UNIT-III**

**Presentation Layer:**Data Compression: Lossless and Lossy

**Application Layer:**DNS, E-mail, FTP, HTTP, HTTPS, WWW

**UNIT-IV**

**Cryptography:**Symmetric key cryptography and AsymmetricKeyCryptography

**Network Security:**IPSec, SSL and TLS

**References:**

1. B.A. Forouzan, Data Communication & Networking.
2. A.S. Tanenbaum, *Computer Networks*, Prentice Hall, 1992, 4th Edition.
3. William Stallings, *Data & Computer Communication*, McMillan Publishing Co.
4. Mcse: NT Server 4 Guide - Mathew Strebe, Charles Perkins From Bpb Publications.
5. Mastering Windows NT Server 4 - Mark Mainasi, Christa Anderson, Elizabeth.
6. Computer Networks & Internets – D.E. Comer, 6<sup>th</sup> Edition.

**CSP464: PROGRAMMING LAB-VIII****Total Marks: 100****CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
0	0	2

Programming Exercises based on Web Technologies

Implementing LAN using workgroup model & windows 95, Implementing LAN using Windows NT Domain model, Using user manager for Domains in Administration, Assigning user rights and permission on different objects,

Applications related to Internet.

**CSL -532: ADVANCED SOFTWARE ENGINEERING**

**CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Total Marks: 100**

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT – I**

**Software Project Management:**

Fundamentals of Software project planning , Conventional Software Management, Evolution of Software Economics, Improvement of Software Economics, Comparison of old and modern ways of Software Management.

**UNIT – II**

**Software Re-engineering:** Introduction Re-engineering, Restructuring and Reverse Engineering, Re-engineering existing systems, Data Re-engineering and migration, Software Reuse and Re-engineering.

**UNIT – III**

**Object-Oriented (OO) Measurements:**

Introduction, Why metrics ?, Classification of OO metrics, Study of Design Metrics- method size, method internals, class size, class inheritance, Method inheritance, class intervals and class externals.

**Object-Oriented Analysis and Design:**

OOAD Methodologies (Booch, Rumbaugh and Jacobson), Unified Software Development Process (Rational Unified Process)

#### **UNIT – IV**

##### **Component Based Software Engineering:**

Component Based Software Engineering: Basic Concepts, Specification of software components, Component Models (COM/COM+/DCOM/.NET, Enterprise JavaBeans)

##### **References:**

1. Walker Royce, Software Project Management, Pearson Education, ISBN: 9780201309584, 2004.
2. Robert S. Arnold, Software Re-engineering, IEEE Comp. Society, ISBN: 9780818632723, 2003.
3. Lorenz and Kidd, Object Oriented Software Metrics, Prentice Hall, ISBN 978- 0131792920, 2001.
4. Booch, Object-Oriented Analysis and Design with Applications, Addison-Wesley Professional, 3rd Edition, ISBN: 978-0201895513, 2007.
5. Pressman, “Software Engineering” Prentice Hall, ISBN 978-0131792920, 2001.
6. IvicaCrnKovics Magnus Larsson (eds.) “Building reliable component based software systems” Artech House, 2002 ISBN – 1-58053327-2.

**CSL535: SOFT COMPUTING**

**Total Marks: 100**

<b>CREDITS</b>		
<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**Unit-I**

Introduction to Evolutionary Computing & Genetic Algorithms. Introduction to Genetic

Algorithms, Goals of Optimization, How Genetic Algorithms work, A Simple Genetic Algorithm's Computer Implementation highlighting Reproduction by Selection,

**Unit-II**

Crossover, Mutation. Advanced GA Techniques Mapping Objective Function to Fitness Form, Fitness scaling, discretization, Different types of Selection and Crossover techniques. A case study of Travelling Salesman Problem using GA Techniques. Introduction to other Evolutionary Techniques: PSO, Simulated Annealing and Ant Colony Optimization.

**Unit-III**

Basics of Neural Networks: Fundamental concept, Model of an Artificial Neuron, Neural Network Architectures, Various types of Learning and Activation Functions. Supervised Learning: Perceptron learning, Linear Separability, Delta Rule or Widrow Hoff Rule, Back Propagation algorithm, ADALINE, MADALINE and Associative Memories.

#### **Unit–IV**

Un-supervised Learning: Kohonen Self Organization Feature maps and Adaptive Resonance Theory. Introduction to Fuzzy Logic and Fuzzy Sets, Fuzzy Relations, Fuzzyfication, Defuzzyfication. Introduction to Hybrid soft Computing. Applications of Advance Computing in Pattern Recognition, Signal Processing & Image Retrieval.

#### **References:**

1. David E. Goldberg, Genetic Algorithms in Search Optimization and Machine Learning, Pearson Education.
2. S. N. Sivanandam, S. N. Deepa, Principles of Soft Computing, Wiley Publications.
3. How to Solve It: Modern Heuristics, by Zbigniew Michalewicz, David B.Fogel, Second Edition Springer Verilag-2004, ISBN- 3-540-22494-7.
4. Gallant Stephen I , Neural Network Learning & Extent Systems, MIT Press, 1993.
5. Aleksander & Morton, Neural Computing, Chapman & Hall, 1991.
6. Kosko, Neural Networks & Fuzzy Systems, PHI, 1991



**CSL – 536: DATA WAREHOUSING AND DATA MINING**

**CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Total Marks: 100**

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT – I**

**Data Warehousing:** Concepts of Data Warehousing, Difference between operational database systems and Data warehousing, Need of a separate Data Warehouse. Multidimensional Data Model.

**Data Warehousing Architecture:** Steps for Design and Construction of Data-Warehouses, Three-Tier Data Warehouse Architecture, Characteristics of Data Warehousing Data, Data Marts and its types, OLAP Servers: ROLAP, MOLAP, HOLAP

**Data Warehouse Implementation:** Efficient Computation of Data Cubes, Indexing OLAP Data, Efficient Processing of OLAP Queries, Metadata Repository, Data Warehouse Back-End Tools and Utilities

**UNIT -II**

**Data Mining:** Data Preprocessing, Data Mining Primitives, Data Mining Query Languages. Applications and Trends in Data Mining.

**Data Mining Techniques: Classification and Prediction:** Issues regarding classification and prediction, Classification by Decision Tree induction, Bayesian Classification, Classification by Back propagation, Associative Classification, Other Classification Methods.

**UNIT-III**

**Data Mining Techniques: Cluster Analysis:** Types of Data in cluster Analysis, Categorization of Major Clustering Methods, K- means Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid Based Methods, Model-Based Clustering Methods

**Outlier Detection:** Distance Based Outlier Detection, Deviation Based Outlier Detection.

#### **UNIT-IV**

**Data Science:** Extracting meaning from data with data science – meaning, the data science process, three basic machine learning algorithms – Linear regression, K-Nearest Neighbours, K-means, spam-filtering, recommendation engines.

#### **References:**

1. Han, Kamber “Data Mining: Concepts and Techniques” Morgan Kaufmann
2. Romez Elmasri, Shamkant B.Navathe, ‘Fundamentals of Database Systems’ Pearson Education.
3. Silberschatz, Korth, Sudershan “Database System Concepts” 4th Ed. McGraw Hill
4. Connolly & Begg “Database Systems – A Practical Approach to Design, Implementation and Management, 3rd Ed. Pearson Education.
5. Doing Data Science by Rachel Schutt and Cathy O’Neil, Published by O’Reilly Media, 2014.

**CSL537: Digital Image Processing**

**Total Marks: 100**

<b>CREDITS</b>		
<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

**Fundamentals:** Introduction to Digital Image Processing, Fundamental steps in Digital Image Processing, Components of Image Processing System, Applications of Digital Image Processing, Image Sensing and Acquisition, Image Sampling and Quantization, Relationships between Pixels, Distance Measure between Pixels.

**Image Enhancement and Restoration:** Spatial Domain Filtering Techniques, Smoothing spatial filters, Sharpening spatial filters, Histogram Processing, Introduction to Fourier Transformation, low pass filters, high pass filters, Image Restoration: A model of the Image Degradation/ Restoration Process, Noise models, Denoising Techniques.

**UNIT-II**

**Color Image Processing:** Color Models, Conversions between Color Models, Pseudo Color Image Processing, Color Transformation, Color Complements, Color Slicing, Color Image Smoothing and Sharpening, Noise in color Images.

**Wavelets and Multi-Resolution Processing:** Wavelet functions, Wavelet transformations in one and two dimensions, fast wavelet transform.

**UNIT-III**

**Image Compression:** Image Compression Models, Data Redundancies, Lossy Compression Techniques, Lossless Compression Techniques, Image Compression standards.

**Image segmentation:** Point, Line and Edge Detection, Edge linking and boundary detection, Thresholding, region based segmentation.

#### **UNIT-IV**

**Representation and Description:** Image Representation, Boundary and Regional Descriptors, Relational Descriptors.

**Object Recognition:** Pattern and pattern classes, recognition based on Decision Theoretic Methods, Structural Methods.

**References:**

1. Rafael C. Gonzalez & Richard E. Woods, “Digital Image Processing”, 2nd Edition.
2. A.K. Jain, “Fundamental of Digital Image Processing”, PHI.

**CSP -536: PROGRAMMING LAB IX**  
**(DIGITAL IMAGE PROCESSING)**

***Total Marks: 100***

<b>CREDITS</b>		
<b>L</b>	<b>T</b>	<b>P</b>
0	0	2

**DIGITAL IMAGE PROCESSING LAB**

Practical based on Digital Image Processing.

**REFERENCE :**

1. Rafael C. Gonzalez & Richard E. Woods, “Digital Image Processing”, 2nd Edition.
2. A.K. Jain, “Fundamental of Digital Image Processing”, PHI

**CSL-542: ADVANCED COMPUTER ARCHITECTURE**

**CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Total Marks: 100**

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT – I**

**Introduction to Computers:** Basic Computer Organization: System Buses, Instruction Cycles

**CPU Organization:** Design specifications for a Simple CPU, Fetching Instructions from Memory, Decoding Instructions, Executing Instructions, Design of a Simple ALU, Designing the Control Unit Using Hardwired Control and Microprogrammed control approach.

Memory Subsystem Organization and Interfacing, Types of Memories

I/O Subsystem Organization and Interfacing

**UNIT – II**

**Parallelism in Uniprocessor Systems:** Trends in parallel processing, Basic Uniprocessor Architecture, Parallel Processing Mechanism.

**Parallel Computer Structures:** Pipeline Computers, Array Computers, Multiprocessor Systems

**Architectural Classification Schemes:** Multiplicity of Instruction-Data Streams, Serial versus Parallel Processing, Parallelism versus Pipelining

**Pipelining :** An overlapped Parallelism, Principles of Linear Pipelining, Classification of Pipeline Processors, General Pipelines and Reservation Tables

**Principles of Designing Pipelined Processors:** Instruction Prefetch and Branch Handling, Data Buffering and Busing Structures, Internal Forwarding and Register Tagging, Hazard Detection and Resolution

**UNIT – III**

**Superscalar and Superpipeline Design:** Superscalar Pipeline Design, Superpipelined Design

**Structures and Algorithms for Array Processors:** SIMD Array Processors, SIMD Computer Organizations, Masking and Data Routing Mechanisms, Inter-PE Communications

**SIMD Interconnection Networks:** Static versus Dynamic Networks, Mesh-Connected Illiac Network, Cube Interconnection Networks

#### **UNIT – IV**

**System Interconnect Architectures:** Network Properties and Routing, Static Connection Networks, Dynamic Connection Networks

**Multiprocessor Architecture:** Functional Structures: Loosely Coupled Multiprocessors, Tightly Coupled Multiprocessors

**Interconnection Networks:** Time Shared for Common Buses, Crossbar Switch and Multiport Memories.

#### **References:**

1. Computer Architecture and Parallel Processing, Faye A. Briggs, McGraw-Hill International Editions
2. Computer Systems Organization & Architecture, John d. Carpinelli, Addison Wesley

**CSL-579: BIG DATA AND BUSINESS ANALYTICS**

**Total Marks: 100**

**CREDITS**

L	T	P
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT – I**

**Introduction to Big Data**

Unstructured and Structured data

Introduction to data analytics, big data analytics, Big Data Management, Characteristics of Big Data, Importance of Big Data, Big data use cases, Big data and business, Sources for Big data, Techniques for analysis of Big data.

**UNIT – II**

**Prediction Methods-** Introduction, Multiple linear regression, explanatory versus predictive modeling, estimating the regression equation and prediction.

**Classification Methods-** Introduction, variable selection in linear regression, KNN classifier.

Business case studies for data classification, K-mean Clustering, Bradley-Fayyad-Reina algorithm, Fuzzy C- means Clustering.

**UNIT – III**

**Decision making process in big data-** Various types of decision aiding processes, Decision Support Systems(DSS), DSS Framework, Building Decision Support Systems, DSS-pros & cons. Analyzing business decision processes- managerial decisions, decision making processes, redesigning decision processes, Improving security in DSS, Business Intelligence in decision making, competitive Business Intelligence.



#### **UNIT – IV**

**Social Network Analysis**-Social Networks, Blogs & Micro blogs, Sentiment Analysis and opinion mining. Big Data Analytics Tools- Map Reduce, Hadoop, No SQL, Gephi, , Web Data, Web Communities, Document Summarization Techniques.

**Case Studies for Business Intelligence.**

#### **References:**

1. Michael Minelli, Michele Chambers, AmbigaDhiraj, “Big Data, Big Analytics”, John Wiley, 2013.
2. Chris Eaton, Dirk Deroos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, Tata McGraw Hill Education, 2012.
3. J.C. Lee, “ Social Network Analysis”, Springer Publications.

**CSL-589: CYBER ETHICS**

**CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Total Marks: 100**

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**UNIT-I**

Foundations of Information Ethics, Milestones in the History of Information and Computer Ethics, Moral Methodology and Information Technology, Value Sensitive Design and Information Systems. Informational Privacy: Concepts, Theories, and Controversies, Online Anonymity.

**UNIT-II**

Cyber Crimes: Ways of Executing Cyber Crimes, Cyber Criminals. Hackers: History of Hacking, Types of Hackers, Hacker Motives, Hacking Topologies, Hackers' Tools of System Exploitation, Types of Attacks, dealing with the Rising Tide of Cyber Crimes, Prevention, Detection, Recovery Ethical Issues Involving Computer Security: Hacking, Hacktivism, and Counter-hacking

**UNIT-III**

Ethical Interest in Free and Open Source Software, Internet Research Ethics: The Field and Its Critical Issues, Health Information Technology: Challenges in Ethics, Science and Uncertainty, Ethical Issues of Information and Business, Virtual Reality and Computer Simulation, Epistemological and Ethical Issues, The Ethics of Cyber Conflict, Regulation and Governance of the Internet, Information Overload, Email spam.

**UNIT-IV**

The Matter of Plagiarism: What, Why, and If. Intellectual Property: Legal and Moral Challenges of Online File Sharing, Censorship and Access to Expression, The Gender Agenda in Computer Ethics, The Digital Divide: A Perspective for the Future, Intercultural Information Ethics.

**REFERENCES:**

1. Handbook of Information and Computer Ethics by Kenneth Einar Himma and Herman T. Tavani, Wiley.
2. Computer Network Security by Joseph Migga Rizza. University of Tennessee-Chattanooga U.S.A. 2005 Springer Science & Business Media, Inc. ISBN-13:978-03872-0473-4

**CSL599: Computational Problem Solving Using Python**

**CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Total Marks: 100**

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

**Unit – I**

**Introduction to Python:** Process of Computational Problem Solving, Python Programming Language

**Data and Expressions:** Literals, Variables and Identifiers, Operators, Expressions, Statements and Data Types

**Control Structures:** Boolean Expressions (Conditions), Logical Operators, Selection Control, Nested conditions, Debugging

**Unit – II**

**Lists:** List Structures, Lists (Sequences) in Python, Iterating Over Lists (Sequences) in Python

**Functions:** Fundamental Concepts, Program Routines, Flow of Execution, Parameters & Arguments

**Iteration:** While statement, Definite loops using For, Loop Patterns, Recursive Functions, Recursive Problem Solving, Iteration vs. Recursion

**Unit – III**

**Dictionaries:** Dictionaries and Files, Looping and dictionaries, Advanced text parsing

**Files:** Opening Files, Using Text Files, String Processing, Exception Handling

**Objects and Their Use:** Introduction to Object Oriented Programming

**Modular Design:** Modules, Top-Down Design, Python Modules

**Unit – IV**

**Using Databases and SQL:** Database Concepts, SQLite Manager Firefox Add-on, SQL basic summary, Basic Data modeling, Programming with multiple tables

**Reference Books:**

1. Python for Informatics, Charles Severance, version 0.0.7
2. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach, Wiley Publications, 2012, ISBN : 978-0-470-91204-1
3. Introduction To Computation And Programming Using Python, GUTTAG JOHN V, PHI, 2014, ISBN-13: 978-8120348660
4. Introduction to Computing & Problem Solving Through Python, Jeeva Jose and Sojan P. Lal, Khanna Publishers, 2015, ISBN-13: 978-9382609810
5. Introduction to Computing and Programming in Python, Mark J. Guzdial, Pearson Education, 2015, ISBN-13: 978-9332556591
6. Fundamentals of Python by Kenneth Lambert, Course Technology, Cengage Learning , 2015
7. Learning Python by Mark Lutz, 5th Edition, O'Reilly Media, 2013

### **CSL549: MOBILE COMPUTING**

**Total Marks: 100**

#### **CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
4	0	0

**Note for Paper Setter:**

There will be eight questions of equal marks, two in each of the four sections (Section A to D), corresponding to the distribution of the syllabus. The paper setters are requested to make sub-section (not exceeding 4) of the questions and allocate appropriate marks to each sub section.

**Note for Candidate:**

Attempt five questions in all by selecting one question from each section and the fifth question may be attempted from any sections.

#### **UNIT-I**

Introduction to Mobile Communications and Computing: Introduction to mobile computing, applications, limitations, and architecture. Frequency reuse, GSM (Global system for mobile Communication) : Mobile services, System architecture, Protocols, Localization and calling, Handover, Security, and data services.

#### **UNIT-II**

Making the internet Mobile : Overview of the WAP , Components of WAP standard ,WAP architecture ,Design principles , WML – Markup Basics , events, tasks, and bindings ,variables ,Other contents ,Controls ,Document type declaration , Errors and Browser limitations. Wireless Binary Extensible Markup Language. WML script, Language Basics, Standard Libraries, Binary WML script, Data base connectivity.

#### **UNIT-III**

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

#### **UNIT-IV**

Mobile Agents:-Introduction to Mobile Agents, Mobile Agent Architecture, Mobile Agent Applications, Elements of Mobile Agent Systems.

**References:**

1. Charles Arehart et al., - The Professional WAP – Wrex Publications.
2. Dale Browk – WAP Beginners Guide – Tata McGrawHill Publications.
3. Kris Jamsa – WML and WML Script A Beginners Guide – Tata McGrawHill Publications.
4. Jochen Schiller - Mobile Communications - Addison-Wesley.
5. . William R Cockayne and Micheal Zyda – Mobile Agents – Printice Hall PTR.

**CSP-546: PROGRAMMING LAB X****Time: 3 Hours.****Total Marks: 100**

Lab exercises based on  
Computational Problem Solving using Python  
Network Programming

**CREDITS**

<b>L</b>	<b>T</b>	<b>P</b>
0	0	2

**CSD–690: MAJOR PROJECT**

**Total Marks: 500**

<b>Credits</b>		
<b>L</b>	<b>T</b>	<b>P</b>
0	0	22

A candidate should work on the project for 5 months and 6-8 hours on each working day.

1<sup>st</sup> synopsis (containing mainly literature survey corresponding to the problem taken up for the project work and line of attack to solve the problem) within one month of joining the training is to be submitted and will be evaluated for 4 credits.

2<sup>nd</sup> synopsis (containing essentially the progress of work in comparative details) within three months of joining the training is to be evaluated will be evaluated for 4 credits.

Credits for Final Project Report & Viva Voce: 14

The evaluation shall be done as per the common ordinances for courses under Credit Based Continuous Evaluation Grading System