

FACULTY OF SCIENCES
SYLLABUS
For
Bachelor of Science (Honours)
(Non-Medical & Computer Science)
(Semester III)

(Offered under 4 Year U.G. Degree Programme)
(Credit Based Continuous Evaluation Grading System)

Under NEP-2020

Session: 2026-27



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 (Honours)
(Non-Medical & Computer Science)
Session-2026-27

Semester-III								
Course Code	Course Name	Course Type	Credits	Total Marks	ESE		C A	Examination time (in Hours)
					L	P		
BSNL/BCSL-3421 BSNL/BCSL-3031 BSNL/BCSL-3431	Punjabi (Compulsory) ¹ Basic Punjabi ² Punjab History and Culture	C	4-0-0	100	70	-	30	3
BSNL/BCSL-3212	English Language Skills- II	AEC	4-0-0	100	70	-	30	3
BSNL/BCSL-3333	Mathematics (Differential Equations)	DSC	4-0-0	100	70	-	30	3
BSNP/BCSP-3333	Differential Equations Lab		0-0-1	50	-	35	15	3
BSNL-3084	Physical Chemistry -I	DSC	4-0-0	100	70	-	30	3
BSNP-3084	Physical Chemistry-I Lab		0-0-2	50	-	35	15	3
BCSM-3134	Computer Science (Computer Oriented Numerical and Statistical Methods)	DSC	3-0-1	100	40	30	30	3+3
BSNL/BCSL-3395	Physics (Statistical Physics and Thermodynamics)	DSC	4-0-0	100	70	-	30	3
BSNP/BCSP-3395	Optics Lab		0-0-2	50	-	35	15	3
BSNM/BCSM-3676	NCC (Army Cadets)	AEC (Optional)	2-0-2	100	40	30	30	3+3
*VACE-3221	Environmental Studies	VAC	2-0-0	50	35	-	15	3
	Total Credits		27/25					

¹ Special paper in lieu of Punjabi (Compulsory) for those who have not studied Punjabi .

² Special paper in lieu of Punjabi (Compulsory) for those students who are not domicile of Punjab.

*credits/ grade points of these courses will not be added in SGPA/ CGPA of the semester/ Programme and only grades will be provided.

C- Compulsory

AEC-Ability Enhancement Course

DSC-Discipline Specific Course

VAC-Value Added Course

Session 2026-27

BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

**Semester III
PUNJABI (COMPULSORY)**

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-3421

COURSE OUTCOMES

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

CO2: 'ਆਧੁਨਿਕ ਇਕਾਂਗੀ' ਇਕਾਂਗੀ ਸੰਗ੍ਰਹਿ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ 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। ਦਿੱਤੇ ਪੈਰੇ ਵਿਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦ ਜੋੜਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO4: ਪੰਜਾਬੀ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ :

ਨਾਂਵ ,ਪੜਨਾਂਵ ,ਕਿਰਿਆ, ਸਬੰਧਕ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

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BACHELOR OF ARTS / BACHELOR OF SCIENCE (MEDICAL) / BACHELOR OF SCIENCE (NON MEDICAL) / BACHELOR OF SCIENCE (COMPUTER SCIENCE) / BACHELOR OF SCIENCE (ECONOMICS) / BACHELOR OF COMMERCE / BACHELOR OF BUSINESS ADMINISTRATION

**Semester III
PUNJABI (COMPULSORY)**

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-3421

**ਸਮਾਂ : 3 ਘੰਟੇ
L-T-P
4-0-0**

**Maximum Marks: 100
Theory : 70
CA :30**

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 14 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 ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

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 ਹਿੱਸਾ ਹਨ)

(ਵਿਸ਼ਾ ਵਸਤੂ/ਸਾਰ/ਕਲਾ ਪੱਖ)

ਯੂਨਿਟ-II

ਆਧੁਨਿਕ ਇਕਾਂਗੀ

(ਸੰਪਾ.ਰੋਸ਼ਨ ਲਾਲ ਆਹੂਜਾ, ਮਨਜੀਤ ਪਾਲ ਕੌਰ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਵਿਸ਼ਾ ਵਸਤੂ/ਪਾਤਰ ਚਿਤਰਨ/ਰੰਗ ਮੰਚੀ ਪੱਖ/ ਸਾਰ

ਯੂਨਿਟ-III

(ੳ) ਸੰਖੇਪ ਰਚਨਾ (ਪ੍ਰੈਸੀ)

(ਅ) ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦ ਜੋੜਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ

ਯੂਨਿਟ-IV

ਪੰਜਾਬੀ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ :

(ੳ) ਨਾਂਵ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ਅ) ਪੜਨਾਂਵ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ੲ) ਕਿਰਿਆ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ਸ) ਸਬੰਧਕ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

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SEMESTER-III

Basic Punjabi

(In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-3031

Course outcomes

CO1:ਸੰਖੇਪ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਸੰਖੇਪ ਵਿਚ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਦੇਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO2:ਕਵਿਤਾ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ।

CO3:ਕਹਾਣੀ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ।

CO4:ਨਿਬੰਧ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਮੁੱਲਵਾਨ ਇਤਿਹਾਸ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।

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SEMESTER-III

Basic Punjabi

(In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-3031

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 100

L-T-P

Theory :70

4-0-0

CA :30

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 14 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

ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ

ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰਾ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ

ਯੂਨਿਟ-II

ਕਵਿਤਾਵਾਂ

- (ੳ) ਸਮਾਂ (ਭਾਈ ਵੀਰ ਸਿੰਘ)
- (ਅ) ਸ਼ੈਰ ਪੰਜਾਬੀ ਦੀ (ਫੀਰੋਜ਼ਦੀਨ ਸ਼ਰਫ)
- (ੲ) ਅੰਬੀ ਦਾ ਬੂਟਾ (ਪ੍ਰੋ.ਮੋਹਨਸਿੰਘ)
- (ਸ) ਬਿਰਹੇਂ ਦੀ ਰੜਕ (ਸ਼ਿਵ ਕੁਮਾਰ)
- (ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ,ਸਾਰ)

ਯੂਨਿਟ-III

ਕਹਾਣੀਆਂ

- (ੳ) ਭੂਆ (ਨਾਨਕ ਸਿੰਘ)
- (ਅ) ਦੁੱਧ ਦਾ ਛੱਪੜ (ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ)
- (ੲ) ਸਾਂਝੀ ਕੰਧ(ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ)
- (ਸ)ਉਹ ਸੋਚਦੀ (ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ)
- (ਵਿਸ਼ਾ ਵਸਤੂ,ਸਾਰ)

ਯੂਨਿਟ-IV

ਨਿਬੰਧ

- (ੳ) ਘਰ ਦਾ ਪਿਆਰ (ਤੇਜਾ ਸਿੰਘ)
- (ਅ) ਖੁਸ਼ਾਮਦੀ ਨਾਲ (ਹਰਿੰਦਰ ਸਿੰਘ ਰੂਪ)
- (ੲ) ਆਓ, ਗੱਲਾਂ ਕਰੀਏ (ਨਰਿੰਦਰ ਸਿੰਘ ਕਪੂਰ)
- (ਸ) ਮਨੁੱਖ ਕੁਦਰਤ ਦੀ ਨੇਕ ਔਲਾਦ ਨਹੀਂ(ਸੁਰਿੰਦਰ ਮੰਡ)
- (ਵਿਸ਼ਾ ਵਸਤੂ,ਸਾਰ)

Session: 2026-27

Bachelor of Arts/ Bachelor of Science (Medical) (Honours) / Bachelor of Science (Non- Medical) (Honours) / Bachelor of Science (Computer Science) (Honours) / Bachelor of Science (Economics) (Honours) / Bachelor of Commerce (Honours) / Bachelor of Business Administration (Honours)

COURSE CODE: BARL-3431/BSML-3431/BSNL-3431/BCSL-3431/BECL-3431/BCRL-3431/BBRL-3431

COURSE TITLE: PUNJAB HISTORY AND CULTURE (FROM 1000-1605 A. D.)

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

After completing the paper, the students will have a thorough insight into the origin of Sikh faith and its major institutions in Punjab. They will be able to

CO 1: Understand the society and culture of Medieval Punjab.

CO 2: Understand the growth of various sects during the Bhakti Movement in Punjab.

CO 3: Comprehend and analyse the teachings of Guru Nanak Dev and its relevance today

CO 4: Make a comparison between the philosophy and teachings of first five Sikh Gurus and their relevance in the present scenario and also to understand and analyse the institutions started by Sikh Gurus and their implications till date

SEMESTER-III

Session: 2026-27

COURSE TITLE: PUNJAB HISTORY AND CULTURE (From 1000-1605 A. D.)

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

Bachelor of Arts/ Bachelor of Science (Medical) (Honours) / Bachelor of Science (Non- Medical) (Honours) / Bachelor of Science (Computer Science) (Honours) / Bachelor of Science (Economics) (Honours) / Bachelor of Commerce (Honours) / Bachelor of Business Administration (Honours)

COURSE CODE: BARL-3431/BSML-3431/BSNL-3431/BCSL-3431/BECL-3431/BCRL-3431/BBRL-3431

Examination Time: 3 Hours
Credits L-T-P: 4-0-0
Contact Hours: 4 Hrs/Week

Max. Marks: 100
Theory: 70
CA: 30

Instructions for the Paper Setter:

Eight questions of equal marks (marks) are to be set, two in each of the Four Sections (A-D). Questions of Sections A-D should be set from Unit I-IV of the syllabus respectively. Candidates are required to attempt five questions in 800 words selecting at least one question from each section. The fifth question may be attempted from any sections Each question will carry 14 Marks

Unit -1

1. Society and Culture of Punjab during Turko-Afghan Rule
2. The Punjab under the Mughals

Unit-II

3. Bhakti Movement and Impact on Society of Punjab
4. Sufism in Punjab

Unit-III

5. Guru Nanak: Early Life and Teachings

6. Concept of Sangat and Pangat

Unit-IV

7. Contribution of Guru Angad Dev, Guru Amar Das and Guru Ram Das

8. Briefly describe the compilation of the Adi Granth and its importance. Guru Arjun Dev and Compilation of Adi Granth

Suggested Readings:

- Chopra, P. N., Puri, B.N., & Das. M.N. (1974). A Social, Cultural and Economic History of India, Vol. II. New Delhi: Macmillan India.
- Grewal, J.S. (1994) The Sikhs of the Punjab, Cambridge University Press, New Delhi.
- Singh, Fauja (1972), A History of the Sikhs, Vol. II, I. Patiala: Punjabi University.
- Singh, Khushwant (2011). A History of Sikhs- Vol. I (1469-1839), New Delhi, Oxford University Press.

**Bachelor of Arts / Bachelor of Science (Medical) / Bachelor of Science (Non-Medical) /
Bachelor of Science (Computer Science) / Bachelor of Science (Economics)/ Bachelor of
Commerce/ Bachelor of Business Administration (Three Year Degree Programme)**

&

**Bachelor of Arts (Honours) / Bachelor of Science (Medical) (Honours) / Bachelor of
Science (Non-Medical) (Honours) / Bachelor of Science (Computer Science) (Honours) /
Bachelor of Science (Economics) (Honours)/ Bachelor of Commerce (Honours) / Bachelor
of Business Administration (Honours) (Four Year Degree Programme)**

(Semester III)

Session 2026-27

ENGLISH LANGUAGE SKILLS-II

Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL -3212

(NEP-2020)

COURSE OUTCOMES

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

CO 1: understand fundamental grammatical rules governing tenses, the use of modal verbs and make correct usage in their language through the study of “English Grammar in Use” by Raymond Murphy

CO 2: to develop the art of creative expression by writing an essay on any given topic

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

CO 4: enhance their reading abilities, vocabulary and writing expression through guided reading by study of “Making Connections” by Kenneth J. Pakenham

Bachelor of Arts / Bachelor of Science (Medical) / Bachelor of Science (Non-Medical) / Bachelor of Science (Computer Science) / Bachelor of Science (Economics)/ Bachelor of Commerce/ Bachelor of Business Administration (Three Year Degree Programme)

&

Bachelor of Arts (Honours) / Bachelor of Science (Medical) (Honours) / Bachelor of Science (Non-Medical) (Honours) / Bachelor of Science (Computer Science) (Honours) / Bachelor of Science (Economics) (Honours)/ Bachelor of Commerce (Honours) / Bachelor of Business Administration (Honours) (Four Year Degree Programme)

(Semester III) Session 2026-27

ENGLISH LANGUAGE SKILLS-II

Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL -3212

(NEP-2020)

Examination Time: 3 Hrs.

L-T-P (Credits): 4-0-0

Max. Marks: 100

Theory: 70

CA: 30

Instructions for the Paper Setters:-

Eight questions are to be set, two from each of the four Units (I-IV). 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 will carry 14 marks. (14x5=70)

UNIT-I

English Grammar in Use, 5th Edition by Raymond Murphy, CUP (Units: 98-130)

UNIT-II

Essay Writing and English Grammar in Use (Units: 131-145)

UNIT-III

Making Connections by Kenneth J. Pakenham, 3rd Edn. CUP: Unit-I (Global Health) and Unit II (Multicultural Societies)

UNIT-IV

Making Connections by Kenneth J. Pakenham, 3rd Edn. CUP: Section III (Aspects of Language) and Section IV (Sustaining Planet Earth)

Texts Prescribed:

1. *English Grammar in Use* (Fifth Edition) by Raymond Murphy, CUP
2. *Making Connections* by Kenneth J. Pakenham, 3rd Edn. CUP

Bachelor of Science (Honours)
Semester–III
Session: 2026-27
Course Title: Mathematics (Differential Equations)
Course Code: BSNL/ BCSL-3333

Course Outcomes

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

CO1: Identify differential equation, its order and degree, exact differential equations and special rules to find integrating factors.

CO2: Demonstrate the concept of linear differential equations with constant coefficients, complete solution of the differential equations, orthogonal trajectories of Cartesian and polar curves.

CO 3: Demonstrate the concept of linear differential equations with variable coefficients and its solution.

CO 4: Analyze System of ordinary simultaneous equations, Power Series, convergence of power series, Radius of convergence.

Bachelor of Science (Honours)
Semester–III
Session: 2026-27
Course Title: Mathematics (Differential Equations)
Course Code: BSNL/ BCSL -3333

Examination Time: 3 Hours

L T P

4 0 0

Max. Marks: 100

Theory: 70

CA: 30

Instructions for the Paper Setter: Eight questions of equal marks (14 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

Differential equation of first order and first degree, Linear differential equation reducible to Linear Bernoulli's equation, Ordinary differential equation of first order. Exact differential equations. Necessary and sufficient conditions for $Mdx + Ndy$ to be Exact, integrating factors by inspections, special rules to find integrating factors with proof.

Unit II

Geometrical meaning of a complete solution of the differential equations, General solution of homogeneous equation of second order, Orthogonal trajectories of cartesian and polar curve, Homogeneous differential equations, Linear differential equations with constant coefficients.

Unit III

Singular solution, p-discriminant, c- discriminant, illustrations of singular solutions Variation of Parameters method, Reduction of order. Linear differential equations with variable coefficients, Define Cauchy's linear equations, Legendre's Linear equation.

Unit IV

First order and higher degree equations, equations solvable for y, x, p, equations not containing x, equations not containing y, Clairaut's equation and equations reducible to Clairaut's form.

System of ordinary simultaneous equations, Power Series, convergence of power series, Radius of convergence, Power Series solution about an ordinary point, solutions about singular points, Frobenius method when roots of indicial equations differ by non-integers, and when roots are equal.

Text Book:-

M.D. Raisinghania, Ordinary and Partial Differential Equations, S. Chand, (20th edition)

Reference Book:-

Tom M. Apostol: Calculus: An Indian Adaptation, Wiley India, 2022

Bachelor of Science (Honours)
Semester–III
Session: 2026-27
Course Title: Differential Equations Laboratory
Course Code: BSNP/ BCSP-3333
Course Outcomes

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

CO1: Apply numerical techniques such as Euler's and Runge–Kutta methods to solve first-order differential equations and visualize their solutions.

CO2: Develop computational solutions for higher-order differential equations using suitable numerical methods.

CO3: Solve and plot systems of ordinary differential equations using appropriate software tools/packages.

CO4: Analyze and numerically solve nonlinear differential equations arising in physical systems such as the simple pendulum.

Bachelor of Science (Honours)
Semester–III
Session: 2026-27
Course Title: Differential Equations Laboratory
Course Code: BSNP/ BCSP -3333

Examination Time: 3 Hours

Max. Marks: 50

Practical: 35

CA: 15

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List of Practicals (using any package)

1. Plotting solution of first order differential equation.
2. Solve the first-order differential equation $\frac{dy}{dx} = ay$, numerically using Runge-Kutta method.
3. Solve the second-order differential equation $\frac{d^2y}{dx^2} = ay$, numerically using Runge-Kutta method.
4. Plotting of solution of family of second order differential equation.
5. Solution of system of ordinary differential equations, numerically using Runge-Kutta method.
6. Numerical solution of the nonlinear simple pendulum equation.

Text Books:-

1. S.S. Sastry, Engineering Mathematics - Volume I (4th Edition), PHI, 2008.
2. S.S. Sastry, Engineering Mathematics - Volume II (4th Edition), PHI

Bachelor of Science (Honours)
Credit Based Continuous Evaluation Grading System (CBCEGS)
(Under NEP 2020)
(Session: 2026-27)
(Semester III)
COURSE CODE: BSNL/BSML-3084
COURSE TITLE: Chemistry (Physical Chemistry-I)

Course Outcomes:

Students will be able to

CO1: Explain the fundamental principles governing the gaseous and liquid states, including kinetic theory, van der Waals equation, critical phenomena, and molecular velocity distributions.

CO2: Describe the properties and classification of colloids and crystals, analyze colloidal stability, and interpret crystal structures using X-ray diffraction techniques.

CO3: Apply the concepts of ideal and non-ideal solutions to determine colligative properties, calculate molecular weights, and explain deviations using thermodynamic and experimental methods.

CO4: Analyze electrochemical systems using concepts like conductivity, electrode potentials, Nernst equation, and concentration cells, and evaluate electrochemical parameters such as EMF, ΔG , ΔH , and equilibrium constants.

Bachelor of Science (Honours)
Credit Based Continuous Evaluation Grading System (CBCEGS)
(Under NEP 2020)
(Session: 2025-2026)
(Semester III)
COURSE CODE: BSNL/BSML-3084
COURSE TITLE: Chemistry (Physical Chemistry-I)

Exam Time: 3Hrs.

Credit(L-T-P): 4-0-0

Max. Marks: 100

(Theory: 70, CA: 30)

Instructions for the Paper Setters: Eight questions of equal marks (fourteen 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

(15 Hrs.)

Gaseous States: Postulates of kinetic theory of gases, deviation from ideal behaviour, van der Waals equation of State. Critical Phenomena: PV isotherms of real gases, continuity of states, the isotherms of van der Waal's equation, relationship between critical constants and van der Waals constants, the law of Corresponding states, reduced equation of state. Molecular Velocities: Root mean square, average and most probable velocities. Qualitative Discussion of the Maxwell's distribution of molecular velocities. Collision number, mean free path and collision diameter. Liquefaction of gases. **Liquid State:** Intermolecular forces, surface tension and viscosity of liquids and its determination. Structure of liquids (a qualitative description). Structural differences between solids, liquids and gases.

UNIT II

(15 Hrs.)

Colloidal State: Definition of colloids, classification of colloids. Solids in liquids (Sol): kinetic, optical and electrical properties, stability of colloids, protective action, Hardy Schulze law, gold number. Liquids in liquids (emulsions): Types of emulsions, preparation. Emulsifiers. General applications of colloids. **Solid State:** 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. Liquid crystals, Classification, structure of nematic and cholestric phases.

UNIT III

(15 Hrs.)

Solutions, Dilute Solutions and Colligative Properties: Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, colligative properties, Raoult's law, non-ideal system, azeotropes-HCl-H₂O and ethanol-water system. Relative lowering of vapour pressure, molecular weight determination. Osmosis, Law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point, Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.

Electrochemistry-I: Specific conductance and equivalent conductance, measurement of equivalent conductance, Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law, its uses and limitations.

UNIT IV

(15 Hrs.)

Electrochemistry-I: Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Migration of ions, Transport number, Applications of conductivity measurements, 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.

Electrochemistry-II: 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.

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 & 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. University General Chemistry, C.N.R. Rao, Macmillan.
11. Metz, C.R., Theory and problems of Physical Chemistry; Schaum's outline series, 2nd edition, Pubs: McGraw-Hall Book Company, 1989.

Bachelor of Science (Honours)
Credit Based Continuous Evaluation Grading System (CBCEGS)
(Under NEP 2020)
(Session: 2026-27)
(Semester III)
COURSE CODE: BSNP/BSMP-3084
COURSE TITLE : Chemistry (Physical Chemistry – I: Lab)

Course outcomes

Students will be able

CO1: Perform acid-catalyzed hydrolysis of esters and evaluate the specific reaction rate and effect of acid strength, applying principles of chemical kinetics.

CO2: Determine physical properties of liquids such as viscosity, surface tension, and refractive index using standard laboratory techniques and calculate related molecular parameters.

CO3: Analyze and interpret crystallographic data from X-ray powder diffraction patterns for crystal system identification and indexing.

CO4: Prepare buffer solutions and perform pH metric titrations to determine dissociation constants, enhancing understanding of acid-base equilibria and solution chemistry.

Bachelor of Science (Honours)
Credit Based Continuous Evaluation Grading System (CBCEGS)
(Under NEP 2020)
(Session: 2024-2025)
(Semester III)
COURSE CODE: BSNP/BSMP-3084
COURSE TITLE : Chemistry (Physical Chemistry – I: Lab)

Time: 3 Hrs

Marks: 50

Credits: 0-0-2

(Practical: 35, CA: 15)

1. To determine the specific reaction rate of hydrolysis of ethyl acetate catalysed by acid at room temperature.
2. To study the effect of acid strength on hydrolysis of an ester.
3. To find the relative and absolute viscosity of given liquid at room temperature. (n-butyl alcohol, sucrose, and glycerine solution in water)
4. To study the surface tension of liquids by drop number and drop weight methods.
5. To determine the Refractive indices of given liquids (water, acetone, methanol, ethyl acetate, cyclohexane) by Abbe's refractometer & calculate their molecular refractivity.
6. To determine the composition of unknown mixture of two liquids by refractive index measurements.
7. Indexing of a given powder diffraction pattern of a cubic crystalline system.
8. Preparation of buffer solutions of different pH (a) Sodium acetate-acetic acid (b) Ammonium chloride-ammonium hydroxide
9. pH metric titration of (a) strong acid vs. strong base, (b) weak acid vs. strong base.
10. Determination of dissociation constant of a weak acid.

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.
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.
10. Findlay's Practical Physical Chemistry, Author: Alexander Findlay, Publisher: Wiley, 1972, ISBN-10:0470258853.
11. Advanced Practical Physical Chemistry, Author: J. B. Yadav, Publisher: Krishna Prakashan Media (P) Ltd (2015), ISBN-10:8182835925.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/
Bachelor of Science (Economics) (Honours) Semester- II
(Session 2026-27)**

**Course Code: BARM-2134
BCSM-2134
BECM-2134**

**COMPUTER SCIENCE
(PROGRAMMING IN C)
(Theory)**

Examination Time: 3 Hrs.

Max. Marks: 100

L-T-P: 3-0-1

Theory: 40

Credits: 4

Practical: 30

CA: 30

Instructions for Paper Setter -

Eight questions of equal marks (08 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

Introduction: Introduction to Computer Programming, concept of algorithm, flow chart, program structure.

Program Development life cycle: Compiling and executing programs using IDE, command line.

Fundamentals of C Programming: Token, Character set, Identifiers and Key Words, Constants, Variables, Expressions, Statements, Symbolic Constants; Data types, declaring variables, initializing variables, types of integers, types of floats, strings, characters C Preprocessor directives: #define Statement, Conditional Compilation, include Files typedef, enum, Type Casting.

UNIT-II

Operations and Expressions: Arithmetic operators, Unary operators, Relational Operators, Logical Operators, Assignment and Conditional Operators.

Data I/O Functions: Types of I/O function, Formatted & Unformatted console I/O Functions.

Control Statements: Preliminaries, While, Do-while and For statements, Nested loops, If, if-else, ladder-if and nested if statements, Switch, Break – Continue statements.

UNIT-III

Storage Classes: Introduction to various storage classes, scope and lifetime of a variable, advantages and disadvantages.

Arrays: Types of Arrays, One Dimensional and Two-Dimensional Arrays.

Strings: Introduction to Strings and String functions and manipulation, array of strings.

Functions: User Defined & Library Function, Function (Prototype, Declaration, Definition), Methods of passing arguments, local and global functions, Recursion.

UNIT-IV

Pointers: Introduction, Uses of pointers, Limitations of pointers, Difference between void pointer and Null pointer, Pointer arithmetic, operators not allowed on pointers, Types of Pointer, Passing Pointers to function, concept of pointer to pointer, dynamic memory management.

Structures & Unions: Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self-referenced structure, unions, Arrays and Structures.

File handling in C: Introduction, file input/output function, binary file and text file.

References:

1. E. Balagurusamy, Programming in ANSI C, Tata McGraw-Hill (2002), 5th edition.
2. Stephen G. Kochan, Programming in C, Pearson Education (2015), 4th edition.
3. Rachhpal Singh K.S. Kahlon, Gurvinder Singh, Programming in C, Kalyani Publishers (2011).
4. Yashwant Kanetkar, Let us C, BPB Publications (2020), 17th edition.
5. R.S. Salari, Application Programming in C, Khanna Book Publishing (2012), 4th edition.
6. Anshuman Sharma, Learn programming in C, Lakhanpal Publishers (2016), 7th edition.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/
Bachelor of Science (Economics) (Honours) Semester- II
(Session 2026-27)**

Course Code: BARM-2134

BCSM-2134

BECM-2134

**COMPUTER SCIENCE
(PROGRAMMING IN C)
(PRACTICAL)**

Examination Time: 3 Hrs.

Max. Marks: 100

L-T-P: 3-0-1

Theory: 40

Credits: 4

Practical: 30

CA: 30

Lab based on Programming in C.

**Bachelor of Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/
Bachelor of Science (Economics) (Honours) Semester- III**

Session 2026-27

Course Code: BARM-3134

BCSM-3134

BECM-3134

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 Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/
Bachelor of Science (Economics) (Honours) Semester- III**

Session 2026-27

Course Code: BARM-3134

BCSM-3134

BECM-3134

COMPUTER SCIENCE

(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)

(THEORY)

Examination Time: 3 Hrs.

Max. Marks: 100

Theory: 40

L-T-P: 3-0-1

Practical: 30

Credits: 4

CA: 30

Instructions for 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 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 Arts (Honours) / Bachelor of Science (Computer Science) (Honours)/
Bachelor of Science (Economics) (Honours) Semester- III**

Session 2026-27

Course Code: BARM-3134

BCSM-3134

BECM-3134

COMPUTER SCIENCE

(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)

PRACTICAL

Examination Time: 3 Hrs.

Max. Marks: 100

L-T-P: 3-0-1

Theory: 40

Credits: 4

Practical: 30

CA: 30

Lab exercises using a spread sheet tool for:

1. Iterative Solutions
2. Simultaneous Solution of Equations
3. Interpolation
4. Measure of Central Tendency
5. Measure of dispersion
6. Correlation
7. Regression

Bachelor of Science (Honours)

SEMESTER-III

(Session-2026-27)

PHYSICS (STATISTICAL PHYSICS AND THERMODYNAMICS)

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

BCSL-3395 for Bachelor of Science (Computer Science)

COURSE OUTCOMES:

After passing this course, students will be able to:

CO1: Understand and explain the foundational concepts of statistical physics, including microstates, macrostates, thermodynamic probability, and equilibrium in systems of distinguishable particles.

CO2: Apply the principles of classical and quantum statistics, including Maxwell-Boltzmann (MB), Bose-Einstein (BE), and Fermi-Dirac (FD) statistics, to analyze the behavior of ideal gases and radiation.

CO3: Evaluate the concept of entropy from a statistical viewpoint and describe its implications for reversible and irreversible processes, including applications to thermodynamic systems such as the Carnot cycle.

CO4: Analyze and derive Maxwell's thermodynamic relations, explain the Joule-Thomson effect, and understand thermodynamic processes like adiabatic expansion and compression.

Bachelor of Science (Honours)

SEMESTER-III

(Session-2026-27)

PHYSICS (STATISTICAL PHYSICS AND THERMODYNAMICS)

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

BCSL-3395 for Bachelor of Science (Computer Science)

Credits: 4-0-0

Max Marks: 100 (ESE Marks: 70, CA: 30)

Examination Time: 3 Hours

Pass Mark: 25

Instructions for the Paper Setters:

Eight questions of equal marks (specified in the syllabus) are to be set, two in each of the four sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question carries 14 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 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 the 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, , Applications of thermodynamics to thermoelectric 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, Adiabatic Compression, change of internal energy with volume, Specific heat at constant pressure and constant volume. , Joule-Thomson effect, Expression for $C_P - C_V$, Change of state and Clapeyron equation.

Text Reference Books:

1. Statistical Mechanics: B.B. Laud, (Macmillan India Ltd.) 1981.
2. Statistical Physics: J. K. Bhattacharjee, (Allied Pub., Delhi) 2000.
3. Statistical Physics and Thermodynamics: V.S. Bhatia
4. A Treatise on Heat: M.N. Saha & B.N. Srivastava (The Indian Press Pvt. Ltd., Allahabad), 1965.
5. Heat and Thermodynamics, Mark Zemansky and Richard Dittman McGraw Hill and Co.
6. Thermal and Statistical Physics-Concepts and Applications : S. Sharma, (Ane Books Pvt. Ltd. 2021)

Bachelor of Science (Honours)

SEMESTER-III

(Session-2026-27)

OPTICS LAB

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

BCSP-3395 for Bachelor of Science (Computer Science)

COURSE OUTCOMES:

After passing this course, students will be able to:

CO1: Demonstrate the ability to set up and conduct optical experiments such as determining the refractive index, Cauchy's constants, and wavelength of light using instruments like the spectrometer, Newton's rings, and diffraction gratings.

CO2: Analyze and interpret interference and diffraction patterns to determine key physical parameters such as wavelength, dispersive power, and resolving power of optical instruments.

CO3: Apply geometrical optics principles to measure accessible and inaccessible heights using a sextant, reinforcing practical understanding of angular measurement techniques.

CO4: Understand and verify statistical principles through experiments like the coin toss, and apply Young's double-slit experiment to study wave nature of light and laser wavelength determination.

Bachelor of Science (Honours)

SEMESTER-III

OPTICS LAB

(PRACTICAL)

(Session-2026-27)

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

BCSM-3395 for Bachelor of Science (Computer Science)

Credits: 0-0-2

Max Marks: 50 (ESE Marks: 35, CA: 15)

Examination Time: 3 Hours

Pass Mark: 13

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

The distribution of marks is as follows :

i) One experiment 15 Marks

ii) Brief Theory 7 Marks

iii) Viva–Voce 7 Marks

iv) Record (Practical file) 6 Marks

II. There will be one session of 2 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. The number of candidates in a group for practical examination should not exceed 12.

IV. In a single group, no experiment should be allotted to more than three examinees.

List of Experiments

1. To determine the refractive index of glass/ liquid using a 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 determine resolving power of a grating.
9. To measure an accessible (Horizontal and vertical) height using sextant.
10. To measure inaccessible height by using sextant.
11. Verify laws of probability distribution by throwing similar coins.
12. To determine the wavelength of given laser source using Young's double slit experiment

Bachelor of Arts / Bachelor of Science
Semester –III
(Session 2026-27)
Course Title: NCC (ARMY CADETS)
Course Code: BARM- 3679
BSNM/BSMM/BCSM/BECM-3676
(THEORY)

Course Outcomes:

After passing this course the student will be able to:

CO1. Learn about Personality Development

CO2. Gain knowledge about Leadership.

CO3. Learn about Disaster Management & Social Services.

CO4. Gain knowledge about Adventure, Border & Coastal Areas

Bachelor of Arts / Bachelor of Science Semester –III
(Session 2026-27)

Course Title: NCC (ARMY CADETS)

Course Code: BARM- 3679

BSNM/BSMM/BCSM/BECD-3676

(THEORY)

Time: 3 Hours

L-T-P (Credits): 2-0-0

Marks: 100

Theory: 40

Practical: 30

CA: 30

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-1

Personality Development:-

1. Group Discussion – Change your Mindset
2. Public Speaking

UNIT-2

Leadership:- Case Studies –

1. APJ Abdul Kalam,
2. Deepa Malik, Maharana Pratap, N Narayan Murthy

UNIT-3

Disaster Management:- Disaster Management Capsule –

1. Organisation
2. Types of Disaster
3. Essential Services
4. Assistance
5. Civil Defence Organisation

UNIT-4

Adventure, Border & Coastal Areas:-

1. Adventure activities
2. History, Geography & Topology of Border/ Coastal Areas

Reference Books:-

NCC Cadet Handbook (Available at <https://indiancc.nic.in/>)

Bachelor of Science (Honours)
Credit Based Continuous Evaluation Grading System (CBCEGS)
(Under NEP 2020)
(Session: 2026-27)
(Semester III)
Course Code: VACE-3221
Course Title: Environmental Studies

COURSE OUTCOMES:

After passing this course, students will be able to:

- CO1. Understand the concept and need of environmental education and role of an individual in conservation of natural resources.
- CO2. Learn about role of major Eco system and their conservation and Develop desirable attitude, value and respect for protection of Biodiversity.
- CO3. Learn about the control measure of pollution and solid waste management and climate change and global warming.
- CO4. Knowledge regarding welfare programmes and Human rights and understand the role of different agencies in the protection of environment

Bachelor of Science (Honours)
Credit Based Continuous Evaluation Grading System (CBCEGS)
(Under NEP 2020)
(Session: 2026-27)
(Semester III)
Course Code: VACE-3221
Course Title: Environmental Studies
(Theory)

Time: 3 Hrs.
Credit: 2-0-0

Max. Marks: 50
Theory: 35
CA: 15

Instructions for the Paper Setter:

Eight questions of equal marks (7 marks) are to be set, two in each out 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

1. The multidisciplinary nature of environmental studies

- Definition, scope and importance, Need for public awareness

2. Natural resources and associated problems.

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

Unit II

3. Ecosystems

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

4. Biodiversity and its conservation

- Introduction – Definition: genetic, species and ecosystem diversity
- Biogeographical classification of India
- Value of biodiversity: consumptive use, productive use, social, ethical aesthetic and option values
- Biodiversity at global, national and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
- Endangered and endemic species of India
- Conservation of biodiversity: *In-situ* and *Ex-situ* conservation of biodiversity

Unit III

5. Environmental Pollution

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

6. Social Issues and the Environment

- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Public awareness

Unit IV

7. Human Population and the Environment

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

8. Introduction to Environmental Laws, Environmental Audit and Impact Assessment

- Constitutional provisions- Article 48A
- Article 51A(g) and other derived environmental rights
- Environmental Protection Act, 1986
- Air (Prevention and Control of Pollution) Act, 1981
- Water (Prevention and control of Pollution) Act, 1974
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Environmental risk assessment Pollution control and management
- Waste Management- Concept of 3R (Reduce, Recycle and Reuse)
- Ecolabeling /Ecomark scheme

References:

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2. Down to Earth, Centre for Science and Environment, New Delhi.
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4. Joseph, K. & Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
5. Kaushik, A. & Kaushik, C.P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
6. Rajagopalan, R. 2011. Environmental Studies from Crisis to Cure. Oxford University Press, New Delhi.
7. Sharma, J. P., Sharma. N.K. & Yadav, N.S. 2005. Comprehensive Environmental Studies, Laxmi Publications, New Delhi.
8. Sharma, P. D. 2009. Ecology and Environment, Rastogi Publications, Meerut.
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10. Subramanian, V. 2002. A Text Book in Environmental Sciences, Narosa Publishing House, New Delhi.