FACULTY OF SCIENCES

Bachelor of Science

(Non-Medical & Computer Science)

(Semester V -VI)

(Under Credit Based Continuous Evaluation Grading System)

(12+3 System of Education)

Session: 2025-26

The Heritage Institution
KANYA MAHA VIDYALAYA
JALANDHAR

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science (Semester System) (12+3 System of Education)
Session-2025-26

Bachelor of Science (Non. Medical/Computer Science) Semester-V									
Course Code		**Course Name**	**Course Type**	**Credits**	**Total**	**Ext.**		**CA**	**Examination time (in Hours)**
						L	**P**		
BSNL/BCSL-5421 BSNL/BCSL-5031BSNL/BCSL-5431		**Punjabi** (Compulsory) **[1]Basic Punjabi** **[2]Punjab History and Culture**	C	4-0-0	100	80	-	20	3
BSNL/BCSL-5212		**English** (Compulsory)	C	4-0-0	100	80	-	20	3
BSNM/BCSM-5333	(I)	**Mathematics** (Dynamics)	C	4-0-0	100	80	–	20	3+3
	(II)	**Mathematics** (Number Theory)		3-0-0	75	60		15	
BSNM-5084	(I)	**Chemistry** (Inorganic Chemistry)	C	2-0-0	50	40	-	10	3+3+3.5
	(II)	**Chemistry** (Physical Chemistry)		3-0-0	75	60	-	15	
	(P)	**Che Chemistry**(Practical)		0-0-2	50	-	40	10	
BCSM-5134		**Computer Science** (Database Management System)	C	3-0-1	100	50	30	20	3+3
	(P)	**Computer Science** (Database Management System) (Practical)							
BSNM/BCSM-5395	(I)	**Physics** (Condensed Matter Physics)	C	3-0-0	75	60	-	15	3+3+3
	(II)	**Physics**(Electronics)		2-0-0	50	40	-	10	
	(P)	**Physics** (Practical)		0-0-2	50	-	40	10	
***SECI-5541**		**Innovation, Entrepreneurship and Creative Thinking**	AC	2-0-0	50	40	-	10	1

C-Compulsory
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 (Semester System) (12+3 System of Education)
Session-2025-26

Bachelor of Science (Non. Medical/Computer Science) Semester-VI									
Course Code		**Course Name**	**Course Type**	**Credits**	**Total**	**Ext.**		**CA**	**Examination time (in Hours)**
						L	**P**		
BSNL/BCSL-6421 BSNL/BCSL-6031BSNL/BCSL-6431		**Punjabi**(Compulsory) **[1]Basic Punjabi [2]Punjab History and Culture**	C	4-0-0	100	80	-	20	3
BSNL/BCSL-6212		**English** (Compulsory)	C	4-0-0	100	80	-	20	3
BSNM/BCSM-6333	(I)	**Mathematics** (Linear Algebra)	C	4-0-0	100	80	–	20	3+3
	(II)	**Mathematics** (Numerical Analysis)		3-0-0	75	60		15	
BSNM-6084	(I)	**Chemistry** (Molecular spectroscopy)	C	3-0-0	75	60		15	3+3+3.5
	(II)	**Chemistry** (Physical Chemistry)		2-0-0	50	40	-	10	
	(P)	**Chemistry**(Practical)		0-0-2	50	-	40	10	
BCSM-6134		**Computer Science** (Information Technology)	C	3-0-1	100	50	30	20	3+3
	(P)	**Computer Science** (Information Technology) (Practical)							
BSNM/BCSM-6395	(I)	**Physics**(Radiation and Particle Physics)	C	3-0-0	75	60	-	15	3+3+3
	(II)	**Physics** (Nuclear Physics)		2-0-0	50	40	-	10	
	(P)	**Physics** (Practical)		0-0-2	50	-	40	10	

C-Compulsory [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 (Non-Medical, Computer Science)

(Semester-V)
Session: 2025-26
Course Title: PUNJABI (COMPULSORY)
COURSE CODE: BSNL/BCSL-5421

COURSE OUTCOMES

CO1:ਚੋਣਵੀਆਂਪੰਜਾਬੀਕਹਾਣੀਆਂਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਕਹਾਣੀਆਂਪ੍ਰਤੀਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ।

CO2:ਨਾਵਲ'ਏਹੁ ਹਮਾਰਾਜੀਵਣਾ'(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 (Non-Medical, Computer Science)
(Semester-V)
Session: 2025-26
Course Title: PUNJABI (COMPULSORY)
COURSE CODE: BSNL/BCSL-5421

ਸਮਾਂ : 3 ਘੰਟੇ | Maximum Marks: 100
L-T-P | Theory: 80
4-0-0 | CA: 20

ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕਲਈਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨਹੋਣਗੇ।ਸੈਕਸ਼ਨA-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨਕ੍ਰਮਵਾਰ ਯੂਨਿਟI-IV ਵਿਚੋਂਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜਪ੍ਰਸ਼ਨਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨਵਿਚੋਂਇਕਪ੍ਰਸ਼ਨਕਰਨਾਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂਪ੍ਰਸ਼ਨਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨਵਿਚੋਂਕੀਤਾਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 16ਅੰਕਹਨ।

4. ਪੇਪਰ ਸੈੱਟ ਕਰਨਵਾਲਾਜੇਕਰਚਾਹੇ ਤਾਂਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡਅੱਗੋਂਵੱਧਤੋਂਵੱਧਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂਵਿਚਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਚੋਣਵੀਆਂਪੰਜਾਬੀਕਹਾਣੀਆਂ
(ਸੰਪਾ.ਡਾ.ਰਮਿੰਦਰਕੌਰ, ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ, 2018)
ਲੇਖਕ ਕਹਾਣੀਕਹਾਣੀ ਸੰਗ੍ਰਹਿ
ਅਜੀਤਕੌਰਨਿਊ ਯੀਅਰਮੌਤਅਲੀਬਾਬੇ ਦੀ
ਜਿੰਦਰਸੌਰੀ ਜਖ਼ਮ
ਸੁਖਜੀਤਹਜ਼ਾਰਕਹਾਣੀਆਂਦਾਬਾਪਮੈ ਇੰਜੁਆਏ ਕਰਦੀਹਾਂ
ਜਤਿੰਦਰਹਾਂਸ ਰਾਹੂ ਕੇਤੂ ਈਸ਼ਵਰਦਾਜਨਮ
ਪ੍ਰੇਮਪ੍ਰਕਾਸ਼ਅਰਜਨ ਛੇੜ ਗਡੀਰਨਾਕੁਝ ਅਣਕਿਹਾਵੀ
ਚੰਦਨ ਨੇਗੀ ਹਰਖ ਸੋਗ ਹਰਖ ਸੋਗ
ਜਸਵਿੰਦਰਸਿੰਘਖੂਹ ਖਾਤੇ ਖੂਹ ਖਾਤੇ
ਗੁਰਦੇਵ ਸਿੰਘ ਰੁਪਾਣਾਸ਼ੀਸ਼ਾਸ਼ੀਸ਼ਾ ਅਤੇ ਹੋਰਕਹਾਣੀਆਂ
(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ /ਪਾਤਰਚਿਤਰਨ)

ਯੂਨਿਟ-II

ਨਾਵਲ : ਏਹੁਹਮਾਰਾਜੀਵਣਾ(ਦਲੀਪਕੌਰਟਿਵਾਣਾ)
(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ /ਬਿਰਤਾਂਤਕ ਜੁਗਤਾਂ)

ਯੂਨਿਟ-III

ਲਗਪਗ 200 ਸ਼ਬਦਾਂਵਿਚਪੈਰ੍ਹਾਰਚਨਾ

ਸਰਲਅੰਗਰੇਜ਼ੀਪੈਰ੍ਹੇ ਦਾਪੰਜਾਬੀਵਿਚਅਨੁਵਾਦ

ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ :
(ੳ) ਨਾਂਵਵਾਕੰਸ਼
(ਅ) ਮੇਲ ਤੇ ਅਧਿਕਾਰ

Bachelor of Science (Non-Medical, Computer Science)
(Semester-V)
Session: 2025-26
Course Title: Basic Punjabi (In lieu of Punjabi Compulsory)
COURSE CODE: BSNL/BCSL-5031

COURSE OUTCOMES

CO1:ਵਿਦਿਆਰਥੀਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ,ਲੋਕ ਕਾਵਿ,ਲੋਕ ਵਾਰਤਕ ਬਿਰਤਾਂਤ ਦੀ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO2: ਵਿਦਿਆਰਥੀ ਸੁਹਾਗ,ਘੋੜੀਆਂ, ਸਿੱਠਣੀਆਂ ਦੀ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO3:ਵਿਦਿਆਰਥੀਗਿੱਧਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ),ਭੰਗੜਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ),ਝੂਮਰ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO4:ਵਿਦਿਆਰਥੀ ਲੋਕ ਖੇਡਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ),ਲੋਕ ਤਮਾਸ਼ੇ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ),ਲੋਕ ਕਲਾਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਦਾ ਵਿਹਾਰਕ ਅਧਿਐਨ ਕਰ ਸਕਣ ਦੇ ਸਮਰੱਥ ਹੋ ਸਕਣਗੇ।

Bachelor of Science (Non-Medical, Computer Science)
(Semester-V)
Session: 2025-26
Course Title: Basic Punjabi (In lieu of Punjabi Compulsory)
COURSE CODE: BSNL/BCSL-5031

ਸਮਾਂ : 3 ਘੰਟੇ | Maximum Marks: 100
L-T-P | Theory: 80
4-0-0 | CA: 20

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ।ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ 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 16 ਅੰਕ ਹਨ।

4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)
ਲੋਕ ਕਾਵਿ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)
ਲੋਕ ਵਾਰਤਕ ਬਿਰਤਾਂਤ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਯੂਨਿਟ-II

ਸੁਹਾਗ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)
ਘੋੜੀਆਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)
ਸਿੱਠਣੀਆਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਯੂਨਿਟ-III

ਗਿੱਧਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)
ਭੰਗੜਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)
ਝੂਮਰ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

ਯੂਨਿਟ-IV

ਲੋਕ ਖੇਡਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)
ਲੋਕ ਤਮਾਸ਼ੇ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)
ਲੋਕ ਕਲਾਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

Bachelor of Science (Non-Medical, Computer Science)
(Semester-V)
Session: 2025-26
Course Title: Punjab History and Culture (From 1849-1947 A.D)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
COURSE CODE: BSNL-5431/ BCSL-5431

COURSE OUTCOMES:-

After completing the course students will be able to understand:

CO 1:- the causes that led to war between the British and Sikhs that led to the annexation of the Punjab and
how the region was put under the control of Board of Administration

CO 2:-various agrarian, industrial and educational policies introduced by the British in Punjab
.
CO 3:- analyse and evaluate the socio-religious reforms movements of Punjab

CO 4:- factors that led to Gurudwara reform movement and various other freedom struggle movements in which the Punjab played a prominent role

Bachelor of Science (Non-Medical, Computer Science)
(Semester-V)
Session: 2025-26
Course Title: Punjab History & Culture (From 1849-1947 A.D.)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
COURSE CODE: BSNL-5431/ BCSL-5431

Examination Time: 3 Hours | Max. Marks: 100
Theory: 80
CA: 20

Instructions for the Paper Setters

1. Question paper shall consist of four Units
2. Examiner shall set 8 questions in 800 words by selecting Two Questions of equal marks from each Unit.
3. Candidates shall attempt 5 questions in all, by at least selecting One Question from each Unit and the 5th question may be attempted from any of the four Units.
4. Each question will carry 16 marks

Unit- I

1. First Anglo-Sikh War.
2. Annexation of Punjab and Board of Administration

Unit-II

3. British Policy towards agriculture and industry
4. Spread of modern education

Unit-III

5. Socio- religious reform movements: Namdhari, Singh Sabha, AryaSamaj and Ad Dharm
6. Gadhar Movement

Unit-IV

7. Gurdwara Reform Movement
8. Contribution to freedom struggle: Jallianwala Bagh tragedy; Non-cooperation and Quit India Movement.

Suggested Readings

- Chopra, P.N.& Das, M.N. (1974), *A Social, Cultural & Economic History of India.*Vol.III, Macmillan India, 1974.
- Grewal, J.S., *The Sikhs of the Punjab*, New Cambridge House, New Delhi, 2005.
- Mittal, S.C, *Freedom Movement in the Punjab (1905-29),* Concept Publishing Company Delhi, 1977.
- Rai, Satya. M (1978), *Heroic Tradition in the Punjab (1900-1947*). Punjabi University, Patiala, 1978.
- Saini B. S, *The Social & Economic History of the Punjab 1901-1939,* EssEss Publications, Delhi, 1975.
- Singh, Fauja, *Freedom Struggle in the Punjab*, Publication Bureau, Punjabi University, Patiala, 1974.
- Singh, Fauja, *History and Culture of the Punjab*, Part II, Publication Bureau, Punjabi University, Patiala, 1987.
- Singh,Kushwant , *A History of the Sikhs*. Vol. II (1839-1998), Oxford University Press, Delhi, 1991.

Bachelor of Science (Non-Medical, Computer Science)
Semester–V
Session: 2025-26
Course Title: ENGLISH (COMPULSORY)
Course Code: BCSM/ BSNM-5212
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 (Non-Medical, Computer Science)
Semester–V
Session: 2025-26
Course Title: ENGLISH (COMPULSORY)
Course Code: BCSM/ BSNM-5212

Examination Time: 3 Hours | Max. Marks: 100
L T P | Theory: 80
4 0 0 | CA: 20

Instructions for the paper setter:

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 will be set. The students will be required to answer any five, each carrying four marks (100 words each). (5×4=20)

Section B: Four questions based on character, tone, plot and theme(s) from the play *All My Sons* from Unit I will be set and the students will be required to attempt any two, each carrying ten marks (400 words each). (2×10= 20)

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. The students will have to attempt any two of these, each carrying ten marks (400 words each). The questions can also be set based on stanzas with reference to context. (2×10= 20)

Section D: Two questions with internal choice will be set from Unit III(formal letter) and Unit IV(Job application and Resume Writing) each carrying ten marks. (2×10=20)

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 (Non-Medical, Computer Science)
Semester–V
Session: 2025-26
Course Title: Mathematics (Dynamics)
Course Code: BCSM/ BSNM-5333(I)
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 (Non-Medical, Computer Science)
Semester–V
Session: 2025-26
Course Title: Mathematics (Dynamics)
Course Code: BCSM/ BSNM-5333(I)

Examination Time: 3 Hours | Max. Marks: 100
L T P | Theory: 80
4 0 0 | CA: 20

Instructions for the paper setter:
Eight questions of equal marks (16 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 (Non-Medical, Computer Science)
Semester–V
Session: 2025-26
Course Title: Mathematics (Number Theory)
Course Code: BCSM/ BSNM-5333(II)
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 (Non-Medical, Computer Science)
Semester–V
Session: 2025-26
Course Title: Mathematics (Number Theory)
Course Code: BCSM/ BSNM-5333(II)

Examination Time: 3 Hours | Max. Marks: 75
L T P | Theory: 60
3 0 0 | CA: 15

Instructions for the Paper Setter:
Eight questions of equal marks (12 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 Book:

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

Bachelor of Science (Non-Medical)
(SEMESTER–V)
SESSION: 2025-26
COURSE CODE: BSNM-5084(I)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)

Course outcomes:

Students will be able to

CO1: Explain the crystal field theory and associated concepts such as orbital splitting, crystal field stabilization energy (CFSE), spectrochemical series, and Jahn-Teller distortion in coordination complexes.

CO2 : Analyze the magnetic properties and thermodynamic stability of transition metal complexes using magnetic susceptibility methods and substitution reaction mechanisms, including the trans-effect.

CO3 : Interpret electronic spectra of transition metal complexes using term symbols, Orgel diagrams, and LS coupling, and apply these concepts to real metal ion systems such as Cr^{3+}, Co^{2+}, Mn^{2+}, and Ni^{2+}.

CO4 : Describe the structure, bonding, classification, and applications of organometallic compounds including alkyllithium, organoaluminium, metal-olefin, and metal carbonyl complexes.

Bachelor of Science (Non-Medical)
(SEMESTER–V)
SESSION: 2025-26
COURSE CODE: BSNM-5084(I)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)

Exam Time: 3Hrs. Max.Marks:50

Credit(L-T-P): 2-0-0 (Theory: 40, CA: 10)

Instructions for the Paper Setter

Eight questions of equal marks (8 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

1. Metal-ligand Bonding in Transition Metal Complexes (8 Hrs)
Limitationsofvalencebondtheory,anelementaryideaofcrystalfieldtheory,crystalfield splitting in octahedral, tetrahedral and square planar complexes, crystal field stabilization energy for d-orbital electrons in tetrahedral and octahedral complexes,Spectrochemical series, factorsaffectingthecrystalfieldparameters,StructuralandThermodynamiceffects ofinnerorbital splittings, Jahn-Teller effects.

Unit II

2. MagneticPropertiesofTransitionMetalComplexes(8Hrs)
Types of magnetic behaviour, methods of determining magnetic susceptibility by Gouy's and Faraday method. Variation of magnetic susceptibility with temperature, ferromagnetic and antiferromagnetic substances, spin-onlyformula.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. Temperature independent paramagnetism, anomalous magnetic moment, paramagnetic and diamagnetic equilibrium.

3. ThermodynamicandKineticAspectsofMetalComplexes
A brief outline of thermodynamic stabilityof metal complexes and factors affecting the stability, Nucleophilic Substitution reactions in square planar complexes: rate law, Trans- effect, Mechanism of nucleophilic substitution in square planar complexes.

Unit III

4. Electronic Spectra of Transition Metal Complexes (7 Hrs)

Term symbols and coupling scheme, LS coupling, calculation of ground term state, microstates, Types of electronic transitions, selection rules and relaxations, splitting of Russel-Saunder states inoctahedralandtetrahedral,spectrochemicalseries,Orgeldiagramofoneelectron-onehole system(d^1,d^4,d^6&d^9)andtwoelectron-twoholesystem(d^2,d^3,d^7&d^8)inoctahedraland tetrahedral complexes.

StudyofelectronictransitioninCr^{3+}(octahedral),Co^{2+}(octahedral&tetrahedral),Mn^{2+} (octahedral), Ni^{2+}(octahedral) complexes. Limitation of Orgel diagram.

Unit IV

5. OrganometallicCompounds: (7Hrs)

Definition, nomenclature and classification of organometallic compounds. σ and π complexes, types of organoligands, EAN rule, bonding in organometals,
Preparation, properties, bonding and applications of alkyllithium and organoaluminium compounds (AlR3).Metal olefin complexes, bonding in metal-ethylenic complexes, Mechanism of homogeneous hydrogenation reactions of alkene. Metal carbonyls: examples and bonding.

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.,ConciseInorganicChemistry;4thedition,Pubs:ChapmanHallLtd.,1991.
3. Shriver,D.E.,Alkins,P.W.,Langford,C.H.,InorganicChemistry;4thedition,OxfordPublisher: 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.,InorganicChemistry;Pubs:Addison-WesleyPublishingCompany, 1984.
6. Miessler, G.L., Larr, D.A., Inorganic Chemistry; 3rd edition, Pubs: Pearson Education Inc., 2004.
7. Jolly,W.L.,ModernInorganicChemistry;2ndedition,Pubs:McGraw-HillPublishingCompany Limited, 1991.
8. Purcell,K.F.,Kotz,J.C.,InorganicChemistry;Pubs:W.B.SaundersCompany,1977.
9. Puri, B.R., Sharma, L.R., Kalia, K.C., Principles of Inorganic Chemistry; 30th edition, Pubs: Milestones Publisher, 2006-07.
10. InorganicChemistry,W.W.PorterfieldAddison-Wesley.
11. InorganicChemistry,A.G.Sharpe,ELBS.

Bachelor of Science (Non-Medical)
(SEMESTER–V)
SESSION: 2025-26
COURSE CODE: BSNM-5084(II)
COURSE TITLE: CHEMISTRY (PHYSICALCHEMISTRY)

Course outcomes:

Students will be able to

CO1 :Understand and apply the principles of ionic conductivity, ion transport, and electrochemical cell operations to analyze and calculate electrochemical parameters such as EMF, transport number, and thermodynamic quantities.

CO2 :Explain electrochemical phenomena such as polarization and concentration cells, and demonstrate understanding of nuclear properties, radioactive decay, and their applications in nuclear reactions and radioactivity detection.

CO3 :Analyze rotational spectra of diatomic molecules using rigid and non-rigid rotor models to determine molecular parameters like bond length and isotope effects.

CO4 :Interpret vibrational, Raman, and electronic spectra based on quantum mechanical models to deduce structural and bonding information of molecules.

Bachelor of Science (Non-Medical)
(SEMESTER–V)
SESSION: 2025-26
COURSE CODE: BSNM-5084(II)
COURSE TITLE: CHEMISTRY (PHYSICALCHEMISTRY)

Exam Time: 3Hrs. Max.Marks:75

Credit (L-T-P): 3-0-0 (Theory: 60, CA: 15)

Instructions for the Paper Setter

Eight questions of equal marks (12 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 (12 hrs.)

Conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of equivalent and specific conductance with dilution, 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). Migration of ions, Transport number: definition and determination by Hittorf method and moving boundary method, factors affecting transport number. Applications of conductivity measurements: determination of degree of dissociation, determination of Ka of acids, determination of solubility product of sparingly soluble salt, conductometric titrations.

Electrolytic and Galvanic cells-reversible and irreversible cells, conventional representation of electrochemical cells.Standard electrode potential, standard hydrogen electrode, reference electrodes, sign conventions, electrochemical series and its significance. Nernst equation, derivation of cell E.M.F. and single electrode potential. EMF of a cell and its measurements. Calculation of thermodynamic quantities of cell reactions (ΔG,ΔH and K). Types of reversible electrodes: gas- metal ion, metal ion, metal insoluble salt-anion and redox electrodes. Electrode reactions. EMF of reversible electrodes.

Unit–II

Electrochemistry – II (11 Hrs.)

Polarization, over potential, hydrogen overvoltage and its application. Concept of activities and activity coefficient. Concentration cells with and without transference, liquid junction potential, application of concentration cells, valency of ions, solubility product and pH determination, potentiometric
Titrations.

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–III

Spectroscopy (11 Hrs.)

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 (semi classical principles), selection rules, spectral intensity and position of lines, distribution using population distribution (Maxwell-Boltzmann distribution) determination of bond length, qualitative description of non-rigid rotor, isotope effect.

Unit–IV

Vibrational Spectrum (11 Hrs.)

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 an harmonic motion and isotope on the spectrum, vibration-rotation spectra, P, Q and R branches, structural information from IR spectra, 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, O, Q and S branches. Comparison with IR spectra.

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 σ, π, 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. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford University Press, 2000.
3. Albert, R.A., Silbey, R.J., Physical Chemistry; 1st edition, Pubs: John Wiley & Sons Inc.,

1992.
4. Levine, I.N., Physical Chemistry; 5th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd, 2002.
5. Moore, W. J., Basic Physical Chemistry; Pubs: Prentice Hall of India Pvt. Ltd, 1983.
6. Metz, C.R., Theory and problems of Physical Chemistry; Schaum's outline series, 2nd edition, Pubs: McGraw-Hall Book Company, 1989.
7. W. Kemp, "Organic Spectroscopy".
8. C.N. Banwell "Fundamentals of Molecular Spectroscopy".
9. D.L. Pavia, G.M. Lampan and G. S. Kriz, Introduction to Spectroscopy" Hartcourt College Publishers, 2001

Bachelor of Science (Non-Medical)
(SEMESTER–V)
SESSION: 2025-26
COURSE CODE: BSNM-5084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Course outcomes:

Students will be able to

CO1:Develop skills in synthesizing coordination compounds such as sodium trioxalatoferrate(III), Ni-DMG, and transition metal complexes, and understand their structural features and ligand interactions.

CO2:Perform conductometric and pH-metric titrations to determine acid-base properties, mixture composition, and dissociation constants, interpreting the data to identify end points and reaction behaviors.

CO3:Determine molecular weights using Rast's method and analyze phase equilibria by calculating distribution coefficients, gaining insights into colligative properties and solute-solvent interactions.

CO4:Measure refractive indices using Abbe refractometry and calculate specific and molar refraction to identify compositions of liquid mixtures, linking optical properties to molecular structure.

Bachelor of Science (Non-Medical)
(SEMESTER–V)
SESSION: 2025-26
COURSE CODE: BSNM-5084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Exam Time: 3Hrs. Max.Marks:50

Credit(L-T-P): 0-0-2 (Theory: 40, CA: 10)

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

Weak acid-Strong base

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

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

(c) pH metric titration :

(i) strong acid with strong base,

(ii) weak acid with strong base and determination of dissociation constant of a weak acid.

(d) Phase Equilibria to determine the distribution coefficient of iodine between CCI4 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.

Books suggested:

1. Experimental Inorganic Chemistry, W.G. Palmer, Cambridge.
2. Handbook of preparative Inorganic Chemistry, Vol. I & 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 & Co.
8. Selected Experiments in Physical Chemistry, N.G. Mukherjee, J.N. Ghosh & Sons.
9. Experiments Physical Chemistry, J.C. Ghosh, Bharati Bhavan.

Bachelor of Science (Computer Science)
Semester–V
Session 2025-26
COURSE CODE: BCSM-5134
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 (Computer Science)
Semester–V
Session 2025-26
COURSE CODE: BCSM-5134
COURSE TITLE : COMPUTER SCIENCE
(DATA BASE MANAGEMENT SYSTEM)
(THEORY)

Examination Time: 3 Hrs. Max. Marks: 100
Theory: 50
L-T-P: 3-0-1 Practical: 30
Credits: 4 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

Normalization: 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 (Computer Science)
Semester–V
Session 2025-26
COURSE CODE: BCSM-5134
COURSE TITLE : COMPUTER SCIENCE
(DATA BASE MANAGEMENT SYSTEM)
(PRACTICAL)

Examination Time: 3 Hrs. Max. Marks: 100

Theory: 50

L-T-P: 3-0-1 Practical: 30

Credits: 4 CA: 20

Lab on Database Management System.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Bachelor of Science (Semester System) (12+3 System of Education)
Session-2025-26
PHYSICS (CONDENSED MATTER PHYSICS)
(THEORY)
Course code: BSNM-5395 (I) for Bachelor of Science (Non. Medical)
BCSM-5395 (I) for Bachelor of Science (Computer Science)

COURSE OUTCOMES

After passing this course, students will be able to:

CO1: Understand and explain the fundamental aspects of crystal structures in solids, including concepts of lattice, basis, unit cells (primitive and conventional), and Bravais lattices. They will study common crystal systems such as simple cubic, body-centered cubic (BCC), face-centered cubic (FCC), and hexagonal close-packed (HCP) structures. Additionally, they will learn the role of symmetry operations (rotation, reflection, inversion, translation) in determining the physical and mechanical properties of crystalline materials.

CO2: Understanding of the experimental techniques used to determine crystal structures, such as X-ray diffraction (XRD) and Laue diffraction methods. They will also learn to construct and interpret reciprocal lattices, understand the concept of Brillouin zones, and calculate structure factors and form factors, which are essential tools for analyzing and predicting diffraction patterns and crystal quality in material characterization.

CO3: Gain insights into the dynamics of atoms in a crystal lattice by studying lattice vibrations and their quantized modes, called phonons. They will explore how phonons contribute to the specific heat of solids, particularly at low temperatures. This includes a comparative understanding of classical (Dulong-Petit), Einstein, and Debye models, helping students to relate theoretical models to experimental observations in thermal properties of materials.

CO4: Build a progressive understanding of electronic properties of solids, beginning with the free electron model and moving to more refined models such as the nearly free electron model and the Kronig-Penney model. They will apply this knowledge to explain the formation of energy bands and band gaps, and differentiate between conductors, semiconductors, and insulators based on their electronic band structure. This understanding forms the theoretical foundation for modern electronic devices and materials science.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
Session-2025-26
PHYSICS (CONDENSED MATTER PHYSICS)
Course code: BSNM-5395 (I) for Bachelor of Science (Non. Medical)
BCSM-5395 (I) for Bachelor of Science (Computer Science)

Credits: 3-0-0 Total Marks: 75 (ESE Marks: 60, CA: 15)
Examination Time: 3 Hours Pass Mark: 21
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 12 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-2025-26
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: Develop a solid understanding of the concepts of ideal and practical voltage and current sources and their significance in circuit design. They will be able to explain the working principles of p-n junction diodes and Zener diodes, including their I-V characteristics and real-world behavior under different biasing conditions. This foundational knowledge will be applied to analyze and implement basic electronic functions such as rectification (half-wave and full-wave), voltage regulation using Zener diodes, and waveform shaping using diode logic gates (AND/OR).

CO2: gain the ability to characterize the behavior of Bipolar Junction Transistors (BJTs) and Field Effect Transistors (FETs) under various biasing conditions. They will understand the input-output characteristics, operating regions (cut-off, active, saturation for BJT; ohmic, saturation for FET), and the significance of proper biasing for stable amplifier operation. This understanding will enable them to select and apply suitable transistor configurations in analog and digital circuits for switching and amplification purposes.

CO3: study the concepts and classification of feedback in amplifiers, focusing particularly on the role and benefits of negative feedback such as stability, gain control, and bandwidth enhancement. Through practical examples like the emitter follower (common collector configuration), students will understand how feedback improves circuit performance in real-world applications.

CO4: Students will understand the principles and functioning of electronic oscillators, specifically LC (Tank circuit-based) and RC (phase shift and Wien bridge) oscillators, which are essential for generating sinusoidal signals without external input. They will analyze the conditions for sustained oscillations (Barkhausen criteria), frequency determination, and waveform purity. The course will also guide students to compare LC and RC oscillators in terms of frequency stability, output frequency range, and circuit complexity, helping them choose appropriate oscillator circuits for specific applications such as communication systems and signal generation.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
Session-2025-26
PHYSICS (ELECTRONICS)
Course code:BSNM-5395 (II) for Bachelor of Science (Non Medical)
BCSM-5395 (II) for Bachelor of Science (Computer Science)

Credits: 2-0-0 Total Marks: 50 (ESE Marks: 40, CA: 10)
Examination Time: 3 Hours Pass Mark: 14

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 8 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-2025-26
PHYSICS PRACTICAL
Course code: BSNM-5395(P) for Bachelor of Science (Non Medical)
BCSM-5395(P) for Bachelor of Science (Computer Science)

Course Outcomes

After completing this course a student will be able to

CO1: Analyze and characterize the electrical behavior of p-n junction and Zener diodes through their I-V characteristics. They will understand their operational principles of rectifier circuits (half-wave and full-wave), filter circuits for smoothing output, and clipping/clamping circuits for waveform shaping. Additionally, they will learn to determine the energy band gap of semiconductors by studying the temperature dependence of the reverse saturation current, which is a fundamental property of semiconductor materials.

CO2: Students will acquire hands-on experience in operating a Cathode Ray Oscilloscope (CRO), enabling them to measure AC voltage, frequency, and waveform characteristics such as amplitude, time period, and phase difference. They will also learn how to use a CRO to analyze signal distortions and verify the performance of electronic circuits, which is a critical skill in electronics troubleshooting and diagnostics.

CO3: Characterize Bipolar Junction Transistors (BJTs) in common base (CB) and common emitter (CE) configurations by plotting input and output characteristics. They will understand the working principles of transistors and their role in signal amplification, including determining current gain, input/output resistance, and voltage gain.

CO4: How semiconductor diodes can be configured to perform basic logic operations such as AND and OR using diode-resistor logic. They will construct and test these basic logic gates in the lab, forming a bridge between analog and digital electronics.

Bachelor of Science (Semester System) (12+3 System of Education)
(Semester–V)
Session-2025-26
PHYSICS (PRACTICAL)
Course code: BSNM-5395(P) for Bachelor of Science (Non Medical)
BCSM-5395(P) for Bachelor of Science (Computer Science)

Credits: 2-0-0 Total Marks: 50 (ESE Marks: 40, CA: 10)
Examination Time: 3 Hours Pass Mark: 14

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: 40
i) One experiment 20 Marks
ii) Brief Theory 5 Marks
iii) Viva–Voce 10 Marks
iv) Record (Practical file) 5 Marks
II. There will be one session 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).

SEMESTER-VI

Bachelor of Science (Non- Medical, Computer Science)
(Semester VI)
Session: 2025-26
COURSE TITLE: PUNJABI (COMPULSORY)
COURSE CODE: BSNL/BCSL-6421

COURSE OUTCOMES

CO1: ‘ਕਾਵਿਗੌਰਵ’ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਕਵਿਤਾਵਾਂਪ੍ਰਤੀਦਿਲਚਸਪੀ, 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 ਰਚਨਾਕਰਨਨਾਲਵਿਦਿਆਰਥੀਆਪਣੀਗੱਲ ਨੂੰ ਕਹਿਣ ਦੀ ਜਾਚਸਿੱਖਣਗੇ ਅਤੇ ਇਹਦਿਸ਼ਾਗੀਕਸਰਤਵਿਚ 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,ਕਾਰਕਕਿਰਿਆਵਾਕੰਸ਼ਦੀਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਤੇ ਪ੍ਰਕਾਰਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂਅੰਦਰਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂਨੂੰ ਸਮਝਣਲਈਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂਦਾਵਿਕਾਸ ਕਰਨਾ ਹੈ।

Bachelor of Science (Non- Medical, Computer Science)
(Semester VI)
Session: 2025-26
COURSE TITLE: PUNJABI (COMPULSORY)
COURSE CODE: BSNL/BCSL-6421

ਸਮਾਂ : 3 ਘੰਟੇ | Maximum Marks: 100
L-T-P | Theory: 80
4-0-0 | CA: 20

ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕਲਈਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨਹੋਣਗੇ।ਸੈਕਸ਼ਨA-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨਕ੍ਰਮਵਾਰ ਯੂਨਿਟI-IV ਵਿਚੋਂਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜਪ੍ਰਸ਼ਨਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨਵਿਚੋਂਇਕਪ੍ਰਸ਼ਨਕਰਨਾਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂਪ੍ਰਸ਼ਨਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨਵਿਚੋਂਕੀਤਾਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 16ਅੰਕਹਨ।

4. ਪੇਪਰ ਸੈੱਟ ਕਰਨਵਾਲਾਜੇਕਰਚਾਹੇ ਤਾਂਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡਅੱਗੋਂਵੱਧਤੋਂਵੱਧਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂਵਿਚਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਕਾਵਿਗੌਰਵ(ਪਹਿਲੇ ਛੇ ਕਵੀ)(ਸੰਪਾ.ਬਿਕਰਮਸਿੰਘ ਘੁੰਮਣ, ਕਰਮਜੀਤਕੌਰ),ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ,
(ਸ਼ੇਖ ਫ਼ਰੀਦ, ਸ਼ਾਹ ਹੁਸੈਨ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਜੀ, ਗੁਰੂ ਅਰਜਨ ਦੇਵ ਜੀ,ਵਾਰਿਸ ਸ਼ਾਹ, ਸ਼ਾਹ ਮੁਹੰਮਦ)
(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ/ਵਿਸ਼ਾਵਸਤੂ/ਸਾਰ)

ਯੂਨਿਟ-II

ਧਰਤੀਆਂ ਦੇ ਗੀਤ(ਸਫ਼ਰਨਾਮਾ), ਬਰਜਿੰਦਰਸਿੰਘਹਮਦਰਦ,ਨਾਨਕਸਿੰਘ ਪੁਸਤਕਮਾਲਾ, ਅੰਮ੍ਰਿਤਸਰ
(ਸਮਾਜ ਸਭਿਆਚਾਰਪਰਿਪੇਖ/ਸਫਰਨਾਮੇ ਦੇ ਤੌਰ ਤੇ ਪਰਖ)

ਯੂਨਿਟ-III

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

ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ :

(ੳ) ਵਿਆਕਰਨਕ ਸ਼੍ਰੇਣੀਆਂ : ਲਿੰਗ, ਵਚਨ,ਕਾਰਕ
(ਅ) ਕਿਰਿਆਵਾਕੰਸ਼ : ਪਰਿਭਾਸ਼ਾ, ਬਣਤਰ ਤੇ ਪ੍ਰਕਾਰ

Bachelor of Science (Non- Medical, Computer Science)
(Semester VI)
Session: 2025-26
COURSE TITLE: Basic Punjabi (In lieu of Punjabi Compulsory)
COURSE CODE: BSNL/BCSL-6031

COURSE OUTCOMES

CO1:ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦਾ ਪਿਛੋਕੜ,ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਭੂਗੋਲਿਕ ਸਥਿਤੀ,ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਨਿਖੜਵੇ ਲੱਛਣਦਾ ਅਧਿਐਨ ਕਰਨਗੇ।

CO2: ਪੰਜਾਬ ਦੇ ਮੇਲੇ,ਪੰਜਾਬ ਦੇ ਤਿਉਹਾਰ,ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਧਾਰਮਿਕ ਸਥਾਨ ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO3: ਜਨਮ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ,ਵਿਆਹ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ,ਮੌਤ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।

CO4:ਪੰਜਾਬ ਦਾ ਖਾਣ ਪੀਣ,ਪੰਜਾਬ ਦਾ ਪਹਿਰਾਵਾ,ਪੰਜਾਬ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸ ਦਾ ਅਧਿਐਨ ਕਰਨਗੇ।

Bachelor of Science (Non- Medical, Computer Science)
(Semester VI)
Session: 2025-26
COURSE TITLE: Basic Punjabi (In lieu of Punjabi Compulsory)
COURSE CODE: BSNL/BCSL-6031

ਸਮਾਂ : 3 ਘੰਟੇ Maximum Marks: 100

L-T-P Theory: 80

4-0-0 CA: 20

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ।ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ 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 16 ਅੰਕ ਹਨ।

4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

ਪਾਠਕ੍ਰਮ

ਯੂਨਿਟ-I

ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦਾ ਪਿਛੋਕੜ
ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਭੂਗੋਲਿਕ ਸਥਿਤੀ
ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਨਿਖੱੜਵੇਂ ਲੱਛਣ

ਯੂਨਿਟ-II

ਪੰਜਾਬ ਦੇ ਮੇਲੇ
ਪੰਜਾਬ ਦੇ ਤਿਉਹਾਰ
ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਧਾਰਮਿਕ ਸਥਾਨ

ਯੂਨਿਟ-III

ਜਨਮ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ
ਵਿਆਹ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ
ਮੌਤ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ

ਯੂਨਿਟ-IV

ਪੰਜਾਬ ਦਾ ਖਾਣ ਪੀਣ
ਪੰਜਾਬ ਦਾ ਪਹਿਰਾਵਾ
ਪੰਜਾਬ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸ

Bachelor of Science (Non- Medical, Computer Science)
(Semester VI)
Session: 2025-26
COURSE TITLE: PUNJAB HISTORY AND CULTURE (1947- 2000 A.D.)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
COURSE CODE: BSNL-6431/BCSL-6431

COURSE OUTCOMES:-

After completing this paper the students will be able to

CO 1:-comprehend Punjab's contribution in the freedom struggle, the exodus and Rehabilitation and its impact on state with special reference to partition

CO 2:- comprehend the causes that led to the formation of New Punjab in 1966and outcomes of Green Revolution in the Punjab

CO 3:-understand nature and reasons of diaspora, female foeticide and growth of education in Punjab and its impact on youth

CO 4: comprehend the growth of Punjabi literature and Drama in the Punjab after Independence and to understand the reasons of drug abuse in Punjab, its management and prevention in the Punjab

Bachelor of Science (Non- Medical, Computer Science)
(Semester VI)
Session: 2025-26
COURSE TITLE: PUNJAB HISTORY AND CULTURE (1947- 2000 A.D.)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)
COURSE CODE: BSNL-6431/BCSL-6431

Examination Time: 3 Hours

Max. Marks: 100
Theory: 80
CA: 20

Instructions for the Paper Setters

1. Question paper shall consist of four Units

2. Examiner shall set 8 questions in all by selecting Two Questions of equal marks from each Unit.

3. Candidates shall attempt 5 questions in 800 words, by at least selecting One Question from each Unit and the 5th question may be attempted from any of the four Units.
4. Each question will carry16 marks

UNIT I

1. Partition and its Impact on Punjab
2. Rehabilitation.

UNIT II

3. Punjabi Suba Movement and Act of 1966.
4. Green Revolution.

UNIT III

5. Punjabi Diaspora (Canada)
6. Development of education in Punjab after Independence

UNIT IV

7. Development of Punjabi Literature and Drama.(With Special Reference to Bhai Veer Singh, Shiv Kumar Batalvi)
8. Emerging Concerns: Drug Addiction and Female Foeticide (In context to the Punjab)

Suggested Readings

- Chopra, P.N. & Das, M.N. (1974), *A Social, Cultural & Economic History of India.*Vol.III, Macmillan India, New Delhi, 1974.

- Grewal, J.S., *Social and Cultural History of Punjab: Prehistoric, Ancient and Early Medieval*. Foundation Books Pvt Ltd Cambridge House, New Delhi, 2004.
- Grewal, J.S., *The Sikhs of Punjab*. New Cambridge House, New Delhi, 2005
- Rai Satya M. ,*Heroic Tradition in Punjab(1900-1947)*. Publication Bureau, Punjabi University, Patiala, 1978
- Singh, Fauja*., Freedom Struggle in Punjab*. Publication Bureau, Punjabi University, Patiala, 1974
- Singh, Fauja, *History and Culture of the Punjab*. Part II, Publication Bureau, Punjabi University, Patiala, 1987.
- Singh, Kushwant, *A History of the Sikhs*. Vol. II (1839-1998), Oxford University Press, Delhi, 1991.
- Yadav, K.C., *Haryana AitihasikSimhavalokan* (Hindi). Haryana Sahitya Akademy, Chandigarh, 1991.

Bachelor of Science (Non-Medical, Computer Science)
Semester–VI
Session: 2025-26
Course Title: ENGLISH (COMPULSORY)
Course Code: BCSM/ BSNM-6212
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 (Non-Medical, Computer Science)
Semester–VI
Session: 2025-26
Course Title: ENGLISH (COMPULSORY)
Course Code: BCSM/ BSNM-6212

Examination Time: 3 Hours Max. Marks: 100
L T P Theory: 80
4 0 0 CA: 20

Instructions for the Examiner:

Section A: Three questions from the novel *Train to Pakistan* from Unit Iand three questions from *Glimpses of Theatre* from Unit II will be set. The students will be required to answer any five, each carrying 4marks (100 words each). (5×4=20)

Section B: Four questions based on character, plot andtheme(s) from the novel*Train to Pakistan* from Unit Iwill be set and students will be required to attempt anytwo, each carrying 10 marks (400 words each). (2×10=20)

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 IIwill be set. The students will have to attempt any two, each carrying 10 marks (400 words each). (2×10=20)

Section D: Two questions with internal choice will be set from Unit III (Essay Writing) and Unit IV (Report Writing) each carrying ten marks. (2×10=20)

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 (Computer Science/Non-Medical)
Semester–VI
Session- 2025-26
Course Title: Mathematics (Linear Algebra)
Course Code: BCSM/BSNM-6333(I)
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 (Computer Science/Non-Medical)
Semester–VI
Session: 2025-26
Course Title: Mathematics (Linear Algebra)
Course Code: BCSM/BSNM-6333(I)

Examination Time: 3 Hours | Max. Marks: 100
L T P | Theory: 80
4 0 0 | CA: 20

Instructions for the paper setters/examiners:

Eight questions of equal marks (16 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 (Computer Science/Non-Medical)

Semester–VI

Session: 2025-26

Course Title: Mathematics (Numerical Analysis)

Course Code: BCSM/BSNM-6333(II)

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 (Computer Science/Non-Medical)
Semester–VI
Session: 2025-26
Course Title: Mathematics (Numerical Analysis)
Course Code: BCSM/BSNM-6333(II)

Examination Time: 3 Hours Max. Marks: 75
L T P Theory: 60
3 0 0 CA: 15

Instructions for the Paper Setter: Eight questions of equal marks (12 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 (Non-Medical)
(SEMESTER–VI)
SESSION: 2025-26
COURSE CODE: BSNM -6084(I)
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 λmax

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–VI)
SESSION: 2025-26
COURSE CODE: BSNM-6084(I)
COURSE TITLE: CHEMISTRY (Molecular Spectroscopy)

Exam Time: 3Hrs. Max.Marks:75
Credit(L-T-P): 3-0-0 (Theory: 60, CA: 15)

Note: Instructions for the Paper Setter
Eight questions of equal marks (12 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

Energy and Electromagnetic Spectrum (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 λmax , 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 λmax 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 (1HNMR) (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 Spectrometry (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 Suggested:

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 (Non-Medical)
(SEMESTER–VI)
SESSION: 2025-26
COURSE CODE: BSNM -6084(II)
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 (Non-Medical)
(SEMESTER–VI)
SESSION: 2025-26
COURSE CODE: BSNM -6084(II)
COURSE TITLE: CHEMISTRY (PHYSICAL CHEMISTRY)

Exam Time: 3Hrs. Max.Marks:50

Credit(L-T-P): 2-0-0 (Theory: 40, CA: 10)

Note: Instructions for the Paper Setter

Eight questions of equal marks (8 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

1. 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

2. 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

3. 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

4. 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 (Non-Medical)
(SEMESTER–VI)
SESSION: 2025-26
COURSE CODE: BSNM-6084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Course outcomes:

Students will be able to

CO1 :Demonstrate proficiency in column chromatography for the separation of organic compounds such as isomers, pigments, and dyes, and interpret separation based on polarity and adsorption principles.

CO2 :Synthesize standard organic compounds like p-nitroacetanilide and p-bromoacetanilide, applying concepts of electrophilic substitution and functional group transformations.

CO3 :Apply green chemistry principles in the synthesis of organic compounds (e.g., benzilic acid, nitrated salicylic acid), emphasizing eco-friendly reagents and reaction conditions.

CO4 :Perform synthesis of azo dyes such as methyl orange and methyl red, and understand the chemical basis and practical relevance of dye formation reactions.

Bachelor of Science (Non-Medical)
(SEMESTER–VI)
SESSION: 2025-26
COURSE CODE: BSNM-6084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Exam Time: 3Hrs. Max.Marks:50

Credit(L-T-P): 0-0-2 (Theory: 40, CA: 10)

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

a) Separation of o & p nitrophenol

b) Separation of Leaf pigments from Spinach leaves

c) Separation of o & p nitro aniline

d) Separation of dyes.

(b) Synthesis of Organic Compounds

a) Preparation of p-nitroacetanilide

b) Preparation of p-bromoacetanilide

c) Green Chemistry Experiment: Preparation of benzilic acid from Benzyl-using green approach.

d) Preparation of Methyl Orange, Methyl Red

e) Nitration of Salicyclic Acid by green approach (using ceric ammonium nitrate).

Books suggested:

1. Experimental Organic Chemistry, Vol. I & 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 (Computer Science)
Semester–VI
(Session 2025-26)
COURSE CODE: BCSM-6134
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 (Computer Science)
Semester–VI
(Session 2025-26)
COURSE CODE: BCSM-6134
COMPUTER SCIENCE
(INFORMATION TECHNOLOGY)
(Theory)

Examination Time: 3 Hrs. Max. Marks: 100
Theory: 50
L-T-P: 3-0-1 Practical: 30
Credits: 4 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 (Computer Science)
Semester–VI
Session 2025-26
COURSE CODE: BCSM-6134
COMPUTER SCIENCE
(INFORMATION TECHNOLOGY)
(PRACTICAL)

Examination Time: 3 Hrs.

Max. Marks: 100
Theory: 50
Practical: 30
CA: 20

L-T-P: 3-0-1
Credits: 4

Lab on Information Technology.

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

(Semester–VI)

Session-2025-26

PHYSICS (RADIATION AND PARTICLE PHYSICS)

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

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

COURSE OUTCOME:

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

CO1: Understand the mechanisms through which different types of nuclear radiation and charged particles interact with matter. This includes heavy charged particles (like alpha particles), light charged particles (like electrons and positrons), and neutral radiation (gamma rays). They will study fundamental processes such as ionization, excitation, Bremsstrahlung, and annihilation, and use theoretical frameworks such as the Bethe-Bloch formula to estimate energy loss. This knowledge is essential for applications in radiation shielding, dosimetry, and detector design.

CO2: Understanding of the working principles, construction, and characteristics of various nuclear radiation detectors, including gas-filled detectors (ionization chambers, proportional counters, and Geiger-Müller tubes), scintillation detectors, semiconductor detectors, solid-state nuclear track detectors, nuclear emulsions, and the Cherenkov detector. They will be able to compare these detectors based on sensitivity, energy resolution, and suitability for detecting alpha, beta, gamma particles, and neutrons, enabling them to select appropriate detection methods for experimental or industrial use.

CO3: Understand the principles and functioning of different particle accelerators, such as linear accelerators (linacs) and cyclic accelerators like the cyclotron, synchrocyclotron, betatron, electron/proton synchrotrons, and colliding beam machines including an introduction to the Large Hadron Collider (LHC). They will also grasp the concept of phase stability and resonance necessary for sustained acceleration.

CO4: Classify elementary particles into fermions and bosons, and understand the nature of particle-antiparticle pairs. They will explore the four fundamental interactions (gravitational, electromagnetic, weak, and strong), and apply quantum numbers such as charge, baryon number, lepton number, parity, isospin, and strangeness to analyze and predict outcomes of nuclear and particle reactions. The course will introduce them to the quark model, hadrons and leptons, and the terminology of high-energy physics, laying the groundwork for advanced studies or research in modern particle physics.

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

(Semester–VI)

Session-2025-26

PHYSICS (RADIATION AND PARTICLE PHYSICS)

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

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

Credits: 3-0-0 **Total Marks: 75 (ESE Marks: 60, CA: 15)**

Examination Time: 3 Hours **Pass Mark: 21**

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 12 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-2025-26

PHYSICS (NUCLEAR PHYSICS)

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

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

COURSE OUTCOMES

CO1: After completing this course, students will be able to understand and explain the fundamental properties of atomic nuclei, including nuclear composition, size, spin, parity, magnetic and electric moments. They will also gain insights into the nature of nuclear forces and their role in nuclear stability, enabling them to interpret and analyze nuclear behavior in various physical and technological contexts.

CO2: Students will develop a thorough understanding of radioactive decay processes, including the theories of alpha, beta, and gamma decay, and the significance of the neutrino hypothesis and parity violation. This knowledge will enable them to evaluate applications such as radioactive dating, nuclear medicine, and radiation protection through a deep understanding of decay laws and mechanisms.

CO3: Students will be able to describe and analyze different nuclear reactions, understand the concept of reaction cross section, apply conservation laws and kinematics, and explain the formation and role of the compound nucleus. This outcome prepares them to understand and interpret experimental nuclear physics data, including applications in nuclear reactors, particle physics experiments, and energy production.

CO4: Students will gain the ability to apply and critically evaluate nuclear models, particularly the Liquid Drop Model and the Shell Model, understanding their assumptions, limitations, and successes. This will allow them to predict nuclear stability, magic numbers, and ground state properties, and understand their relevance in nuclear structure research, reactor design, and isotope production.

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

(Semester–VI)

Session-2025-26

PHYSICS (NUCLEAR PHYSICS)

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

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

Credits: 2-0-0 **Total Marks: 50 (ESE Marks: 40, CA: 10)**

Examination Time: 3 Hours **Pass Mark: 14**

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 8 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-2025-26

PHYSICS PRACTICAL

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

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

Course Outcome

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

CO1: Understanding of magnetic parameters such as magnetic field strength (H), magnetic flux density (B), magnetic permeability, and susceptibility. They will learn about the phenomenon of magnetic hysteresis, its physical interpretation, and its significance in the design of magnetic materials.

CO2: Understand the operation and characteristics of Zener diodes, focusing on their ability to maintain a constant voltage across a load regardless of variations in input voltage or load current. They will explore the breakdown mechanism in Zener diodes and design and implement voltage regulator circuits for use in power supplies and electronic devices. This knowledge is fundamental in understanding regulated DC power sources, especially in consumer electronics and embedded systems.

CO3: Study and analyze the characteristics and functioning of Field Effect Transistors (FETs), including their operation in ohmic and saturation regions. They will also examine the behavior of Light Dependent Resistors (LDRs) and their use in light-sensing applications. Additionally, students will explore the transient and steady-state responses of RC circuits to different types of input voltages (step, sine), gaining insight into their role as filters, integrators, and differentiators in analog electronics.

CO4: Students will learn to operate and interpret results from a Geiger-Müller (GM) counter, a fundamental tool in nuclear radiation detection. They will understand the concept of dead time (the period after each detection event during which the counter is unresponsive), and its correction techniques. They will also calculate the linear absorption coefficient for various materials, which is essential for radiation shielding and material identification.

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

(Semester–VI)

Session-2025-26

PHYSICS (PRACTICAL)

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

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

Credits: 2-0-0 **Total Marks: 50 (ESE Marks: 40, CA: 10)**

Examination Time: 3 Hours **Pass Mark: 14**

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: 40**

i) One experiment **20 Marks**

ii) Brief Theory **5 Marks**

iii) Viva–Voce **10 Marks**

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

II. There will be one session 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 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 absorption of beta particles in aluminium using GM counter and determine the absorption coefficient of beta particles from it.
7. To study the characteristics of a thermistor and find its parameters.
8. To the characteristics of a differentiating circuit (or differentiator) of RC circuit.
9. To the characteristics of a integrating circuit (or integrator) of RC circuit.
10. To study characteristics of LDR.
11. To study the statistical fluctuations using GM counter.