FACULTY OF SCIENCES

SYLLABUS

of

Bachelor of Science (Non-Medical & Computer Science)
(Semester III to VI)

(Under Continuous Evaluation System)

(12+3 System of Education)

Session: 2023-24

The Heritage Institution

KANYA MAHA VIDYALAYA
JALANDHAR
(AUTONOMOUS)

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science
(Non-Medical/ Computer Science)
Session-2023-24

Bachelor of Science (Non-Medical/ Computer Science) Semester-III								
Course Code		**Course Type**	**Course Title**	**Marks**				**Examination time (in Hours)**
				Total	**Ext.**		**CA**	
					L	**P**		
BCSL-3421 BCSL-3031 BCSL-3431		C	Punjabi (Compulsory) [1]Basic Punjabi [2]Punjab History and Culture	50	**40**		**10**	**3**
BCSL-3212		C	English (Compulsory)	50	**40**		**10**	**3**
BSNM-3333 BCSM-3333	I	E	Mathematics (Analysis)	100	40		10	3
	II		Mathematics (Analytical Geometry)		40		10	3
BSNM-3084	I	E	Chemistry (Organic Chemistry)	100	30	-	20	3
	II		Chemistry (Physical Chemistry)		30	-		3
	P		Chemistry (Practical)		-	20		3½
BCSM-3134		E	**Computer Science** (Computer Oriented Numerical and Statistical Methods)	100	50		20	3
	P		**Computer Science** (Computer Oriented Numerical and Statistical Methods) (Practical)			30		3
BSNM-3395 BCSM-3395	I	E	Physics (Statistical Physics and Thermodynamics)	100	30	-	20	3
	II		Physics (Optics and Laser)		30	-		3
	P		Physics (Practical)		-	20		3
***AECE-3221**		AC	**Environmental Studies** (Compulsory)	100	60	20	20	3
***SECP-3512**		AC	**Personality Development**	25	20		5	1
Total			400					

C-Compulsory
E-Elective
AC- Audit Course
[1] Special paper in lieu of Punjabi (Compulsory).
[2] Special paper in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.
***Marks of these papers will not be added in total marks and only grades will be provided.**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science
(Non-Medical & Computer Science)
Session-2023-24

Bachelor of Science (Non-Medical/ Computer Science) Semester-IV								
Course Code		**Course Type**	**Course Title**	**Marks**				**Examination time (in Hours)**
				Total	**Ext.**		**CA**	
					L	**P**		
BCSL-4421 BCSL-4031 BCSL-4431		C	Punjabi (Compulsory) [1]Basic Punjabi [2]Punjab History and Culture	50	**40**		**10**	**3**
BCSL-4212		C	English (Compulsory)	50	**40**		**10**	**3**
BSNM-4333 BCSM-4333	I	E	Mathematics (Statics and Vector Calculus)	100	40		10	3
	II		Mathematics (Solid Geometry)		40		10	3
BSNM-4084	I	E	Chemistry (Inorganic Chemistry)	100	30	-	20	3
	II		Chemistry (Organic Chemistry)		30	-		3
	P		Chemistry (Practical)		-	20		3½
BCSM-4134		E	**Computer Science** (Data Structures)	100	50		20	3
	P		**Computer Science** (Data Structures)(Practical)			30		3
BSNM-4395 BCSM-4395	I	E	Physics (Quantum Mechanics)	100	30	-	20	3
	II		Physics (Atomic and Molecular Spectra)		30	-		3
	P		Physics (Practical)		-	20		3
SECS-4522		AC	Social Outreach	25	20	-	5	
Total			400					

C-Compulsory
E-Elective
AC- Audit Course
[1] Special paper in lieu of Punjabi (Compulsory).
[2] Special paper in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.
***Marks of these papers will not be added in total marks and only grades will be provided.**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science
(Non-Medical/ Computer Science)
Session-2023-24

Bachelor of Science (Non-Medical/ Computer Science) Semester-V								
Course Code		**Course Type**	**Course Title**	**Marks**				**Examination time (in Hours)**
				Total	**Ext.**		**CA**	
					L	**P**		
BCSL-5421 BCSL-5031 BCSL-5431		C	Punjabi (Compulsory) [1]Basic Punjabi [2]Punjab History and Culture	50	**40**		**10**	**3**
BCSL-5212		C	English (Compulsory)	50	**40**		**10**	**3**
BSNM-5333 BCSM-5333	I	E	Mathematics (Dynamics)	100	40		10	3
	II		Mathematics (Number Theory)		40		10	3
BSNM-5084	I	E	Chemistry (Inorganic Chemistry)	100	30	-	20	3
	II		Chemistry (Physical Chemistry)		30	-		3
	P		Chemistry (Practical)		-	20		3½
BCSM-5134		E	**Computer Science** (Database Management System)	100	50		20	3
	P		**Computer Science** (Database Management System)(Practical)			30		3
BSNM-5395 BCSM-5395	I	E	Physics (Condensed Matter Physics)	100	30	-	20	3
	II		Physics (Electronics)		30	-		3
	P		Physics (Practical)		-	20		3
*SECI-5541		AC	Innovation, Entrepreneurship and Creative Thinking	25	20		5	1
Total			400					

C-Compulsory
E-Elective
AC- Audit Course
[1] Special paper in lieu of Punjabi (Compulsory).
[2] Special paper in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.
***Marks of these papers will not be added in total marks and only grades will be provided.**

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science
(Non-Medical/ Computer Science)
Session-2023-24

Bachelor of Science (Non-Medical / Computer Science) Semester-VI								
Course Code		**Course Type**	**Course Title**	**Marks**				**Examination time (in Hours)**
				Total	**Ext.**		**CA**	
					L	**P**		
BCSL-6421 BCSL-6031 BCSL-6431		C	Punjabi (Compulsory) [1]Basic Punjabi [2]Punjab History and Culture	50	**40**		**10**	**3**
BCSL-6212		C	English (Compulsory)	50	**40**		**10**	**3**
BSNM-6333 BCSM-6333	I	E	Mathematics (Numerical Analysis)	100	40		10	3
	II		Mathematics (Linear Algebra)		40		10	3
BSNM-6084	I	E	Chemistry (Molecular Spectroscopy)	100	30	-	20	3
	II		Chemistry (Physical Chemistry)		30	-		3
	P		Chemistry (Practical)		-	20		3½
BCSM-6134		E	**Computer Science** (Information Technology)	100	50		20	3
	P		**Computer Science** (Information Technology)(Practical)			30		3
BSNM-6395 BCSM-6395	I	E	Physics (Nuclear Physics)	100	30	-	20	3
	II		Physics (Radiation and Particle Physics)		30	-		3
	P		Physics (Practical)		-	20		3
BSNI-6696 BCSI-6696		O	Internship	Satisfactory/ Non-satisfactory				3
Total			400					

C-Compulsory E-Elective O-Optional
AC- Audit Course
[1] Special paper in lieu of Punjabi (Compulsory).
[2] Special paper in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.
***Marks of these papers will not be added in total marks and only grades will be provided.**

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-III
(Session-2023-24)
Course code: BSNM-**3421**for Bachelor of Science (Non-Medical)
BCSM-**3421**for Bachelor of Science (Computer Science)
COURSE TITLE: PUNJABI (COMPULSORY)

COURSE OUTCOMES

CO1: 'ਚੋਣਵੇ ਪੰਜਾਬੀ ਨਿਬੰਧ' ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ **ਵਾਰਤਕ** ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO2:'ਸਮਾਂਮੰਗਕਰਦਾ ਹੈ' ਇਕਾਂਗੀ ਸੰਗ੍ਰਹਿ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਇਕਾਂਗੀ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲ ਜੋੜਣਾ ਹੈ।

CO3: ਸੰਖੇਪ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਸੰਖੇਪ ਵਿਚ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ।ਲੇਖ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO4: ਮੂਲ ਵਿਆਕਰਣਕ ਇਕਾਈਆਂ: ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵੰਨਗੀਆਂ (ਭਾਵੰਸ਼, ਸ਼ਬਦ, ਵਾਕੰਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ)ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-**3421**for Bachelor of Science (Non-Medical)

BCSM-**3421**for Bachelor of Science (Computer Science)

COURSE TITLE: PUNJABI (COMPULSORY)

ਸਮਾਂ : 3 ਘੰਟੇ **Maximum Marks: 50**

Theory: 40

CA: 10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਚੋਣਵੇ ਪੰਜਾਬੀ ਨਿਬੰਧ (ਜੋਗਿੰਦਰ ਸਿੰਘ ਪੁਆਰ,ਪਰਮਜੀਤ ਸਿੰਘ ਸਿੱਧੂ), ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,ਪਟਿਆਲਾ।

ਘਰ ਦਾ ਪਿਆਰ, ਉਮਰ ਲੰਮੀ ਹੋ ਸਕਦੀ ਹੈ, ਅੱਥਰੂ, ਪੁਰਾਣਾ ਪੰਜਾਬ, ਇੰਗਲੈਂਡ ਦਾ ਸੋਗੀ ਸੋਮਵਾਰ,ਖਿਡਾਰੀਆਂ ਦੇ ਵਹਿਮ।

(ਪਾਠਕ੍ਰਮ ਦਾ ਹਿੱਸਾਹਨ)

(ਵਿਸ਼ਾ ਵਸਤੂ/ ਸਾਰ /ਕਲਾਪੱਖ) **8 ਅੰਕ**

ਯੂਨਿਟ-II

ਸਮਾਂ ਮੰਗ ਕਰਦਾ ਹੈ (ਇਕਾਂਗੀ ਸੰਗ੍ਰਹਿ) (**ਸੰਪਾ. ਕੇਵਲ ਧਾਲੀਵਾਲ**) ਚੇਤਨਾ ਪ੍ਰਕਾਸ਼ਨ,ਲੁਧਿਆਣਾ।

(ਵਿਸ਼ਾਵਸਤੂ /ਸਾਰ /ਪਾਤਰਚਿਤਰਨ) **8 ਅੰਕ**

ਯੂਨਿਟ-III

(ੳ) ਸੰਖੇਪ ਰਚਨਾ (ਪ੍ਰੈਸੀ)

(ਅ) ਲੇਖ ਰਚਨਾ **8 ਅੰਕ**

ਯੂਨਿਟ-IV

ਮੂਲ ਵਿਆਕਰਣਕ ਇਕਾਈਆਂ: ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵੰਨਗੀਆਂ (ਭਾਵੰਸ਼, ਸ਼ਬਦ, ਵਾਕੰਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ)

8 ਅੰਕ

ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕਲਈਹਦਾਇਤਾਂ

1. **ਪ੍ਰਸ਼ਨਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ।ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ।ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।**
2. **ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ।ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।**
3. **ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।**
4. **ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।**

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-III
(**Session-2023-24)**
Course code: BSNM-3212for Bachelor of Science (Non-Medical)
BCSM-3212for Bachelor of Science (Computer Science)
COURSE TITLE: ENGLISH (COMPULSORY)

COURSE OUTCOMES

After passing this course, the students will be able to:

CO 1: comprehend the basics of grammatical rules governing relative clauses, adjectives, adverbs, conjunctions and prepositions through the study of "English Grammar in Use" by Raymond Murphy

CO 2:develop skills to write an essay on a given topic and enhance their vocabulary through the study of "The Students' Companion"by Wilfred D. Best

CO 3: enhance their reading and analysing power of texts through guided reading through the study of "Making Connections"by Kenneth J. Pakenham

CO 4: develop an understanding of the poems taught, relate to the socio-cultural background of England and be able to answer questions regarding tone, style and central idea through the study of the poems in the prescribes text "Moments in Time"

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3212for Bachelor of Science (Non-Medical)

BCSM-3212for Bachelor of Science (Computer Science)

COURSE TITLE: ENGLISH (COMPULSORY)

Examination Time: 3 Hrs **Theory: 40** **CA: 10**

Instructions for the Examiner:

(The paper setters should avoid questions of theoretical nature from *Making Connections*.)

Section A: One question with sub-parts will be set from Unit I of the syllabus. Fifteen sentences will be set and the students would be required to attempt any ten. Each sentence will carry one mark. **(10×1=10)**

Section B: Two questions will be set from Unit II of the syllabus. The students would be required to attempt one essay out of the given two topics carrying six marks (word limit 300 words). The second question will be based on vocabulary. The students would be required to write single words for phrases and sentences choosing any four out of six and each carrying one mark. **(1×6 + 4×1=10)**

Section C: The students would be required to attempt two questions (with sub parts) based on exercises as given before and after reading essays in the prescribed text book *Making Connections*. **(2×5=10)**

Section D: This section will be divided into two parts. In part one, three questions based on Central idea, theme, tone and style etc. of the poems from the prescribed textbook, *Moments In Time* from Unit IV of the syllabus will be set. The students would be required to attempt any two, each carrying three marks (100 words each). **(2×3=6)**

Part two will have one question (with internal choice) requiring students to explain a stanza with reference to context carrying four marks (word limit 200 words). The stanzas for explanation will be taken from the prescribed textbook, *Moments in Time* from Unit IV in the syllabus. **(1×4=4)**

Unit I

English Grammar in Use, 4th Edition by Raymond Murphy, CUP (Units 92-120)

Unit II

Essay Writing and *The Students' Companion* by Wilfred D. Best (Section 1: Single words for phrases and sentences: Words denoting Numbers and words denoting Places)

Unit III

Making Connections by Kenneth J. Pakenham, 2nd Edn. CUP: Unit-II

Unit IV

Moments in Time: Poems at Sr. No. 1-6

Texts Prescribed:

1. *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP
2. *The Students' Companion* by Wilfred D. Best
3. *Making Connections* by Kenneth J. Pakenham, 2nd Edn. CUP
4. *Moments in Time: An Anthology of Poems*, GNDU, Amritsar

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3333(I) for Bachelor of Science (Non-Medical)

BCSM-3333(I) for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (ANALYSIS)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate an understanding of limits and how they are used in sequences.

CO 2: Understanding how limits are used in series and apply various test on series.

CO 3: To understand the concepts of Riemann sum, partitions, upper and lower sums, Riemann Integrability of continuous functions and of monotone functions. Distinguish between the absolute convergence and conditional convergence.

CO 4: To know and describe the converging behaviour of improper integrals and Beta, Gamma functions. To find the relation between Beta and Gamma functions.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3333(I) for Bachelor of Science (Non Medical)
BCSM-3333(I) for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (ANALYSIS)

Examination Time: 3 Hours | Max Marks: 50
Theory: 40
CA: 10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT-I

Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion.

UNIT-II

Series of non-negative terms. Comparison tests. Cauchy's integral tests. Ratio tests. Cauchy's root test. Raabe's test, logarithmic test. Demorgan's and Bertrand's tests. Kummer's test, Cauchy Condensation test, Gauss test, Alternating series. Leibnitz's test, absolute and conditional convergence

UNIT-III

Partitions, Upper and lower sums. Upper and lower integrals, Riemann integrability. Conditions of existence of Riemann integrability of continuous functions and of monotone functions. Algebra of integrable functions.

UNIT-IV

Improper integrals and statements of their conditions of existence. Test of the convergence of improper integral, beta and gamma functions.

Text Book:

A. Kumar and S. Kumaresan , A Basic Course in Real Analysis, CRC Press, New York, 2014.

Reference Books:

1.S.C Malik and S. Arora, Mathematical Analysis, New Age international Publishers, New Delhi, second edition, 2005.
2.T. M. Apostal, Mathematical Analysis, Pearson education, second edition, 2004.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(**Session-2023-24)**

Course code: BSNM-3333(II) for Bachelor of Science (Non Medical)

BCSM-3333(II) for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (ANALYTICAL GEOMETRY)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of the geometry of lines, shifting of origin and rotation of axis in the Euclidian plane.

CO 2: Develop geometry with a degree of confidence and will gain fluency in the basics of parabola in Euclidian geometry.

CO 3: Demonstrate the concept of ellipse and hyperbola in general quadratic equation.

CO 4: Understand the concept of geometry and real time characteristics of plain and spheres.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3333(II) for Bachelor of Science (Non Medical)
BCSM-3333(II) for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (ANALYTICAL GEOMETRY)

Examination Time: 3 Hours Max Marks: 50
Theory:40
CA:10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT-I

Transformation of axes, shifting of origin, Rotation of axes in two dimension and three dimension, the invariants, Joint equation of pair of straight lines, equations of bisectors

UNIT-II

Parabola and its properties. Tangents and normal, Pole and polar, pair of tangents at a point, Chord of contact, equation of the chord in terms of midpoint and diameter of conic.

UNIT-III

Ellipse and hyperbola with their properties. Tangents and normal, Pole and polar. pair of tangents at a point, Chord of contact, Identifications of curves represented by second degree equation (including pair of lines).

UNIT-IV

Intersection of three planes, condition for three planes to intersect in a point or along a line or to form a prism. Sphere: Section of a sphere by a plane, spheres of a given circle. Intersection of a line and a sphere. Tangent line, tangent plane, power of a point with respect to a sphere, radical planes.

Text Book:

S.L. Loney, The Elements of Coordinate Geometry, Arihant Publications, Sixth edition, 2016.

Reference Books:

1. G. Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Private Limited, Allahabad, 2000.
2. S. Narayan and P.K. Mittal, Analytical Solid Geometry, S. Chand & company, Seventeenth edition, 2007.
3. E. Kreyszig, Advanced Engineering Mathematics, Wiley Publisher, Tenth edition, 2010.
4. G.B. Thomos, and R.L. Finney, Calculus and Analytic Geometry, Addison Wesley, Ninth edition, 1995.

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-III
(**Session-2023-24)**
Course code: BSNM-3084 (I) for Bachelor of Science (Non-Medical)
COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)

Course outcomes:

Students will be able to

CO1: to resolve the different enantiomers and differentiate between dextrorotatory-laevorotatory chiral and achiral compounds, understand the concept of isomerism, axial and equatorial bonds.
CO2: understand the methods of formation, chemical reactions, acidic character of alcohols
CO3: preparation of understand structure and bonding phenols, acidic character of phenols
CO4: compare reactivity of aliphatic and aromatic aldehydes and ketones, to understand the various reactions given by carbonyl compounds

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(**Session-2023-24)**

Course code: BSNM-3084 (I) for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)

Time: 3 Hrs. **Max. Marks: 30**

Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT I

Stereochemistry of Organic Compounds

Concept of isomerism,types of isomerism, Optical isomerism, elements of symmetry, molecular chirality, enantiomers, stereogeniccentre, optical activity, properties of enantiomers, chiral and achiral molecules with two stereogeniccentres, diastereomers, threo and erythrodiasteremers, meso compounds, resolution of enantiomers, inversion, retention and racemization. Relative and absolute configuration, sequence rules, D and L and R and S systems of nomenclature. Geometric isomerism–determination of configuration of geometric isomers. E and Z system of nomenclature. Conformational isomerism–conformational analysis of ethane and n–butane; conformation of cyclohexane, axial and equatorial bonds, conformation of mono substituted cyclohexane derivatives. Newman projection and Sawhorse formulae, Fischer and flying wedge formulae. Difference between configuration and conformation.

UNIT–II

Alcohols

Classification and nomenclature.Monohydric alcohols—nomenclature, Acidic nature, Reactions of alcohols, Dihydric alcohols—nomenclature, methods of formation, chemical reactions of vicinal glycols, oxidative cleavage [$Pb(OAc)_4$] and [HIO_4] and pinacol-pinacolone rearrangement.

UNIT–III

Phenols

Nomenclature, structure and bonding, preparation of phenols, physical properties and acidic character, Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion.Reactions of phenols—electrophilic aromatic substitution, acylation and carboxylation.Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Reimer Tiemann reaction.

UNIT–IV

Aldehydes and Ketones

Nomenclature and structure of the carbonyl group. Synthesis of aldehydes and ketones with particular reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones using 1,3-dithianes, synthesis of ketones from nitriles and from carboxylic acids. Physical properties.Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations.Condensation with ammoniaand its derivatives. Witting reaction,Mannichreaction.Use of acetals as protecting group.Oxidation of aldehydes, Baeyer-Villiger oxidation of Ketones, Cannizzaro reaction.MPV, Clemmensen, Wolff-Kishner, $LiAlH_4$ and $NaBH_4$ reductions. Halogenation of enolizable ketones. Halogenation of enoliable ketones

Books suggested:

1. Morrison, R.T., Boyd, R.N., Organic Chemistry; 6th edition, Pubs: Prentice-Hall, 1992.
2. Wade Jr., L.G., Singh, M.S., Organic Chemistry; 6th edition, Pubs: Pearson Education, 2008.
3. Mukherji, S.M., Singh, S.P., Kapoor, R.P., Organic Chemistry; Pubs: Wiley Eastern Limited, 1985, Vol. I, II, III.

4. Solomons, T.W., Fryhle, C.B., Organic Chemistry; 9th edition, Pubs: Wiley India, 2007.
5. Carey, F.A., Organic Chemistry; 4th edition, Pubs: McGraw-Hill, 2000.
6. Streitwieser, A., Clayton, Jr., Heathcock, H., Introduction to Organic Chemistry; 3rd edition, Pubs:Macmillan Publishing Company, 1989.
7. University General Chemistry, C.N.R. Rao, Macmillan.

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-III
(Session-2023-24)
Course code: BSNM-3084 (II) for Bachelor of Science (Non-Medical)
COURSE TITLE: CHEMISTRY (PHYSICALCHEMISTRY)

Course outcomes:

Students will be able to

CO1: understand and evaluate thermodynamic property of any system and its applications to various systems, acquire the knowledge of phase equilibria of various systems

CO2: demonstrate the carnot cycle, understand the concept of Entropy

CO3: understand the concept of Residual entropy, demonstrate Clausius-Clapeyron equation, CO4: understand concept of spontaneity of a reaction in terms of free energy change.

CO4: understand and demonstrate the concept of phase equilibria of one component system, two component system

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3084 (II) for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (PHYSICALCHEMISTRY)

Time: 3 Hrs. **Max. Marks: 30**

Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

Unit–I

Thermodynamics-I Definition of thermodynamic terms: System, surroundings etc. Types of systems, intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.

First Law of Thermodynamics:

Statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law-Joule-Thomson coefficient and inversion temperature, Calculation of w,q,dUanddH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process.

Thermochemistry:

Standard state, standard enthalpy of formation-Hess's Law of heat summation and its applications. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy. Kirchhoff's equation.

Unit–II

Thermodynamics-II

Second Law of Thermodynamics: Need for the law, different statements of the law, Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature.

Concept of Entropy: Entropy as a state function, entropy as a function of V and T, entropy as a function of P and T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases.

Unit–III

Thermodynamics-III

Third Law of Thermodynamics: Nernst heat theorem, statement and concept of residual entropy, evaluation of absolute entropy from heat capacity data. Gibbs and Helmholtz functions; Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities, A and G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change, Variation of G and A with P,V and T.

Chemical Equilibrium

Equilibrium constant and free energy. Thermodynamic derivation of law of mass action. Determination of K_p, K_c, $K_a$and their relationship, Clausius-Clapeyron equation, applications.

Unit–IV

Introduction to Phase Equilibrium

Statement and meaning of the terms-phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system-water, CO_2 and S systems. Phase equilibria of two component systems-solid-liquid equilibria, simple eutectic-Bi-Cd, Pb-Ag systems, desilverisation of lead. Solid solutions-compound formation with congruent melting point (Mg-Zn) and incongruent melting point, (NaCl-H_2O), $FeCl_3$-H_2O) and $CuSO_4$-H_2O) system. Freezing mixtures, acetone-dry ice. Non-ideal system-azeotropes-HCl-H_2O and ethanol-water system. Partially miscible liquids Phenol-water, trines-thylamin-water, Nicotine-water System. Lower and upper consulate temperature, Effect of impurity on consolutetemperature, immiscible liquids, steam distillation. Nernst distribution law-thermodynamic derivation and applications.

Books suggested:

1. Atkins, P., Paula, J.de, Atkins Physical Chemistry; 8th edition, Pubs: Oxford University Press, 2008.
2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co., 2008.
3. Barrow, G.M., Physical Chemistry; 6th edition, Pubs: McGraw Hill Inc, 1996.
4. Rao, C.N.R., University General Chemistry; Pubs: Macmillan India, 1985.
5. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford University Press, 2000.
6. Albert, R.A., Silbey, R.J., Physical Chemistry; 1st edition, Pubs: John Wiley and Sons Inc., 1992.
7. Dogra, S.K., Dogra, S., Physical Chemistry Through Problems; Pubs:Wiley Eastern Limited, 1991.
8. Levine, I.N., Physical Chemistry; 5th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd., 2002.
9. Moore, W. J., Basic Physical Chemistry; Pubs: Prentice Hall of India Pvt. Ltd, 1983.
10. Metz, C.R., Theory and Problems of Physical Chemistry; Schaum's outline series, 2nd edition, Pubs: McGraw-Hall Book company, 1989.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3094 (P) for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (PRACTICAL)

Course outcomes:

Students will be able to

CO1: understand and master the technique of volumetric analysis, analyze an acidic and alkali content in different samples,

CO2: To analyze calcium content in various samples permanganometricall, understand the concept of hardness of water and its analysis by EDTA method

CO3: understand and master the technique of gravimetric analysis

CO4: to understand the concept of TLC and its applications

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3094 (P) for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (PRACTICAL)

Duration: 3½ Hrs. **Max. Marks: 20**

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar.

Quantitative Analysis

Volumetric Analysis

a. Determination of acetic acid in commercial vinegar using NaOH.
b. Determination of alkali content-antacid tablet using HCI.
c. Estimation of calcium content in chalk as calcium oxalate by permanganometry.
d. Estimation of hardness of water by EDTA.
e. Estimation of ferrous and ferric by dichromate method.
f. Estimation of copper using sodiumthiosulphate.

Gravimetric Analysis

Analysis of Cu as CuSCN and Ni as Ni (dimethylgloxime)

Organic Chemistry Laboratory Techniques

Thin Layer Chromatography

Determination of R_f values and identification of organic compounds.

(a). Separation of green leaf pigments (spinach leaves may be used).

(b). Preparation and separation of 2, 4. dinitrophenylhydrazones of acetone, 2-butone, 2-Butanone, hexan-2 and 3-one using toluene and light petroleum (40 : 60).

(c). Separation of a mixture of dyes using cyclohexane and ethyl acetate (8.5:1.5).

Practical Examination

1) Volumetry / Gravimetry	11
2) Thin Layer chromatography	04
3) Viva-Voce	03
4) Note Book	02

Books suggested:

1. Vogel's Textbook of Quantitative Inorganic Analysis (revised), J. Bassett, R.C. Denney, G.H. Jeffery and J. Mandham, ELBS.
2. Standard Methods of Chemical. Analysis, W.W. Scott: The Technical Press.
3. Experimental Inorganic Chemistry, W.G. Palmer, Cambridge.
4. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
5. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
6. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.
7. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill

Bachelor of Science (Semester System) (12+3 System of Education)

(**Session-2023-24)**

Course code: BCSM-3134 for Bachelor of Science (Computer Science)

COURSE TITLE: COMPUTER SCIENCE (COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)

Course Outcomes:

After passing this course the student will be able to:

CO1: Solve non-linear and linear equations using different methods.

CO2: comprehend interpolation and numerical integration.

CO3: Calculate different means and deviations using statistical techniques.

CO4: Comprehend correlation, curve fitting and regression for finding solutions to various statistical problems.

Bachelor of Science (Semester System) (12+3 System of Education)
(**Session-2023-24)**
Course code: BCSM-3134 for Bachelor of Science (Computer Science)
COURSE TITLE: COMPUTER SCIENCE (COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)

Examination Time: (3+3)Hrs. Max. Marks: 100
Theory: 50
Practical: 30
CA: 20

Instructions for Paper Setter: Eight questions of equal marks (10 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. The students can use Non–programmable/ scientific & Non–storage type calculator.

Unit –I

Introduction: Numerical methods, Numerical methods versus numerical analysis, Errors and Measures of Errors. Bisection method, false position method and Newton Raphson method. Simultaneous Solution of Equations: Gauss Elimination Method, Gauss Jordan method

Unit -II

Interpolation: Interpolation and Curve Fitting, Newtons Methods: Forward Difference Method, Backward Difference Method and Divided Difference Method. Numerical Integration: Trapezoidal Rule, Simpson's 1/3 Rule Simpson's 3/8 Rule.

Unit -III

Measure of Central Tendency: Mean Arithmetic, Mean Geometric, Mean Harmonic, Mean, Median and Mode. Measure of dispersion: Range, Mean deviation, Standard deviation, co-efficient of variation.

Unit –IV

Correlation: Meaning, Karl Pearson method, Rank correlation. Regression: Meaning, Linear Regression and its coefficients.

References/ Textbooks:

1. B.S. Grewal, Numerical Methods in Engineering & Science: With Programs in C, C++ & MATLAB, Khanna Publisher, 2014.
2. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall of India Private Ltd., 2009.
Note: The latest editions of the books should be followed.

Bachelor of Science (Semester System) (12+3 System of Education)
(**Session-2023-24)**
Course code: BSNM-3395 (I) for Bachelor of Science (Non Medical)
BCSM-3395 (I) for Bachelor of Science (Computer Science)
COURSE TITLE: PHYSICS (STATISTICAL PHYSICS AND THERMODYNAMICS)

Course Outcomes

After passing this programme the students will be able to:

CO1: Understand the basic ideas and scope of probability as well as distribution of n particles in different compartments.

CO2: Concept of different types of Statistics and the need for Quantum Statistics.

CO3: Understand the concept of entropy, Laws of Thermodynamics and applications to thermoelectric effect.

CO4: Understand the Maxwell Thermodynamics relations, Change of state and Claypron equation.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3395 (I) for Bachelor of Science (Non Medical)

BCSM-3395 (I) for Bachelor of Science (Computer Science)

COURSE TITLE: PHYSICS (STATISTICAL PHYSICS AND THERMODYNAMICS)

Time: 3 Hours **Marks: 30**

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I

Basic ideas of Statistical Physics, Scope of Statistical Physics, Basic ideas about probability, Distribution of four distinguishable particles into compartments of equal size. Concept of macro states, microstates, Thermodynamic Probability, Effects of constraints on the system. Distribution of n particles in two compartments, Deviation from the state of maximum probability. Equilibrium state of dynamic system, Distribution of distinguishable n particles in k compartments of unequal sizes.

UNIT–II

Phase space and division into elementary cells. Three kinds of statistics. The basic approach in three statistics. Maxwell Boltzmann (MB) statistics applied to an ideal gas in equilibrium. Experimental verification of law of distribution of molecular speeds. Need for Quantum Statistics – B.E. Statement of Planck's law of Radiation Wien's Displacement and Stefan's law. Fermi Dirac (FD) statistics. Comparison of M.B, B.E and F.D statistics.

UNIT–III

Statistical definition of entropy, Change of entropy of system, additive nature of entropy, Law of increase of entropy, Reversible and irreversible processes, and their examples, work done in reversible process, examples of increase in entropy in natural processes, entropy and disorder, Brief review of Terms, Laws of Thermodynamics, Carnot Cycle, Entropy changes in Carnot cycle, Absolute thermodynamics or Kelvin Scale of Temperature, Applications of thermodynamics to thermoelectric effect, Peltier Effect, Thomson Effect, change of entropy along reversible path in P-V diagram. Heat death of universe.

UNIT–IV

Derivation of Maxwell Thermodynamics relations, Cooling produced by adiabatic stretching, A diabetic Compression, change of internal energy with volume, Specific heat and constant pressure and constant volume. Expression for C_P-C_V, Change of state and Claypron equation, Joule-Thomson effect.

Text Reference Books:

1. Statistical Physics and Thermodynamics by V.S. Bhatia (Sohan Lal Nagin Chand), Jal.
2. A Treatise on Heat by M.N. Saha & B.N. Srivastava (The Indian Press Pvt. Ltd., Allahabad),1965.
3. Statistical Mechanics: An Introductory Text by Bhattacharjee, J.K. (Allied Pub., Delhi), 2000.
4. Statistical Physics by Bhattacharjee, J.K. (Allied Pub., Delhi) 2000.
5. Statistical Mechanics by B.B. Laud, (Macmillan India Ltd.) 1981.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3395 (II) for Bachelor of Science (Non Medical)

BCSM-3395 (II) for Bachelor of Science (Computer Science)

PHYSICS (OPTICS AND LASER)

Course Outcomes:

After passing this programme the students will be able to:

CO1: understand the concept of interference of waves by division of wave front and by division of Amplitude, its different methods and interferometers.

CO2: understand the Huygen's Fresnel theory and diffraction, Fraunhoffer diffraction due to single slit, double slit and n slits, the concept of resolving power.

CO3: understand the concept the polarization of light and types of polarisers.

CO4: understand the fundamentals of lasers and its processes. The knowledge of different components and types of lasers and its applications

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III

(Session-2023-24)

Course code: BSNM-3395 (II) for Bachelor of Science (Non Medical)

BCSM-3395 (II) for Bachelor of Science (Computer Science)

PHYSICS (OPTICS AND LASER)

Time: 3 Hours **Marks: 30**

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I

Interference of Light:

Superposition of light waves and interference, Young's double slit experiment, Conditions for sustained interference pattern, Coherent sources of light, Interference pattern by division of wave front, Fresnel Biprism, Displacement of fringes, Change of phase on reflection, Interference in thin films due to reflected and transmitted light, non reflecting films, Newton's Rings. Michelson Interferometer.

UNIT–II

Diffraction:

Huygen's Fresnel theory, half-period zones, Zone plate, Distinction between Fresnel and Fraunhoffer diffraction. Fraunhoffer diffraction due to single slit, rectangular and circular apertures, Effect of diffraction in optical imaging, Resolving power of telescope in diffraction grating, its use as a spectroscopic element and its resolving power, Resolving power of microscope

UNIT–III

Polarization:

Plane Polarized light, Elliptically polarized light, wire grid polarizer, Sheet polarizer, Mauls' Law, Brewester Law, Polarization by reflection and scattering, Double reflection, Nicol prism, Retardation plates,
Production and Analysis of polarized light, Quarter and half wave plates.

UNIT–IV

Laser Fundamentals:

Derivation of Einstein relations, Concept of stimulated emission and population inversion, broadening of spectral lines, three level and four level laser schemes, Threshold and Schawlow Tonnes condition, Components of laser devices, types of lasers, Ruby and Nd:YAG lasers, He-Ne and CO2 lasers construction, mode of creating population inversion and output characteristics, application of lasers –a general outline.

Text Reference Books:

1.Fundamentals of Optics: F.A. Jenkins and Harvey E White, (Megraw Hill) 4th Edition, 2001.
2. Optics: Ajoy Ghatak, (McMillan India) 2nd Edition, 7th Reprint, 1997
3. Optics: Born and Wolf, (Pergamon Press) 3rd Edition, 1965.
4. Laser Fundamentals: W.T. Silfvast (Foundation Books), New Delhi, 1996.
5. Laser and Non-Liner Optics: B.B. Laud (New Age Pub.) 2002
6. Laser: Svelto, Plenum Press) 3rd Edition, New York

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-III
(Session-2023-24)
Course code: BSNM-3395 for Bachelor of Science (Non Medical)
BCSM-3395 for Bachelor of Science (Computer Science)
PHYSICS (PRACTICAL)

After passing this programme the students will be able to:

CO1: use spectrometer to determine the refractive index of different transparent materials wills dispersive power and resolving power of different transparent prisms and liquids using spectrometer.

CO2: use diffraction grating and apply it to determine dispersive power, resolving power, the wavelengths of Hg source and the Cauchy's constants.

CO3: to measure an accessible (Horizontal and vertical) and inaccessible heights using sextant.

CO4: set up of Newton's rings to determine wavelength of sodium light.

CO5: demonstrate the verification of laws of probability distribution.

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-III
(Session-2023-24)
Course code: BSNM-3395 (P) for Bachelor of Science (Non Medical)
BCSM-3395 (P) for Bachelor of Science (Computer Science)
COURSE TITLE: PHYSICS (PRACTICAL)

Instructions to Practical Examiner

Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar

General Guidelines for Practical Examination
I. The distribution of marks is as follows: **Marks: 20**
i) One experiment **7 Marks**
ii) Brief Theory **3 Marks**
iii) Viva–Voce **5 Marks**
iv) Record (Practical file) **5 Marks**
II. There will be one sessions of 3 hours duration. The paper will have one session.
Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.
III. Number of candidates in a group for practical examination should not exceed 12.
IV. In a single group no experiment is to be allotted to more than three examinees in any group.

List of Experiments

1. To determine refractive index of glass/ liquid using spectrometer.
2. To determine the Cauchy's constants.
3. To study the refractive index of a doubly refracting prism.
4. To set up Newton's rings to determine wavelength of sodium light.
5. To determine the wavelength by using plane diffraction grating (Use Hg source)
6. To determine dispersive power of plane diffraction grating.
7. To determine resolving power of a telescope.
8. To measure an accessible (Horizontal and vertical) height using sextant.
9. To measure inaccessible height by using sextant.
10. Verify laws of probability distribution by throwing of similar coins.
11. To determine the wavelength of given laser source using Young's double slit experiment

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-IV
(Session-2023-24)
Course code: BSNM-**4421**for Bachelor of Science (Non Medical)
BCSM-**4421**for Bachelor of Science (Computer Science)
Course Title:Punjabi (Compulsory)

COURSE OUTCOMES

CO1: 'ਪਗਡੰਡੀਆਂ' (**ਸਵੈਜੀਵਨੀ**) ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰ**ਸਵੈਜੀਵਨੀ**ਸਾਹਿਤ ਰੂਪ ਪ੍ਰਤੀਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ।

CO2: '**ਫ਼ਾਸਲੇ**' (**ਨਾਟਕ**) ਨੂੰ ਸਿਲੇਬਸ ਵਿਚਸ਼ਾਮਿਲਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂਅੰਦਰ**ਨਾਟਕ**ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ ਅਤੇ **ਨਾਟਕ**ਜਗਤਨਾਲਜੋੜਣਾ ਹੈ।

CO3: ਦਫ਼ਤਰੀਚਿੱਠੀਪੱਤਰ ਅਤੇਅਖ਼ਬਾਰਵਿਚਇਸ਼ਤਿਹਾਰਲਿਖਣਾਸਿਖਾਉਣ ਦਾ ਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾਵਿਚਨਿਪੁੰਨਕਰਨਾ ਹੈ।

CO4: ਸ਼ਬਦਜੋੜਾਂ ਦੇ ਨਿਯਮ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚਸ਼ਾਮਿਲਕਰਨ ਦਾ ਮਕਸਦਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਲਿਖ਼ਤ ਵਿਚਕੀਤੀਆਂਜਾਣਵਾਲੀਆਂਗਲਤੀਆਂ ਨੂੰ ਸੁਧਾਰਨਾਹੈ।ਗੁਰਮੁਖੀਲਿਪੀਦੀਆਂਵਿਸ਼ੇਸ਼ਤਾਵਾਂਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਪੰਜਾਬੀਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂਨੂੰ ਸਮਝਣਲਈਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-**4421**for Bachelor of Science (Non Medical)

BCSM-**4421**for Bachelor of Science (Computer Science)

Course Title:Punjabi (Compulsory)

ਸਮਾਂ : 3 ਘੰਟੇ **Maximum Marks: 50**

Theory: 40

CA: 10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਪਗਡੰਡੀਆਂ (**ਸਵੈਜੀਵਨੀ**) :**ਡਾ.**ਬਚਿੰਤਕੌਰ

(ਸਾਰ /ਵਿਸ਼ਾਵਸਤੂ /ਆਤਮਬਿੰਬ) 8 ਅੰਕ

ਯੂਨਿਟ-II

ਫ਼ਾਸਲੇ (**ਨਾਟਕ**) :ਜਤਿੰਦਰਬਰਾੜ,

(ਵਿਸ਼ਾਵਸਤੂ/ਸਾਰ /ਨਾਟਜੁਗਤਾਂ) 8 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਦਫ਼ਤਰੀਚਿੱਠੀਪੱਤਰ

(ਅ) ਅਖ਼ਬਾਰਵਿਚਇਸ਼ਤਿਹਾਰ 8 ਅੰਕ

ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ

(ੳ) ਸ਼ਬਦਜੋੜਾਂ ਦੇ ਨਿਯਮ

(ਅ) ਗੁਰਮੁਖੀਲਿਪੀਦੀਆਂਵਿਸ਼ੇਸ਼ਤਾਵਾਂ8 ਅੰਕ

ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕਲਈਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨਹੋਣਗੇ।ਸੈਕਸ਼ਨA-Dਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟI-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ।ਹਰ ਸੈਕਸ਼ਨਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜਪ੍ਰਸ਼ਨਕਰਨੇ ਹਨ।ਹਰ ਸੈਕਸ਼ਨਵਿਚੋਂਇਕਪ੍ਰਸ਼ਨਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂਪ੍ਰਸ਼ਨਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨਵਿਚੋਂਕੀਤਾਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕਹਨ।
4. ਪੇਪਰ ਸੈੱਟਕਰਨਵਾਲਾਜੇਕਰਚਾਹੇ ਤਾਂਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡਅੱਗੋਂਵੱਧਤੋਂਵੱਧਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂਵਿਚਕਰ ਸਕਦਾ ਹੈ।

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-IV
(Session-2023-24)
Course code: BSNM-**4212**for Bachelor of Science (Non Medical)
BCSM-**4212**for Bachelor of Science (Computer Science)
Course Title:ENGLISH (COMPULSORY)

COURSE OUTCOMES

After passing this course, the students will be able to:

CO 1: comprehend the basics of grammatical rules governing prepositions and phrasal verbs through the study of"English Grammar in Use"by Raymond Murphy

CO 2: develop skills to write an essay on a given topic and enhance their vocabulary through the study of"The Students' Companion"by Wilfred D. Best

CO 3: enhance their reading and analysing power of texts through guided reading through the study of "Making Connections"by Kenneth J. Pakenham

CO 4: develop an understanding of the poems taught, relate to the socio-cultural background of England and be able to answer questions regarding tone, style and central idea through the study of the poems in the prescribes text "Moments in Time"

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-**4212**for Bachelor of Science (Non-Medical)

BCSM-**4212** for Bachelor of Science (Computer Science)

Course Title:ENGLISH (COMPULSORY)

Examination Time: 3 Hrs **Theory: 40** **CA: 10**

Instructions for the Examiner:

The paper setters should avoid questions of theoretical nature from *Making Connections*.

Section A: One question with sub-parts will be set from Unit I of the syllabus. Fifteen sentences will be set and the students would be required to attempt any ten. Each sentence will carry one mark. **(10×1=10)**

Section B: Two questions will be set from Unit II of the syllabus. The students would be required to attempt one essay out of the given two topics carrying six marks (word limit 300 words). The second question will be based on vocabulary. The students would be required to write single words for phrases and sentences choosing any four out of six and each carrying one mark. **(1×6 + 4×1=10)**

Section C: The students would be required to attempt two questions (with sub parts) based on exercises as given before and after reading essays in the prescribed text book *Making Connections.* **(2×5=10)**

Section D: This section will be divided into two parts. In part one, three questions based on central idea, theme, tone and style etc. of the poems from the prescribed textbook, *Moments In Time* from Unit IV of the syllabus will be set. The students would be required to attempt any two, each carrying three marks (100 words each). **(2×3=6)**

Part two will have one question (with internal choice) requiring students to explain a stanza with reference to context carrying four marks (word limit 200 words). The stanzas for explanation will be taken from the prescribed textbook, *Moments in Time* from Unit IV in the syllabus. **(1×4=4)**

Unit I

English Grammar in Use, 4th Edition by Raymond Murphy, CUP (Units 121-145)

Unit II

Essay Writing and *The Students' Companion* by Wilfred D. Best (Section 1: Single words for phrases and sentences: Words pertaining to Government, words pertaining to Marriage, Opposites and Negatives)

Unit III

Making Connections by Kenneth J. Pakenham, 2nd Edn. CUP: Unit-IV

Unit IV

Moments in Time: Poems at Sr. No. 7-12

Texts Prescribed:

CO 1. *English Grammar in Use* (Fourth Edition) by Raymond Murphy, CUP

CO 2. The Students' Companion by Wilfred D. Best

CO 3. Making Connections by Kenneth J. Pakenham, 2nd Edn. CUP

CO 4. Moments in Time: An Anthology of Poems, GNDU, Amritsar

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4333(I) for Bachelor of Science (Non Medical)

BCSM-4333(I) for Bachelor of Science (Computer Science)

Course Title:MATHEMATICS (STATICS AND VECTOR CALCULUS)

Course Outcomes

After passing this course, the students will be able:

CO 1: To apply parallelogram law of forces, triangle law of forces, Lami's theorem to real life problems and also understand that how one can resolve number of coplanar forces, parallel forces and concurrent forces acting at a body.

CO 2: To find the applications of CG of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

CO 3: To find the values of gradient, divergence and curl operator of given vectors

CO 4: To find the application of Gauss theorem, Green's theorem and Stokes's theorem in real life problems.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4333(I) for Bachelor of Science (Non Medical)

BCSM-4333(I) for Bachelor of Science (Computer Science)

Course Title:MATHEMATICS (STATICS AND VECTOR CALCULUS)

Examination Time: 3 Hours Max Marks: 50

Theory: 40

CA: 10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT-I

Composition and resolution of forces (parallelogram law, triangle law, polygon law, Lami's Theorem(ג-μ) theorem). Resultant of a number of coplanar forces, parallel forces. Moments ,Varignon's Theorem of moments, Couples , Resultant of two Coplanar Couples, Equilibrium of two coplanar couples, Resultant of a force and a couple, Equilibrium of coplanar forces.

UNIT-II

Friction, Laws of friction, Equilibrium of a particle on a rough plane. Centre of Gravity: Centre of gravity of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

UNIT-III

Vector differentiation, Gradient, divergence and curl operators, line integrals, Vector identity, and Vector integration.

UNIT-IV

Theorems of Gauss, Green, Stokes and problems based on these.

Reference Books:

1. N.P. Bali, Statics, Laxmi Publications, Sixth edition, 2007.
2. M.R. Spiegal, Vector Analysis, Schaum's outline Series, McGraw Hill, Second edition, 2017.
3. S.L. Loney, The Elements of Statics and Dynamics, Arihant Publications, Sixth edition, 2016.
4. R.S. Verma, A Text Book on Statics, Pothishala Private Limited, Allahabad, 1962.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4333(I) for Bachelor of Science (Non Medical)

BCSM-4333(I) for Bachelor of Science (Computer Science)

Course Title:MATHEMATICS(SOLID GEOMETRY)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of cylinder, enveloping cylinder and its limiting form.

CO 2: Demonstrate the concept of cone, classification of cone, intersection of line and cone, reciprocal cone.

CO 3: Describe the concept of conicoids or quadratic surface, its classification, trace different types of conicoids and hence find surface of revolution.

CO 4: Describe the concept of tangent and normal plane to the conicoid and identify the conicoids, representing it in the form of hyperboloid, ellipsoid, paraboloid.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4333(I) for Bachelor of Science (Non Medical)
BCSM-4333(I) for Bachelor of Science (Computer Science)

Course Title:MATHEMATICS(SOLID GEOMETRY)

Examination Time: 3 Hours Max Marks: 50

Theory: 40
CA: 10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT-I

Cylinder as surface generated by a line moving parallel to a fixed line and through fixed curve. Different kinds of cylinders such as right circular, elliptic, hyperbolic and parabolic in standard forms

UNIT-II

Cone with a vertex at the origin as the graph of homogeneous equation of second degree in *x, y, z* . Cone as a surface generated by a line passing through a fixed curve and fixed point outside the plane of the curve. Right circular and elliptic cones.

UNIT-III

Equation of surface of revolution obtained by rotating the curve f(x,y)=0 about the z-axis in the form of $f(x^2+y^2, z) = 0$.Equation of ellipsoid, hyperboloid and Paraboloid in standard forms.

UNIT-IV

Surfaces represented by general equation of 2nd degree S = 0. Tangent lines, tangent planes and Normal Plane.

Text Books:

1. P. K. Jain & Khalil Ahmed, A text book of Analytical Geometry of three dimensions, New age international limited, Second edition, 2003.

Reference Books:

1. S. Narayan, &P.K.Mittal , Analytical Solid Geometry, Sultan Chand & Sons, New Delhi, Sixteenth edition, 2002 (Scope in Chapters-7,8,11).
2. E. Kreyszig, Advance Engineering Mathematics, John Willey & Sons, tenth edition, 2011.

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-IV
(**Session-2023-24)**
Course code: BSNM-4084 (I) for Bachelor of Science (Non-Medical)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)

Course outcomes:

Students will be able to

CO1: understand the key features of coordination compounds viz. Nomenclature, Isomerism and electronic configurations of coordination compounds, have general knowledge of Chelates, Postulates of VBT
CO2: understand theproperties and reactions of non-aqueous solvents.
CO3: write both reduction and oxidation half reactions for a simple redox reaction, Frost and understand the Latimer Pourbaix diagram.
CO4: understand the positions,electronic configurations,relative stability,preparation, properties, structures and characteristics of the f-block elements in the periodic table and understand the role of metal ions and other inorganic elements in biological systems

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4084 (I) for Bachelor of Science (Non-Medical)

COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)

Time: 3 Hrs. **Max. Marks: 30**

Note: Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT–I

Coordination Compounds **(10 Hrs)**

Werner's coordination theory and its experimental verification, effective atomic number concept, chelates, nomenclature of coordination compounds, isomerism in coordination compounds, valence bond theory of transition metal complexes

Non-AqueousSolvents **(5 Hrs)**

Physical properties of a solvent, types of solvents and their general characteristics, reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2.

UNIT–II

Oxidation and Reduction **(8 Hrs)**

Use of redox potential data-analysis of redox cycle, redox stability in water, Frost, Latimer and Pourbaix diagrams

Chemistry of Lanthanide Elements **(7 Hrs)**

Electronic structure, oxidation states and ionic radii and lanthanide contraction. Electronic absorption and magnetic properties of lanthanides

UNIT–III

Chemistry of Actinides **(5 Hrs)**

General features and chemistry of actinides, similarities between the later actinides and the later lanthanides. Electronic and magnetic properties of actinides and their general comparison with the lanthanide elements

UNIT–IV

Bioinorganic Chemistry **(10 Hrs)**

Essential and trace elements in biological processes, metalloporphyrins and special reference to haemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Ca^{2+}

Books Suggested:

1. Cotton, F.A., Wilkinson, G., Gaus, P.L., Basic Inorganic Chemistry; 3rd edition, Pubs: John Wiley Sons. 1995.
2. Lee, J.D., Concise Inorganic Chemistry; 4th edition, Pubs: Chapman Hall Ltd., 1991.
3. Shriver, D.E., Alkins, P.W., Langford, C.H., Inorganic Chemistry; 4th edition, Oxford Publisher: Oxford University Press, 2006.
4. Douglas, B. McDamiel, D., Alexander, J., Concepts and Models of Inorganic Chemistry; 3rd edition, Pubs: John Wiley and Sons Inc., 1994.
5. Porterfield, W.W., Wesley, A., Inorganic Chemistry; Pubs: Addison-Wesley Publishing Company, 1984.
6. Miessler, G.L., Larr, D.A., Inorganic Chemistry; 3rd edition, Pubs: Pearson Education Inc., 2004.
7. Jolly, W.L., Modern Inorganic Chemistry; 2nd edition, Pubs: McGraw-Hill Publishing Company Limited, 1991.
8. Purcell, K.F., Kotz, J.C., Inorganic Chemistry; Pubs: W.B. Saunders Company, 1977.
9. Puri, B.R., Sharma, L.R., Kalia, K.C., Principles of Inorganic Chemistry; 30th edition, Pubs: Milestones Publisher, 2006-07.

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-IV
(Session-2023-24)
Course code: BSNM-4084 (II) for Bachelor of Science (Non Medical)
COURSE TITLE: CHEMISTRY(ORGANIC CHEMISTRY)

Course outcomes:

Students will be able to

CO1: understand structure and bonding in carboxylic acids and carboxylic acid derivatives, Compare the acidity of alcohols,phenols and acids
CO2: understand preparations and reactions of ethers and epoxides, understand cleavages in ethers, the ring opening reactions of epoxides
CO3:understand preparation and reactions of nitroalkanes and nitroarenes, differentiate between primary, secondary and tertiary amines, basicity of amines
CO4:understandnomenclature, structural features, methods of formation and chemical reactions of Organomagnesium, Organolithium, Organozinc and Organocopper compounds and to know the various methods of synthesis and compare electrophilic substitution, basicity, reactions of pyrrole, furan, thiophene and nucleophilic substitution reactions of pyridine.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4084 (II) for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY(ORGANIC CHEMISTRY)

Time: 3 Hrs. **Max. Marks: 30**

Note:Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT–I

Carboxylic Acids (8 Hrs)

Nomenclature, structure and bonding, physical properties, acidity of carboxylic acids, effects of substituents on acid strength.Reactions of carboxylic acids.Hell-Volhard-Zelinskyreaction.Synthesis of acid chlorides, esters and amides.Reduction of carboxylic acids.Mechanism of decarboxylation.

Carboxylic Acids Derivatives (7 Hrs)

Structure and nomenclature of acid chlorides, esters, amides and acid anhydrides, Relative stability and reactivity of acyl derivatives.Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution.Preparation of carboxylic acid derivatives, chemical reactions.Mechanisms of esterification and hydrolysis (acidic and basic).

UNIT–II

Ethers and Epoxides (5 Hrs)

Nomenclature of ethers and methods of their formation, physical properties.Chemical reaction-cleavage and autoxidation, Ziesel'smethod.Synthesis of epoxides. Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and organolithium reagents with epoxides.

UNIT-III

Organic Compounds of Nitrogen (10 Hrs)

Preparation of nitroalkanes and nitroarenes.Chemical reactions of nitroalkanes, Mechanisms of nucleophilc substitution in nitroarenes and their reduction in acidic, neutral and alkaline media.Reactivity, Structure and nomenclature of amines, Methods of preparation of amines by Reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction and Hoffmann bromamide reaction.Physicalproperties.Stereochemistry of amines.separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Amine salts as phase-transfer catalysts.

UNIT–IV

Organometallic Compounds (7 Hrs)

Organomagnesium Compounds: The Grignard reagentsformation, structure and chemical reactions.Organolithium Compounds: Formation and chemical reactions.Organozinc and Organo copper Compounds: Nomenclature, structural features, Methods of formation and chemical reactions.

Heterocyclic Compounds (8 Hrs)

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution.Mechanism of nucleophilic substitution reactions in pyridine derivatives.Comparison of basicity of pyridine, piperidine and pyrrole.

Book Suggested:

1. Morrison, R.T., Boyd, R.N., Organic Chemistry; 6th edition, Pubs: Prentice-Hall, 1992.
2. Wade Jr., L.G., Singh, M.S., Organic Chemistry; 6th edition, Pubs: Pearson Education, 2008.
3. Mukherji, S.M., Singh, S.P., Kapoor, R.P., Organic Chemistry; Pubs: Wiley Eastern Limited, 1985, Vol.I, II, III.

4. Solomons, T.W., Fryhle, C.B., Organic Chemistry; 9th edition, Pubs: Wiley India, 2007.
5. Carey, F.A., Organic Chemistry; 4th edition, Pubs: McGraw-Hill, 2000.
6. Streitwieser, A., Clayton, Jr., Heathcock, H., Introduction to Organic Chemistry; 3rd edition, Pubs: Macmillan Publishing Company, 1989.
7. Introduction to Organic Chemistry, Sireitwieser, Heathcock and Kosover, Macmilan.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4084 (P) for Bachelor of Science (Non-Medical)

COURSE TITLE: CHEMISTRY (PRACTICAL)

Course outcomes:

Students will be able to analyze the given organic compound through

CO1: understand the basics of Qualitative analysis

CO2: detection of elements (N, S and halogens) in organic compounds.

CO3: detection of functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines,amides, nitro and anilide) in simple organic compounds

CO4: preparation of their derivatives

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4084 (P) for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (PRACTICAL)

Duration: 3½ hrs. **Max. Marks: 20**

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar.

Qualitative Analysis

Detection of elements: N, S and halogens

Detection of functional groups:phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide in simple organic compounds and preparing their derivatives.

Practical Examination

1) Detection of Elements, functional group and derivative preparation	15
2) Viva-Voce	03
3) Note Book	02

Book Suggested:

1. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
3. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
4. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BCSM-4134 for Bachelor of Science (Computer Science)

COURSE TITLE: COMPUTER SCIENCE (DATA STRUCTURES)

Course Outcomes:

After passing course the student will be able to:

CO1: Analyze complexity of algorithms to determine their efficiency.

CO2: Comprehend various hashing method, sorting and searching algorithms.

CO3: Comprehend various operations of stack and queue along with different scenarios.

CO4: Comprehend advanced data structures such as tree and graph.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BCSM-4134 for Bachelor of Science (Computer Science)

COURSE TITLE: COMPUTER SCIENCE (DATA STRUCTURES)

Examination Time: 3Hrs. Max. Marks: 100

Theory: 50

CA: 20

Instructions for Paper Setter

Eight questions of equal marks (10 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. The students can use Non–programmable/ scientific & Non–storage type calculator.

UNIT–I

Data Structures: Introduction to elementary data organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time-Space Tradeoff between Algorithms. Arrays: Array defining, representing arrays in memory, various operations on linear arrays, MultiDimensional arrays.

UNIT–II

Linked Lists: Types of Linked Lists, representing linked list in memory, advantages of using linked lists over arrays, various operations of linked lists. Stacks: Description of stack structure, Implementation of stack, using arrays and linked lists, application of stack-converting, arithmetic expression from infix notation to polish notation and their subsequent evaluation, quicksort technique.

UNIT–III

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, description or priorities of queues, deques. Sorting and Searching: Sorting Algorithms, bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, searching Algorithms, linear search and binary search.

UNIT-IV

Trees: Description of Tree Structure and its Terminology, Binary Trees and Binary Search Trees and their representation in Memory, Heapsort. Graphs: Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix, graph traversal techniques - DFS, BFS.

References / Textbooks:

1. Seymour Lipschutz, Data Structures with C (Schaum's Outline Series), McGraw Hill Education (2017), 1st Edition

2. Reema Thareja, Data Structures Using C, Oxford Publication (2014), 2nd Edition

3. Sahni Horowitz, Fundamentals of Data Strucetures in C (2008), 2nd Edition

4. Narasimha Karumanchi, Data Structures and Algorithms made easy, Careermonk Publications (2016), 5th Edition

5. S.K. Srivastava and Deepali Srivastava, Data Structures through C, BPB Publications (2004)

6. Yedidyah Langsam, Augestein and Tanenbaum, Data Structures using C and C++, Pearson Education India (2015), 2nd Edition

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BCSM-4134 (P) for Bachelor of Science (Computer Science)

COURSE TITLE: COMPUTER SCIENCE (PRACTICAL) (DATA STRUCTURES)

Examination Time: (3+3) Hrs. Max. Marks: 30

Practical on Data Structures

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4395 (I) for Bachelor of Science (Non Medical)
BCSM-4395 (I) for Bachelor of Science (Computer Science)

COURSE TITLE: PHYSICS (QUANTUM MECHANICS)

Course Outcomes

After completing this course

CO1: Students will be familiar with the main aspects of the historical development of quantum mechanics

CO2: Students will understand the central concepts and principles in quantum mechanics

CO3: Students will be able to find the solution of Schrödinger wave equation for simple systems in one dimension and for Hydrogen atom.

CO4: Students will be able to find the solution of Schrödinger wave equation for simple systems in three dimensions and for Hydrogen atom in spherical coordinates.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-IV

(Session-2023-24)

Course code: BSNM-4395 (I) for Bachelor of Science (Non Medical)
BCSM-4395 (I) for Bachelor of Science (Computer Science)

COURSE TITLE: PHYSICS (QUANTUM MECHANICS)

Time: 3 Hours **Marks: 30**

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I

Formalism of Wave Mechanics:

Brief introduction to need and development of quantum mechanics, photoelectric effect, Compton effect, Wave particle duality, De broglie hypothesis, Wave packet, Group velocity, Uncertainty principle, Fundamental postulates of wave mechanics, Time dependent and time independent Schrodinger wave equation for a free particle and equation of a particle subject to forces. Stationary states, Superposition principle.

UNIT–II

Normalization and probability interpretation of wave function, Gaussian wave packet. Admissibility conditions of wave function, Eigen function and Eigen value, Expectation value, Operator and commutator formalism, Hermitian operator, orthogonal system, Probability current and conservation of probability, Ehrenfest theorem,.

UNIT–III

Application of Schrodinger wave equation to one dimensional problems:

Application of Schrodinger Equation for solving one dimensional Particle in a box, One dimensional step potential for E>V0 , one dimensional step potential for 0<E<V0,
one dimensional potential barrier of finite height and width, Quantum mechanical tunnelling effect, one dimensional square well of finite depth

UNIT–IV

Application of Schrodinger equation to three dimensional problems:

Free particle in three dimensional rectangular box, Eigen wave function, Eigen values of momentum, energy and degeneracy, three dimensional harmonic oscillator (Cartesian coordinates) wave function, energy levels, degeneracy, Schrodinger's wave equation in spherical polar co-ordinates, Schrodinger wave equation for spherically symmetric potential for hydrogen atom, wave function of H atom, □(□),□ (□solution of R(r), equations.

Text Reference Books:

1. A Text book of Quantum Mechanics by P.M. Mathews and K. Venkatesan,(Tata McGraw Hill Pub., Co., Delhi) 2002.
2. Quantum Mechanics by J.L. Powell and B. Craseman (Narosa Pub. House, New Delhi) 1997.
3. Concepts of Modern Physics by Arthur Beiser (McGraw Hill Pub. Co., New Delhi, 9th Ed.)1995.
4. Elements of Modern Physics by S.H. Patil (McGraw Hill), 1998.
5. Quantum Mechanics by E. Merzbacher (John Wiley, 2nd Edition)
6. Fundamentals of Molecular Spectroscopy by C.N. Banwell (Tata McGraw Hill Pub. Co.,
7. Delhi), 2001.

8. Atomic Spectra by H.G. Kuhn (Longmans), 2nd Ed., 1969.
9. Introduction to Quantum Mechanic by L. Pauling and E.B. Wilson (Tata McGraw Hill Pub. Co., Delhi), 2002.
10. Quantum Mechanics by W. Greiner (Springer Verlag), 1994.
11. Fundamentals of Molecular Spectroscopy by C.B. Banwell-Tata McGraw Hill, 1986.
12. Molecular Spectroscopy: Jeanne L McHale.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER–IV

(Session-2023-24)

Course code: BSNM-4395 (II) for Bachelor of Science (Non Medical)
BCSM-4395 (II) for Bachelor of Science (Computer Science)

COURSE TITLE: PHYSICS (ATOMIC AND MOLECULAR SPECTRA)

Course Outcomes:

CO1: understand fine and hyperfine spectrum of hydrogen atom and the concept of spin and magnetic moment of an electron

CO2: understand spectra of alkali atoms and Zeeman effect

CO3: demonstrate understanding of exchange symmetry of wave function, different coupling schemes and spectra of atoms with more than one electron.

CO4: Students will understand concept of X rays spectra and molecular spectra including rotational, vibrational and Raman Spectra

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER–IV

(Session-2023-24)

Course code: BSNM-4395 (II) for Bachelor of Science (Non Medical)
BCSM-4395 (II) for Bachelor of Science (Computer Science)

COURSE TITLE: PHYSICS (ATOMIC AND MOLECULAR SPECTRA)

Time: 3 Hours **Marks: 30**

Pass Marks: 11

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I

Introduction to Atomic Spectra:

Observation of spectra, Types of spectra, Spectral analysis, Units in spectroscopy, Bohr's Theory and Hydrogen spectrum, Spectral series, Bohr's correspondence Principle, quantum numbers, The Spinning electron and the vector model, Stern Gerlach Experiment, Total Quantum number, Term values, Magnetic moment(Orbital, Spin and Total)

UNIT–II

One Electron Atomic Spectra:

Electron Spin orbit interaction, Fine and Hyperfine structure of Hydrogen atom, Energy level and different series of alkali spectra, Doublet structure in alkali Spectra (Fine Structure), Selection rules for doublets, Zeeman Effect and its experimental setup, Classical theory of Normal Zeeman effect, Quantum theory of Normal and anomalous Zeeman effect

UNIT–III

Many Electron System Spectra:

Exchange symmetry of wave function, Pauli's Exclusion principle, Electronic configuration and atomic states, shells, subshells in atoms, Two valence electron atoms: LS and JJ coupling schemes and resulting spectral terms, optical spectra for one and many electron system (Helium), spectra of alkaline earth atoms.

UNIT–IV

X-Ray and Molecular Spectra:

Production of X-rays and Types of X-ray spectra, Mosley law, Molecular bonding, Molecular spectra, selection rules, symmetric structure, Rotational Vibrational, electronic level and spectra of molecules, Raman spectra. Introduction to Raman spectra.

Text Reference Books:

1. Introduction to Atomic Spectra by: H.E. White-Auckland McGraw Hill, 1934.
2. Spectroscopy Vol. I, II & III by Walker &Straughen
3. Introduction to Molecular Spectroscopy by G.M. Barrow-Tokyo McGraw Hill, 1962.
4. Spectra of Diatomic Molecules by Herzberg-New York, 1944
5. Introduction to Atomic Spectra by H.E. White (Mcgraw Hill, Book Co., Inc., New York)

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER–IV

(Session-2023-24)

Course code: BSNM-4395 for Bachelor of Science (Non Medical)
BCSM-4395 (P) for Bachelor of Science (Computer Science)

COURSE TITLE: PHYSICS (PRACTICAL)

Course Outcomes:

CO1: The exercises included in this laboratory course are aimed at training the students to handle different type of equipment for verification of some of the laws and concepts studied in theory like concepts of thermodynamics, photoelectric effect and for carrying out precise measurements so that they develop confidence to use later the sophisticated instruments in their respective fields.

CO2: After the completion of this course students will be able to use spectrometer and hence will be able to study absorption spectra of iodine.

CO3: At the end of this course students will be able to prepare cane sugar solution and hence will be able to find its specific rotation by using polarimeter.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER–IV

(Session-2023-24)

Course code: BSNM-4395 for Bachelor of Science (Non Medical)

BCSM-4395 for Bachelor of Science (Computer Science)

PHYSICS(PRACTICAL)

Instructions to Practical Examiner

Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar

General Guidelines for Practical Examination

I. The distribution of marks is as follows: **Marks: 20**

i) One experiment **7 Marks**

ii) Brief Theory **3 Marks**

iii) Viva–Voce **5 Marks**

iv) Record (Practical file) **5 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session.

Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.

III. Number of candidates in a group for practical examination should not exceed 12.

IV. In a single group no experiment is to be allotted to more than three examinees in any group.

List of Experiments

1. To study adiabatic expansion of gas and hence to calculate value of V.
2. To find the coefficient of Thermal Conductivity of a bad conductor by Lee's method.
3. To plot a calibration curve of a given thermocouple (copper constantan).
4. To study the photoelectric effect and determine the value of Planck's constant.
5. To determine the ionization potential of mercury.
6. Study of variation of light intensity with distance using photovoltaic cell
(Inverse Square Law)
7. To determine the heating efficiency of an electric kettle with varying voltage.
8. To study the absorption spectra of iodine vapours.
9. To study the rotation of plane of polarization by using polarimeter.
10. To determine the specific rotation of sugar using Laurent's half shade polarimeter
11. To study the characterizations of Photovoltaic cell.

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-V
(Session-2023-24)
Course code: BSNM-**5421**for Bachelor of Science (Non-Medical)
BCSM-**54212**for Bachelor of Science (Computer Science)
COURSE TITLE: PUNJABI (COMPULSORY)

COURSE OUTCOMES

CO1:ਚੋਣਵੀਆਂਪੰਜਾਬੀਕਹਾਣੀਆਂਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਕਹਾਣੀਆਂਪ੍ਰਤੀਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ।
CO2:ਨਾਵਲ'ਏਹੁਹਮਾਰਾਜੀਵਣਾ' (ਦਲੀਪਕੌਰਟਿਵਾਣਾ)ਨੂੰ ਸਿਲੇਬਸ ਵਿਚਸ਼ਾਮਿਲਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂਅੰਦਰਨਾਵਲਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲਜੋੜਣਾ ਹੈ।
CO3:ਪੈਰ੍ਹਾਰਚਨਾਕਰਨਨਾਲਵਿਦਿਆਰਥੀਆਪਣੀਗੱਲ ਨੂੰ ਕਹਿਣ ਦੀ ਜਾਚਸਿੱਖਣਗੇ ਅਤੇ ਇਹਦਿਮਾਗੀਕਸਰਤਵਿਚ ਸਹਾਈਹੋਵੇਗੀ।ਸਰਲਅੰਗਰੇਜ਼ੀਪੈਰ੍ਹੇ ਦਾਪੰਜਾਬੀਵਿਚਅਨੁਵਾਦਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰਕਰਨਾ ਹੈ।
CO4:ਵਾਕਾਤਮਕਜੁਗਤਾਂ : ਮੇਲ ਤੇ ਅਧਿਕਾਰਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂਨੂੰ ਸਮਝਣਲਈਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂਦਾਵਿਕਾਸ ਕਰਨਾ ਹੈ।

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-**5421**for Bachelor of Science (Non-Medical)

BCSM-**54212**for Bachelor of Science (Computer Science)

COURSE TITLE: PUNJABI (COMPULSORY)

ਸਮਾਂ : 3 ਘੰਟੇ **Maximum Marks: 50**

Theory: 40

CA: 10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਚੋਣਵੀਆਂਪੰਜਾਬੀਕਹਾਣੀਆਂ

(ਸੰਪਾ.ਡਾ.ਰਮਿੰਦਰਕੌਰ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ, 2018)

ਲੇਖਕ ਕਹਾਣੀਕਹਾਣੀ ਸੰਗ੍ਰਹਿ

ਅਜੀਤਕੌਰਨਿਊ ਯੀਅਰਮੌਤਅਲੀਬਾਬੇ ਦੀ

ਜਿੰਦਰ ਸੌਰੀ ਜਖ਼ਮ

ਸੁਖਜੀਤਹਜ਼ਾਰਕਹਾਣੀਆਂ ਦਾ ਬਾਪ ਮੈ ਇੰਜੁਆਏ ਕਰਦੀਹਾਂ

ਜ਼ਤਿੰਦਰਹਾਂਸ ਰਾਹੁ ਕੇਤੁ ਈਸ਼ਵਰ ਦਾ ਜਨਮ

ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ਅਰਜਨ ਛੇੜ ਗਡੀਰਨਾਕੁਝ ਅਣਕਿਹਾਵੀ

ਚੰਦਨ ਨੇਗੀ ਹਰਖ ਸੋਗ ਹਰਖ ਸੋਗ

ਜਸਵਿੰਦਰਸਿੰਘ ਖੂਹ ਖਾਤੇ ਖੂਹ ਖਾਤੇ

ਗੁਰਦੇਵ ਸਿੰਘ ਰੁਪਾਣਾਸ਼ੀਸ਼ਾਸ਼ੀਸ਼ਾ ਅਤੇ ਹੋਰਕਹਾਣੀਆਂ

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ /ਪਾਤਰਚਿਤਰਨ)8 ਅੰਕ

ਯੂਨਿਟ-II

ਨਾਵਲ : ਏਹੁਹਮਾਰਾਜੀਵਣਾ(ਦਲੀਪਕੌਰਟਿਵਾਣਾ)

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ /ਬਿਰਤਾਂਤਕਜੁਗਤਾਂ)8 ਅੰਕ

ਯੂਨਿਟ-III

ਲਗਪਗ 200 ਸ਼ਬਦਾਂਵਿਚਪੈਰ੍ਹਾਰਚਨਾ

ਸਰਲਅੰਗਰੇਜ਼ੀਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀਵਿਚਅਨੁਵਾਦ8 ਅੰਕ

ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ :

(ੳ) ਨਾਂਵਵਾਕੰਸ਼

(ਅ) ਮੇਲ ਤੇ ਅਧਿਕਾਰ8 ਅੰਕ

ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕਲਈਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨਹੋਣਗੇ।ਸੈਕਸ਼ਨA-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟI-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ।ਹਰ ਸੈਕਸ਼ਨਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜਪ੍ਰਸ਼ਨਕਰਨੇ ਹਨ।ਹਰ ਸੈਕਸ਼ਨਵਿਚੋਂਇਕਪ੍ਰਸ਼ਨਕਰਨਾਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂਪ੍ਰਸ਼ਨਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨਵਿਚੋਂਕੀਤਾਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕਹਨ।
4. ਪੇਪਰ ਸੈੱਟਕਰਨਵਾਲਾਜੇਕਰਚਾਹੇ ਤਾਂਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡਅੱਗੋਂਵੱਧਤੋਂਵੱਧਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂਵਿਚਕਰ ਸਕਦਾ ਹੈ।

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-V
(Session-2023-24)
Course code: BSNM-**5212**for Bachelor of Science (Non Medical)
BCSM-**5212**for Bachelor of Science (Computer Science)
COURSE TITLE: ENGLISH (COMPULSORY)

COURSE OUTCOMES

After passing this course, the students will be able to:

CO 1: analyze and appreciate the dramatic technique, plot development and art of characterisation in the prescribed play,"All My Sons"by Arthur Miller

CO 2: widen their knowledge about various literary devices used in poetry such as tone, style, imagery, figures of speech, symbolism etc. thorough the study of prescribed poems from the text "Poems of Nature and Culture"

CO 3: develop the knowledge, skills and capabilities for effective business writing such as formal letter writing, job application and resume writing

CO 4: will develop skills for writing job application and suitable resume along with.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-**5212**for Bachelor of Science (Non-Medical)

BCSM-**5212**for Bachelor of Science (Computer Science)

COURSE TITLE: ENGLISH (COMPULSORY)

Examination Time: 3 Hrs **Theory: 40** **CA: 10**

Instructions for the Examiner:

Section A: Three questions from the play *All My Sons* from Unit I and three questions from *Poems of Nature and Culture* from Unit II requiring very short answers will be set. The students would be required to answer any five, each carrying two marks (50 words each). **(5×2=10)**

Section B: Four questions requiring brief descriptive answers based on character, tone, plot and theme(s) in the play *All My Sons* from Unit I will be set and the students would be required to attempt any two, each carrying five marks (250 words each). **(2×5= 10)**

Section C: Four questions based on the central idea, theme, tone or style etc. of the prescribed poems from the textbook, *Poems of Nature and Culture* from Unit II will be set for the students to attempt any two of these, each carrying five marks (250 words each). The questions can also be set based on stanzas with reference to context. **(2×5= 10)**

Section D: Two questions with internal choice will be set based on unit 3 (formal letter) and unit 4 (Job application and Resume Writing) each carrying five marks.**(2×5=10)**

Unit I

All My Sons by Arthur Miller

Unit II

Poems of Nature and Culture:

William Wordsworth: The World is Too Much with Us
Gordon Lord Byron: She Walks in Beauty
P.B. Shelly: Ozymandias
Alfred Lord Tennyson: In Memoriam
Mathew Arnold: Dover Beach
Wilfred Owen: Strange Meeting
Robert Graves: The Portrait
W.H. Auden: The Unknown Citizen
Ted Hughes: The Thought-Fox
Sylvia Plath: Mirror
Rabindranath Tagore: False Religion
Nissim Ezekiel: Night of Scorpion

Unit III

Formal letter,

Unit IV

Job Application and Resume Writing

Texts Prescribed:

1. *All My Sons* by Arthur Miller
2. *Poems of Nature and Culture,* Guru Nanak Dev University, Amritsar
3. *Oxford Guide to Effective Writing and Speaking* by John Seely.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-5333(I) for Bachelor of Science (Non Medical)

BCSM-5333(I)for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (DYNAMICS)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate the basic relations between distance, time, velocity and acceleration, manage to solve the problems of Newton's Laws of Motion and the motion of particles connected by a string.

CO 2: Illustrate motion along a smooth inclined plane. Solve different types of problems with Variable Acceleration. Discuss Simple Harmonic Motion.

CO 3: Understand the concept of projectile, oscillating system.

CO 4: Define Work, Power and Energy and explain their relationship. Use measurement tools to apply the concepts of Work and power to solve real life problems. Identify the different types of energy.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-5333(I) for Bachelor of Science (Non Medical)

BCSM-5333(I)for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (DYNAMICS)

Examination Time:3 Hours Max Marks:50

Theory: 40

CA: 10

Instructions for the paper setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

UNIT-I

Rectilinear motion in a straight line with uniform acceleration, Newton's laws of motion. Motion of two particles connected by a string.

UNIT-II

Motion along a smooth inclined plane. Variable acceleration. Simple Harmonic Motion.

UNIT-III

Curvilinear motion of particle in a plane, Definition of velocity and acceleration, projectiles, velocity and direction of motion of a projectile after a given time, projectiles on an inclined plane. Oscillations: Free Vibrations, Simple Pendulum, Conical Pendulum.

UNIT-IV

Work, Power and Energy: Kinetic and Potential energy, Conservative forces. Theorem of conservation of energy. Work done against gravity.

Text Book:

R. Kumar, Fundamentals of Dynamics, Pardeep Publications, Jalandhar city, second edition, 2004

Reference Books:

1.F. Chorlton, Text Book of Dynamics, CBS Publishers, New Delhi, second edition, 2004 (Scope in chapters 3,8).

2. S.R. Gupta, Elementary Analytical Dynamics, S. Chand and Company, New Delhi, Fourteenth Edition, 1983(Scope in chapters 1,2,3)

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-5333(II) for Bachelor of Science (Non Medical)

BCSM-5333(II)for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS(NUMBER THEORY)

Course Outcomes

Successful completion of this course will enable the students to:

CO 1: Prove results involving divisibility and greatest common divisors.

CO 2: Find solutions of specified linear Diophantine equation, basic properties of Congruences.

CO 3: Solve system of linear congruences. Apply Fermat's and Wilson's theorem to solve numerical problems.

CO 4: Apply Euler's theorem and apply properties of phi functions in real world problems. Understand application of important arithmetic functions.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-5333(II) for Bachelor of Science (Non Medical)

BCSM-5333(II)for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS(NUMBER THEORY)

Examination Time: 3 hrs. Max.Marks:50

Theory: 40

CA:10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

UNIT-I

The division algorithm, The greatest common divisor, least common multiple, The Euclidean algorithm.

UNIT-II

The Diophantine equation ax + by = c, Prime numbers and their distribution, the fundamental theorem of arithmetic, Basic properties of congruences.

UNIT-III

Linear congruences, Special divisibility tests, Chinese remainder theorem, The Fermat's theorem, Wilson's theorem

UNIT-IV

Euler's Phi function, Euler's theorem, some properties of the Phi Function, σ and τ functions, Mobius Inversion formula, Greatest integer function

Text Book:

D. M. Burton, Elementary Number Theory, Mc Graw-Hill, seventh edition, 2010.

Reference Books,

1.Niven and Zuckerman, An Introduction to the theory of Numbers, John Willey & Sons, 1991.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-**5084(I)**for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY(INORGANIC CHEMISTRY)

Course outcomes

CO1: use Crystal Field Theory to understand the structure, hybridisation, geometry and predict the colour of the complexes.

CO2: to describe the magnetic properties of coordination compounds.

CO3: describe the stability of metal complexes by the use of formation constants and to calculate thermodynamic parameters from them.

CO4: to draw Orgel diagrams for d^1 to d^{10} systems and predict the possible transitions and to calculate number of microstate and ground state term symbols and understand preparations, properties and applications of alkyls aryls of lithium and aluminium, bonding in metal-ethylenic complexes, mechanism of homogeneous hydrogenation.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-**5084(I)**for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY(INORGANIC CHEMISTRY)

Time: 3 Hrs. **Max. Marks: 30**

Instructions for the Paper Setters:

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT-I

Metal-ligand Bonding in Transition Metal Complexes

Limitations of valence bond theory, an elementary idea of crystal-field theory, crystal field splitting in octahedral, tetrahedral and square planar complexes, factors affecting the crystal-field parameters.

UNIT-II

Magnetic Properties of Transition Metal Complexes

Types of magnetic behaviour, methods of determining magnetic susceptibility, spin-only formula. L-S coupling, correlation of μ_s and μ_{eff} values, orbital contribution to magnetic moments, application of magnetic moment data for characterization of 3d-metal complexes.

Thermodynamic and Kinetic Aspects of Metal Complexes

A brief outline of thermodynamic stability of metal complexes and factors affecting the stability, substitution reactions of square planar complexes.

UNIT-III

Electronic Spectra of Transition Metal Complexes

Term Symbols for $p^2$and d^2 systems, spectroscopic ground states for d^1-d^{10} electronic configurations. Types of electronic transitions, selection rules for d-d transitions, spectroscopic ground states, Orgel diagram for d^1-d^5.

UNIT-IV

Organometallic Compounds

Definition, nomenclature and classification of organometallic compounds. EAN rule, preparation, properties, and applications of alkyls aryls of lithium and aluminium, bonding in metal-ethylenic complexes, Mechanism of homogeneous hydrogenation reactions.

Books Suggested:

1. Cotton, F.A., Wilkinson, G., Gaus, P.L., Basic Inorganic Chemistry; 3rd edition, Pubs: John Wiley Sons. 1995. 2.
Lee, J.D., Concise Inorganic Chemistry; 4th edition, Pubs: Chapman Hall Ltd., 1991.
3. Shriver, D.E., Alkins, P.W., Langford, C.H., Inorganic Chemistry; 4th edition, Oxford Publisher: Oxford University Press, 2006.
4. Porterfield, W.W., Wesley, A., Inorganic Chemistry; Pubs: Addison-Wesley Publishing Company, 1984. 5
.Miessler, G.L., Larr, D.A., Inorganic Chemistry; 3rd edition, Pubs: Pearson Education Inc., 2004.
6. Puri, B.R., Sharma, L.R., Kalia, K.C., Principles of Inorganic Chemistry; 30th edition, Pubs: Milestones Publisher, 2006-07.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-**5084(II)**for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY(PHYSICALCHEMISTRY)

Course outcomes:

Students will be able to:

CO1: understand conductance and its types, applications of conductivity measurements, conductometric titrations, transport numbers

CO2: acquire knowledge about electrodes, reversible and irreversible cells, concentration cells, E.M.F, potentiometric titrations

CO3: understand radioactivity, laws of radioactive decay, nuclear reactions, applications of radioactivity

CO4: characterise the molecules with the help of various spectroscopic techniques such as vibrational, rotational, raman and electronic spectroscopy

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-**5084(II)**for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY(PHYSICALCHEMISTRY)

Time: 3 Hrs. **Max. Marks: 30**

Instructions for the Paper Setters:

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT-I

Electrochemistry-I

Electrical transport-conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution, migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method and moving boundary method. Applications of conductivity measurements: determination of degree of dissociation, determination of K_a of acids, determination of solubility product of a sparingly soluble salt, conductometric titrations.

UNIT-II

Electrochemistry – II

Types of reversible electrodes-gas metal ion, metal ion, metal insoluble salt-anion and redox electrodes. Electrode reactions. Nernst equation, derivation of cell E.M.F. and single electrode potential, standard hydrogen electrode, reference electrodes, standard electrode potential, sign conventions, electrochemical series and its significance. Electrolytic and Galvanic cells -reversible and irreverisible cells, conventional representation of electrochemical cells.

EMF of a cell and its measurements. Computation of cell. EMF, Calculation of thermodynamic quantities of cell reactions (ΔG, ΔH and K), polarization, over potential and hydrogen overvoltage. Concentration cells with and without transport, liquid junction potential, application of concentration cells, valency of ions, solubility product and activity coefficient, potentiometric titrations.Definition of pH and pK_a, determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometric methods. Buffers-mechanism of buffer action, Henderson-Hazel equation, Hydrolysis of salts. Corrosion-types, theories and methods of combating it.

UNIT-III

Nuclear Chemistry

Introduction: Radioactivity, Nuclear Structure, Size of Nucleus, Mass Defects and Binding Energy, Nuclear Stability, Nuclear Forces, Nuclear Spin and Moments of Nuclei, Nuclear Models, Nuclear Decay Processes, The Laws of Radioactive Decay, Soddy-Fajans Group Displacement Law, Rate of Nuclear Decay and Half Life Time (Kinetics of Radioactive Decay), Induced Nuclear Reactions, Types of Nuclear Processes, High Energy Nuclear Reactions, Nuclear Reaction Cross-Section, Artificial radioactivity, Detection and Measurement of Radioactivity, Nuclear Fission, Nuclear Fusion, Applications of Radioactivity.

UNIT-IV

Spectroscopy

Introduction: Electromagnetic radiation, regions of the spectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.

Rotational Spectrum

Diatomic molecules. Energy levels of a rigid rotor (semiclassical principles), selection rules, spectral intensity, distribution using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotor, isotope effect.

Vibrational Spectrum

Infrared spectrum: Energy levels of simple harmonic oscillator, selection rules, pure vibrational spectrum, intensity, determination of force constant and qualitative relation of force constant and bond energies, effect of anharmonic motion and isotope on the spectrum, idea of vibrational frequencies of different functional groups.

Raman Spectrum: Concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules.

Electronic Spectrum

Concept of potential energy curves for bonding and antibonding molecular orbitals, qualitative description of selection rules and Franck-Condon principle. Qualitative description of s, p, and n M.O., their energy levels and the respective transitions.

Books Suggested: -

1. Atkins, P., Paula, J.de, Atkins Physical Chemistry; 8th edition, Pubs: Oxford University Press, 2008.
2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co., 2008.
3. Barrow, G.M., Physical Chemistry; 6th edition, Pubs: McGraw Hill Companies Inc, 1996.
4. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford University Press, 2000.
5. Albert, R.A., Silbey, R.J., Physical Chemistry; 1st edition, Pubs: John Wiley and Sons Inc., 1992.
6. Levine, I.N., Physical Chemistry; 5th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd,2002.

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-V
(Session-2023-24)
Course code: BSNM-**5084(P)**for Bachelor of Science (Non Medical)
COURSE TITLE: CHEMISTRY(PRACTICAL)

Course outcomes:

Students will be able to
CO1: synthesize and analyse the coordination compounds and to determine the end point of various conductometric titrations

CO2: know the principle and working of Abbe's Refractometer and to determine the composition of unknown mixture of two liquids by refractive index measurements.

CO3: learn the technique of Rast's methods and learn phenomenon of adsorption of acetic acid and oxalic acid on charcoal

CO4: learn distribution coefficient of of iodine between CCl_4 and water

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-V

(Session-2023-24)

Course code: BSNM-**5084(P)**for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY(PRACTICAL)

Duration: 3½ Hrs. **Max. Marks: 20**

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE office, Kanya Maha Vidyalaya, Jalandhar.

(I) Synthesis and Analysis

(a) Preparation of Sodium trioxalatoferrate (III) (b) Preparation of Ni-DMG Complex

(c) Preparation of Copper tetrammine complex

(d) Preparation of cis-bisoxalatodiaquachromate (III) ion

(II) Physical Chemistry

(a) Conductometric Titrations

(i) Determine the end point of the following titrations by the conductometric methods.

Strong acid-Strong base

Strong acid-Weak base

Weak acid-Strong base

Weak acid-Weak base

(ii) Determine the composition of a mixture of acetic acid and the hydrochloric acid by conductometric titration.

(b) (i) Molecular Weight Determination of acetanilide, napthalane, using camphor as solvent **(Rast's methods).**

(ii) To determine the molecular weight of a polymer by viscosity measurements. **(c) Adsorption** (i)To study the adsorption of acetic acid oxalic/acid from aqueous solutions by charcoal.

(d) Phase Equilibria (i) To determine the distribution coefficient of iodine between CCl_4 and water.

(e) Refractometry

(i) Determination of refractive index of a liquid by Abbe refractometer, and hence the specific and molar refraction.

(ii) To determine the composition of unknown mixture of two liquids by refractive index measurements.

Practical Examination

1) Inorganic Synthesis 07
2) Physical experiment 08
3) Viva- Voce 03
4) Note Book 02

Books Suggested: -

1. Experimental Inorganic Chemistry, W.G. Palmer, Cambridge.
2. Handbook of preparative Inorganic Chemistry, Vol. I and II, Brauer, Academic Press.
3. Inorganic Synthesis, McGraw Hill.
4. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press
5. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill.
6. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
7. Advanced Experimental Chemistry, Vol. I, Physical, J.N. Guru and R. Kapoor, S. Chand and Co.
8. Selected Experiments in Physical Chemistry, N.G. Mukherjee, J.N. Ghosh and Sons.
9. Experiments Physical Chemistry, J.C. Ghosh, Bharati Bhavan.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)

Course code: BSNM-5134 for Bachelor of Science (Non Medical)
BCSM-5395 (I) for Bachelor of Science (Computer Science)

COURSE TITLE: COMPUTER SCIENCE (DATA BASE MANAGEMENT SYSTEM)

Course Outcomes:

After passing course the student will be able to:

CO1: Understand data, database and database models.

CO2: Gain knowledge of normalization, security and recovery of database.

CO3: Create, manage and access database using SQL.

CO4: Comprehend the application of programming language constructs in database access.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)
Course code: BCSM-5134 for Bachelor of Science (Non Medical)
COURSE TITLE: COMPUTER SCIENCE (DATA BASE MANAGEMENT SYSTEM)

Examination Time: 3 Hrs. Max. Marks: 100
Theory: 50
Practical: 30
CA: 20

Instructions for Paper Setter
Eight questions of equal marks (10 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided 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.

UNIT–I

DBMS: Introduction to database management system, Components of DBMS, Three Level Database System Architecture, ER. Diagrams. Data Models, Hierarchical Model, Network Model and Relational Model, Relational Databases, Relational Algebra and Calculus.

UNIT–II

Normalisation: Introduction, Normal Forms: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF. Database Security: Protection, Integrity. Recovery: Introduction, Recovery Techniques: Log Based Recovery and Shadow Paging. Concurrency Control: Introduction, Concurrency control with locking methods, Two Phase locking, Precedence graph, Concurrency control based on timestamp ordering, Concurrency control based on optimistic scheduling.

UNIT–III

SQL * PLUS: Introduction to Oracle , Features of Oracle . SQL Statements: DDL, DML, DCL, TCL, constraints, Join methods & Sub query, Union, Intersection, Built in Functions, View, and Security amongst users, Sequences, indexing object

UNIT–IV

PL/SQL: Introduction to PL/SQL. Cursors – Implicit & Explicit. Procedures, Functions & Packages, Database Triggers.

References/Textbooks:

1. C. J. Date, An Introduction to Database Systems, Pearson Education 2000.
2. F. Korth & Silverschatz, A., Database System Concepts, Tata McGraw Hill, 2010.
3. Elmasri & Navathe, Fundamentals of Database Systems, Addison-Wesley, 2011.
4. B.C.Desai, An Introduction to Database Management System, Galgotia Publication, 1991.
5. Ivan Bayross, SQL, PL/SQL - The Programming Language of Oracle, BPB Publications, 2010.
6. Gurvinder Singh, Parteek Bhatia, Simplified Approach to DBMS, Kalyani Publishers, 2016.
7. Anshuman Sharma, Fundamentals of DBMS, Lakhanpal Publications, 4th Edition.

Note: The latest editions of the books should be followed.

Bachelor of Science (Semester System) (12+3 System of Education)

(Semester–V)

(Session 2023-24)

Course code: BCSM-5134 for Bachelor of Science (Non Medical)

COURSE TITLE: COMPUTER SCIENCE (DATA BASE MANAGEMENT SYSTEM)

Examination Time: 3 Hrs. Max. Marks: 30

Lab on database management system.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)

Course code: BSNM-5395 (I) for Bachelor of Science (Non Medical)
BCSM-5395 (I) for Bachelor of Science (Computer Science)

COURSE TITLE: PHYSICS (CONDENSED MATTER PHYSICS)

Course Outcomes

After passing this course, students will be able to:

CO 1. Understand basics about crystal structures in solids, various types of crystal structure, unit cells and symmetry operations.

CO 2. Understand the experimental methods to determine crystal structures, reciprocal lattice, Brillioun zones and form factor.

CO 3. Understand the concept of lattice vibrations and role of phonons in determining specific heat of solids at low temperatures and models of specific heat.

CO 4. Build concept from free electron model to Kronig Penny model and its application to band theory to differentiate insulators, semiconductors and conductors.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)
Course code: BSNM-5395 (I) for Bachelor of Science (Non Medical)
BCSM-5395 (I) for Bachelor of Science (Computer Science)
PHYSICS (CONDENSED MATTER PHYSICS)

Time: 3 Hours **Max. Marks: 30** **Pass Marks: 11**

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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. Each question carries 6 marks.

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I
Crystal structure, Symmetry operations for a two and three dimensional crystal, Two dimensional Bravais lattices, Three dimensional Bravais lattices, Basic primitive cells, Crystal planes and Miller indices, Diamond and NaCl structure.

UNIT–II
Crystal Diffraction: Bragg's law, Experimental methods for crystal structure studies, Laue equations, Reciprocal lattices of SC, BCC and FCC, Brag's law in reciprocal lattice, Brillioun zones and its construction in two and three dimensions, Structure factor and atomic form factor.

UNIT–III
Lattice vibrations, One Dimensional Monoatomic Lattice, Dispersion relation, phonons, phonon momentum during elastic and inelastic scattering, Inelastic scattering of photons by phonons, Specific heat of solids, Classical Model of specific heat of solids (Dulong and Petit's Law), Einstein and Debye Models of Specific Heat of Solids. T3 law.

UNIT–IV
Free electron model of metals, Free electron, Fermi gas and Fermi energy. Band Theory: Kronig Penney model, Metals and insulators, Conductivity and its variation with temperature in semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, band gap in semiconductors.

Books Suggested:
1. Introduction to Solid State Physics by C. Kittel (Wiley Eastern)
2. Elements of Modern Physics by S.H. Patil (TMGH, 1985).
3. Solid State Physics by Puri and Babbar.
4. Condensed Matter Physics by T.S. Bhatia (Vishal Publishing Co.)

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)
PHYSICS (ELECTRONICS)
Course code:BSNM-5395 (II) for Bachelor of Science (Non Medical)
BCSM-5395 (II) for Bachelor of Science (Computer Science)

Course Outcomes-After completing this course a student will be able to

CO1: understand, concept of voltage and current sources, working of a p-n junction diode, zener diode, and their use in basic gates, photonic devices, rectification and voltage regulation.

CO2: understand the characteristics, biasing and working of BJT and FETs.

CO3: able to understand h-parameters, amplifiers using BJT & FETs and types of feedbacks and practical example of negative feedback (emitter follower).

CO4: understand LC and RC oscillators and their comparison.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)
Course code:BSNM-5395 (II) for Bachelor of Science (Non Medical)
BCSM-5395 (II) for Bachelor of Science (Computer Science)
PHYSICS (ELECTRONICS)

Time: 3 Hours **Marks: 30** **Pass Marks: 11**

Instructions for the Paper Setters:

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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. **Each question carries 6 marks.**

Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I

Concepts of current and voltage sources, p-n junction, Biasing of diode, V-I characteristics, Rectification: half wave, full wave rectifiers and bridge rectifiers, Efficiency, Ripple factor, Qualitative ideas of filter circuits (Shunt capacitor, L section and π filters), Zener diode and voltage regulation, Introduction to Photonic devices (construction and working of solar cell, photo diode and LED). Basic concepts of Boolean algebra, AND, OR ,NOT and NAND gates using diodes.

UNIT–II

Junction transistor : Structure and working relation between different currents in transistors, Sign conventions, Amplifying action, Different configurations of a transistor and their comparison, CB and CE characteristics, Structure and characteristics of JEFT, Transistor biasing and stabilization of operating point, Voltage divider biasing circuit.

UNIT–III

Working of CE amplifier, Amplifier analysis using h-parameters, Equivalent circuits, Determination of current gain, Power gain, Input impedance, FET amplifier and its voltage gain, Feed back in amplifiers, Different types, Voltage gain, Advantage of negative feed back, Emitter follower as negative feedback circuit.

UNIT–IV

Barkausen criterion of sustained oscillations, LC oscillator (tuned collector, tuned base Hartley),RC oscillators, Phase shift Oscillator and Wein bridge Oscillator

Books Suggested:

1. Basic Electronics and Linear Circuits by N.N. Bhargave, D.C. Kulshreshtha and S.C. Gupta.
2. Foundations of Electronics by D. Chatophadhyay, P.C. Rakshit, B. Saha and N.N. Purkit.
3. Basic Electronics by D.C. Tayal (Himalaya Pub.)

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)
Course code: BSNM-5395 for Bachelor of Science (Non Medical)
BCSM-5395 for Bachelor of Science (Computer Science)
Course Title: PHYSICS (PRACTICAL)

Course Outcomes:

CO 1. Students will be able to characterize p-n junction, zener diode, and their use as rectifier, filters, clipping element and to find energy gap.
CO 2. Student will be able to use CRO for AC voltage and frequency.
CO 3. Students will be able to characterize Common base and common emitter transistors and their use as amplifier.
CO 4. Students will be able to use diodes as basic gates.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
(Session 2023-24)
Course code: BSNM-5395 for Bachelor of Science (Non Medical)
BCSM-5395 for Bachelor of Science (Computer Science)
Course Title: PHYSICS (PRACTICAL)

Instructions to Practical Examiner
Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar
General Guidelines for Practical Examination
I. The distribution of marks is as follows: **Marks: 20**
i) One experiment **7 Marks**
ii) Brief Theory **3 Marks**
iii) Viva–Voce **5 Marks**
iv) Record (Practical file) **5 Marks**
II. There will be one sessions of 3 hours duration. The paper will have one session.
Paper will consist of 8 experiments out of which an examinee will mark 6 experiments and one of these is to be allotted by the external examiner.
III. Number of candidates in a group for practical examination should not exceed 12.
IV. In a single group no experiment is to be allotted to more than three examinees in any group.

LIST OF EXPERIMENTS-
1. Measurement of reverse saturation current in p-n-junction diode at various temperatures and to find
the approximate value of energy gap.
2. To draw forward and reverse bias characteristics of a p-n junction diode.
3. To study working of CRO and its use to find AC signal voltage and its frequency.
4. Study of a diode as a clipping element.
5. To measure the efficiency and ripple factors for (a) halfwave (b) full wave and (c) bridge rectifier circuits.
6. To draw the characteristics of a Zener diode.
7. To study characteristics of Common Base transistor. and to find input resistance, output resistance, voltage gain and current gain.
8. To study characteristics of Common Emitter transistor. and to find h-parameters.
9. To study the gain of an amplifier at different frequencies and to find Band width
10. To study the reduction in the ripple in the rectified output with RC, LC and л filters.
11. To study logic gates (OR, AND, NOT and NAND).

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-VI
(Session-2023-24)
Course code:BSNM-**6421**for Bachelor of Science (Non Medical)
BCSM-**6421**for Bachelor of Science (Computer Science)
COURSE TITLE:PUNJABI (COMPULSORY)

COURSE OUTCOMES

CO1: ‘ਕਾਵਿਗੌਰਵ’ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਕਵਿਤਾਵਾਂਪ੍ਰਤੀਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ।
CO2:‘ਧਰਤੀਆਂ ਦੇ ਗੀਤ’ (ਸਫ਼ਰਨਾਮਾ) ਨੂੰ ਸਿਲੇਬਸ ਵਿਚਸ਼ਾਮਿਲਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂਅੰਦਰਸਫ਼ਰਨਾਮਾਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲਨਾਲਜੋੜਣਾ ਹੈ।
CO3:ਲੇਖ ਰਚਨਾਕਰਨਨਾਲਵਿਦਿਆਰਥੀਆਪਣੀਗੱਲਨੂੰ ਕਹਿਣ ਦੀ ਜਾਚਸਿੱਖਣਗੇ ਅਤੇ ਇਹਦਿਮਾਗੀਕਸਰਤਵਿਚ ਸਹਾਈਹੋਵੇਗੀ।ਸਾਹਿਤ ਰੂਪਾਂਕਵਿਤਾ, ਕਹਾਣੀ, ਨਾਵਲ, ਨਾਟਕ, ਇਕਾਂਗੀਦੀ ਪਰਿਭਾਸ਼ਾ,ਪ੍ਰਕਾਰ ਤੇ ਤੱਤਨਾਲਜਾਣੂ ਕਰਵਾਇਆਜਾਵੇਗਾ।ਸਾਹਿਤ ਰੂਪਾਂ ਨੂੰ ਸਿਲੇਬਸ ਵਿੱਚਸ਼ਾਮਲਕਰਨ ਦਾ ਮਕਸਦਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਨ੍ਹਾਂ ਸਾਹਿਤ ਰੂਪਾਂ ਦੀ ਪਰਿਭਾਸ਼ਾ,ਪ੍ਰਕਿਰਤੀ ਅਤੇ ਤੱਤਾਂਤੋਂਬਾਰੀਕੀਨਾਲਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।
CO4:ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ : ਲਿੰਗ, ਵਚਨ,ਕਾਰਕਕਿਰਿਆਵਾਕੰਸ਼ ਦੀ ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਤੇ ਪ੍ਰਕਾਰਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂਨੂੰ ਸਮਝਣਲਈਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-VI
(Session-2023-24)
Course code:BSNM-**6421**for Bachelor of Science (Non Medical)
BCSM-**6421**for Bachelor of Science (Computer Science)
COURSE TITLE:PUNJABI (COMPULSORY)

ਸਮਾਂ : 3 ਘੰਟੇ **Maximum Marks: 50**

Theory: 40
CA: 10

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I
ਕਾਵਿਗੌਰਵ(ਪਹਿਲੇ ਛੇ ਕਵੀ)(ਸੰਪਾ.ਬਿਕਰਮਸਿੰਘ ਘੁੰਮਣ, ਕਰਮਜੀਤਕੌਰ),ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅਮ੍ਰਿਤਸਰ,
(ਸ਼ੇਖ ਫ਼ਰੀਦ, ਸ਼ਾਹ ਹੁਸੈਨ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਜੀ, ਗੁਰੂ ਅਰਜਨ ਦੇਵ ਜੀ,ਵਾਰਿਸ ਸ਼ਾਹ, ਸ਼ਾਹ ਮੁਹੰਮਦ)
(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾਵਸਤੂ/ਸਾਰ)8 **ਅੰਕ**

ਯੂਨਿਟ-II
ਧਰਤੀਆਂ ਦੇ ਗੀਤ(ਸਫ਼ਰਨਾਮਾ), ਬਰਜਿੰਦਰਸਿੰਘਹਮਦਰਦ,ਨਾਨਕਸਿੰਘ ਪੁਸਤਕਮਾਲਾ, ਅੰਮ੍ਰਿਤਸਰ
(ਸਮਾਜ ਸਭਿਆਚਾਰਪਰਿਪੇਖ/ਸਫਰਨਾਮੇ ਦੇ ਤੌਰ ਤੇ ਪਰਖ) 8 ਅੰਕ

ਯੂਨਿਟ-III
(ੳ) ਲੇਖ ਰਚਨਾ(ਵਿਗਿਆਨ, ਤਕਨਾਲੋਜੀ ਅਤੇ ਚਲੰਤਮਸਲਿਆਂ ਸਬੰਧੀ)
(ਅ) ਆਧੁਨਿਕ ਸਾਹਿਤ ਰੂਪ : ਕਵਿਤਾ, ਕਹਾਣੀ, ਨਾਵਲ, ਨਾਟਕ, ਇਕਾਂਗੀ

8 **ਅੰਕ**

ਯੂਨਿਟ-IV
ਵਿਆਕਰਣ :
(ੳ) ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ : ਲਿੰਗ, ਵਚਨ,ਕਾਰਕ
(ਅ) ਕਿਰਿਆਵਾਕੰਸ਼ : ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਤੇ ਪ੍ਰਕਾਰ8 **ਅੰਕ**

ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕਲਈਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨਹੋਣਗੇ।ਸੈਕਸ਼ਨA-Dਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟI-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ।ਹਰ ਸੈਕਸ਼ਨਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜਪ੍ਰਸ਼ਨਕਰਨੇ ਹਨ।ਹਰ ਸੈਕਸ਼ਨਵਿਚੋਂਇਕਪ੍ਰਸ਼ਨਕਰਨਾਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂਪ੍ਰਸ਼ਨਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨਵਿਚੋਂਕੀਤਾਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕਹਨ।
4. ਪੇਪਰ ਸੈੱਟਕਰਨਵਾਲਾਜੇਕਰਚਾਹੇ ਤਾਂਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡਅੱਗੋਂਵੱਧਤੋਂਵੱਧਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂਵਿਚਕਰ ਸਕਦਾ ਹੈ।

Bachelor of Science (Semester System) (12+3 System of Education)
SEMESTER-VI
(Session-2023-24)
Course code:BSNM-**6212**for Bachelor of Science (Non Medical)
BCSM-**6212**for Bachelor of Science (Computer Science)
COURSE TITLE:ENGLISH (COMPULSORY)

COURSE OUTCOMES

After passing this course, the students will be able to:

CO 1: comprehend, appreciate and critically analyse a novel through the story of the novel *Train to Pakistan* by Khushwant Singh

CO2: analyze and appreciate the dramatic technique, plot development and art of characterisation through the study of the prescribed plays from the book *Glimpses of Theatre*

CO 3:enhance their writing skills by writing essay on any given topics well as to write report on any incident witnessed

CO 4: write appropriate reports on any incident witnessed.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-**6212**for Bachelor of Science (Non Medical)

BCSM-**6212**for Bachelor of Science (Computer Science)

COURSE TITLE:ENGLISH (COMPULSORY)

Examination Time: 3 Hrs **Theory: 40** **CA: 10**

Instructions for the Examiner:

Section A: Three questions from the novel *Train to Pakistan* from Unit I and three questions from *Glimpses of Theatre* from Unit II requiring very short answers will be set. The students would be required to answer any five, each carrying 2 marks (50 words each). **(5×2=10)**

Section B: Four questions requiring brief descriptive answers based on character, plot and theme(s) in the novel *Train to Pakistan* from Unit I will be set and students would be required to attempt any two, each carrying 5 marks (250 words each). **(2×5=10)**

Section C: Four questions based on the central idea, theme, tone or style etc. of the prescribed plays from the textbook, *Glimpses of Theatre* from Unit II will be set for the students to attempt any two, each carrying 5 marks (250 words each).**(2×5=10)**

Section D: Two questions with internal choice will be set based on Unit 3 (Essay Writing) carrying six marks (word limit 300 words) and Unit 4 (Report Writing) carrying four marks word limit 200 words). **(1×6+1×4=10)**

Unit I

Train to Pakistan by Khushwant Singh

Unit II

Glimpses of Theatre:

i) The Will
ii) Villa for Sale
iii) Progress
iv) The Monkey's Paw

Unit III

Essay Writing

Unit IV

Report Writing

Texts Prescribed:

1. *Train to Pakistan* by Khushwant Singh
2. *Glimpses of Theatre*, Guru Nanak Dev University Amritsar

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6333(I)for Bachelor of Science (Non Medical)

BCSM-6333(I) for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (LINEAR ALGEBRA)

Course Outcomes

After the completion of this course, students should be able to:

CO 1: Express the algebraic concepts such as binary operation, groups, rings and fields. Define a vector space and subspace of a vector space and check the linear dependence and linear independence of vectors.

CO 2: Describe the concepts of basis and dimension of vector spaces.

CO 3: Investigate properties of vector spaces and subspaces using linear transformation.

CO 4: Find the matrix representing a linear transformation.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6333(I)for Bachelor of Science (Non Medical)
BCSM-6333(I) for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (LINEAR ALGEBRA)

Examination Time: 3 Hours Max. Marks: 50
Theory: 40
CA: 10

Instructions for the paper setters/examiners:

Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT-I

Definition of groups, rings and fields with examples. Definition of a vector space, subspaces with examples. Direct sum of subspaces. Linear span, Linear dependence, Linear independence of vectors. Linear combination of vectors.

UNIT-II

Basis of a vector space, Finitely generated vector spaces. Existence theorem for basis. Invariance of the number of elements of the basis set. Dimension of sum of two subspaces. Quotient space and its dimension.

UNIT-III

Linear transformation. Algebra of linear transformation. Rank-Nullity theorem, Isomorphism and Isomorphic spaces.

UNIT-IV

Matrix of a linear transformation. Changes of basis, Linear operator.

Text Book:

C.W.Curtis, Linear Algebra, Springer, New York, 2017

Reference Books:

1.S. Singh, Linear Algebra, Vikas Publishing, sixth edition, 1983.
2.V. Krishnamurthy, V. P. Mainra and J. L. Arora, An Introduction to Linear Algebra, East West Press, 1976.
3.S. Narayan and P.K. Mittal, A Text Book of Matrices, S. Chand & Co, tenth edition, 1972.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6333(II)for Bachelor of Science (Non Medical)

BCSM-6333(II) for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (NUMERICAL ANALYSIS)

Course Outcomes

After passing this course, the students will be able to:

CO 1. Know how to find the roots of transcendental and polynomial equations.

CO 2. Perform computation for solving a system of equations.

CO 3. Learn how to interpolate the given set of values.

CO 4. Learn numerical solution of differential equations & compute numerical integration and differentiation, numerical solution of ordinary differential equations.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6333(II)for Bachelor of Science (Non Medical)

BCSM-6333(II) for Bachelor of Science (Computer Science)

COURSE TITLE: MATHEMATICS (NUMERICAL ANALYSIS)

Examination Time: 3 Hours Max. Marks: 50

Theory: 40

CA: 10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

The students can use only Non Programmable& Non Storage Type Calculator.

UNIT-I

Error generation, propagation, error estimation and error bounds, Solution of non-linear equations, Bisection method, Iteration method, Newton's Method, Generalized Newton's Method, Method of false position, Muller's method, Rate of convergence of these methods.

UNIT-II

Solution of linear system of equation; Direct method, Gauss elimination variant (Gauss Jordan and Crout reduction), Triangular Method, Iterative Method, Jacobi's Method, Gauss Seidel Method. Finite Differences: Forward, Backward, Central, Divided differences, shift operator, relationship between the operators and detection of errors by use of difference operator. Interpolation with divided difference, Newton's formula, Lagrangian Method.

UNIT-III

Finite difference interpolation, Gauss formula, Stirling formula, Bessel's formula, Error Estimation Extrapolation. Numerical differentiation, Method based on interpolation. Numerical Integration, Trapezoidal rule, Simpson's rule, Weddle rule, Romberg Integration, Gaussian integration method, Gaussian legendre integration. Double numerical integration.

UNIT-IV

Numerical solution of ordinary differential equations, Initial value problem, Taylor's method, Euler's methods, Picard's method, Milne's Method, Runge-Kutta Method. Predictor- Corrector's Method.

Text Book:

M K Jain, S R K Iyenger, R K Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Private Limited, Seventh edition, 2019.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6084(I)for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (MOLECULAR SPECTROSCOPY)

Course Outcomes

Students will be able to

CO1: understand the principle and applications of ultraviolet and apply Woodward Fisher Rule to calculate λ_{max}

CO2: understand the concepts of Vibrational spectroscopy, Vibrational coupling overtones and Fermi resonance and its application in Organic Chemistry

CO3: know about the Nuclear magnetic resonance spectroscopy. Proton chemical shift, spin-spin coupling, coupling constants and its applications to determine organic structures

CO4: to understand different cleavage patterns of organic compounds in Mass spectrometry and apply the knowledge for interpretation of the spectrum of an unknown compound.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6084(I)for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY(MOLECULAR SPECTROSCOPY)

Examination Time: 3 Hrs. **Max. Marks: 30**

Instructions for the Paper Setters:

Eight questions of equal marks (six marks each) 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.

UNIT –I

Energy and ElectromagneticSpectrum (10 Hrs)

Introduction, electromagnetic spectrum and Units, Regions of the spectrum,Statement of Born-Oppenheimer approximation, Degree of freedom, Frank Condon Principle, Fluorescence and Phosphorescence.

Ultraviolet and Visible Spectroscopy

The energy of electronic excitation, Measurement techniques, Beer-Lambert Law, Molar extinction coefficient. Different types of transition noticed in UV spectrum of organic functional groups and their relative energies. Chromophore, Auxochromes, Absorption and intensity shifts, Factors affecting λ_{max} , Effect of steric hindrance to coplanarity, Solvent effects.

UNIT – II

Infrared Spectroscopy (10 Hrs)

Vibrational energy levels, Selection rules, Force constant, Fundamental vibration frequencies, Factors influencing Vibrational Frequencies (Vibrational Coupling, Hydrogen Bonding, Electronic effect, Bond Angles, Field Effect) of different functional groups, Sampling techniques.

Applications of UV and IR Spectroscopy

Applications of UV spectroscopy, Woodward Fieser rules for calculating λ_{max} of conjugated polyenes and α,ß -unsaturated carbonyl compounds. Applications of IR spectroscopy, Absorption of Common functional Groups, Interpretation of simple IR spectra, Finger print regions. Simple numerical problems based on UV and IR spectroscopy.

UNIT-III

Proton Magnetic Resonance spectroscopy (^{1}HNMR) (13 Hrs)

The Nuclear spin, Larmor frequency, the NMR isotopes, Population of nuclear spin level, Spin and Spin lattice relaxation, Measurement techniques (CW and FT method), Solvent used, Reference compounds, Chemical shift, nuclear shielding and deshielding, chemical shift, spin-spin splitting and coupling constants, Anisotropic effect, Application of structure elucidation of simple organic molecules.

UNIT- IV

Mass Spectrometery (12 Hrs)

Basic Principles, Elementary theory, Molecular ions, isotope ions, Fragment ions of odd and even electron types, Nitrogen rule, Factors affecting cleavage patterns, Simple cleavage, Cleavages at a hetero atom, Multicentre fragmentations, Rearrangements, Diels – Alder fragmentation, Mc Lafferty rearrangement, Interpretation of the spectrum of unknown simple molecules.

Books Recommended:

1. Organic Spectroscopy By W. Kemp; Publisher- Palgrave, NewYork
2. D.H. Williams and I. Fleming. Spectroscopic Methods in OrganicChemistry.
3. Spectrometric Identification of Organic Compounds - R.M. Silverstein and F. X. Webster; Publisher: John Willey and Sons,Inc.
4. Introductory Problems in Spectroscopy- By R.C. Banks, E.R. Matjeha and G.

Mercer; Publisher : The Benzamine / Cummings Publishing CompanyInc.
5. Introduction to Spectroscopy – D. L. Pavia, G. M .Lampman, and G. S. Kriz Publisher: Brooks / Cole, a part of cengage learning

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6084(II)for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (PHYSICAL CHEMISTRY)

Course outcomes:

Students will be able to

CO1: understand schrodinger wave equation (S.W.E) and its applications to partical in one, two and three dimensional boxes.

CO2: understand the applications of S.W.E to rigid rotator, harmonic oscillators, hydrogen and hydrogen like atoms, quantum numbers

CO3: acquire knowledge about unit cell,space lattice, miller indices, symmetry operations, Bragg equation, powder method

CO4: understand photophysical, photo chemical, radioative and non-radiative processes, quantum yield, energy transfer processes

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6084(II)for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (PHYSICAL CHEMISTRY)

Time: 3 Hrs. **Max. Marks: 30**

Note: Instructions for the Paper Setter

Eight questions of equal marks (6 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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.

UNIT–I

Quantum Mechanics-I **(12 Hrs)**

Black-body radiation, Planck's radiation law, Photoelectric effect, heat capacity of solids, Bohr's model of hydrogen atom (no derivation) and its defects, Compton effect. de Broglie hypothesis, Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger wave equation and its importance, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one dimensional box, quantization of energy levels, extension to two and three dimensional boxes, degeneracy.

UNIT–II

Quantum Mechanics-II **(12 Hrs)**

Simple harmonic oscillator model of vibrational motion, setting up Schrodinger equation and discussion of solution and wave functions. Rigid rotator model of rotation of diatomic molecules transformation to spherical polar coordinates spherical harmonics and their discussion. Qualitative investigation H-atom, setting up Schrodinger equation, radial and angular part, radial distribution functions of 1s, 2s, 2p, 3s, 3p and 3d.

UNIT–III

Solid State **(10 Hrs)**

Definition of space lattice and unit cell, Law of crystallography- (i) Law of constancy of interfacial angles, (ii) Law of rationality of indices, (iii) Symmetry elements in crystals. X-ray diffraction by crystals.Derivation of Bragg’s Law in Reciprocal space.Determination of crystal structure of NaCl, KCl by use of Powder method; Laue’s method.

UNIT-IV

Photochemistry **(11Hrs)**

Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grothus–Drapper law, Stark–Einstein law, Jablonski diagram depicting various processes occurring in the excited state, qualitative description of flourescence, phosphorescence, non–radiative processes (internal conversion, intersystem crossing), quantum yield, photosensitized reactions–energy transfer processes (simple examples).

Books Suggested:

1. Atkins, P., Paula, J.de, Atkins, Physical Chemistry; 8th edition, Pubs: Oxford University Press, 2008.
2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co., 2008.
3. Barrow, G.M., Physical Chemistry; 6th edition, Pubs: McGraw Hill Company Inc., 1996.
4. Rao, C.N.R., University General Chemistry; Pubs: Macmillan of India, 1985.
5. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford University Press, 2000.
6. Albert, R.A., Silbey, R.J., Physical Chemistry; I edition, Pubs: John Wiley and Sons Inc., 1992.

7. Dogra, S.K., Dogra, S., Physical Chemistry Through Problems, Pubs: Wiley Eastern Ltd., 1991.
8. Levine, I.N., Physical Chemistry; 5th edition, Pubs : Tata McGraw Hill Publishing Co. Ltd., 2002.
9. Moore, W.J., Basic Physical Chemistry; Pubs : Prentice Hall of India Pvt. Ltd., 1983.
10. Metz, C.R., Theory and Problems of Physical Chemistry; Schaum's outline series, 2nd edition, Pubs:McGraw-Hall Book Company, 1989.
11. Banwell, C.N., McCash, E.M., Fundamentals of Molecular Spectroscopy; 4th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd., 1999.
12. Atkins, P. Friedman, R., Molecular Quantum Mechanics; 4th edition Pubs: Oxford University Press, 2007.
13. Levine, I.N., Quantum Chemistry; 5th edition, Pubs: Prentice Hall International Inc., 2000.
14. Inorganic Chemistry, W.W. Porterfield Addison-Wesley.
15. Inorganic Chemistry, A.G. Sharpe, ELBS.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6084(P)for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (PRACTICAL)

Course outcomes:

Students will be able to

CO1: separate the various mixtures by Column Chromatography technique

CO2: synthesize different Organic Compounds

CO3: synthesise the different compounds by Green Approach

CO4: prepare the different dyes

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code:BSNM-6084(P)for Bachelor of Science (Non Medical)

COURSE TITLE: CHEMISTRY (PRACTICAL)

Duration: 3½ hrs. **Max. Marks: 20**

Instruction for practical examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar.

(I) Organic Chemistry Laboratory Techniques

(a) Column Chromatography

Separation of o and p nitrophenol

Separation of Leaf pigments from Spinnach leaves

Separation of o and p nitro aniline

Separation of dyes.

(b) Synthesis of Organic Compounds

Preparation of p-nitroacetanilide

Preparation of p-bromoacetanilide

Preparation of benzilic acid from Benzyl-using green approach(Green Chemistry Experiment)

Preparation of Methyl Orange, Methyl Red

Practical Examination

1) Column Chromatography= 07

2) Organic Synthesis =16

3) Viva-Voce =04

4) Note Book= 03

Books suggested:

1. Experimental Organic Chemistry, Vol. I and II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.

2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.

3. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.

4. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)
Course code: BCSM-6134 for Bachelor of Science (Computer Science)
COURSE TITLE: COMPUTER SCIENCE (INFORMATION TECHNOLOGY)

Course Outcomes:

After passing course the student will be able to:

CO1: Identify usage of various communication media and internet.
CO2: Acquaint with the usage of various information systems.
CO3: Comprehend digital marketing concepts and content.
CO4: Create and manage YouTube channel and blog.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)
Course code: BCSM-6134 (I) for Bachelor of Science (Computer Science)
COURSE TITLE: COMPUTER SCIENCE (INFORMATION TECHNOLOGY)

Examination Time: (3+3) Hrs. Max. Marks: 100
Theory: 50
CA: 20

Instructions for Paper Setter
Eight questions of equal marks (10 marks each) are to be set, two in each of the four sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be divided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section. The students can use only Non–programmable & Non–storage type calculator

UNIT-I

Data and Network Communication: Communication media: Twisted pair, Coaxial, Fiber optics, Wireless (Line of Sight and Satellite), Network Advantages, Typesand Topologies, Communication using Network protocol/Network Interface card (NP/NIC), Transmission & Communication protocol/protocol (TCP/IP) Internet: Internet basics, its uses and applications. System Development Process and System development Tools.

UNIT-II

Information Technology: Introduction to IT and its components, Information systems, Components of Computer based information systems. Types of Information systems- TPS, MIS, and DSS.

UNIT-III

Introduction to Digital Marketing: Digital Strategy and Planning, Website marketing tools, Digital content – website, blogs, email, webinars, videos, podcasts, e-zines, PPC advertising. Social Media and Social Bookmarking: Facebook, Twitter, Pinterest, Instagram, Search Engine Marketing: Meaning, Working and Search Engine Optimization,

UNIT-IV

YouTube Studio: Navigating studio, Uploading videos, Edit Video settings, Analytics, Copyright and Monetization. Blog Writing: Blog Domain, choice of CMS, Register a domain or subdomain with a website host.

References/Textbooks:

1. Peter Norton, Introduction to Computers, McGraw Hill (2017), 7th edition.
2. Patrick, G.Mckeown, Living with the Computers, Harcourt College Pub (1990) 3rd edition.
3. Hussain & Hussain, Computer: Technology, Applications & Social Implications, PHI Learning (2006)
4. Behrouz A. Forouzan, Data Communications & Networking, McGraw-Hill Education (2012), 5th edition.
5. Andrew S. Tanenbaum, Computer Network, Prentice Hall (2010), 5th edition.
6. Abraham Silberschatz, Greg Gagne, Peter B. Galvin, Operating System Concepts, Wiley Publishers (2018), 10th edition.
7. Yashavant Kanetkar, Unix Shell Programming, BPB Publications (2003), 1st edition.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)
Course code: BCSM-6134 (P) for Bachelor of Science (Computer Science)
COURSE TITLE: COMPUTER SCIENCE (INFORMATION TECHNOLOGY)

Examination Time: 3 Hrs. Practical: 30

Lab on Information Technology.

Bachelor of Science (Semester System) (12+3 System of Education)

(Semester–VI)

(Session 2023-24)

Course code: BSNM-6395 (I) for Bachelor of Science (Non Medical)

BCSM-6395 (I) for Bachelor of Science (Computer Science)

COURSE TITLE: PHYSICS (NUCLEAR PHYSICS)

Course Outcomes

After passing this course, students will be able to:

CO 1. Understand basic properties of nucleus and nuclear forces.

CO 2. Understand about radioactivity, theories of alpha, beta and gamma decay, neutrino hypothesis.

CO 3. Understand concepts and types about nuclear reactions, reactions cross section and compound nucleus.

CO 4. Understand nuclear models (Liquid drop and Shell model) and their failures and successes.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)
Course code: BSNM-6395 (I) for Bachelor of Science (Non Medical)
BCSM-6395 (I) for Bachelor of Science (Computer Science)
PHYSICS (NUCLEAR PHYSICS)

Time: 3 Hours **Marks: 30** **Pass Marks: 11**

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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. Each question carries 6 marks.
Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I

Nuclear Properties: Constituents of nucleus, non-existence of electrons in nucleus, Nuclear mass and binding energy, features of binding energy versus mass number curve, nucleus radius, angular momentum and parity, nuclear moments: magnetic dipole moment and electric quadruple moment, properties of nuclear forces, Yukawa theory.

UNIT–II

Radioactive Decays: Modes of decay of radioactive nuclides and decay Laws, radioactive series and displacement law, radioactive dating, Alpha decay: Gamow's theory of alpha decay, barrier penetration as applied to alpha decay, Geiger Nuttal law, Beta decays: β-, β+ and electron capture decays, Neutrino hypothesis and its detection, parity violation in β decay, Gamma transitions, internal conversion.

UNIT–III

Nuclear Reactions: Types of nuclear reactions, reactions cross section, conservation laws, Kinematics of nuclear reaction, examples of nuclear reactions: proton, deuteron, alpha particle, neutron and photon induced reactions. Q-value and its physical significance, Compound nucleus

UNIT–IV

Nuclear Models: Liquid drop model, semi-empirical mass formula, condition of stability, evidence for nuclear magic numbers, Shell Model, energy level scheme, angular momenta of nuclear ground states, parity and magnetic moment of nuclear ground states.

Reference Books:
1. Basic Ideas and Concepts in Nuclear Physics by K. Hyde
2. Introduction to Nuclear Physics by H.A. Enge
3. Nuclear Physics by I. Kaplan (Addison Wesley)
4. Nuclei and Particles by E. Segre

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)
Course code:BSNM-6395 (II) for Bachelor of Science (Non Medical)
BCSM-6395 (II) for Bachelor of Science (Computer Science)
PHYSICS (RADIATION AND PARTICLE PHYSICS)

Course Outcome:
After successfully completing this course a student will be able to:
CO1: understand interaction of radiation and charged particles with matter.
CO2: understand theory and working of various types of nuclear detectors like gas filled, semiconductor, solid state track detectors and nucleus emulsions.
CO3: understand theory and working of various particle accelerators, linear and cyclic and phase stability conditions.
CO4: understand about elementary particles, different types of interactions and quark model.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)
Course code:BSNM-6395 (II) for Bachelor of Science (Non Medical)
BCSM-6395 (II) for Bachelor of Science (Computer Science)
PHYSICS (RADIATION AND PARTICLE PHYSICS)

Time: 3 Hours **Marks: 30** **Pass Marks: 11**

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. 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. **Each question carries 6 marks.**
Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT–I
Interaction of Radiation and Charged Particles with Matter: Derivation of Bethe-Bloch formula, Stopping power and range of heavy charged particles, Energy loss of electrons and positrons, Positrons annihilation, interaction of gamma rays with matter.
UNIT–II
Nuclear Radiation Detection: Gas-filled detectors, Proportional and Geiger-Mueller counters, Scintillation detectors, Semiconductor detectors, Cherenkov effect, Solid state nuclear track detectors. Bubble chamber.
UNIT–III
Accelerators: Linear accelerators, Cyclic accelerators: Cyclotron, Synchrocyclotron, Betatron, Electron and proton synchrotron, Colliding beam machines: introduction to Large Hadron Collider
UNIT–IV
Elementary Particles: Historical introduction, high energy physics units, fermions and bosons, particles and antiparticles, Classification of particles, types of interactions, electromagnetic, weak, strong interactions, gravitational interactions, Quantum numbers and conservation laws: Charge, Baryon number, lepton number, parity, isospin, charge conjugation, strangeness. Introduction to quarks and qualitative discussion of the quark model,

Reference Books:
1. Basic Ideas and Concepts in Nuclear Physics by K. Hyde
2. Introduction to Nuclear Physics by H.A. Enge
3. Nuclear Physics by I. Kaplan (Addison Wesley)
4. Nuclei and Particles by E. Segre
5. Introduction to High Energy Physics by D.H. Perkins
6. Elementary Particles by I.S. Hughes

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)
Course code: BSNM-6395 (P) for Bachelor of Science (Non Medical)
BCSM-6395 (P) for Bachelor of Science (Computer Science)
PHYSICS (PRACTICAL)

Course Outcome: After successfully completing this course a student will be able to:

CO1: understand magnetic parameters and phenomenon of hysteresis and tracing of B-H curve.
CO2: understand application of zener diode as voltage regulators.
CO3: understand the characteristics and working of FET& LDR and response of RC circuits.
CO4: use of GM counter to understand the concepts of dead time and absorption coefficient and statistical fluctuations.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–VI)
(Session 2023-24)
Course code: BSNM-6395 (P) for Bachelor of Science (Non Medical)
BCSM-6395 (P) for Bachelor of Science (Computer Science)
PHYSICS (PRACTICAL)

Instructions to Practical Examiner
Question paper is to be set on the spot jointly by the external and internal examiners. Two copies of the same to be submitted for the record to COE office, KanyaMahaVidyalaya, Jalandhar
General Guidelines for Practical Examination
I. The distribution of marks is as follows: **Marks: 20**
i) One experiment **7 Marks**
ii) Brief Theory **3 Marks**
iii) Viva–Voce **5 Marks**
iv) Record (Practical file) **5 Marks**
II. There will be one sessions of 3 hours duration. The paper will have one session.
Paper will consist of 8 experiments out of which an examinee will mark 6 experiments andone of these is to be allotted by the external examiner.
III. Number of candidates in a group for practical examination should not exceed 12.
IV. In a single group no experiment isto be allotted to more than three examinees in any group.

LIST OF EXPERIMENTS-

1. To trace the B-H curves for different materials using CRO and find the magnetic parameters from these.
2. To study the stabilization of output voltage of a power supply with Zener diode.
3. To draw output and mutual characteristics of an FET (Experiments) and determine its parameters.
4. To set up an oscillator and to study its output on CRO for different C values.
5. To draw the plateau of a GM counter and find its dead time.
6. To study the statistical fluctuations using GM counter.
7. To study the absorption of beta particles in aluminium using GM counter and determine the absorption coefficient of beta particles from it.
8. To study the characteristics of a thermistor and find its parameters.
9. To study the response of RC circuit to various input voltage (square, sine and triangular).
10. To study characteristics of LDR.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code: BSNI-6696for Bachelor of Science (Non-Medical)

BCSI-**6696** for Bachelor of Science (Computer Science)

COURSE TITLE: INTERNSHIP

COURSE OUTCOMES

After completing the course student will be able to

CO 1. Understand the motive of research and the job opportunities after completing the graduation in Physical Sciences.

CO 2. Formulate general research problems related to Physical Sciences.

CO 3. Conduct research work successfully in a technical position.

CO 4. Apply Computational techniques to solve the research related problems.

Bachelor of Science (Semester System) (12+3 System of Education)

SEMESTER-VI

(Session-2023-24)

Course code: BSNI-6696 for Bachelor of Science (Non-Medical)

BCSI-**6696** for Bachelor of Science (Computer Science)

COURSE TITLE: INTERNSHIP

Students may opt internship for a period of one month or more in a research lab or industry in any of the elective subjects, i.e., Computer Science or Chemistry, Mathematics, Physics based on subject of their interest. They will have to submit their report after attending the internship. A viva will be conducted in Kanya Maha Vidyalaya Jalandhar based on the report submitted. No awards will be provided, but the result will be declared as Satisfactory or Non satisfactory based on the performance of the student, who have opted for internship, in her detail marks card.