FACULTY OF SCIENCES

SYLLABUS

of

BACHELOR OF SCIENCE (NON-MEDICAL/COMPUTER SCIENCE)

(Semester III-IV)

(Credit Based Continuous Evaluation Grading System (CBCEGS)

(12+3 System of Education)

Session: 2024-25

The Heritage Institution

KANYA MAHA VIDYALAYA

JALANDHAR
(AUTONOMOUS)

KANYA MAHA VIDYALAYA JALANDHAR (AUTONOMOUS)

SCHEME AND CURRICULUM OF EXAMINATION OF TWO YEAR DEGREE PROGRAMME
Bachelor of Science (Non-Medical/Computer Science)
Credit Based Continuous Evaluation Grading System (CBCEGS)
(Session: 2024-2025)
Semester III-IV

Course Code		Course Name	Course Type	Credits (L-T-P)	Total Credits	Marks Total	Ext. L	Ext. P	CA	Examination time (Hours)
BSNL/ BCSL-3421		Punjabi (Compulsory)	C	4-0-0	4	100	80	-	20	3
BSNL/ BCSL-3031		[1]Basic Punjabi								
BSNL/ BCSL-3431		[2]Punjab History & Culture								
BSNL/ BCSL-3212		English (Compulsory)	C	4-0-0	4	100	80	-	20	3
BSNM/BCSM- 3333	(I)	Mathematics (Analysis)	C	4-0-0	7	100	80	-	20	3
	(II)	Mathematics (Analytical Geometry)		3-0-0		75	60	-	15	3
BSNM-3084	(I)	Chemistry (Organic Chemistry)	C	2-0-0	7	50	40	-	10	3
	(II)	Chemistry (Physical Chemistry)		3-0-0		75	60	-	15	3
	(P)	Chemistry (Practical)		0-0-2		50	-	40	10	3
BCSM-3134		Computer Science (Computer Oriented Numerical and Statistical Methods))	C	3-0-1	7	100	50	30	20	3
BSNM/ BCSM-3395	(I)	Statistical Physics and Thermodynamics	C	3-0-0	7	75	60	-	15	3
	(II)	Optics and Laser		2-0-0		50	40	-	10	3
	(P)	Physics Lab		0-0-2		50	-	40	10	3
AECE-3221		*Environmental studies	C	1-0-1	2	50	40		10	3
SECP-3512/ SECG- 3531		**Personality Development Programme (Skill Based)/ Gender Sensitization Programme	AC	2-0-0	2	25	20	-	5	2
Total										

Course Code		Course Name	Course Type	Credits	Total Credits	Marks				Examination time (Hours)
						Total	Ext.		CA	
							L	P		
BSNL/ BCSL - 4421		Punjabi (Compulsory)	C	4-0-0	4	100	80	-	20	3
BSNL/ BCSL - 4031		[1]Basic Punjabi								
BSNL/BCSL- 4431		[2]Punjab History & Culture								
BSNL/BCSL- 4212		English (Compulsory)	C	4-0-0	4	100	80	-	20	3
BSNM/BCSM-4333	(I)	Mathematics (Statics and Vector Calculus)	C	4-0-0	7	100	80	-	20	3
	(II)	Mathematics (Solid Geometry)		3-0-0		75	60	-	15	3
BSNM-4084	(I)	**Chemistry** (Inorganic Chemistry)	C	3-0-0	7	75	60	-	15	3
	(II)	**Chemistry** (Orgainc Chemistry)		2-0-0		50	40	-	10	3
	(P)	**Chemistry** (Practical)		0-0-2		50	-	40	10	3
BCSM-4134		**Computer Science** (Data Structures)	C	3-0-1	4	100	50	30	20	3
BSNM/BCSM-4395	(I)	Quantum Mechanics	C	3-0-0	7	75	60	-	20	3
	(II)	Atomic and Molecular Spectra		2-0-0		50	40	-	10	3
	(P)	Physics Lab		0-0-2		50		40	10	3
SECM-4522		*Social Outreach	AC	2-0-0	2	25	20	-	5	2
Total										

Bachelor of Science (Non-Medical/Computer Science) Semester – IV

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 ADMINISTRATIONSemester III

PUNJABI (COMPULSORY)

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

COURSE OUTCOMES

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

CO2:'ਸਮਾਂਗ ਕਰਦਾ ਹੈ' ਇਕਾਂਗੀ ਸੰਗ੍ਰਹਿਨੂੰ ਸਿਲੇਬਸ ਵਿਚਸ਼ਾਮਿਲਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਇਕਾਂਗੀ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲਜੋੜਨਾ ਹੈ।

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

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

Session 2024-25

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 ADMINISTRATIONSemester III
PUNJABI (COMPULSORY)

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

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

ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

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

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨਕਰਨੇ ਹਨ।ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 16ਅੰਕਹਨ।

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

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

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

ਘਰਦਾਪਿਆਰ, ਉਮਰ ਲੰਮੀ ਹੋ ਸਕਦੀ ਹੈ,ਅੱਥਰੂ, ਪੁਰਾਣਾਪੰਜਾਬ, ਇੰਗਲੈਂਡਦਾ ਸੋਗੀ ਸੋਮਵਾਰ,ਖਿਡਾਰੀਆਂ ਦੇ ਵਹਿਮ।

(ਪਾਠਕ੍ਰਮਦਾਹਿੱਸਾਹਨ)

(ਵਿਸ਼ਾਵਸਤੂ/ਸਾਰ/ਕਲਾਪੱਖ)   16ਅੰਕ

ਯੂਨਿਟ-II

ਸਮਾਂਮੰਗਕਰਦਾ ਹੈ (ਇਕਾਂਗੀ ਸੰਗ੍ਰਹਿ) (ਸੰਪਾ. ਕੇਵਲਧਾਲੀਵਾਲ) ਚੇਤਨਾਪ੍ਰਕਾਸ਼ਨ,ਲੁਧਿਆਣਾ।

(ਵਿਸ਼ਾਵਸਤੂ /ਸਾਰ/ਪਾਤਰਚਿਤਰਨ)   16ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਸੰਖੇਪ ਰਚਨਾ (ਪ੍ਰੈਸੀ)

(ਅ) ਲੇਖ ਰਚਨਾ   16ਅੰਕ

ਯੂਨਿਟ-IV

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

16ਅੰਕ

SESSION 2024-25

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

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 ਵਿਚਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ।ਪੈਰ੍ਹਾਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

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

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

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 ADMINISTRATIONSEMESTER–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 : 80
4-0-0   CA   : 20

ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ

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

2.   ਵਿਦਿਆਰਥੀ ਨੇ 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

ਪੈਰ੍ਹਾਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ

ਸੰਖੇਪ ਰਚਨਾ   16 ਅੰਕ

ਯੂਨਿਟ-II

ਕਵਿਤਾਵਾਂ

(ੳ) ਸਮਾਂ (ਭਾਈਵੀਰਸਿੰਘ)

(ਅ) ਖੈਰਪੰਜਾਬੀ ਦੀ (ਫ਼ੀਰੋਜ਼ਦੀਨ ਸ਼ਰਫ਼)

(ੲ) ਸ਼ਨਗਾਹੀ ਦੀਵਾ ਬਾਲਦੀਏ (ਪ੍ਰੋ.ਮੋਹਨਸਿੰਘ)

(ਸ) ਰੁੱਖ (ਸ਼ਿਵ ਕੁਮਾਰ)

(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ,ਸਾਰ)   16 ਅੰਕ

ਯੂਨਿਟ-III

ਕਹਾਣੀਆਂ

(ੳ) ਭੂਆ (ਨਾਨਕਸਿੰਘ)

(ਅ) ਪੇਮੀ ਦੇ ਨਿਆਣੇ (ਪ੍ਰਿੰ. ਸੰਤ ਸਿੰਘ ਸੇਖੋਂ)

(ੲ) ਕੁਲਫੀ (ਸੁਜਾਨਸਿੰਘ)

(ਸ)ਧਰਤੀ ਹੇਠਲਾਬੌਲਦ(ਕੁਲਵੰਤਸਿੰਘਵਿਰਕ)

(ਵਿਸ਼ਾਵਸਤੂ,ਸਾਰ)   16 ਅੰਕ

ਯੂਨਿਟ-IV

ਨਿਬੰਧ

(ੳ) ਘਰਦਾਪਿਆਰ (ਤੇਜਾਸਿੰਘ)

(ਅ) ਮਾਂ (ਗੁਰਬਖ਼ਸ਼ ਸਿੰਘ)

(ੲ) ਭਾਈਮਰਦਾਨਾਜੀ (ਹਰਪਾਲ ਸਿੰਘ ਪੰਨੂ)

(ਸ) ਮਨੁੱਖ ਕੁਦਰਤ ਦੀ ਨੇਕਔਲਾਦਨਹੀਂ (ਸੁਰਿੰਦਰਮੰਡ)

 (ਵਿਸ਼ਾਵਸਤੂ,ਸਾਰ)   16 ਅੰਕ

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)
SESSION 2024-25

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)

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

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

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)
Session 2024-25

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)

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

Examination Time: 3 Hours   Max. Marks: 100
Credits L-T-P: 4-0-0   Theory: 80
Contact Hours: 4 Hrs/Week   CA: 20

Instructions for the Paper Setter:

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 1000 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 carry 16 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 andPangat

Unit-IV:

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

8. 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 Sikhsof 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
Semester III
Session 2024-25
ENGLISH (COMPULSORY)
Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/ BBRL-3212

COURSE OUTCOMES

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

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

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

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

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

BACHELOR OF 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
Session 2024-25
ENGLISH (COMPULSORY)
Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/ BBRL-3212

Max. Marks: 100
Examination Time: 3 Hrs **Theory: 80**
CA: 20

Instructions for the Examiner:

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

Section A: One question with sub-parts will be set from Unit I of the syllabus. Fifteen sentences will be set and the students would be required to attempt any ten. Each sentence will carry two marks. **(10×2=20)**

Section B: Two questions will be set from Unit II of the syllabus. The students would be required to attempt one essay out of the given two topics carrying ten marks (word limit 400 words). The second question will be based on vocabulary. The students would be required to write single words for phrases and sentences choosing any five out of eight and each carrying two marks. **(1×10 + 5×2=20)**

Section C: The students would be required to attempt two questions (with sub parts) based on exercises as given before and after reading essays in the prescribed text book *Making Connections*. **(5×2 + 5×2=20)**

Section D: This section will be divided into two parts. In part one, five questions based on Central idea, theme, tone and style etc. of the poems from the prescribed textbook, *Moments In Time* from Unit IV of the syllabus will be set. The students would be required to attempt any three, each carrying five marks (200 words each). **(3×5=15)**

Part two will have one question (with internal choice) requiring students to explain a stanza with reference to context carrying five marks (word limit 250 words). The stanzas for explanation will be taken from the prescribed textbook, *Moments in Time* from Unit IV in the syllabus. **(1×5=5)**

Unit I
English Grammar in Use, 4th Edition by Raymond Murphy, CUP (Units 92-120)
Unit II
Essay Writing and *The Students' Companion* by Wilfred D. Best (Section 1: Single words for phrases and sentences: Words denoting Numbers and words denoting Places)
Unit III
Making Connections by Kenneth J. Pakenham, 2nd Edn. CUP: Unit-II
Unit IV
Moments in Time: Poems at Sr. No. 1-6

Texts Prescribed:

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

(1/1)

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
SEMESTER-III
SESSION: 2024-25
COURSE TITLE: MATHEMATICS (ANALYSIS)
COURSE CODE: BARM/ BECM/ BCSM/ BSNM-3333(I)

Course Outcomes

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

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

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

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

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

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
SEMESTER–III
SESSION: 2024-25
COURSE TITLE: MATHEMATICS (ANALYSIS)
COURSE CODE: BARM/ BECM/ BCSM/ BSNM-3333(I)

Examination Time: 3 Hrs   Max. Marks: 100
L T P

4 0 0   Theory: 80

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.

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

Text Book:

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

Reference Books:

1. S. C Malik and S. Arora, Mathematical Analysis, New Age international Publishers, New Delhi, second edition, 2005.

2. T. M. Apostal, Mathematical Analysis, Pearson education, second edition, 2004.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
SEMESTER–III
SESSION: 2024-25
COURSE TITLE: MATHEMATICS (ANALYTICAL GEOMETRY)
COURSE CODE: BARM/ BECM/ BCSM/ BSNM-3333(II)

Course Outcomes

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

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

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

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

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

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
SEMESTER–III
SESSION: 2024-25
COURSE TITLE: MATHEMATICS (ANALYTICAL GEOMETRY)
COURSE CODE: BARM/ BECM/ BCSM/ BSNM-3333(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.

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

Text Book:

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

Reference Books:

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

Bachelor of Science
(SEMESTER–III)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-3084(I)
COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)

Course outcomes:

Students will be able to

CO1: to resolve the different enantiomers and differentiate between dextrorotatory-leavorotatory chiral and achiral compounds,understand the concept of isomerism, axial and equatorial bonds.

CO2: understand the methods of formation, chemical reactions, acidic character of alcohols

CO3: preparation of understand structure and bonding phenols, acidic character of phenols

CO4: compare reactivity of aliphatic and aromatic aldehydes and ketones, to understand the various reactions given by carbonyl compounds

Bachelor of Science
(SEMESTER–III)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-3084(I)
COURSE TITLE: CHEMISTRY (ORGANIC 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

Stereochemistry of Organic Compounds

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

Unit–II

Alcohols

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

Unit–III

Phenols

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

Unit–IV

Aldehydes and Ketones

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

Books suggested:

1. Morrison, R.T., Boyd, R.N., Organic Chemistry; 6th edition, Pubs: Prentice-Hall, 1992.
2. Wade Jr., L.G., Singh, M.S., Organic Chemistry; 6th edition, Pubs: Pearson Education, 2008.
3. Mukherji, S.M., Singh, S.P., Kapoor, R.P., Organic Chemistry; Pubs: Wiley Eastern Limited, 1985, Vol. I, II, III.
4. Solomons, T.W., Fryhle, C.B., Organic Chemistry; 9th edition, Pubs: Wiley India, 2007.
5. Carey, F.A., Organic Chemistry; 4th edition, Pubs: McGraw-Hill, 2000.
6. Streitwieser, A., Clayton, Jr., Heathcock, H., Introduction to Organic Chemistry; 3rd edition, Pubs:Macmillan Publishing Company, 1989.
7. University General Chemistry, C.N.R. Rao, Macmillan.

Bachelor of Science
(SEMESTER–III)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-3084(II)
COURSE TITLE: CHEMISTRY (PHYSICALCHEMISTRY)

Course outcomes:

Students will be able to

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

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

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

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

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

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

First Law of Thermodynamics:

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

Thermochemistry:

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

Unit–II

Thermodynamics-II

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

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

<div align="center">

Unit–III

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Thermodynamics-III

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

Chemical Equilibrium

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

<div align="center">

Unit–IV

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Introduction to Phase Equilibrium

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

Books suggested:

1. Atkins, P., Paula, J.de, Atkins Physical Chemistry; 8th edition, Pubs: Oxford
University Press, 2008.

2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co., 2008.

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

Course outcomes:

Students will be able to

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

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

CO3: understand and master the technique of gravimetric analysis

CO4: to understand the concept of TLC and its applications

Duration: 3½ Hrs.   **Max. Marks: 20**

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

Quantitative Analysis

Volumetric Analysis

a. Determination of acetic acid in commercial vinegar using NaOH.

b. Determination of alkali content-antacid tablet using HCI.

c. Estimation of calcium content in chalk as calcium oxalate by permanganometry.

d. Estimation of hardness of water by EDTA.

e. Estimation of ferrous and ferric by dichromate method.

f. Estimation of copper using sodiumthiosulphate.

Gravimetric Analysis

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

Organic Chemistry Laboratory Techniques

Thin Layer Chromatography

Determination of R_f values and identification of organic compounds.

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

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

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

Books suggested:

1. Vogel's Textbook of Quantitative Inorganic Analysis (revised), J. Bassett, R.C. Denney, G.H. Jeffery and J. Mandham, ELBS.

2. Standard Methods of Chemical. Analysis, W.W. Scott: The Technical Press.

3. Experimental Inorganic Chemistry, W.G. Palmer, Cambridge.

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

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

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

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

**BACHELOR OF ARTS / BACHELOR OF SCIENCE (COMPUTER SCIENCE) /
BACHELOR OF SCIENCE (ECONOMICS) SEMESTER- III
SESSION 2024-25
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 / Bachelor of Science (Computer Science) /
Bachelor of Science (Economics) Semester- III
Session 2024-25
Course Code: BARM-3134
BCSM-3134
BECM-3134

COMPUTER SCIENCE

(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)

(THEORY)

Examination Time: 3 +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 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 / BACHELOR OF SCIENCE (COMPUTER SCIENCE) /
BACHELOR OF SCIENCE (ECONOMICS) SEMESTER- III
SESSION 2024-25
COURSE CODE: BARM-3134
BCSM-3134
BECM-3134**

COMPUTER SCIENCE

(COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS)

PRACTICAL

Examination Time: 3 +3 Hrs.   **Max. Marks: 100**
                                                              Theory: 50
L-T-P: 3-0-1   **Practical:30**
Credits: 4   **CA: 20**

Practical on Computer Oriented Numerical and Statistical Methods.

Bachelor of Science
SEMESTER-III
(SESSION-2024-25)
PHYSICS (STATISTICAL PHYSICS AND THERMODYNAMICS)

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

COURSE OUTCOMES:

After passing this course, students will be able to:

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

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

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

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

Bachelor of Science
SEMESTER-III
(SESSION-2024-25)
PHYSICS (STATISTICAL PHYSICS AND THERMODYNAMICS)
Course code: BSNM-3395 (I) for Bachelor of Science (Non Medical)
BCSM-3395 (I) for Bachelor of Science (Computer Science)

Time: 3 Hours	**Max Marks: 75**	**Ext Marks: 60**
Credits: 3-0-0	**CA: 15**	**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
Basic ideas of Statistical Physics, Scope of Statistical Physics, Basic ideas about probability, Distribution of four distinguishable particles into compartments of equal size. Concept of macro states, microstates, Thermodynamic Probability, Effects of constraints on the system. Distribution of n particles in two compartments, Deviation from the state of maximum probability. Equilibrium state of dynamic system, Distribution of distinguishable n particles in k compartments of unequal sizes.

UNIT–II
Phase space and division into elementary cells. Three kinds of statistics. The basic approach in three statistics. Maxwell Boltzmann (MB) statistics applied to an ideal gas in equilibrium. Experimental verification of 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, Absolute thermodynamics or Kelvin Scale of Temperature, Applications of thermodynamics to thermoelectric effect, Peltier Effect, Thomson Effect, change of entropy along reversible path in P-V diagram. Heat death of universe.

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

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

Bachelor of Science
SEMESTER-III
(SESSION-2024-25)
PHYSICS (OPTICS AND LASER)
Course code: BSNM-3395 (II) for Bachelor of Science (Non Medical)
BCSM-3395 (II) for Bachelor of Science (Computer Science)

COURSE OUTCOMES:
After passing this course, students will be able to:

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

CO2: understand the Huygens Fresnel theory and diffraction, Fraunhofer diffraction due to single slit, double slit and n slits, the concept of resolving power.

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

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

Bachelor of Science
SEMESTER-III
(SESSION-2024-25)
PHYSICS (OPTICS AND LASER)

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

Time: 3 Hours	**Max Marks: 50**	**Ext Marks: 40**
Credits: 2-0-0	**CA: 10**	**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

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

UNIT–II

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

UNIT–III

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

UNIT–IV

Laser Fundamentals:
Derivation of Einstein relations, Concept of stimulated emission and population inversion, broadening of spectral lines, three level and four level laser schemes, Threshold and Schawlow Townes condition, Components of laser devices, types of lasers, Ruby and Nd:YAG lasers, He-Ne and CO_2 lasers construction, mode of creating population inversion and output characteristics, application of lasers –a general outline.

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

Bachelor of Science
SEMESTER-III
(SESSION-2024-25)
PHYSICS (PRACTICAL)
Course code: BSNM-3395(P) for Bachelor of Science (Non Medical)
BCSM-3395(P) for Bachelor of Science (Computer Science)

COURSE OUTCOMES:
After passing this course, students will be able to:

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

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

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

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

CO5: demonstrate the verification of laws of probability distribution.

Bachelor of Science
SEMESTER-III
PHYSICS (PRACTICAL)
(SESSION-2024-25)
Course code: BSNM-3395(P) for Bachelor of Science (Non Medical)
BCSM-3395(P) for Bachelor of Science (Computer Science)

Time: 3 Hours	**Max Marks: 50**	**Ext Marks: 40**
Credits: 0-0-2	**CA: 10**	**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 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 measure an accessible (Horizontal and vertical) height using sextant.
9. To measure inaccessible height by using sextant.
10. Verify laws of probability distribution by throwing similar coins.
11. To determine the wavelength of given laser source using Young's double slit experiment

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 IV)

Punjabi (Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-4421

COURSE OUTCOMES

CO1: 'ਪਗਡੰਡੀਆਂ' (ਸਵੈਜੀਵਨੀ) ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਸਵੈਜੀਵਨੀ ਸਾਹਿਤ ਰੂਪ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO2: 'ਫ਼ਾਸਲੇ' (ਨਾਟਕ) ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਨਾਟਕ ਨੂੰ ਪੜ੍ਹਨ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾਕਰਨਾ ਹੈ ਅਤੇ ਨਾਟਕਜਗਤਨਾਲਜੋੜਨਾ ਹੈ।

CO3: ਦਫ਼ਤਰੀ ਚਿੱਠੀਪੱਤਰ ਅਤੇਅਖ਼ਬਾਰ ਵਿਚ ਇਸ਼ਤਿਹਾਰ ਲਿਖਣਾ ਸਿਖਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨਕਰਨਾ ਹੈ।

CO4: ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰਨ ਦਾ ਮਕ'ਦ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਲਿਖਤ ਵਿਚ ਕੀਤੀਆਂ ਜਾਣ ਵਾਲੀਆਂ ਗਲਤੀਆਂ ਨੂੰ ਸੁਧਾਰਨਾ ਹੈ।ਗੁਰਮੁਖੀ ਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

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 IV)

Punjabi (Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL/BECL/BCRL /BBRL-4421

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

ਅੰਕਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕਲਈਹਦਾਇਤਾਂ

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ ਸੈਕਸ਼ਨ ਹੋਣਗੇ।ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟI-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ।ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।

2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ।ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 16ਅੰਕਹਨ।

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

ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਪਗਡੰਡੀਆਂ (ਸਵੈਜੀਵਨੀ) :ਡਾ.ਬਚਿੰਤਕੌਰ

(ਸਾਰ/ਵਿਸ਼ਾਵਸਤੂ/ਆਤਮਬਿੰਬ)   16ਅੰਕ

ਯੂਨਿਟ-II

ਫ਼ਾਸਲੇ (ਨਾਟਕ) :ਜਤਿੰਦਰਬਰਾੜ,

(ਵਿਸ਼ਾਵਸਤੂ/ਸਾਰ/ਨਾਟਜੁਗਤਾਂ)   16ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ

        (ਅ) ਅਖ਼ਬਾਰ ਵਿਚ ਇਸ਼ਤਿਹਾਰ   16ਅੰਕ

<center>ਯੂਨਿਟ-**IV**</center>

ਵਿਆਕਰਨ

(ੳ) ਸ਼ਬਦਜੋੜਾਂ ਦੇ ਨਿਜਮ

(ਅ) ਗੁਰਮੁਖੀਲਿਪੀ ਦੀਆਂ ਵਿਸ਼ੇਸ਼ਤਾਵਾਂ   16ਅੰਕ

ਵਿਆਕਰਨ

(ੳ) ਸ਼ਬਦਜੋੜਾਂ ਦੇ ਨਿਜਮ

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 ADMINISTRATIONSEMESTER–IV

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-4031

Course outcomes

CO1:ਮੁੱਢਲੀਪੰਜਾਬੀਦੇਵਿਦਿਆਰਥੀ 'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਨਾਮਵਰਕਵੀਆਂਮੋਹਨ ਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਸ਼ ਦੀਆਂਰਚਨਾਵਾਂਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ ਤੋਂਜਾਣੂਹੋਣਗੇ।

CO2:ਮੁੱਢਲੀਪੰਜਾਬੀਦੇਵਿਦਿਆਰਥੀ'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਵੱਖੋਵੱਖਰੀਆਂਧਾਰਾਵਾਂਨਾਲਸਬੰਧਤ ਮੋਹਨ ਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਸ਼ਦੀਆਂਰਚਨਾਵਾਂਦੇ ਸਾਰ ਤੋਂਜਾਣੂਹੋਣਗੇ।

CO3: ਮੁੱਢਲੀਪੰਜਾਬੀਦੇਵਿਦਿਆਰਥੀ 'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਵੱਖੋਵੱਖਰੀਆਂਧਾਰਾਵਾਂਨਾਲਸਬੰਧਤ ਮੋਹਨ ਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਸ਼ਕਵੀਆਂ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾ ਤੋਂਜਾਣੂਹੋਣਗੇ।

CO4: ਲੇਖ ਰਚਨਾਦਾਮਨੋਰਥਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰਕਰਨਾ ਹੈ।ਸ਼ਬਦਜੋੜਾਂ ਦੇ ਨਿਜਮ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚਸ਼ਾਮਿਲਕਰਨਦਾਮਕਸਦਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਲਿਖਤ ਵਿਚਕੀਤੀਆਂਜਾਣਵਾਲੀਆਂਗਲਤੀਆਂ ਨੂੰ ਸੁਧਾਰਨਾ ਹੈ।

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 ADMINISTRATIONSEMESTER–IV

Basic Punjabi (In lieu of Punjabi Compulsory)

COURSE CODE- BARL/BSML/BSNL/BCSL /BECL/BCRL /BBRL-4031

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 ਸੈਕਸ਼ਨ ਹੋਣਗੇ।ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚ 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

ਆਤਮਅਨਾਤਮ (ਕਵਿਤਾਭਾਗ)(ਸੰਪਾਦਕਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮਸਿੰਘ ਸੰਧੂ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਮੋਹਨਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਠਸਿਲੇਬਸ ਦਾਹਿੱਸਾਹਨ।

ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ

                                                                                                            16ਅੰਕ

ਯੂਨਿਟ-II

ਆਤਮਅਨਾਤਮ (ਕਵਿਤਾਭਾਗ)(ਸੰਪਾਦਕਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮਸਿੰਘ ਸੰਧੂ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਮੋਹਨ ਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਠ ਸਿਲੇਬਸ ਦਾਹਿੱਸਾਹਨ।

(ਸਾਰ)

ਯੂਨਿਟ-III

ਆਤਮਅਨਾਤਮ (ਕਵਿਤਾਭਾਗ)(ਸੰਪਾਦਕਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮਸਿੰਘ ਸੰਧੂ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਮੋਹਨ ਸਿੰਘ,ਜਗਤਾਰ,ਸੁਰਜੀਤ ਪਾਤਰ,ਪਾਠਸਿਲੇਬਸ ਦਾਹਿੱਸਾਹਨ।

(ਕਵੀਆਂ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾਬਾਰੇ ਮੁੱਢਲੀਜਾਣਕਾਰੀ)

16ਅੰਕ

ਯੂਨਿਟ-IV

ਲੇਖਰਚਨਾ

ਅਸ਼ੁੱਧ ਸ਼ਬਦਜੋੜਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਕੇ ਲਿਖਣਾ16ਅੰਕ

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 IV)
Session 2024-25
COURSE TITLE: PUNJAB HISTORY AND CULTURE (From 1605 to 1849 A.D.)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

COURSE CODE: BARL-4431/BSML-4431/BSNL-4431/BCSL-4431/BECL-4431BCRL-4431/BBRL-

4431

After completing the paper the students will have a thorough insight into the origin of Sikh faith and its major institutions in Punjab

CO 1:understand the adoption of new policy by Guru Hargobind and martyrdom of Guru Tegh Bahadur

CO 2: To understand the factors leading to the establishment of Khalsa Panthand its impact

CO 3: Have deep insight into the conflict with Mughals and the rise of Banda Singh Bahadur and aftermath.

CO 4: Understand the administration under Maharaja Ranjit Singh, also the fairs, festivals and folk music of Punjab.

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 IV)
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COURSE CODE: BARL-4431/BSML-4431/BSNL-4431/BCSL-4431/BECL-4431/BCRL-4431/BBRL-

4431

Examination Time: 3 Hours	Max. Marks: 100
Credits L-T-P: 4-0-0	Theory: 80
Contact Hours: 4 Hrs/Week	CA: 20

Instructions for the Paper Setter:

    a. Question paper shall consist of four Units
    b. Examiner shall set 8 questions in all by selecting Two Questions of equal marks from each Unit.
    c. Candidates shall attempt 5 questions in 1000 words, by at least selecting One Question from each Unit and the 5th question may be attempted from any of the four Units.
    d. Each question will carry 16 marks

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 600 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 carry 8 marks

<div align="center">UNIT I</div>

1. Transformation of Sikhism under Guru Hargobind.
2. Martydom of Guru Teg Bahadur

<div align="center">UNIT II</div>

3. Creation of Khalsa
4. Khalsa and its impact on the Punjab

<div align="center">UNIT III</div>

5. Banda Bahadur and his achievements
6. Rise of Misls.

UNIT IV

7. Maharaja Ranjit Singh:- Civil, Military and Land Revenue Administration.

8. Fair, Festivals and Folk Music in the Punjab during the medieval period (Jarag, Baisakhi and Diwali)

Suggested Readings

- Chopra P.N., Puri, B.N., & Das, M.N.(1974), A Social, Cultural & Economic History of India.Vol.II, Macmillan India Limited, New Delhi.
- Grewal, J.S. (1994). The Sikhs of the Punjab, Cambridge University Press, New Delhi.
- Singh, Fauja (1972). A History of the Sikhs, Vol. III, Patiala: Punjabi University.
- Singh, Kushwant (2011). A History of the Sikhs- Vol. I (1469-1839). New Delhi:
- Singh,Kirpal (1990). History and Culture of the Punjab-Part II (Medieval Period)

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 IV
Session 2024-25
ENGLISH (COMPULSORY)
Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/ BBRL-4212

COURSE OUTCOMES

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

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

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

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

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

BACHELOR OF 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 IV
Session2024-25
ENGLISH (COMPULSORY)
Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/ BBRL-4212

Max. Marks: 100
Examination Time: 3 Hrs   **Theory: 80**
                                                                              CA: 20

Instructions for the Examiner:
(The paper setters should avoid questions of theoretical nature from *Making Connections*.)

Section A: One question with sub-parts will be set from Unit I of the syllabus. Fifteen sentences will be set and the students would be required to attempt any ten. Each sentence will carry two marks. **(10×2=20)**

Section B: Two questions will be set from Unit II of the syllabus. The students would be required to attempt one essay out of the given two topics carrying ten marks (word limit 400 words). The second question will be based on vocabulary. The students would be required to write single words for phrases and sentences choosing any five out of eight and each carrying two marks.   **(1×10 + 5×2=20)**

Section C: The students would be required to attempt two questions (with sub parts) based on exercises as given before and after reading essays in the prescribed text book *Making Connections*.   **(5×2 + 5×2=20)**

Section D: This section will be divided into two parts. In part one, five questions based on Central idea, theme, tone and style etc. of the poems from the prescribed textbook, *Moments In Time* from Unit IV of the syllabus will be set. The students would be required to attempt any three, each carrying five marks (200 words each).
(3×5=15)
Part two will have one question (with internal choice) requiring students to explain a stanza with reference to context carrying five marks (word limit 250 words). The stanzas for explanation will be taken from the prescribed textbook, *Moments in Time* from Unit IV in the syllabus.
(1×5=5)

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

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

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

Unit IV

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

Texts Prescribed:

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

(1)

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
SEMESTER–IV
SESSION: 2024-25
COURSE TITLE: MATHEMATICS (STATICS AND VECTOR CALCULUS)
COURSE CODE: BARM/BECM/ BCSM/BSNM-4333(I)

Course Outcomes

After passing this course, the students will be able:

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

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

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

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

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
SEMESTER–IV
SESSION: 2024-25
COURSE TITLE: MATHEMATICS (STATICS AND VECTOR CALCULUS)
COURSE CODE: BARM/BECM/ BCSM/BSNM-4333(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.

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

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

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
SEMESTER–IV
SESSION: 2024-25
COURSE TITLE: MATHEMATICS (SOLID GEOMETRY)
COURSE CODE: BARM/BECM/ BCSM/BSNM-4333(II)

Course Outcomes

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

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

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

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

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

BACHELOR OF ARTS/ BACHELOR OF SCIENCE (ECONOMICS, NON-MEDICAL, COMPUTER SCIENCE)
SEMESTER–IV
SESSION: 2024-25
COURSE TITLE: MATHEMATICS (SOLID GEOMETRY)
Course Code: BARM/BECM/ BCSM/BSNM-4333(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.

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

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

Reference Books:

1. S. Narayan, & P.K.Mittal, Analytical Solid Geometry, Sultan Chand & Sons, New Delhi, Sixteenth edition, 2002 (Scope in Chapters-7,8,11).

2. E. Kreyszig, Advance Engineering Mathematics, John Willey & Sons, tenth edition, 2011.

Bachelor of Science
(SEMESTER–IV)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-4084(I)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)

Course outcomes:

Students will be able to

CO1: understand the key features of coordination compounds viz. Nomenclature, Isomerism and electronic configurations of coordination compounds, have general knowledge of Chelates, Postulates of VBT

CO2: understand theproperties and reactions of non-aqueous solvents.

CO3: write both reduction and oxidation half reactions for a simple redox reaction , Frost and understand the Latimer Pourbaix diagram.

 CO4: understand the positions,electronic configurations,relative stability,preparation, properties, structures and characteristics of the f-block elements in the periodic table and understand the role of metal ions and other inorganic elements in biological systems

Bachelor of Science
(SEMESTER–IV)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-4084(I)
COURSE TITLE: CHEMISTRY (INORGANIC CHEMISTRY)

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
Coordination Compounds   **(10 Hrs)**

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

Non-Aqueous Solvents   **(5 Hrs)**

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

Unit–II
Oxidation and Reduction   **(8 Hrs)**

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

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

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

Unit–III
Chemistry of Actinides   **(5 Hrs)**

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

Unit–IV

Bioinorganic Chemistry **(10 Hrs)**

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

Books Suggested:

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

Bachelor of Science
(SEMESTER–IV)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-4084(II)
COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)

Course outcomes:

Students will be able to

CO1: understand structure and bonding in carboxylic acids and carboxylic acid derivatives, Compare the acidity of alcohols,phenols and acids

CO2: understand preparations and reactions of ethers and epoxides, understand cleavages in ethers, the ring opening reactions of epoxides

CO3:understand preparation and reactions of nitroalkanes and nitroarenes, differentiate between primary, secondary and tertiary amines, basicity of amines

CO4:understand nomenclature, structural features, methods of formation and chemical reactions of Organomagnesium, Organolithium, Organozinc and Organocopper compounds and to know the various methods of synthesis and compare electrophilic substitution, basicity, reactions of pyrrole, furan, thiophene and nucleophilic substitution reactions of pyridine.

Bachelor of Science
(SEMESTER–IV)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-4084(II)
COURSE TITLE: CHEMISTRY (ORGANIC CHEMISTRY)

Exam Time: 3Hrs.   **Max.Marks:50**

Credit (L-T-P): 3-0-0   **(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

Carboxylic Acids and its derivatives   **(10 Hrs)**

Nomenclature and structure of carboxylic acids, acid chlorides, esters, amides and acid anhydrides, physical properties, acidity of carboxylic acids, effects of substituents on acid strength.Reactions of carboxylic acids.Hell-Volhard-Zelinsky reaction.Synthesis of acid chlorides, esters and amides. Reduction of carboxylic acids. Mechanism of decarboxylation. Relative stability and reactivity of acyl derivatives. interconversion of acid derivatives by nucleophilic acyl substitution. Chemical reactions of carboxylic acid derivatives, Mechanisms of esterification and hydrolysis (acidic and basic).

Unit–II
Ethers and Epoxides   **(10 Hrs)**

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

Unit-III

Organic Compounds of Nitrogen **(10 Hrs)**

Structure and nomenclature of amines, Methods of preparation of amines by Reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction and Hoffmann bromamide reaction.Physicalproperties.Stereochemistry of amines.separation of a mixture of primary, secondary and tertiary amines. Structural features affecting basicity of amines. Amine salts as phase-transfer catalysts.

Unit–IV

Organometallic Compounds **(7 Hrs)**

Organomagnesium Compounds: The Grignard reagents formation, structure and chemical reactions. Organolithium Compounds: Formation and chemical reactions.

Heterocyclic Compounds **(8 Hrs)**

Introduction: Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine. Methods of synthesis. Mechanism of electrophilic substitution reactions of pyrrole, furan, thiophene and pyridine. Mechanism of nucleophilic substitution reactions in pyridine.Comparison of basicity of pyridine, piperidine and pyrrole.

Book Suggested:

1. Morrison, R.T., Boyd, R.N., Organic Chemistry; 6th edition, Pubs: Prentice-Hall, 1992.
2. Wade Jr., L.G., Singh, M.S., Organic Chemistry; 6th edition, Pubs: Pearson Education, 2008.
3. Mukherji, S.M., Singh, S.P., Kapoor, R.P., Organic Chemistry; Pubs: Wiley Eastern Limited, 1985, Vol.I, II, III.
4. Solomons, T.W., Fryhle, C.B., Organic Chemistry; 9th edition, Pubs: Wiley India, 2007.
5. Carey, F.A., Organic Chemistry; 4th edition, Pubs: McGraw-Hill, 2000.
6. Streitwieser, A., Clayton, Jr., Heathcock, H., Introduction to Organic Chemistry; 3rd edition, Pubs: Macmillan Publishing Company, 1989.
7. Introduction to Organic Chemistry, Sireitwieser, Heathcock and Kosover, Macmilan.

Bachelor of Science
(SEMESTER–IV)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-4084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Course outcomes:

Students will be able to analyze the given organic compound through

CO1:understand the basics of Qualitative analysis

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

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

CO4: preparation of their derivatives

Bachelor of Science
(SEMESTER–IV)
SESSION: 2024-25
COURSE CODE: BSMM/BSNM-4084(P)
COURSE TITLE: CHEMISTRY PRACTICAL

Duration: 3½ hrs.   **Max. Marks: 20**

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

Qualitative Analysis

Detection of elements: N, S and halogens

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

Practical Examination

1) Detection of Elements, functional group and derivative preparation   15

2) Viva-Voce   03

3) Note Book   02

Book Suggested:

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

BACHELOR OF ARTS / BACHELOR OF SCIENCE (COMPUTER SCIENCE) /
BACHELOR OF SCIENCE (ECONOMICS)
SEMESTER- IV
(SESSION 2024-25)
COURSE CODE: BARM-4134
BCSM-4134
BECM-4134

COMPUTER SCIENCE

(DATA STRUCTURES)

Course Outcomes:

After passing course the student will be able to:

CO1: Analyze complexity of algorithms to determine their efficiency.

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

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

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

BACHELOR OF ARTS / BACHELOR OF SCIENCE (COMPUTER SCIENCE) /
BACHELOR OF SCIENCE (ECONOMICS)
SEMESTER- IV
(SESSION 2024-25)
COURSE CODE: BARM-4134
BCSM-4134
BECM-4134

COMPUTER SCIENCE

(DATA STRUCTURES)

(THEORY)

Examination Time: 3 +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 Non–programmable/ scientific & Non–storage type calculator.

UNIT–I

Data Structures: Introduction to elementary data organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time-Space Tradeoff between Algorithms.

Arrays: Array defining, representing arrays in memory, various operations on linear arrays, Multi-Dimensional arrays.

UNIT–II

Linked Lists: Types of Linked Lists, representing linked list in memory, advantages of using linked lists over arrays, various operations of linked lists.

Stacks: Description of stack structure, Implementation of stack, using arrays and linked lists, application of stack-converting, arithmetic expression from infix notation to polish notation and their subsequent evaluation, quicksort technique.

UNIT–III

Queues: Description of queue structure, Implementation of queue using arrays and linked lists, description or priorities of queues, deques.

Sorting and Searching: Sorting Algorithms, bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, searching Algorithms, linear search and binary search.

UNIT-IV

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

References / Textbooks:

1. Seymour Lipschutz, Data Structures with C (Schaum's Outline Series), McGraw Hill Education (2017), 1st Edition
2. Reema Thareja, Data Structures Using C, Oxford Publication (2014), 2nd Edition
3. Sahni Horowitz, Fundamentals of Data Strucetures in C (2008), 2nd Edition
4. Narasimha Karumanchi, Data Structures and Algorithms made easy, Careermonk Publications (2016), 5th Edition
5. S.K. Srivastava and Deepali Srivastava, Data Structures through C, BPB Publications (2004)
6. Yedidyah Langsam, Augestein and Tanenbaum, Data Structures using C and C++, Pearson Education India (2015), 2nd Edition

**BACHELOR OF ARTS / BACHELOR OF SCIENCE (COMPUTER SCIENCE) /
BACHELOR OF SCIENCE (ECONOMICS)
SEMESTER- IV
(SESSION 2024-25)
COURSE CODE: BARM-4134
BCSM-4134
BECM-4134**

COMPUTER SCIENCE

(DATA STRUCTURES)

(PRACTICAL)

Examination Time: 3 +3 Hrs.   **Max. Marks: 100**
                                                                        Theory: 50
L-T-P: 3-0-1   **Practical:30**
Credits: 4   **CA: 20**

Practical on Data Structures.

Bachelor of Science
SEMESTER-IV
PHYSICS (QUANTUM MECHANICS)
(SESSION-2024-25)
Course code: BSNM-4395 (I) for Bachelor of Science (Non Medical)
BCSM-4395 (I) for Bachelor of Science (Computer Science)

COURSE OUTCOMES:
After passing this course, students will be able to:
CO1: Students will be familiar with the main aspects of the historical development of quantum mechanics.

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

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

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

Bachelor of Science
SEMESTER–IV
(**SESSION-2024-25**)
PHYSICS (QUANTUM MECHANICS)
Course code: BSNM-4395 (I) for Bachelor of Science (Non-Medical)
BCSM-4395 (I) for Bachelor of Science (Computer Science)

Time: 3 Hours	**Max Marks: 75**	**Ext Marks: 60**
Credits: 3-0-0	**CA: 15**	**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
Formalism of Wave Mechanics:
Brief introduction to need and development of quantum mechanics, photoelectric effect, Compton effect, Wave particle duality, De broglie hypothesis, Wave packet, Group velocity, Uncertainty principle, Fundamental postulates of wave mechanics, Time dependent and time independent Schrodinger wave equation for a free particle and equation of a particle subject to forces. Stationary states, Superposition principle.

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

UNIT–III
Application of Schrodinger wave equation to one dimensional problems:
Application of Schrodinger Equation for solving one dimensional Particle in a box, One dimensional step potential for $E>V_0$, one dimensional step potential for $0<E<V0$,
one dimensional potential barrier of finite height and width, Quantum mechanical tunnelling effect, one dimensional square well of finite depth

UNIT–IV
Application of Schrodinger equation to three dimensional problems:
Free particle in three dimensional rectangular box, Eigen wave function, Eigenvalues of momentum, energy and degeneracy, three dimensional harmonic oscillator (Cartesian coordinates) wave function, energy levels, degeneracy, Schrodinger's wave equation in spherical

polar coordinates, Schrodinger wave equation for spherically symmetric potential for hydrogen atom, wave function of H atom, $\Phi(\varphi)$, Θ (Usolution of R(r), equations.

Text Reference Books:
1. A Text book of Quantum Mechanics by P.M. Mathews and K. Venkatesan,(Tata McGraw Hill Pub. Co. Delhi) 2002.
2. Quantum Mechanics by J.L. Powell and B. Craseman (Narosa Pub. House, New Delhi) 1997.
3. Concepts of Modern Physics by Arthur Beiser (McGraw Hill Pub. Co., New Delhi, 9th Ed.)
4. 1995.
5. Elements of Modern Physics by S.H. Patil (McGraw Hill), 1998.
6. Quantum Mechanics by E. Merzbacher (John Wiley, 2nd Edition)
7. Fundamentals of Molecular Spectroscopy by C.N. Banwell (Tata McGraw Hill Pub. Co.Delhi), 2001.
8. Atomic Spectra by H.G. Kuhn (Longmans), 2nd Ed., 1969.
9. Introduction to Quantum Mechanics by L. Pauling and E.B. Wilson (Tata McGraw Hill Pub. Co., Delhi), 2002.
10. Quantum Mechanics by W. Greiner (Springer Verlag), 1994.
11. Fundamentals of Molecular Spectroscopy by C.B. Banwell-Tata McGraw Hill, 1986.
12. Molecular Spectroscopy: Jeanne L McHale.

Bachelor of Science
SEMESTER–IV
(**SESSION-2024-25**)
PHYSICS (ATOMIC AND MOLECULAR SPECTRA)
Course code: BSNM-4395 (II) for Bachelor of Science (Non Medical)
BCSM-4395 (II) for Bachelor of Science (Computer Science)

COURSE OUTCOMES:
After passing this course, students will be able to:

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

CO2: understand spectra of alkali atoms and Zeeman effect

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

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

Bachelor of Science
SEMESTER–IV
(SESSION-2024-25)
PHYSICS (ATOMIC AND MOLECULAR SPECTRA)
Course code: BSNM-4395 (II) for Bachelor of Science (Non Medical)
BCSM-4395 (II) for Bachelor of Science (Computer Science)

Time: 3 Hours	**Max Marks: 50**	**Ext Marks: 40**
Credits: 2-0-0	**CA: 10**	**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

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

UNIT–II

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

UNIT–III

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

UNIT–IV

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

Text Reference Books:

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

Bachelor of Science
SEMESTER–IV
(**SESSION-2024-25**)
COURSE TITLE: PHYSICS (PRACTICAL)

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

COURSE OUTCOMES:
After passing this course, students will be able to:

CO1: The exercises included in this laboratory course are aimed at training the students to handle different type of equipment for verification of some of the laws and concepts studied in theory like concepts of thermodynamics, photoelectric effect and for carrying out precise measurements

CO2: use later the sophisticated instruments in their respective fields.

CO3: use spectrometers and hence will be able to study absorption spectra of iodine.

CO4: prepare cane sugar solution and hence will be able to find its specific rotation by using a polarimeter.

Bachelor of Science
SEMESTER–IV
(**SESSION-2024-25**)
PHYSICS (PRACTICAL)
Course code: BSNM-4395 (P) for Bachelor of Science (Non Medical)
BCSM-4395 (P) for Bachelor of Science (Computer Science)

Time: 3 Hours   **Max Marks: 50**   **Ext Marks: 40**
Credits: 0-0-2 (4 Hours/week)   **CA: 10**   **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 study adiabatic expansion of gas and hence to calculate the value of V.
2. To find the coefficient of Thermal Conductivity of a bad conductor by Lee's method.
3. To plot a calibration curve of a given thermocouple (copper constantan).
4. To study the photoelectric effect and determine the value of Planck's constant.
5. To determine the ionization potential of mercury.
6. Study of variation of light intensity with distance using photovoltaic cell
(Inverse Square Law)
7. To determine the heating efficiency of an electric kettle with varying voltage.
8. To study the absorption spectra of iodine vapours.
9. To study the rotation of the plane of polarization by using a polarimeter.
10. To determine the specific rotation of sugar using Laurent's half shade polarimeter
11. To study the characterizations of Photovoltaic cells.