ANNEXURE E
Faculty of Sciences
Syllabus for
Bachelor of Science (Honours) Physics
(Under Continuous Evaluation System)

(SEMESTER: I-IV)

Session – (2021-22)

Kanya Maha Vidyalaya, Jalandhar
(Autonomous)
The Heritage Institution

SCHEME AND CURRICULUM OF EXAMINATIONS OF THREE YEAR DEGREE PROGRAMME
Bachelor of Science (Honours) Physics
Session-2021-22

Semester-I

Sr. No.	Course Code	Course Type	Course Title	Max Marks				Examination time in Hours)
				Total	Ext		CA	
					L	P		
1.	BOPL-1421 BOPL-1031 BOPL-1431	C	Punjabi(Compulsory [1]Basic Punjabi [2]Punjab History and Culture	50	40	-	10	3
2.	BOPL-1102	C	Communication skills in English	50	40	-	10	3
3.	BOPL-1393	C	Mechanics-I	75	60	-	15	3
4.	BOPL-1394	C	Electricity and Magnetism-I	75	60	-	15	3
5.	BOPL-1335	C	Mathematics-I	50	40	-	10	3
6.	BOPL-1086	C	Chemistry-I	50	40	-	10	3
7.	BOPP-1397	C	Physics Lab-I	50	-	40	10	3
8.	BOPP-1088	C	Chemistry Lab-I	50	-	40	10	3
9.	AECD-1161	AC	*Drug Abuse: Problem Management and Prevention (Compulsory)	50	40	-	10	3
10.	SECF-1492	AC	*Foundation Course	25	20		5	1
Total				**450**				

***Marks of these papers will not be added in total marks**
1 In Lieu of Punjabi (Compulsory) for students from Punjab
2. In Lieu of Punjabi (Compulsory) for students outside Punjab (Other States)

SEMESTER -II

Sr. No.	Course Code	Course Type	Course Title	Max Marks				Examination time in Hours)
				Total	Ext		CA	
					L	P		
1	BOPL-2421 BOPL-2031 BOPL-2431	C	Punjabi(Compulsory [1]Basic Punjabi [2]Punjab History and Culture	50	40	-	10	3
2	BOPM-2102	C	Communication Skills in English	50	25	15	10	3
3	BOPL-2393	C	Electricity and Magnetism-II	75	60	-	15	3
4	BOPL-2394	C	Vibrations and Waves	75	60	-	15	3
5	BOPL- 2335	C	Mathematics-II	50	40	-	10	3
6	BOPL-2086	C	Chemistry-II	50	40	-	10	3
7	BOPP-2397	C	Physics Lab-II	50	-	40	10	3
8	BOPP-2088	C	Chemistry Lab-II	50	-	40	10	3
9	AECD-2161	AC	*Drug Abuse: Problem, Management and Prevention (Compulsory)	50	40	-	10	3
10	SECM-2502	AC	* Moral Education	25	20		5	1
Total				**450**				

****Marks of these papers will not be added in total marks**

1 In Lieu of Punjabi (Compulsory) for students from Punjab

2. In Lieu of Punjabi (Compulsory) for students outside Punjab (Other States)

Semester-III

Sr. No.	Course Code	Course Type	Course Title	Max Marks				Examination time in
				Total	Ext		CA	
					L	P		
1	BOPL-3391	C	Optics	75	60	-	15	3
2	BOPL-3392	C	Statistical and Thermal Physics	75	60	-	15	3
3	BOPL-3333	C	Mathematics –III	50	40	-	10	3
4	BOPL-3084	C	Chemistry-III	50	40	-	10	3
5.	BOPM-3135	C	Python Programming Interdisciplinary Course (ID)-I	50	25	15	10	3
5	BOPP-3396	C	Physics Lab –III	50	-	40	10	3
6	BOPP-3087	C	Chemistry Lab –III	50	-	40	10	3
8	AECE-3221	AC	*Environmental Studies (compulsory)	100	60	20	20	3
9	SECP-3512	AC	* Personality Development	25	20		5	
	Total			**400**				

***Marks of these papers will not be added in total marks**

Semester-IV

Sr. No.	Course Code	Course Type	Course Title	Max Marks				Examination time in Hours)
				Total	Ext		Int	
					L	P		
1	BOPL-4391	C	Mechanics-II	75	60	-	15	3
2	BOPL-4392	C	Atomic Spectroscopy	75	60	-	15	3
3	BOPL-4333	C	Mathematics –IV	50	40	-	10	3
4	BOPL-4084	C	Chemistry-IV	50	40	-	10	3
5	BOPL -4175	C	Statistical Methods Interdisciplinary Course (ID)-II	50	40	-	10	3
6	BOPP-4396	C	Physics Lab –IV	50	-	40	10	3
7	BOPP-4087	C	Chemistry Lab –IV	50	-	40	10	3
8	SECS-4522	AC	*Social Outreach	25	20	5		2
	Total			**400**				

***Marks of this papers will not be added in total marks**

PROGRAM SPECIFIC OUTCOMES (PSOs)

1. Students will demonstrate proficiency in mathematics and the mathematical concepts needed for a proper understanding of physics.

2. Students will demonstrate knowledge of classical mechanics, electromagnetism, quantum mechanics, Electronics, Nuclear and thermal physics, and be able to apply this knowledge to analyse a variety of physical phenomena.

3. Students will demonstrate knowledge of organic, Physical and inorganic chemistry and are able to recognize and apply the principles of atomic and molecular structure to predict chemical properties and chemical reactivity.

4. Students will show that they have learned laboratory skills, enabling them to take measurements in a physics and chemistry laboratory and analyse the measurements to draw valid conclusions.

5. Upon completion of this degree, students will be able to understand theoretical concepts of instruments that are commonly used in most physics and chemistry fields as well as interpret and use data generated in instrumental analysers.

6. Students will be capable of oral and written scientific communication, and will prove that they can think critically and work independently.

SESSION 2021-22
Punjabi (Compulsory)

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

COURSE CODE- BOPL-1421

COURSE OUTCOMES

Co1:‘ਸਾਹਿਤ ਦੇ ਰੰਗ’ ਪੁਸਤਕ ਦੇ ਕਵਿਤਾ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚਲ ਰਹੀਆਂ ਕਾਵਿ ਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਲ ਕਰ ਸਕਣ। ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਕਵਿਤਾ ਦੀ ਵਿਆਖਿਆ, ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁਲੰਕਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ ਵੀ ਹੈ ਤਾਂ ਕਿ ਉਹ ਸਮਕਾਲੀ ਸਮਾਜ ਦੀਆਂ ਸਮੱਸਿਆਵਾਂ ਨੂੰ ਸਮਝ ਸਕਣ ਅਤੇ ਆਲੋਚਨਾਤਮਕ ਦ੍ਰਿਸ਼ਟੀ ਬਣਾ ਸਕਣ।

Co2:‘ਸਾਹਿਤ ਦੇ ਰੰਗ’ ਪੁਸਤਕ ਦੇ ਕਹਾਣੀ ਭਾਗ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਕਹਾਣੀ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।

Co3:ਪੈਰ੍ਹਾ ਰਚਨਾ ਅਤੇ ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

Co4: ਧੁਨੀ ਵਿਉਂਤ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਧੁਨੀਆਂ ਦੀ ਉਚਾਰਨ ਪ੍ਰਣਾਲੀ ਤੋਂ ਵਾਕਫ਼ ਹੋਣਗੇ।

SESSION 2021-22
Punjabi (Compulsory)

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

COURSE CODE- BOPL-1421

ਸਮਾਂ : 3 ਘੰਟੇ

Maximum Marks: 50
Theory : 40
CA :10

ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾ ਮਹਿਲ ਸਿੰਘ),ਭਾਗ ਪਹਿਲਾ(ਕਵਿਤਾ),
ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ,ਅੰਮ੍ਰਿਤਸਰ।
(ਸਾਰ,ਵਿਸ਼ਾ ਵਸਤੂ)
(ਡਾ. ਹਰਿਭਜਨ ਸਿੰਘ,ਪਾਸ਼,ਸੁਰਜੀਤ ਪਾਤਰ ਕਵੀ ਪਾਠਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ) ੪ ਅੰਕ

ਯੂਨਿਟ-II

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾ ਮਹਿਲ ਸਿੰਘ),ਭਾਗ ਪਹਿਲਾ(ਕਹਾਣੀ),
ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ,ਅੰਮ੍ਰਿਤਸਰ।

ਯੂਨਿਟ-III

ਪੈਰ੍ਹਾ ਰਚਨਾ

(ਸਾਰ,ਵਿਸ਼ਾ ਵਸਤੂ)
(ਕੋਈ ਇਕ ਸਵਾਰ,ਘੋਟਣਾ, ਆਪਣਾ ਆਪਣਾ ਹਿੱਸਾ ਕਹਾਣੀਆਂ ਪਾਠਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ) ੪ ਅੰਕ

ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪਸ਼੍ਨਾਂ ਦੇ ਉਤਰ। ੪ ਅੰਕ

ਯੂਨਿਟ-IV

(ੳ) ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ : ਪਰਿਭਾਸ਼ਾ ਤੇ ਉਚਾਰਨ ਅੰਗ

(ਅ) ਸਵਰ, ਵਿਅੰਜਨ ੪ ਅੰਕ

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 ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

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

SESSION 2021-22
BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

BASIC PUNJABI

In lieu of Punjabi (Compulsory)

COURSE CODE -BOPL-1031

Course outcomes

CO1:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦਾ ਮੌਕਾ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।

CO2:ਇਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਬਾਰੀਕਬੀਨੀ ਨਾਲ ਭਾਸ਼ਾ ਦਾ ਅਧਿਐਨ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO4:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਬਾਰੇ ਦੱਸਣਾ ਹੈ।

CO5:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਸ਼ਬਦ ਘੇਰਾ ਵਿਸ਼ਾਲ ਕਰਨਾ ਹੈ।

CO6:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਵਿਚ ਹਫ਼ਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰ੍ਹਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤੱਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿਚ ਸਿਖਾਉਣਾ ਹੈ।

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

SESSION 2021-22

BASIC PUNJABI

In lieu of Punjabi (Compulsory)

COURSE CODE - BOPL-1031

ਸਮਾਂ : 3 ਘੰਟੇ **Maximum Marks: 50**

Theory : 40

CA : 10

ਪਾਠ ਕ੍ਰਮ

ਯੂਨਿਟ-I

ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ, ਪੈਰ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਮਾਤ੍ਰਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਲਗਾਖਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ।

08ਅੰਕ

ਯੂਨਿਟ-II

ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ (ਸਾਧਾਰਨ ਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ, ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ)
08ਅੰਕ

ਯੂਨਿਟ-III

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਸ਼ਤੇਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਆਦਿ ਨਾਲ ਸੰਬੰਧਤ। 08
ਅੰਕ

ਯੂਨਿਟ-IV

ਹਫ਼ਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰ੍ਹਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿਚ ।

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 ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

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

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

SESSION 2021-22

Course Title: Punjab History and Culture (From Earliest Times to C 320) (Special paper in lieu of Punjabi Compulsory) (For those students who are not domicile of Punjab)

Course Code: BOPL-1431

COURSE OUTCOMES

After completing Semester I and course on Punjab History and Culture students of History will be able to identify and have a complete grasp on the sources & writings of Ancient Indian History of Punjab.

CO1: Identify and describe the emergence of earliest civilizations in: Indus Valley Civilization and Aryan Societies.

CO2: Identify and analyses the Buddhist, Jain and Hindu faith in the Punjab

CO3: Analyses the emergence of Early Aryans and Later Vedic Period, their Society, Culture, Polity and Economy

CO4: To make students understand the concepts of two faiths Jainism and Buddhism, its principles and their application and relevance in present times

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

SESSION 2021-22

Course Title: Punjab History and Culture (From Earliest Times to C 320) (Special paper in lieu of Punjabi Compulsory) (For those students who are not domicile of Punjab)

Course Code: BOPL-1431

Examination Time: 3 Hours **Max. Marks: 50**
Theory: 40
C A: 10

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.

Unit-I

1. Physical features of the Punjab
2. Sources of the ancient history of Punjab

Unit-II

3. Harappan Civilization: social, economic and religious life of the Indus Valley People.
4. The Indo-Aryans: Original home

Unit-III

5. Social, Religious and Economic life during Early Vedic Age.
6. Social, Religious and Economic life during Later Vedic Age.

UNIT-IV

7. Teachings of Buddhism
8. Teachings of Jainism

Suggested Readings

- L. M Joshi (ed.), *History and Culture of the Punjab*, Art-I, Patiala, 1989 (3rd edition)
- L.M. Joshi and Fauja Singh (ed.), *History of Punjab*, Vol.I, Patiala 1977.

- Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
- B.N. Sharma, *Life in Northern India*, Delhi. 1966.
- Chopra, P.N., Puri, B.N., & Das, M.N.(1974). *A Social, Cultural & Economic History of India*, Vol. I, New Delhi: Macmillan India.

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

SESSION 2021-22
COMMUNICATION SKILLS IN ENGLISH
(Theory)
Course Code: BOPL -1102

COURSE OUTCOMES

At the end of this course, the students will develop the following Skills:

CO 1: Reading skills that will facilitate them to become an efficient reader
CO 2: The ability to realise not only language productivity but also the pleasure of being able to
articulate well
CO 3: The power to analyse, interpret and infer the ideas in the text
CO 4: The ability to have a comprehensive understanding of the ideas in the text and enhance their
critical thinking
CO 5: Writing skills of students which will make them proficient enough to express ideas in clear and grammatically correct English
CO 6: Ability to plan, organise and present ideas coherently on a given topic
CO 7: The skill to use an appropriate style and format in writing letters (formal and informal)

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I
SESSION 2021-22
COMMUNICATION SKILLS IN ENGLISH
(Theory)
Course Code: BOPL -1102
Time: 3 Hours
Max. Marks: 50
Theory: 40
Continuous Assessment: 10

Instructions for the paper setter and distribution of marks:
The question paper will consist of four sections. The candidate will have to attempt five questions in all selecting one from each section and the fifth question from any of the four sections. Each question will carry 8 marks.
Section-A: Two questions of theoretical nature will be set from Unit I.
Section-B: Two comprehension passages will be given to the students based on Unit II.
Section-C: Two questions will be given from Unit III.
Section-D: Two questions will be set from Unit IV.

(8 x 5 = 40)

The syllabus is divided in four units as mentioned below:

Unit I

Reading Skills: Reading Tactics and strategies; Reading purposes–kinds of purposes and associated comprehension; Reading for direct meanings.

Unit II

Reading for understanding concepts, details, coherence, logical progression and meanings of phrases/ expressions.

Activities:

- Comprehension questions in multiple choice format
- Short comprehension questions based on content and development of ideas

Unit III

Writing Skills: Guidelines for effective writing; writing styles for application, personal letter, official/ business letter.

Activities

- Formatting personal and business letters.
- Organising the details in a sequential order

Unit IV

Resume, memo, notices etc.; outline and revision.

Activities:

- Converting a biographical note into a sequenced resume or vice-versa
- Ordering and sub-dividing the contents while making notes.
- Writing notices for circulation/ boards

Recommended Books:

1. *Oxford Guide to Effective Writing and Speaking* by John Seely.

2. *Business Communication,* by Sinha, K.K. Galgotia Publishers, 2003.

3. *Business Communication* by Sethi, A and Adhikari, B., McGraw Hill Education 2009.

4. *Communication Skills* by Raman, M. & S. Sharma, OUP, New Delhi, India (2011).

5. *English Grammar in Use: A Self Study Reference and Practice Book Intermediate Learners Book* by Raymond Murphy, Cambridge University Press.

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I
SESSION 2021-22

MECHANICS-I

Course Code: BOPL-1393

Course Outcomes: Mechanics -I

After passing this course, students will be able to:

CO1: Understand the various coordinate systems and its applications. Students will be able to know the conservations laws and the symmetries of space & time.

CO2: Know the fundamental forces of nature, concept of center mass, central forces and the motion of particle under central force and to determine the turning points of orbit.

CO3: Understand the frames of reference, coriolis forces and its applications and effect of rotation of earth on g.

CO4: understand the elastic collision in different systems, cross section of elastic scattering as well as Rutherford scattering and know the motion of rigid body.

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**
)
SEMESTER-I

COURSE CODE: BOPL-1393

MECHANICS-I

Maximum Marks: 75 (External 60 + Internal 15) **Examination Time: 3 Hours**
Pass Marks: 35% **Total Teaching hours: 60**

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.

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

Unit- I

Co-ordinate system and Motion of a Particle: Cartesian and Spherical polar co-ordinate systems; area, volume, displacement, velocity and acceleration in these systems. Solid angle, Newton's laws of motion. Relationship of conservation laws and symmetries of space and time.

Unit- II

Conservation of Momentum and Collisions: Internal forces and momentum conservation, Centre of mass, Elastic collisions in laboratory and centre of mass systems; velocities, angles, energies in these systems and their relationships. Conservation of angular momentum and examples-shape of the galaxy, angular momentum of solar system. Torques due to internal forces, angular momentum about center of mass. Cross-section elastic scattering and impact parameter, Rutherford scattering.

Unit- III

Inverse-Square-Law Force: Forces in nature (qualitative). Central forces, Potential energy and force between a point mass and spherical shell, a point mass and solid sphere, gravitational and electrostatic self-energy. Two body problem and concept of reduced mass. Motion of a body under central force, equation of orbit in inverse-square force field. Kepler's laws and their derivation.

Unit- IV

Dynamics of Rigid Bodies: Equation of motion of a rigid body, rotational motion of a rigid body in general and that of plane lamina. Rotation of angular momentum vector about a fixed axis. Angular momentum and kinetic energy of a rigid body about principal axis, Euler's equations. Precession and elementary gyroscope, Spinning top.

Reference Books:

1. Mechanics-Berkeley Physics Course, Vol-I by C. Kittel, W. D. Knight, M. A. Ruderman, C. A. Helmholtz and R. J. Moyer-Tata McGraw Hill Publishing Company Ltd., New Delhi.
2. Fundamentals of Physics by D. Halliday, R. Resnick and J. Walker -Wiley India Pvt. Ltd., New Delhi.
3. Introduction to Classical Mechanics by R. G. Takwale & P.S. Puranik. Tata McGraw Hill Publishing Company Ltd., New Delhi
4. An introduction to Mechanics by D. Kleppne r& R. Kolenkow. Tata McGraw Hill Publishing Company Ltd., New Delhi.
5. Mechanics by H.S. Hans & S.P Puri, Tata McGraw Hill Publishing Company Ltd. New Delhi.
6. Analytical Mechanics by S. K. Gupta, Modern Publishers.

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

SESSION 2021-22
ELECTRICITY and MAGNETISM-I

Course No. BOPL-1394

Course Outcomes: Electricity and Magnetism-I

After passing this course the students will be able to:

CO1: understand the vector calculus and vector algebra and its applications in electricity and magnetism. The students will be able to solve the electrostatic problems with the help of Gauss law and Coulomb's law.

CO2: understand the applications of scalar potential for the calculation of electric field and electric potential due to an arbitrary charge distribution.

CO3: solve the problems with the help of method of images and understand the conduction of electric current and fundamental laws of electricity and relate the electric and magnetic fields in two inertial frames of reference.

CO4: able to understand electric field, potential and polarization of different media and related quantities.

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)
SEMESTER-I

COURSE CODE: BOPL-1394

ELECTRICITY AND MAGNETISM-I

Maximum Marks: 75 (External 60 + Internal 15) **Examination Time: 3 Hours**
Pass Marks: 35% **Total Teaching hours: 60**

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.

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

Unit- I

Calculus of Vectors : Introduction to gradient, divergence & curl; their physical significance. Rules for vector derivatives, useful relations involving gradient, divergence &curl. Fundamental theorem for gradients, Gauss's and Stoke's theorems.

Unit- II

Electrostatics and Electric Current: Electric charge and its properties, Coulomb's law. The electric field due to a point charge and continuous charge distributions, Field due to electric dipole, Field lines, flux, Gauss's law and its applications. Curl of electric field. Relation between potential and electric field. Poisson's and Laplace's equations. Electric potential due to different charge distribution: Wire, Ring, Disc, Spherical Shell, Sphere, dipole etc. The potential energy for a point and continuous charge distribution.

Unit- III

Field of Moving Charges:- Conductors in the electrostatic field, Capacitors, Current and current density, drift velocity, expression for current density vector, equation of continuity. Ohm's Law and expression for electrical conductivity, limitations of Ohm's law. Equipotential surface method of electrical images, Measurement of charge in motion, Transformation of electric and magnetic fields in different frames of references, Electric field due to moving charges, electric force in two inertial frames, Interaction between moving charges.

Unit- IV

Electric Fields in Matter: Moments of charge distribution, Potential and field of a dipole, torque and force on a dipole in an external electric field, polarizability tensor, Electric field caused by polarized matter, Electric field of Polarized Sphere, Dielectric sphere in a uniform electric field, Field of a charge in a dielectric medium, Electric susceptibility and atomic polarizability tensor, Polarization in alternating fields.

Text and Reference Books:

1. Introduction to Electrodynamics by D.J. Griffiths, Perason Prentice Hall of India, New Delhi

2. Electricity & Magnetism by E.M. Purcell, Berkeley Physics Course Vol. 2, McGraw Hill, New York
3. Fundamental of Physics by D. Halliday, R. Resnick and J. Walker (6th edition)-John Wiley India Pvt. Ltd.,.
4. Electricity and Magnetism by A. S. Mahajan & A. A. Rang Wala, Tata –McGraw Hill Publication Pvt. Ltd.

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–I

Course Title: Mathematics-I

Course Code: BOPL-1335

Course outcomes

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

CO 1:Give argument related to limits, continuity and derivative of a function.

CO 2: Understand the concept of maxima and minima of a function of a single variable.

CO 3: Explain the significance of Roll's theorem, Mean Value theorem, and Taylor's and Maclaurin's theorem to find the expansions of functions.

CO 4: Demonstrate the geometrical meaning of integral calculus as an area and their uses in the determination of C.G & moments of inertia.

CO 5: Understand how to solve linear differential equations with constant coefficients and linear homogeneous and inhomogeneous differential equations of second order.

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)

SEMESTER-I

COURSE CODE: BOPL-1335

MATHEMATICS-I

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**

Pass Marks: 35% **Total Teaching hours: 60**

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.

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

UNIT –I

Functions and Derivatives: Limits, continuity and derivative of function. Differentiation of standard functions, Successive differentiation. Geometrical significance of derivative. Maxima and Minima of a function of single variable. Partial differentiation. Chain rule of differentiation. 15 Lectures

UNIT –II

Differential Calculus: Statement of Rolle's theorem and Mean value theorem, Taylor's and Maclaurins theorems and their applications to formal expansion of functions. Tangents and normals. Basic idea about asymptotes.

15 Lectures

UNIT –III

Integral Calculus: Integration as inverse of differentiation. Indefinite integrals of standard forms. Method of substitution. Integration using partial fractions. Integration by parts. Reduction formulae. Definite integrals. Definite integral as limit of a sum and geometrical interpretation as an area.

15 Lectures

UNIT –IV

Differential Equations: Definition & formation of differential equations. Linear differential equation of first order and first degree. Linear homogenous and inhomogeneous differential equation of second order. Linear differential equations with constant coefficients.

15 Lectures

Text Book:

Higher Engineering Mathematics: B.S. Grewal, Delhi, Khanna

Reference Books:

1. Differential Calculus by Shanti Narayan, New Delhi, Shyam Lal
2. Integral Calculus by Shanti Narayan, Delhi, S. Chand
3. Mathematical Hand Book by M. Vygodsky, Mir, Moscow

Bachelor of Science (Honours) Physics Semester–I

SESSION 2021-22

Course Title: Chemistry I

Course Code: BOPL-1086

Course outcomes:

Students will be able to

CO1: differentiate between chiral and achiral compounds, configuration and conformation.

CO2: understand the concept of isomerism

CO3: understand the resolution of enantiomers and differentiate between dextrorotatory and laevorotatory compounds.

CO4: do conformational analysis of ethane, butane, cyclohexane, monosubstituted and disubstituted cyclohexane.

CO5: explain the various methods of formation and chemical reactions of alkanes, alkenes and alkynes.

CO6: understand functional group transformation by nucleophilic substitution.

CO7: describe the mechanism and stereochemistry of nucleophilic substitution reactions.

CO8: understand the principles of nucleophilic addition to carbonyl groups.

Bachelor of Science (Honours) Physics Semester–I
SESSION 2021-22
Course Title: Chemistry I
Course Code: BOPL-1086

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

Instructions for the Paper Setters:
Eight questions of equal marks (Specified in the syllabus) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.
Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT I

Stereochemistry: General introduction to stereochemistry and molecular chirality, properties of chiral molecules-optical activity, enantiomers, introduction to absolute and relative configuration, the Cahn-Ingold Prelog R-S notional system physical properties of enantiomers. Stereochemistry of alkenes, naming stereo isometric alkenes by the E-Z system.
Conformational analysis. Conformational analysis of ethane, butane, cyclohexane, mono substituted and disubstituted cyclohexane

UNIT II

Chemistry of alkanes and alkenes: General chemistry of alkanes and alkenes, preparation of alkanes by decarboxylation. Wurtz reaction and Corey House reaction with mechanisms. Dehydration of alcohols and regioselectivity of these reactions. Acid catalysed dehydration of alcohols with complete mechanistic discussion, Mechanism of dehydrohalogenation of alkyl halides (Elimination mechanism), stereoselective and anti-elimination in elimination reactions.
Mechanism of hydrogenation of alkenes, stereochemistry of hydrogenation of cyclo alkenes, electrophilic addition of hydrogen halides to alkenes its regioselectivity explained on the basis of mechanism, free radical addition of hydrogen bromide to alkenes, acid catalysed hydration of alkene with mechanism, stereochemistry of halogen addition to alkenes and its mechanistic explanation. Hypohalous acid addition to alkenes, epoxidation of alkenes.
Alkynes: General chemistry of alkynes, preparation of alkynes, acidity of acetylene and terminal alkenes, metal ammonia reduction of alkyne, addition of hydrogen halides and water to alkynes, with detailed discussion of mechanism of these reactions.

UNIT-III

Nucleophilic substitution reactions: Functional group transformation by nucleophilic substitution, the biomolecular (S_N2), mechanism of nucleophilic substitution, stereochemistry of S_N2 reactions, steric effect in S_N2 reactions, nucleophiles and nucleophilicity. The unimolecular (S_N1) mechanism of nucleophilic substitution, carbocation stability and the rate of substitution, stereochemistry of S_N1 reactions, carbocation arrangements in S_N1 reactions, solvent effects, substitution and elimination as competing reactions.

UNIT-IV

Chemistry of carbonyl compounds. Principles of nucleophillic addition to carbonyl groups: Hydration, acetal formation, cyanohydrin formation; reactions with primary and secondary amines, Wittig reaction, mechanism of halogenation, acid and base catalysed enolization, haloform reaction, aldol condensation, conjugate nucleophillic addition to unsaturated carbonyl compounds

Text and Reference Books:

1. Advanced Organic Chemistry, Reactions Mechanisms and Structure by J. March.
2. Organic Chemistry by F. A Carey
3. Schaum's Outlines Series Theory and Problems of Organic Chemistry by Herbert Meislick and Jacob Sharefkin
4. Problems and their solution in Organic chemistry by I.L. Finar,
5. Organic Chemistry by D.J. Cram and G.S. Hammond.
6. J.E. Banks, Naming Organic Compounds – Programmed Introduction to Organic Chemistry.
7. E.L. Eliel, Stereochemistry of carbon compounds.

Bachelor of Science (Honours) Physics Semester–I
Course Outcomes: Physics Lab-I Sem I

Course No. BOPP-1397

CO1: Students will be able to find the value of acceleration due to gravity using pendulums.

CO2: It will give understanding of collisions in 1-Dimension.

CO3: It helps to study the moment of inertia of a body & on what factors it depends.

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)
SEMESTER-I

COURSE CODE: BOPP-1397

PHYSICS LAB-I

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**
Passing Marks 35% **Total Teaching hours: 90**
Instructions to Practical Examiner:

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

General Guidelines for Practical Examination
I. The distribution of marks is as follows:
i) One experiment 20 Marks
ii) Brief Theory 6 Marks
iii) Viva–Voce 7 Marks
iv) Record (Practical file) 7Marks
II. There will be one sessions of 3 hours duration. The paper will have one session and 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 20.

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

List of experiments-

1. To measure the time periods of oscillation for the objects of various geometrical shapes but of same mass.
2. To study rotational motion using a flywheel and hence show that torque is proportional to angular acceleration.
3. To find the moment of inertia of an irregular body about an axis through its centre of gravity with a torsion pendulum.
4. To determine the moment of inertia of a flywheel.
5. To determine the Young's modulus by bending.
6. Determination of Poisson's ratio for rubber.
7. To verify laws of conservation of (a) linear momentum, (b) kinetic energy in elastic collisions using one dimensional collisions of hanging spheres. (c) Also determine energy transfer and coefficient of restitution.
8. To determine modulus of rigidity of copper wire by Maxwell needle experiment.
9. To determine the coefficient of viscosity of glycerine by Stoke's method.
10. To find the unknown capacitance of a capacitor by flashing and quenching
11. of a neon lamp.
12. Measurement of capacitance, determination of permittivity of a medium air and relative permittivity by de–Sauty's bridge.
13. To study the variation in resistance of filament of a bulb with temperature.

Reference Books:

1. Practical Physics, C.L. Arora, S. Chand & Co.

Bachelor of Science (Honours) Physics Semester–I

SESSION 2021-22

Course Title: Chemistry Lab-I

Course Code: BOPP-1088

Course outcomes

Students will be able to

CO1: develop skills required for the qualitative analysis of organic compounds,

CO2: detect elements (N, S and halogens)

CO3: detect functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro) in simple organic compounds

CO4: determine the physical constants of organic compounds.

CO5: prepare the derivatives of organic compounds.

Bachelor of Science (Honours) Physics Semester–I
SESSION 2021-22
Course Title: Chemistry Lab-I
Course Code: BOPP-1088

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

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

General Guidelines for Practical Examination
The preliminary examination of physical and chemical characteristics (physical state, colour, odor and ignition tests), elemental analysis (nitrogen, sulphur, chlorine, bromine, iodine), solubility tests including acid-base reactions, classification tests involving functional reactivity other than acid-base test, preparation of derivatives for given pure organic compounds.
The following categories of compounds should be analysed:

-Phenols
- Carboxylic acids
-Carbonyl compounds (ketones, aldehydes)
-Carbohydrates
-Aromatic amines
-Amides and Nitro compounds

Suggested Book:

1. Practical Organic Chemistry by F.G. Mann and B.C. Saunders
2. Practical Organic Chemistry by Vogel

Bachelor of Science (Honours) Physics Semester–I

SEMESTER – I
DRUG ABUSE
Course Code: AECD-1161
(Theory)

Course Outcomes:

CO 1. This information can include factual data about what substance abuse is; warning signs of addiction; information about how alcohol and specific drugs affect the mind and body;
CO 2. How to be supportive during the detoxification and rehabilitation process.
CO 3. Main focus of substance abuse education is teaching individuals about drug and alcohol abuse and how to avoid, stop, or get help for substance use disorders.
CO 4. Substance abuse education is important for students alike; there are many misconceptions about commonly used legal and illegal substances, such as alcohol and marijuana.

Bachelor of Science (Honours) Physics Semester–I

SEMESTER – I

SESSION 2021-22

DRUG ABUSE

Course Code: AECD-1161

(Theory)

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

Theory: 40 **CA: 10**

Instructions for the Paper Setter

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.

UNIT-I

1)Meaning of Drug Abuse: Concept and Overview, Historical Perspective of Drug Abuse, Drug Dependence, Drug Addiction, Physical and Psychological Dependence: Drug Tolerance and withdrawal symptoms.

UNIT-II

2) Types of Abused Drugs and their Effects -I

1) Stimulants: Amphetamines – Benzedrine, Dexedrine, Cocaine.
2) Depressants: Alcohol Barbiturates: Nembutal, Seconal, Phenobarbital and Rohypnol.
3) Narcotics: Heroin, Morphine, Oxycodone.

UNIT-III

3) Types of abused drugs and their effects - II

1) Hallucinogens: Cannabis, Marijuana, Hashish, Hash Oil, MDMA, LSD.
2) Steroids.

UNIT-IV

4) Nature and Extent of the Problem: Magnitude or prevalence of the menace of Drug Abuse in India and Punjab, Vulnerable groups by age, gender and economic status, Signs and Symptoms of Drug Abuse: Physical, Academic, Behavioural and Psychological Indicators.

References:

1.Ahuja, Ram (2003), *Social Problems in India*, Rawat Publication, Jaipur.
2. Extent, Pattern and Trend of Drug Use in India, Ministry of Social Justice and Empowerment, Government of India, 2004.
3. Inciardi, J.A. 1981. *The Drug Crime Connection.* Beverly Hills: Sage Publications.
4. Kapoor. T. (1985) *Drug epidemic among Indian Youth*, New Delhi: Mittal Pub.
5. Modi, Ishwar and Modi, Shalini (1997) *Drugs: Addiction and Prevention*, Jaipur: Rawat Publication.
6. National Household Survey of Alcohol and Drug abuse. (2003) New Delhi, Clinical Epidemiological Unit, All India Institute of Medical Sciences, 2004.
7. Sain, Bhim 1991, *Drug Addiction Alcoholism,* Smoking obscenity New Delhi: Mittal Publications.
8. Sandhu, Ranvinder Singh, 2009, *Drug Addiction in Punjab*: A Sociological Study. Amritsar: Guru Nanak Dev University.
9. Singh, Chandra Paul 2000. *Alcohol and Dependence among Industrial Workers*: Delhi: Shipra.
10. Sussman, S and Ames, S.L. (2008). *Drug Abuse: Concepts, Prevention and Cessation,* Cambridge University Press.

Bachelor of Science (Honours) Physics Semester–I

FOUNDATION PROGRAMME

Course Title: Foundation Programme

Course Duration: 30 hours

Course intended for: Semester I students of undergraduate degree programmes of all streams.

Course Credits: 1

Course Code: SECF-I

PURPOSE & AIM

This course has been designed to strengthen the intellectual foundation of all the new entrants in the college. One of the most common factors found in the students seeking admission in college after high school is the lack of an overall view of human history, knowledge of global issues, peaks of human intellect, social/political benchmarks and inventors & discoverers who have impacted human life. For a student, the process of transformation from school to college is full of apprehension and intimidation of the system. The Foundation Programme intends to bridge the gap between high school and college education and develop an intellectual readiness and base for acquiring higher education.

INSTRUCTIONAL OBJECTIVES

- to enable the students to realise their position in the whole saga of time and space
- to inculcate in them an appreciation of life, cultures and people across the globe
- to promote, in the students, an awareness of human intellectual history
- to make them responsible and humane world citizens so that they can carry forward the rich legacy of humanity

FOUNDATION PROGRAMME

Course title: Foundation Programme
Course duration: 30 hours
Course intended for: Sem. I students of all streams (UG Only)
Course credits: 1
Course code: SECF-I

CURRICULUM

Course Code: V1 **Course Credits: 1** **Total Contact Hours: 20**

MODULE	TITLE	HOURS
I	Introduction & Initial Assessment	2
II	The Human Story	3
III	*The Vedas, The Gita*& Eastern Philosophy	2.5
IV	*The Holy Bible*& Genesis	2.5
V	Woman: A Journey through the Ages	2.5
VI	Changing Paradigms in Society, Religion & Literature	2.5
VII	Makers of Modern India	2.5
VIII	Racism & Martin Luther King Jr.	2.5
IX	Modern India at a Glance: Political & Economic Perspective	2.5
X	Technology & Human Life	2.5
XI	The KMV Experience	2.5
XII	Final Assessment, Feedback & Closure	2.5

EXAMINATION

• Total Marks: 25 (Final Exam: 20; Internal Assessment: 5)

• Final Exam: multiple choice quiz**.** Marks – 20; Time: 1 hour

• Internal Assessment: 5 (Assessment: 3; Attendance:2)
Comparative assessment questions (medium length) in the beginning and close of the programme. Marks: 3; Time: 0.5 hour each at the beginning and end.

• Total marks: 25 converted to grade for final result

• Grading system: 90% marks & above: A grade

80% - 89% marks : B grade
70% - 79% marks : C grade
60% - 69% marks : D grade
50% - 59% marks : E grade
Below 50% marks : F grade (Fail - must give the exam again)

SYLLABUS

Module I Being a Human: Introduction & Initial Assessment

• Introduction to the programme

• Initial Assessment of the students through written answers to a couple of questions

Module 2 The Human Story

• Comprehensive overview of human intellectual growth right from the birth of human history

• The wisdom of the Ancients

• Dark Middle Ages

• Revolutionary Renaissance

• Progressive modern times

• Most momentous turning points, inventions and discoveries

Module 3 *The Vedas, The Gita* & The Indian Philosophy

• Origin, teachings and significance of *The Vedas*

• Upnishads and Puranas

• Karma Theory of *The Bhagwad Gita*

• Main tenets of Buddhism & Jainism

• Teachings of Guru Granth Sahib

Module 4 *The Holy Bible* & Genesis

• Book of Genesis: Creation and Fall

• Noah's Ark

• Moses &The Ten Commandments

• Christ and His teachings

• Christianity and the world

Module 5 Changing Paradigms in Society, Religion & Literature

• Renaissance: The Age of Rebirth

• Transformation in human thought

• Importance of humanism

• Geocentricism to heliocentricism

• Copernicus, Galileo, Columbus, Darwin and Saint Joan

• Empathy and Compassion

Module 6 Woman: A Journey through the Ages

• Status of women in pre-vedic times

• Women in ancient Greek and Roman civilizations

• Women in vedic and ancient India

• Status of women in the Muslim world

• Women in the modern world

• Crimes against women

• Women labour workforce participation

• Women in politics

• Status of women- our dream

Module 7 Makers of Modern India

• Early engagement of foreigners with India

• Education: The first step to modernization

• Railways: The lifeline of India

• Raja Ram Mohan Roy, Gandhi, Nehru, Vivekanand, Sardar Patel etc.

• Indira Gandhi, Mother Teresa, Homai Vyarawala etc.

• The Way Ahead

Module 8 Racism: Story of the West

• European beginnings of racism

• Racism in the USA - Jim Crow Laws

• Martin Luther King Jr. and the battle against racism

• Apartheid and Nelson Mandela

• Changing face of racism in the modern world

Module 9 Modern World at A Glance: Political & Economic Perspective

• Changing world order

• World War I & II

• UNO and The Commonwealth

• Nuclear Powers; Terrorism

• Economic Scenario: IMF, World Bank

• International Regional Economic Integration

Module 10 Technology and Human Life

• Impact of technology on modern life

• Technological gadgets and their role in our lives

• Technology and environment

• Consumerism and materialism

• Psychological and emotional consequences of technology

• Harmonising technology with ethics and humaneness

Module 11 The KMV Experience

• Historical Legacy of KMV

• Pioneering role in women emancipation and empowerment

• KMV Contribution in the Indian Freedom Struggle

• Moral, cultural and intellectual heritage of KMV

• Landmark achievements

• Innovative initiatives; international endeavours

• Vision, mission and focus

• Conduct guidelines for students

Module 12 Final Assessment, Feedback & Closure

- Final multiple choice quiz
- Assessment through the same questions asked in the beginning
- Feedback about the programme from the students
- Closure of the programme

PRESCRIBED READING

- ***The Human Story*** published by Dawn Publications

Semester II

SESSION 2021-22
Punjabi (Compulsory)

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–II

COURSE CODE- BOPL-2421

COURSE OUTCOMES

CO1: 'ਸਾਹਿਤ ਦੇ ਰੰਗ' ਪੁਸਤਕ ਦੇ ਵਾਰਤਕ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਵਾਰਤਕ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO2:ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਭਾਸ਼ਣ ਕਲਾ ਤੇ ਲਿਖਣ ਕਲਾ ਦੀ ਨਿਪੁੰਨਤਾ ਪੈਦਾ ਕਰਨਾ ਹੈ।

CO3:'ਸਾਹਿਤ ਦੇ ਰੰਗ' ਪੁਸਤਕ ਦੇ ਰੇਖਾ ਚਿੱਤਰ ਭਾਗ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਰੇਖਾ ਚਿੱਤਰ ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤੇ ਇਹਨਾਂ ਮਹਾਨ ਸ਼ਖ਼ਸੀਅਤਾਂ ਦੀ ਸਫ਼ਲਤਾ ਪਿੱਛੇ ਘਾਲੀਆਂ ਘਾਲਣਾਵਾਂ ਤੋ ਵਾਕਫ਼ ਕਰਵਾਉਂਦਿਆਂ ਜੀਵਨ ਸੇਧ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ।

CO4:ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣ ਦਾ ਮਨਰੋਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।

CO5:ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਇਸਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਨੂੰ ਆਧਾਰ ਬਣਾ ਕੇ ਇਹਨਾਂ ਸੰਕਲਪਾਂ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ।

CO6:ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ - ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

CO7:ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ। ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

SESSION 2021-22
Punjabi (Compulsory)

BACHELOR OF SCIENCE (HONOURS) PHYSICS
SEMESTER–II

COURSE CODE- BOPL-2421

ਸਮਾਂ : 3 ਘੰਟੇ **Maximum Marks: 50**

Theory : 40
CA :10

ਪਾਠ ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

ਯੂਨਿਟ-I

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾ ਮਹਿਲ ਸਿੰਘ),ਭਾਗ ਦੂਜ਼ਾ(ਵਾਰਤਕ),ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ,ਅੰਮ੍ਰਿਤਸਰ।
(ਲਾਲ ਬਾਦਸ਼ਾਹ,ਹਾਰ ਸ਼ਿੰਗਾਰ,ਡੂੰਘੀਆਂ ਸਿਖਰਾਂ ਲੇਖ ਪਾਠਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ)
(ਸਾਰ,ਵਿਸ਼ਾ ਵਸਤੂ)

08 ਅੰਕ

ਯੂਨਿਟ-II

ਸਾਹਿਤ ਦੇ ਰੰਗ (ਸੰਪਾ.ਡਾ ਮਹਿਲ ਸਿੰਘ),ਭਾਗ ਦੂਜਾ (ਰੇਖਾ ਚਿੱਤਰ),ਰਵੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ,ਅੰਮ੍ਰਿਤਸਰ।
(ਬਾਤਾਂ ਮੋਹਨ ਸਿੰਘ ਕੀਆਂ, ਗੁਲਾਬੀ ਕਾਗਜ਼ ਉਤੇ ਲਿਖੀ ਕਵੀਤਾ :ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ,ਸਤਿੰਦਰ ਸਿੰਘ ਨੂਰ :ਸਾਹਿਤ ਦਾ ਜਥੇਦਾਰ ਰੇਖਾ ਚਿੱਤਰ ਪਾਠਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਨਹੀਂ ਹਨ)
(ਸਾਰ,ਵਿਸ਼ਾ ਵਸਤੂ)

08 ਅੰਕ

ਯੂਨਿਟ-III

(ੳ) ਮੁਹਾਵਰੇ
(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪਸ਼੍ਨਾਂ ਦੇ ਉਤਰ। 08 ਅੰਕ

ਯੂਨਿਟ-IV

(ੳ) ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਨਾਂਵ,ਪੜਨਾਂਵ,ਕਿਰਿਆ,ਵਿਸ਼ੇਸ਼ਣ
(ਅ) ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ,ਸੰਬੰਧਕ,ਯੋਜਕ,ਵਿਸਮਿਕ 08 ਅੰਕ

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 ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

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

SESSION 2021-22

BACHELOR OF SCIENCE (HONOURS) PHYSICS

SEMESTER–II

BASIC PUNJABI

In lieu of Punjabi (Compulsory)

COURSE CODE - BOPL-2031

Course outcomes

CO1:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸਿਖਾਉਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਵਿਚ ਪਾ ਕੇ ਇਕ ਹੋਰ ਭਾਸ਼ਾ ਸਿੱਖਣ ਦੇ ਮੌਕੇ ਪ੍ਰਦਾਨ ਕਰਨਾ ਹੈ ।

CO2:ਇਸ ਵਿਚ ਵਿਦਿਆਰਥੀ ਨੂੰ ਬਾਰੀਕਬੀਨੀ ਨਾਲ ਭਾਸ਼ਾ ਦਾ ਅਧਿਐਨ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO3:ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।

CO4:ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ - ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ ।

CO5:ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦਾ ਸ਼ਬਦ ਘੇਰਾ ਵਿਸ਼ਾਲ ਕਰਨਾ ਹੈ ।

CO6:ਵਿਦਿਆਰਥੀ ਵਾਕ ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਇਸਦੀ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ਅਤੇ ਭਾਸ਼ਾ ਤੇ ਪਕੜ ਮਜਬੂਤ ਹੋਵੇਗੀ।

CO7:ਪੈਰ੍ਹਾ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ ।

CO8: ਸੰਖੇਪ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਸੰਖੇਪ ਵਿਚ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ।

CO9:ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ ।

CO10: ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ।ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

SESSION 2021-22

BACHELOR OF SCIENCE (HONOURS) PHYSICS

SEMESTER–II

BASIC PUNJABI

In lieu of Punjabi (Compulsory)

COURSE CODE - BOPL-2031

smW: 3 GMty **Maximum Marks: 50**

Theory : 40

CA : 10

ਪਾਠ ਕ੍ਰਮ

ਯੂਨਿਟ-I

ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ (ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ, ਯੋਜਕ ਅਤੇ ਵਿਸਮਿਕ)

08 ਅੰਕ

ਯੂਨਿਟ-II

ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ : ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ

(ੳ) ਸਾਧਾਰਨ ਵਾਕ, ਸੰਯੁਕਤ ਵਾਕ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

(ਅ) ਬਿਆਨੀਆ ਵਾਕ, ਪ੍ਰਸ਼ਨਵਾਚਕ ਵਾਕ ਅਤੇ ਹੁਕਮੀ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)

08 ਅੰਕ

ਯੂਨਿਟ-III

ਪੈਰ੍ਹਾ ਰਚਨਾ

ਸੰਖੇਪ ਰਚਨਾ 08 ਅੰਕ

ਯੂਨਿਟ-IV

ਚਿੱਠੀ ਪੱਤਰ (ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ)

ਮੁਹਾਵਰੇ 08 ਅੰਕ

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 ਕੁਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।

3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 08 ਅੰਕ ਹਨ।

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

Bachelor of Science (Honours) Physics
(Semester-II)
SESSION 2021-22
Course Title: Punjab History and Culture (C. 320 to 1000 B.C.)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Course Code: BOPL-2431

COURSE OUTCOMES

After completing Semester II and course on Ancient History of Punjab, students of History will be able to identify and have a complete grasp on the sources & writings of Ancient History of Punjab

CO 1: Analyse the emergence of Mauryan, Gupta empires during the classical age in India

CO 2: To understand the various factors leading to rise and fall of empires and emergence of new dynasties and their Culture, society, administration , polity and religion specifically of Kushans and Vardhanas in the Punjab

CO 3: Students will be adept in constructing original historical argument based on primary source material research

CO 4: To have an insight on the existing Literature of this period and understand the past developments in the light of present scenario.

CO 5: To enable students to have thorough insight into the various forms/styles of Architecture and synthesis of Indo - Muslim Art and Architecture in Punjab

Bachelor of Science (Honours) Physics

(Semester-II)
SESSION 2021-22
Course Title: Punjab History and Culture (C. 320 to 1000 B.C.)
(Special paper in lieu of Punjabi Compulsory)
(For those students who are not domicile of Punjab)

Course Code- BOPL-2431

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

Instructions for the Paper Setter:

4. **Question paper shall consist of four Units**
5. **Examiner shall set 8 questions in all by selecting Two Questions of equal marks from each Unit.**
6. **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.**
7. **Each question will carry 8 marks**

Unit-I

1. Alexander's Invasion's and Impact
2. Administration of Chandragupta Maurya and Ashoka.

Unit-II

3. The Kushans: Gandhar School of Art .
4. Gupta Empire: Golden period (Science , Art and Literature)

Unit-III

5. The Punjab under the Harshvardhana
6. Socio-cultural History of Punjab from 7th to 1000 A.D.

UNIT IV

7. Development of Languages and Education with Special reference to Taxila
8. Development to Art and Architecture

Suggested Readings

1. L. M Joshi (ed), *History and Culture of the Punjab*, Art-I, Punjabi University, Patiala, 1989 (3rd edition)
2. L.M. Joshi and Fauja Singh (ed.), *History of Punjab* , Vol.I, Punjabi University, Patiala, 1977.
3. Budha Parkash, *Glimpses of Ancient Punjab*, Patiala, 1983.
4. B.N. Sharma: *Life in Northern India*, Delhi. 1966.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2020-21)

SESSION 2021-22

COMMUNICATION SKILLS IN ENGLISH

Course Code: BOPM-2102

COURSE OUTCOMES

At the end of this course, the students will develop the following skills:

CO 1: Enhancement of listening skills with the help of listening exercises based on conversation, news and TV reports

CO 2: Improvement of speaking skills enabling them to converse in a specific situation

CO 3: Acquisition of knowledge of phonetics which will help them in learning about correct pronunciation as well as effective speaking

CO 4: The capability to present themselves well in a job interview

CO 5: The ability of Note-Taking to be able to distinguish the main points from the supporting details and the irrelevant information from the relevant one

CO 6: Speaking skills of the students enabling them to take active part in group discussion and present their own ideas

CO 7: The capability of narrating events and incidents in a logical sequence

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2020-21)

SESSION 2021-22

COMMUNICATION SKILLS IN ENGLISH

Course Code: BOPM-2102

Time: 3 hours (Theory) Max. Marks: 50

3 hours (Practical) Theory: 25

Practical: 15

Continuous Assessment: 10

Instructions for the paper setters and distribution of marks:

The question paper will consist of four sections and distribution of marks will be as under:

Section-A: Two questions of theoretical nature will be set from Unit I of the syllabus and the candidates will have to attempt one carrying 5 marks.

Section-B: Two questions will be set from Unit II of the syllabus. Candidates will have to attempt one carrying 5 marks.

Section-C: Two questions will be set from Unit III of the syllabus. Candidates will have to attempt one carrying 5 marks.

Section-D: Two questions will be set from Unit IV of the syllabus. Candidates will have to attempt one carrying 5 marks.

Important Note:

The candidate will have to attempt five questions in all selecting one from each section of the question paper and the fifth question from any of the four sections.

(5 x 5 = 25)

Course Contents:

Unit I

Listening Skills: Barriers to listening; effective listening skills; feedback skills.

Activities: Listening exercises – Listening to conversation, News and TV reports

Unit II

Attending telephone calls; note taking and note making

Activities: Taking notes on a speech/lecture

Unit III

Speaking and Conversational Skills: Components of a meaningful and easy conversation, understanding the cue and making appropriate responses, forms of polite speech, asking and providing information on general topics

Activities: 1) Making conversation and taking turns

2) Oral description or explanation of a common object, situation or concept

Unit IV

The study of sounds of English, stress Situation based

Conversation in English Essentials of Spoken English

Activities: Giving Interviews

Recommended Books:

1. Oxford Guide to Effective Writing and Speaking by John Seely.

2. Business Communication by Sethi, A and Adhikari, B., McGraw Hill Education 2009.

3. Communication Skills by Raman, M. & S. Sharma, OUP, New Delhi, India (2011).

4. A Course in Phonetics and Spoken English by J. Sethi and P.V. Dhamija, Phi Learning.

PRACTICAL / ORAL TESTING

Time: 3 hours Marks: 15

Course Contents:

1. Oral Presentation with/without audio visual aids

2. Group Discussion

3. Listening to any recorded or live material and asking oral questions for listening comprehension

Questions:

1. Oral Presentation will be of 5 to 7 minutes duration. (Topic can be given in advance or it can be of student's own choice). Use of audio-visual aids is desirable.

2. Group discussion comprising 8 to 10 students on a familiar topic. Time for each group will be 15 to 20 minutes.

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)
Semester II

Course Outcome of ELECTRICITY and MAGNETISM-II

Course No. BOPL-2393

After passing this course, students will be able to:

CO1: understand source of magnetic field and application of BiotSavart's Law and Ampere's circuital law in different situations.

CO2: understand different type of magnetic materials and their characteristics.

CO3: understand the Faraday's Law of electromagnetic induction and LCR circuits.

CO4: derive Maxwell equations and their applications in propagation of e.m. waves in conductors and insulators.

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)
SEMESTER-II

COURSE CODE: BOPL-2393

ELECTRICITY AND MAGNETISM-II

Maximum Marks: 75 (External 60 + Internal 15) **Examination Time: 3 Hours**
Pass Marks: 21 **Total Teaching hours: 60**

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.

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

Unit-I

Magnetostatics : Magnetic fields, magnetic forces, magnetic force on a current carrying wire. Torque on a current loop, Biot-Savart law. Magnetic Field due to infinite wire carrying steady current, field of rings and coils. Magnetic field due to a solenoid, Force on parallel current carrying wires. Ampere's circuital law and its applications to infinite hollow cylinder, solenoid and toroid. The divergence and curl of magnetic induction, Comparison of magnetostatics and electrostatics. Magnetic vector potential and its expression. Surface current density and Change in magnetic field at a current sheet. Hall Effect.

Unit-II

Magnetic Fields in Matter: some important terms associated with magnetic materials, Field of a current loop, force on magnetic dipole in a an external field, torque on current loop, potential energy of magnetic dipole, Electric currents in atoms, electron spin and magnetic moment, free and bound currents, magnetization and magnetic susceptibility, Magnetic field caused by magnetized matter,. Basics about diamagnetism paramagnetism and ferromagnetism, hysteresis curve.

Unit-III

Faraday's law and Maxwell's equations: Electromagnetic Induction, Faraday's Induction Experiments, Faraday's Laws of Electromagnetic Induction (Integral And Differential Forms) ,Lenz's law, Self-Induction, Expression for Self Induction : Neumann's Formula, . Self-Inductance of a Solenoid and a Toroidal, Energy Stored in an Inductor, Mutual Induction, Expression for Coefficient of Mutual Induction and Reciprocity theorem, Mutual Inductance of two Solenoids, Inductive Coupling of Electrical Circuits, Modification of Ampere's Law and the Displacement Current, Maxwell's Equation of Electromagnetism, Series and Parallel LCR Circuits, Average Power Associated with LCR Circuit

Unit-IV

Plane Electromagnetic Waves: Production of em waves, EM wave spectrum, EM wave equation for a medium having finite μ and ε but $\sigma = 0$, Nature of em waves, Wave equation for polarized em waves and their solutions, Relation between electric and magnetic field vectors an em wave, Impedance of a dielectric to em waves, The Poynting vector and flow of energy in an em wave, Equation of continuity, EM waves for a medium having finite values of μ and ε but $\sigma \neq 0$, Solution of wave equation for a

conducting medium, Skin depth, EM wave velocity and wave dispersion in a conductor, Behaviour of a medium as a conductor or dielectric, Characteristic impedance of a conducting medium to em waves, magnetic and electric energy densities, Poynting vector and Equation of Continuity for a Conducting medium, Reflection and transmission of em waves at the boundary (Normal and Oblique incidence).

Text and Reference Books:

1. Introduction to Electrodynamics by David J. Griffiths, Pearson Prentice Hall of India

2. Electricity & Magnetism, Berkeley Physics Course Vol. 2 by E.M. Purcell, McGraw Hill, New York

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)
Semester II

Course Outcomes: Vibrations and Waves

Course No. BOPL-2394

After passing this course the student will be able to:

CO1: demonstrate Lissajous figures by mechanical and analytical method with different cases.

CO2: understand Free, damped and resonance oscillations, both mechanical and electric using differential equations.

CO3: solve differential equation of forced oscillations & to obtain related quantities.

CO4: understand concept of coupled oscillators and wave motion. Student will also be able to apply the concept of waves and oscillations to any type of waves like e. m. waves, mechanical waves.

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)
SEMESTER-II

COURSE CODE: BOPL-2394

VIBRATIONS AND WAVES

Maximum Marks: 75 (External 60 + Internal 15) **Examination Time: 3 Hours**
Pass Marks: 21 **Total Teaching hours: 60**

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.

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

Unit-I

Simple and Damped Oscillations: Simple Harmonic Motion, energy of SHO, Compound pendulum, Torsional pendulum, Equation of SHM, Superposition of two perpendicular SHM, Lissajous figures– superposition of SHM's. Damped motion of mechanical and electrical oscillator, heavy damping, critical damping. Energy dissipation and energy of damped oscillator, amplitude decay, logarithmic decrement, relaxation time, Q value, comparison between Free and Damped oscillations

Unit-II

Forced Oscillations: Differential equation of forced mechanical oscillator**,** Transient and steady state behaviour of a forced oscillator, Variation of displacement and velocity with frequency of driving force, frequency dependence of phase angle between force and (a)displacement, (b) velocity, Power supplied to oscillator by driving force and its variation with driving force frequency, Resonance absorption and Q-value as a measure of power absorption bandwidth, Q-value as amplification factor, Forced electrical oscillator, Variation of current with frequency, Variation of power supplied with frequency of applied voltage, Q factor as amplification factor.

Unit-III

Coupled Oscillations: Stiffness coupled oscillators, In phase and Out phase modes, normal co-ordinates and normal modes of vibration, solutions for differential equations for normal modes and exchange of energy, inductance coupling of electrical oscillators, loose, intermediate and strong coupling, energy exchange between two electrically coupled oscillators.

Unit-IV

Wave Motion: Types of wave motion**,** The wave equation, transverse waves on a string, the string as a forced oscillator, characteristic impedance of a string, reflection and transmission of transverse waves on a string at a boundary, Energy of a progressive wave, impedance matching, standing waves on a string of fixed length, Energy of a vibrating string, normal modes and eigen frequencies. Energy in a normal mode of oscillation, wave groups, group velocity, dispersive and non-dispersive media, longitudinal waves.

Reference Books:

1. The Physics of Vibrations and Waves by H.J. Pain, John Wiley, Chichester

2. Vibrations and Waves in Physics by I.G. Main-Cambridge University, Cambridge

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)

Semester–II

Course Title: Mathematics-II

Course Code: BOPL-2335

Course outcomes

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

CO 1: Manage to solve problems related to series solution of Bessel, Legendre and Hermite functions.
CO 2: Understand the concept of Partial differential equations& its applications to find the solution of Laplace, Wave & Diffusions equations.
CO 3: Apply Laplace transforms on periodic functions and differential equations with constant coefficients.
CO 4: Differentiate between Fourier Sine & Cosine series and Fourier Sine & Cosine transforms.
CO 5: Classify the difference between Laplace transforms and Fourier transforms.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-II
COURSE CODE: BOPL-2335
MATHEMATICS-II

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**
Pass Marks: 35% **Total Teaching hours: 60**

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

UNIT –I

Second order Differential Equations: Linear differential equations with variable coefficients. Series Solution of Bessel, Legendre, Hermite, Laguerre and Hypergeometric differential equations by Frobenius method. Recurrence relations and orthogonality properties.

15 Lectures

UNIT –II

Partial Differential Equations: Definition and formation of first and second order partial differential equations, Laplace, Wave and diffusion equation in one and two dimensions, Solutions of these equations by separation of variables.

15 Lectures

UNIT –III

Laplace Transforms: Definition, elementary Laplace transforms, transforms of derivatives, integration of transforms, Laplace transform of periodic functions, solution of differential equations with constant coefficients using Laplace transforms.

15 Lectures

UNIT –IV

Fourier series and Transforms: Periodic functions, Drichlet's conditions, Fourier coefficients, Sine and Cosine series, half range expansions, exponential series, differentiation and integration of Fourier transform, Fourier Sine and Cosine transforms, Inversion formulae, Fourier transforms of derivatives.

15 Lectures

Text Book:

1. Mathematical Methods for Physicists by George Arfken, New York, Academic Press

Reference Books:

1. Mathematics Hand book by M. Vygodsky, Mir, Moscow
2. Higher Engineering Mathematics by B.S. Grewal, Delhi, Khanna
3. Applied Mathematics for Engineers and Physicists by Pipes &Harvill, London, McGraw Hill
4. Mathematics of Physics and Modern Engineering by Sokolnikoff & Recheffer

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)
(Semester-II)
COURSE CODE: BOPL-2086
Chemistry-II

(Theory)

Course outcomes:

Course outcomes:

Students will be able to

CO1: understand the key features of coordination compounds viz. variety of structures, oxidation numbers and electronic configurations, coordination numbers and explain the bonding and stability of complexes. CO2: describe the shapes and structures of coordination complexes with coordination numbers ranging from 4 to 12.

CO3: describe the stability of metal complexes by the use of formation constants.

CO4: understand the splitting of d-orbitals in octahedral, tetrahedral, cubic and square planar fields of ligands.

CO5: calculate C.F.S.E. of high spin and low spin octahedral and high spin tetrahedral complexes.

CO6: explain thermodynamic effects of crystal field splitting and determine microstate and ground state terms.

CO7: draw MOEL diagram for octahedral and tetrahedral complexes. CO8: explain bonding in polynuclear metal carbonyls and counting of electrons in carbonyl clusters. CO9: describe the effect of macrocyclic ligands on anion and cation complex structure.

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)
SEMESTER-II

Bachelor of Science (Honours) Physics (Semester II)

(Session: 2021-2022)

Course Code: BOPL-2086

COURSE TITLE: Chemistry-II (Theory)

Examination Time: 3 Hours **Max. Marks: 50**
(Theory: 40, CA: 10)

Instructions for the Paper Setters:
Eight questions of equal marks (eight marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.
Note: Students can use Non-Scientific calculators or logarithmic tables.

UNIT- I Co-ordination Chemistry: Introduction, Werner's coordination theory, naming of co-ordinate complexes. Co-ordination numbers 1-12 and their stereo-chemistries. Factors affecting co-ordination numbers and stereo-chemistry
(a) Configurational Isomers
(b) Conformational isomerism, VSPER theory, molecular orbital theory applied to homoneuclear diatomic molecules and heteronuclear Diatomic molecules.

Bonding in metal complexes: Valence bond theory for co-ordinate complexes, inner and outer orbital complexes, Electro-neutrality and back bonding, limitations of V.B. theory.
Stability of coordination compounds: Introduction, Stability constant, stepwise stability constant, overall stability constant. Factors affecting the stability of metal ion complexes with general ligands, HSAB principle.

UNIT-II Crystal field theory: Splitting of d-orbitals in octahedral, tetrahedral fields of ligands. Calculation of C.F.S.E. in high spin and low spin octahedral and High spin tetrahedral complexes, factors affecting the 10 Dq Value. Structural effects of crystal field splitting (Jahn-Teller distortion, variation of Ionic radii with increase in atomic number). Thermodynamics effects of C.F. splitting, variation in lattice energies, Hydration energies, Dissociation energies, Formation constants of 71 hexammines. Site selection in spinels, Paramagnetism, diamagnetism, ferro and anti ferromagnetism. Microstates and spectroscopic terms, a calculation of spectroscopic terms for d1 electronic configurations, L S coupling, Hund‟s rule for finding the ground state terms, Electronic spectral properties of Ist transition series, limitations of C.F.T.

UNIT-III Molecular Orbital Theory: Evidence for covalent character in Bonding, MOEL diagram for octahedral and tetrahedral complexes involving bonding, charge transfer transitions.
πAcid Ligands: Definition Carbon monoxide complexes, bonding in linear MCO groups. polynuclear metal carbonyls, carbonyl hydrides and halides. Metal-metal bonding metal-metal multiple bonding, isolable analogies, Structure of high nuclearity carbonyl clusters, counting of electrons in carbonyl clusters.

UNIT-IV Alkali metal and alkaline earth metal chelators: Macrocyclic ligands, macrocyclic effect, crown ethers and podands, coronands, cryptands, structure of 18 crown-6 complex with KNCS, ion cavity complex, effect of anion and cation type on complex structure, simultaneous complexation of metal ion and water or of two metal ions,sandwich formation, cryptands and their cation complexes, podands with aromatic donors and groups.

Text and Reference Books:

1. Inorganic Chemistry, 3rd Ed. By J.E. Huheey
2 Advanced Inorganic Chemistry by . F.A. Cotton and G. Wilkinson
3. Concepts and Models of Inorganic Chemistry by B.E. Douglas and D.H. McDaniel
4. Topics in current chemistry Vol-II by R. Hilgenfeld and W. Saengar

BACHELOR OF SCIENCE (HONURS) PHYSICS (**SESSION 2021-22**)

PHYSICS LAB-II

Course No. BOPP-2397

COURSE OUTCOMES

CO1: Students will be able to study resonance in series & parallel LCR circuit.

CO2: At the end of this course, students will be able to find the value of capacitor, coefficient of self-inductance, permeability & permittivity of air.

CO3: Students will be able to study the variation of magnetic field on the axis of coil & can find the value of horizontal component of magnetic field.

CO4: Students will be able to verify various concepts related to oscillations of various pendulums and laws of vibrations of strings.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-II

COURSE CODE: BOPP-2397

PHYSICS LAB-II

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**
Pass Marks: 35% **Total Teaching hours: 90**

General Guidelines for Practical Examination

I. The distribution of marks is as follows:

i) One experiment 20 Marks **ii) Brief Theory 6 Marks**

iii) Viva–Voce 7 Marks **iv) Record (Practical file) 7 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session and 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 be allotted to more than three examinee in any group.

1. To study the magnetic field produced by a current carrying solenoid using a search coil and calculate permeability of air.
2. To study the induced e.m.f. as a function of the velocity of the magnet.
3. To study the phase relationships using impedance triangle for LCR circuit and calculate impedance.
4. Resonance in a series and parallel LCR circuits for different R–value and calculate Q–value.
5. To determine low resistance with Carey-Foster's Bridge.
6. To measure the self-inductance L of a given coil by Anderson Bridge method.
7. To find the value of BH, the horizontal component of ear using a deflection & vibration magnetometer.
8. To study the variation of magnetic field with distance along the axis of coil carrying current by plotting a graph.
9. To plot a graph between the distance of the knife edge from the centre of gravity and the time period of a compound pendulum from graph find (a) acceleration due to gravity, (b) the radius of gyration and moment of inertia about an axis passing through centre of gravity.
10. To determine the acceleration due to gravity by Kater's Pendulum.
11. To verify the laws of vibrating string by using Meldes apparatus and to show that $/2\lambda$ is constant.
12. To measure logarithmic decrement, coefficient of damping, relaxation time and quality factor of a damped simple pendulum.

Reference Books:

1. Practical Physics by C.L. Arora, S. Chand & Co.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)

(Semester-II)

COURSE CODE: BOPP-2088

Chemistry Lab-II

(Practical)

Course outcomes:

Students will be able to

CO1: separate and identify the various ions present in the mixture.

CO2: detect and remove interfering radicals present in the mixture.

CO3: understand the principle of inorganic qualitative analysis.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-II

COURSE CODE: BOPP-2088

CHEMISTRY LAB-II

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**
Pass Marks: 18 **Total Teaching hours: 60**

Qualitative Analysis

Identification of cations and anions in a mixture which may contain combinations of acid ions. These must contain interfering acid anions and one, the insoluble.

a) Special Tests for Mixture of anions

I. Carbonate in the presence of sulphate.
II. Nitrate in the presence of nitrite
III. Nitrate in the presence of bromide and iodide.
IV. Chloride in the presence of bromide and iodide.
V. Chloride in the presence of bromide.
VI. Chloride in the presence of iodide.
VII. Bromide and iodide in the presence of each other and of chloride.
VIII. Sulphide, sulphite, thiosulphate and sulphate in the presence of each other.
IX. Borate in the presence of copper and barium salts.

b) Separation and identification of cations in mixtures

i) Separation of cations in groups.
ii) Separation and identification of Group I, Group II ,Group III, Group IV, Group V and Group VI cations.

Reference Books:

1. Vogel's Qualitative Inorganic Analysis (revised) by G. Svehla, and B. Sivasankar, Pearson
2. Vogel's Textbook of Quantitative Inorganic Analysis (revised) by R. C. Bassett, G. H. Denney,and J. Jeffery, Mendham
3. Vogel's book on Inorganic Qualitative Analysis

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)

SEMESTER-II

Course title: Moral Education Programme

Course duration: 30 hours **Course code: SECM-2502**

Course Objectives:

- To sensitize students about the role and importance of human values and ethics in personal, social and professional life.
- To enable students to understand and appreciate ethical concerns relevant to modern lives.
- To prepare a foundation for appearing in various competitive examinations.
- To sensitize the students about the current issues and events of national and international importance.
- To highlight plausible implications of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with nature.

Course Contents:

- Introduction to Moral Education
- Need , content and purpose
- Vedic values
- Character building

The Self and You

- Understanding the Self –Self awareness, fighting the five evils (lust, anger, attachment, ego and greed), Self growth.
- Personal ethics
- Aspiration v/s ambition, self- seeking v/s selflessness
- Physical and mental health

The Family and You

- Importance of family- the basic unit of human interaction.
- Generation gap
- Relationship with siblings and elders

The Society and You

- Social responsibility
- Our rights and duties
- Civic sense
- Opposite sex relations
- Globalization and IT boom – cellphone menace
- Peer pressure
- Gender issues

The Nation and You

- International peace and brotherhood
- Saving the environment
- Communal harmony, Tolerance, Understanding of Cultures
- Respect for Martyrs
- National Pride

SEMESTER III

SEMESTER–III

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-III
OPTICS

Course Code: BOPL-3391

Course Outcome of Optics

After passing this programme the students will be able to:

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

CO2: understand the interference of waves by division of Amplitude and its methods and will have knowledge of interferometers

CO3: understand the Huygen's Fresnel theory and diffraction, Fraunhoffer diffraction due to single slit, double slit and n slits, the concept of resolving power.

CO4: understand the concept the polarization of light and types of polarisers.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-III

OPTICS

Course Code: BOPL-3391

Maximum Marks: 75 (External 60 + Internal 15) **Examination Time: 3 Hours**
Passing Marks : 21 **Total Teaching hours: 60**

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.

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, Distribution of intensity in young's double slit experiment, Conditions for sustained interference pattern, Coherent sources of light, Temporal and spatial coherence, Mathematical analysis of temporal coherence, Interference pattern by division of wave front, Theory of interference fringes Fresnel Biprism, thickness of thin transparent sheet Fresnel double mirror, Llyod's single mirror, Displacement of fringes,.

UNIT–II

Interference by Division of Amplitude: Change of phase on reflection, Interference in thin films due to reflected and transmitted light, colour of thin film, Need for extended source for interference by division of amplitude, Fringes of equal inclination and equal. Thickness non reflecting films, Newton's Rings and their application, Michelson Interferometer and their application, Fabry Perot interferometer and etalon. Distribution of intensity in Fabry Perot fringes. Anti reflection coatings

UNIT–III

Diffraction: Diffraction of Light, Huygen's Principle, Huygen's -fresnel Diffraction theory, half-period zones, Zone plate, Diffraction at a straight edge, Diffraction by a circular aperture, diffraction by circular disc Distinction between fresnel and fraunhoffer diffraction. Fraunhoffer diffraction at a single slit, at double slit, at rectangular and circular apertures, Effect of diffraction in optical

imaging, Diffraction of N slits, dispersive power, Rayleigh Criterion for resolving power, Resolving power of telescope in diffraction grating, its use as a spectroscopic element and its resolving power, Resolving power of microscope. Resolving power of Fabry-perot interferometer.

UNIT–IV

Polarization: Transverse nature of light, Polarization by reflection and refraction, Brewster's Law, Malus Law, Double refraction, Nicol Prism, Elliptically and circularly polarized light, Quarter wave and half-wave plates, production and detection of polarized light, Optical activity, specific rotation. Half shade polarimeter

Reference Books:

1. Text book of Optics by N. Subramanayam, B. Lal and M. N. Avadhamulu
2. Fundamentals of Optics: by Jenkins and White
3. Optics by Ajoy Ghatak

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-III

STATISTICAL AND THERMAL PHYSICS

(SESSION 2021-22)

Course No. BOPL-3392

Course Outcomes: STATISTICAL AND THERMAL PHYSICS

After passing this programme the students will be able to:

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

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

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

CO4: Understand the Maxwell Thermodynamics relations, Change of state and Claypron equation. Thermodynamic Potentials and Equilibrium of Thermodynamic Systems

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-III

COURSE CODE: BOPL-3392

STATISTICAL AND THERMAL PHYSICS

Maximum Marks: 75 (External 60 + Internal 15) **Examination Time: 3 Hours**
Pass Marks: 21 **Total Teaching hours: 60**

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.

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 Boltzman (MB) statistics applied to an ideal gas in equilibrium. Experimental verification of law of distribution of molecular speeds. Need for Quantum Statistics – B.E. Statement of Planck's law of Radiation, Wien's Displacement and Stefan's law. Pressure exerted by radiations, equation of state of Photon gas, Radiation pressure and stability of massive stars, Fermi Dirac (FD) statistics. Application of FD statistics to free electron gas inside conductor, equation of state of a degenerate Fermi gas, Stability of white dwarfs, Comparison of M.B, B.E and F.D statistics, relative occupation of energy levels.

UNIT- III

Statistical Basis of Entropy : Definition of entropy, change of entropy of a system, third law of thermodynamics. Additive nature of entropy, law of increase of entropy, reversible and irreversible processes and their examples, work done in a reversible process, Examples of

increase of entropy in some natural processes, entropy and disorder. Brief review of terms used in thermodynamics, Laws of Thermodynamics, Carnot's Heat Engine, Entropy changes in Carnot's cycle, Carnot's theorem, Thermodynamic temperature scale, Thermoelectric effect and its applications, change of entropy along a reversible path in P-V diagram, entropy of a perfect gas, equation of state of an ideal gas, Heat death of Universe.

UNIT- IV

Maxwell's Thermodynamic Relations : Perfect differentials in Thermodynamics, Derivation Maxwell Thermodynamic Relationships, Cooling produced by adiabatic expansion, adiabatic compression, adiabatic stretching of wires and thin films, change of internal energy with volume. Expression for Cp-Cv, variation of Cv with volume, Clapeyron's equation. Joule-Thomson effect and its thermodynamic treatment, Joule-Thomson effect for a Vander Waal's gas, Production of very low temperatures by adiabatic demagnetization, Concept of Negative Temperatures, Thermodynamic Potentials and Equilibrium of Thermodynamic Systems, Equation of state of an ideal gas, degrees of freedom, Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic, Mean free path (Zeroth Order).

Reference Books:

1. Thermal Physics by S. Garg, R. Bansal and C. Ghosh, 1993, Tata McGraw-Hill.
2. A Treatise on Heat by Meghnad Saha, and B.N. Srivastava, 1969, Indian Press.
3. Thermodynamics by Enrico Fermi, 1956, Courier Dover Publications.
4. Heat and Thermodynamics by M.W.Zemasky and R. Dittman, 1981, McGraw Hill
5. Statistical Physics and Thermodynamics by V.S. Bhatia and T.S. Bhatia (Vishal Publishing Co.)

B.Sc. (Honours) Physics Semester–III
Session 2021-22
Course Title: Mathematics-III
Course Code: BOPL-3333
Course outcomes

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

CO 1: Understand the concept of complex numbers and De-moivre's theorem.

CO 2: Understand De-moivre's theorem.

CO3: Understand the basic concept of lines, parabola, hyperbola and ellipse

CO 4: Understand and Demonstrate the concept of cone, cylinder and sphere

CO 5: Understand the tangent plane and normal plane to the surfaces

B.Sc. (Honours) Physics Semester–III
Session 2021-22
Course Title: Mathematics-III
Course Code: BOPL-3333

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**
Pass Marks: 35% **Total Teaching hours: 60**

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

UNIT –I

Complex numbers and their geometrical interpretation, De-Moivre's theorem and its applications. 15 Lectures

UNIT –II

Polar and Cartesian co-ordinates, Distance Formulae, Section Formulae of a line in different forms, Angle between two lines, Intersection of two lines, Standard Equation of ellipse, parabola, hyperbola and their properties . 15 Lectures

UNIT –III

Sphere, Cone, Cylinder and simple properties of these surfaces. Equation of tangent planes and normal planes to above surfaces. 15 Lectures

UNIT –IV

Double and Triple integrals, Evaluation of area and volumes using double triple integrals. Change of order in integration in double integrals. Area in polar co-ordinates, Triple integrals in spherical and polar coordinates. 15 Lectures

Text Book:
B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.

B.Sc. (Hons.) Physics (Semester-III)
COURSE CODE: BOPL-3084
(SESSION 2021-22)

Chemistry-III

(Theory)

Course outcomes:

Students will be able to

CO1: acquire the knowledge of structure and intermolecular forces present between solids, liquids and gases.

CO2: Understand the concept of surface tension and interfacial tension

CO3: Understand the concept of reaction rates and determine the rate law from initial rate data

CO4: demonstrate an understanding of basic principles of colligative properties

CO5: understand the basic concepts of colloidal state of matter and applications of colloids.

Bachelor of Science (Honours) Physics Semester–III
Session: 2021-22
Course Title: Chemistry III
(Physical Chemistry)
Course Code: BOPL-3084

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

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 8 marks.**

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

UNIT I

1. Solutions

Ideal and non–ideal solutions, methods of expressing concentrations of solutions, Dilute solution, colligative properties, Raoult's law, 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.

UNIT-II

2. Surface Chemistry

Bulk phases and interfacial region, types of interfaces; Surface tension and interfacial tension. Thermodynamics of surfaces, plane interface, curved interface, Laplace and Kelvin equations, the contact angle, capillary rise and surface tension. Surface tension of solutions, Gibbs adsorption equation and its derivation from thermodynamic considerations. Surfactants, Surface films on liquids. Criteria for spreading in liquid-liquid systems. (Wetting as contact angle and capitulary action Phenomenon solid liquid systems).

UNIT-III

3. Chemical Kinetics

Rate of reaction, rate constant and rate laws, the order of reaction, first ,second & third and zero order reactions, half-lives; determination of reaction order. Temperature dependence of reaction rates, reaction mechanism, rate-determining step approximation, steady-state approximation. Catalysis, homogeneous catalysis, autocatalysis, oscillation reactions. Enzyme catalysis, heterogeneous catalysis.

UNIT-IV

4. Liquid State

Intermolecular forces, structure of liquids (a qualitative description). Structural differences between

solids, liquids and gases. Liquid crystals: Difference between liquids crystal, solid and liquid. Classification, structure of nematic and cholestric phases. Thermography and seven segment cell.

5. 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.

Book Recommended:

1. Physical Chemistry by P.W. Atkins, 8th Ed., Oxford University Press, 2006 (Indian Print).
2. Physical Chemistry by T. Engel & P. Reid, 1st ed., Pearson Education,2006.
3. Physical Chemistry by Castellan, 3rd Ed., Addison Wisley/Narosa, 1985 (IndianPrint)

INTERDICIPLINARY COURSE ID-I

Bachelor of Science (Honours) Physics

Semester–III

Session- 2021-22

Course Title: Python Programming **Course Code: BOPM-3135**

Course Outcome

After passing the course the students will be able to:

CO1: Comprehend the use of various programming constructs like data types, operators, string processing and control structures.

CO2: Identify the flow of control in various control statement.

CO3: Implement various built-in and user defined function, packages and modules to solve basic problems in Physics.

CO4: Comprehend file manipulation using various built-in functions.

CO5: Comprehend visualization of data and result through graphics.

Bachelor of Science (Honours) Physics

Semester–III

Session- 2021-22

Course Title: Python Programming **Course Code: BOPM-3135**

Examination Time:(3+3) Hours **Max. Marks:50**

Theory: 25, Practical:15

CA:10

Instructions for the Paper Setters:

Eight questions of equal marks (10 marks each), (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 Section.

UNIT I

Introduction to python and Setting up the Python development Environment, Basic syntax, interactive shell, editing, saving, and running a script, Concept of data types, Declaring and using Numeric data types: int, float, complex Lists and Tuples and their basic operations, Python console Input / Output. Arithmetic operators and expressions, Conditions, Comparison operators, Logical Operators, Is and In operators.

UNIT II

String Handling, Unicode strings, Strings Manipulation: - compare strings, concatenation of strings, slicing strings in python, converting strings to numbers and vice versa. Dictionaries Control statements: if-else, Nested If-Else, Loops (for, while) Loop manipulation using pass, continue, break and else.

Matrix operations using NumPy array (Multiplication. Addition, matrix multiplication, inverse, determinant, adjoint, Eigenvalues, etc).

UNIT III

Built in function and modules in python, user defined functions, passing parameters, arguments and return values; formal vs actual arguments, Lamda function in python, Recursion, organizing python codes using functions, modules and external packages.

Case study of Projectile Motion.

UNIT IV

SciPy: Integration, differentiation and interpolation.

Files: manipulating files and directories, OS and Sys modules; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab separated) understanding read functions, read(), readline() and readlines() Understanding write functions, write() and writelines() Manipulating file pointer using seek. Introduction to graphics. **Plotting graphs and objects.**

References / Textbooks:

1. Mark Lutz, Learning Python, O'Reilly Media, 2013.
2. David Beazley, Python cookbook, O'Reilly Media, 2013.
3. David Beazley, Python Essential Reference, Addison-Wesley Professional, 2009.
4. John Zelle, Python programming: An Introduction to Computer Science, Franklin, Beedle & Associates Inc, 2004.
5. Alex Mortelli, Python in a Nutshell, O'Reilly Media, 2006.

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

Course Outcomes: Physics Lab-III

Semester III

(SESSION 2021-22)

Course No. BOPP-3396

CO1: After the completion of this course students will be able to use spectrometer along with prism, doubly refractive prism, diffraction grating to find various optical parameters.

CO2: Students will be able to find resolving power of grating and telescope

CO3: At the end of this course students will be able to use polarimeter and hence will be able to measure specific rotation by using polarimeter.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-III

COURSE CODE: BOPP-3396

PHYSICS LAB-III

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**
Pass Marks: 35% **Total Teaching hours: 90**
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:

i) One experiment 20 Marks

ii) Brief Theory 6 Marks

iii) Viva–Voce 7 Marks

iv) Record (Practical file) 7Marks

II. There will be one sessions of 3 hours duration. The paper will have one session and 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 20.

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

List of experiments-

1. To determine refractive index of glass and liquid using spectrometer.
2. To determine the Cauchy's constants.
3. To study the refractive index of a doubly refracting prism.
4. To set up Newton's rings to determine wavelength of sodium light.
5. To determine the wavelength by using plane diffraction grating (Use Hg source)
6. To determine dispersive power of plane diffraction grating.
7. To determine resolving power of a telescope.
8. To determine resolving power of a grating.
9. To study the absorption spectra of iodine vapours.
10. To study the rotation of plane of polarization by using polarimeter.
11. To determine the specific rotation of sugar using Laurent's half shade polarimeter

Reference Books:

1 Practical Physics Volume-II, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications

2 Practical Physics, C.L. Arora, S. Chand & Co.

BACHELOR OF SCIENCE (HONURS) PHYSICS
SEMESTER-III
(SESSION 2021-22)
COURSE CODE: BOPP-3087
CHEMISTRY LAB-III

Course outcomes

Students will be able to

CO1: understand the technique of crystallisation

CO2: compare the viscosity and surface tension of different liquids and solutions

CO3: determine the rate of the reactions

CO4: efficiently use of calorimeter in various experiments

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)

SEMESTER-III

COURSE CODE: BOPL-3087

CHEMISTRY LAB-III

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**

Total Teaching hours: 60

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.

Crystallisation:

Concept of indication of crystallisation. Phthalic acid from hot water (using fluted filter paper &stem less funnel) Acetanilide from boiling water, Naphthalene from Ethanol, Benzoic acid from water

Physical Chemistry

1. To determine the specific reaction rate of hydrolysis of ethyl acetate catalyzed by Hydrogen ions at room temperature.
2. To study the effect of acid strength on hydrolysis of an ester.

Viscosity, Surface Tension (Pure Liquids)

3. To study the viscosity and surface tension of glycerine solution in water.
4. To determine the solubility of benzoic acid at different temperatures and to determine H of the dissolution process.
5. To determine the enthalpy of neutralization of a weak acid/weak base versus strong base/strong acid and determine the enthalpy of ionization of the weak acid/weak base.
6. To determine the enthalpy of dissolution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born Haber cycle.

Book Recommended:

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.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-III
Course Title: Environmental Studies (Compulsory)

Course Code: AECE-3221

(THEORY)

Time: 3 Hours. Max. Marks: 100 **Theory: 60**
Field Report:20
CA: 20

Instructions for the Paper Setter:
The question paper should carry 60 marks. The structure of the question paper being:
Part-A, Short answer pattern – 20 marks
Attempt any five questions out of seven. Each question carries 4 marks. Answer to each question should not exceed 2 pages
Part-B, Essay type with inbuilt choice – 40 marks
Attempt any five questions out of eight. Each question carries 8 marks. Answer to each question should not exceed 5 pages.

UNIT 1

The multidisciplinary nature of environmental studies,Definition, scope and importance, Need for public awareness

UNIT 2

Natural Resources: Renewable and non-renewable resources:Natural resources and associated problems.
(a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer pesticide problems, water logging, salinity, case studies.
(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
(f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
• Role of an individual in conservation of natural resources.
• Equitable use of resources for sustainable lifestyles.

UNIT 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)

UNIT 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 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

UNIT 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
• Environmental Protection Act, 1986
• Air (Prevention and Control of Pollution) Act, 1981
• Water (Prevention and control of Pollution) Act, 1974
• Wildlife Protection Act
• Forest Conservation Act
 Issues involved in enforcement of environmental legislation
 Public awareness

UNIT 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 Information Technology in Environment and Human Health
• Case Studies

UNIT 8

Field Work
• Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
• Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
• Study of common plants, insects, birds
• Study of simple ecosystems-pond, river, hill slopes, etc

References:

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

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-III

Bachelor of Science (Computer Science)

SEMESTER–III

Course Title: Personality Development Programme

PERSONALITY DEVELOPMENT PROGRAMME

Course Title: Personality Development **Nature of course: Audit Course (Value added)**

Course duration: 30 hours

Course intended for: Sem. III students of all streams (UG Only)

Course credits: 2 (For Credit based Continuous Evaluation Grading System)

Course Code: SECP-3512

PURPOSE

To enhance holistic development of students and improve their employability skills.

INSTRUCTIONAL OBJECTIVES

• To re-engineer attitude and understand its influence on behaviour.

• To develop inter-personal skills and be an effective goal-oriented team player.

• To develop communication and problem solving skills.

• To develop professionals with idealistic, practical and moral values.

CURRICULUM

Course credits-2 Total Contact Hours-30

MODULE TITLE HOURS

1. Positive Thinking & Attitude -2

2. Self Analysis & Self Confidence - 2

3. Communication Skills - 10

• Basic Communication Skills

• Body Language

• Interview Skills

• Résumé Writing

• Group Discussion

• Telephone and E-mail etiquette

• Public Speaking

4. Time Management -2

5. Stress and Conflict Management- 2

6. Physical Fitness and Personal Grooming -2

7. Appropriateness of Apparel -2

8. Social Etiquette -2

9. Decision Making process & Problem Solving Skills -5

• Leadership Skills

• Goal Setting

• Motivation

10. Closure -1

Examination

1. Total marks of the course will be 25 (Final Examination: 20 Marks; Internal Assessment: 5Marks)

2. The pattern of the final examination will be multiple choice questions. 20 multiple choice type questions will be set. Each question will carry 1 mark (20 X 1 = 20). The student will have to attempt all the questions. Total time allotted will be 1 hour.

3. Internal Assessment will consist of Attendance: 2 Marks, Internal: 3 Marks. (Total Internal Assessment:5 Marks)

SYLLABUS

MODULE 1: Positive Thinking & Attitude

• Factors Influencing Attitude

• Essentials to develop Positive Attitude

• Challenges & Lessons from Attitude

MODULE 2: Self Analysis & Self Confidence

• Who am I

• Importance of Self Confidence

• SWOT Analysis

MODULE 3: Communication Skills

(i) Basic Communication Skills

• Speaking Skills

• Listening Skills

• Presentation Skills

(ii) Body Language

• Forms of Non-Verbal Communication

• Interpreting Body Language clues

• Effective use of Body Language

(iii) Interview Skills

• Type of Interviews

• Ensuring success in job interviews

• Appropriate use of Non-verbal Communication

(iv) Résumé Writing

• Features

• Different types of Résumés for Different Posts

(v) Group Discussion

• Differences between Group Discussion and Debate

• Importance of Group Discussion

• Group Decision

• Ensuring Success in Group Discussions

(vi) Telephone & E-mail Etiquette

• Telephone etiquette

• E-mail etiquette

(vii) Public Speaking

• Introductory Speech

• Informative Speech

• Persuasive Speech

• Extempore Session

MODULE 4: Time Management

• Importance of Time Management

• Values & Beliefs

• Goals and Benchmarks – The Ladders of Success

• Managing Projects and Commitments

• Prioritizing your To-do's

• Getting the results you need

MODULE 5: Stress & Conflict Management

• Introduction to Stress

• Types of Stressors

• Small Changes and Large Rewards

• Stress Prevention

• Overcoming Unhealthy Worry

• Stress at Home and Workplace

• Dealing with Frustration and Anger

• Stress reducing Exercises

• Understanding Conflicts

• Violent and Non-violent Conflicts

• Source of Conflict

• Structural and Cultural Violence

MODULE 6: Physical Fitness and Personal Grooming

• Fitness and Exercise

• Balanced & Healthy Diet

• Skin Care & Hair Care

• Make-up Skills

MODULE 7: Appropriateness of Apparel

• Apparel & Personality

• Psycho-social aspects of Apparel

• Style-tips for smart dressing & effective use of design elements

MODULE 8: Social Etiquette

• Civic Sense

• Workplace Skills

• Meeting and greeting people

• Table Setting and Table Manners

MODULE 9: Decision Making Process and Problem Solving Skills

• Anatomy of a Decision

• How to use Problem solving steps and Problem solving tools

• How to distinguish root causes from symptoms to identify right solution for right problems

• How to improve Problem solving and Decision making by identifying individual problem solving styles

• The Creative process for making decisions

• Tools to improve creativity

• Implementing the Decision – Wrap up

(i) Leadership Skills

• Handling Peer Pressure and Bullies

• Team Work

• Decision Making

• Taking initiatives

(ii) Goal Setting

• Wish List

• SMART Goals

• Blueprint for Success

• Short-term, Long-term, Life-term Goals

(iii) Motivation

• Factors of motivation

• Self Talk

• Intrinsic & Extrinsic Motivators

Books Recommended

1. Rossi, P. (2011). Everyday Etiquette: How to navigate 101 common and uncommon social situations. St Martins Pr.

2. Pietrzak, T., & Fraum, M. (2005). Building career success skills. ASTD Press.

3. Treffinger, D.J., Isaksen, S.G., & Brian, K. (2005). Creative problem solving: An Introduction.

4. Carr, A. (2004). Positive Psychology: The science of happiness and human strengths. Burnnerv Routlrdge.

5. Oberg, B.C. (1994). Speech craft: An Introduction to public speaking. Meriwether Publishing.

Semester IV

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-IV

COURSE CODE: BOPL-4391

Course Outcomes: Mechanics -II

After passing this course, students will be able to:

CO1: know about different frames of references, theory of relativity and will be able to apply Galilean and Lorentz transformations,

CO2: understand variation of mass with velocity and relativistic Doppler effect

CO3: understand concepts related to Minkowski space and world lines.

CO4: understand the principle of equivalence and related concept, Precession of the perihelion of Mercury. Fictitious forces, Foucault's pendulum

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-IV

COURSE CODE: BOPL-4391

MECHANICS-II

Maximum Marks: 75 (External 60 + Internal 15) **Examination Time: 3 Hours**
Pass Marks: 21 **Total Teaching hours: 60**

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.

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

UNIT–I

Frames of References: Inertial frame of reference, Galilean transformation, Galilean Invariance of space & time intervals; Michelson Morley Experiment, Explanation of the Null Result, Postulates of Special Theory of Relativity, Lorentz transformation equations, Length contraction, Time dilation, Experimental evidence in support of time dilation, Twin paradox, Relativity of simultaneity, Relativistic formula for the composition of velocities, The velocity addition theorem

UNIT–II

Relativistic Dynamics: Variation of mass with velocity: Relativity of mass, mass energy equivalence, Relation between momentum and energy, Transformation equations for momentum and energy, Relativistic Doppler effect (longitudinal and transverse) and its confirmation.

UNIT–III

Structure of Spacetime: Concept of Minkowski space, geometrical interpretation of Lorentz transformations of space & time; simultaneity; contraction and dilation. Space-like, time like and light-like intervals, four vectors, concept of world lines.

UNIT–IV

Principle of Equivalence and Fictitious Forces: Principle of Equivalence, gravitational and inertial mass, gravitational mass of photons, gravitational red shift, Precession of the perihelion of Mercury. Fictitious forces, Effect of rotation of earth on 'g', Effects of centrifugal and Coriolis forces produced as a result of earth's rotation. Foucault's pendulum and its equation of motion.

Reference Books:

1. Relativity and Electromagnetism, T.S. Bhatia, Vishal Publishing Co.

2.. Mechanics : Berkeley Physics Course Vol-I, C. Kittel, W.D. Knight, M.A. Ruderman, C.A. Helmholtz and B.J. Moyer- Tata McGraw Hill Publishing Company Ltd., New Delhi.

3. The Special Theory of Relativity, S. Banerji & A. Banerji (Prentice Hall India).

4. Introduction of to Special Relativity: R. Resnick Wiley Eastern India Pvt. Ltd.

5. 5.The Feymann Lectures Physics: R.P. Feymann, R.B. Leighton and M. Sands, Vol. I & II- Narosa Publishing House, New Delhi.

6."Special Relativity" A.P. French, N.W. Norton and Company Inc. , New York

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-IV

Course Outcomes: Atomic Spectroscopy
Course No. BOPL-4392

After passing this programme the students will be able to:

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

CO2: demonstrate understanding of exchange symmetry of wave function, different coupling schemes and spectra of atoms with more than one electron.

CO2: Understand the concept of spin and magnetic moment of an electron

CO3: Students will understand concept of X rays spectra and molecular spectra.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-IV

ATOMIC SPECTROSCOPY

COURSE CODE: BOPL-4392

Maximum Marks: 75 (External 60 + Internal 15) **Examination Time: 3 Hours**
Pass Marks: 21 **Total Teaching hours: 60**

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.

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

Unit-I

Introduction to Atomic Spectra: Observation of spectra, Types of spectra, Light sources, Spectral analysis, Units in spectroscopy, Bohr's Theory and Hydrogen spectrum, Explanation of Spectral series, Representation of spectral lines by terms, Energy level Diagram, Ritz combination Rule, Continuum at series limit, Evidences in favour of Bohr's Theory, Experimental confirmation of Bohr's theory, Franck-Hertz Experiment.

Unit-II

Spectra of Alkali Atoms: Different series in Alkali Spectra, Term values. The effective quantum number and the quantum defect, The Spinning electron and the vector model, The normal order of fine structure doublets, Electron Spin orbit interaction, Spin orbit interaction for Non-penetrating orbits, Doublet structure in alkali Spectra (Fine Structure), Energy level diagram of Sodium Atom, Selection rules for doublets, Intensity rules for fine structure doublets.

Unit-III

Zeeman Effect and the Paschen-Back effect: Early discoveries and developments, The vector model of one electron system in weak magnetic field. The magnetic moment of a bound electron, Magnetic interaction energy, Selection rules, Intensity rules, The Paschen-Back effect, The Paschen-Back effect of a Principal-series doublet, Selection rules for the Paschen-Back effect, the Zeeman and Paschen-Back effect of hydrogen.

Unit-IV

X-rays Spectra: Production of X-rays, Origin of X-rays from electromagnetic theory, X-ray diffraction, Bragg's law, Laue Spots, Bragg's spectrometer, Reflection and refraction of X-rays, X- ray scattering, Continuous X-ray spectrum, Characteristics absorption and emission Spectra, comparison of optical and X-ray Spectra, Moseley's law, Applications of Moseley's law.

Text and Reference Books:

1. Introduction to Atomic Spectra by H. E. White
2. Atomic Spectra and Atomic structure by Gerhard Herzberg
3. Concepts of Modern Physics by Arthur Beiser
4. Elements of Spectroscopy by Gupta, Kumar and Sharma

B.Sc. (Hons.) Physics Semester–IV

Course Title: Mathematics-IV

Course Code: BOPL-4333

Course outcomes

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

CO 1: Understand the concept of matrices, determinants

CO 2: Solve system of linear equations and obtain Eigen values, eigen vectors and characteristic polynomial

CO 3: Understand the concept of Vector Spaces, Linear Independence and Dependence

CO 4: Understand the concept of Basis and Dimension

CO5: Understand the concept of linear Transformation and its matrix representation

B.Sc. (Honours) Physics Semester–IV

Session 2021-22

Course Title: Mathematics-IV

Course Code: BOPL-4333

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**

Pass Marks: 35% **Total Teaching hours: 60**

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.

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

UNIT –I

Matrices, Determinants and their properties, algebra of matrices, Eigen values and Eigen vectors, Unitary, Hermitian and Orthogonal matrices and their properties, Cayley-Hamilton theorem and its applications 15 Lectures

UNIT –II

Elementary operations on matrices, Rank of a matrix, Row Rank, Column rank and their equivalence, System of linear equations and conditions for consistency, Quadratic forms
. 15 Lectures

UNIT-III

Vector spaces, subspaces, linear spans, linear dependence and independence, basis and dimension, Linear transformation, Representation of linear transformation by matrices

15 Lectures

UNIT –IV

Infinite Series, Series Of positive terms, alternate series, Behaviour of infinite series, Cauchy's convergence criterion, D' Alembert Ratio Test, Cauchy's root test, Rabbes test Gauss test, Cauchy's Integral test, Absolute and conditional convergence (Tests without Proof)

15 Lectures

Text Book:

B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.

B.Sc. (Hons.) Physics (Semester-IV)

COURSE CODE: BOPL-4084
CHEMISTRY-IV

(Molecular Spectroscopy)

Students will be able to

CO1:learn about the Principle and applications of ultraviolet and Woodward Fisher Rule

CO2: understand the infra-red spectroscopy in organic structure determination

CO3:explain common terms in NMR spectroscopy such as chemical shift, coupling constant, and anisotropic effect, spin spin splitting, shielding constant and their affect on the spectra of the compound.

CO4:study thevarious measurement techniques in NMR spectroscopy.

CO5:understand the various cleavages and rearrangements in Mass spectroscopy.

CO6:factors affecting cleavage patterns in Mass spectroscopy.

CO7: interpret the spectrum of unknown compounds on the basis of NMR and Mass spectroscopy.

CO8:understand the various applications of NMR and Mass spectroscopy.

CO9:use NMR and Mass spectroscopy data in elucidating the chemical structure of a compound.

CO10:solve the numerical problems based on use NMR and Mass spectroscopy.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)

SEMESTER-IV

COURSE CODE: BOPL-4084

CHEMISTRY-IV

(Molecular Spectroscopy)

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**

Total Teaching hours: 60

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.

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

UNIT – I

1. Energy and Electromagnetic Spectrum

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

II. Ultraviolet and Visible Spectroscopy

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

UNIT – II

III. Infrared Spectroscopy

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

IV. Applications of UV and IR Spectroscopy

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

UNIT-III

V. Proton Magnetic Resonance spectroscopy (^{1}H NMR)

The Nuclear spin, Larmor frequency, the NMR isotopes, Population of nuclear spin level, Spin and Spin lattice relaxation. Measurement techniques (CW & FT method), Solvent used. Chemical shift, Reference compounds, Shielding constant, Range of typical chemical Shifts, Simple application of chemical shifts, Anisotropic effect. Spin spin splitting, Coupling constant.

VI. Applications of NMR spectroscopy

NMR spectra with various examples such as ethyl bromide, ethanol, acetaldehyde, 1,1,2- tribromoethane, ethyl acetate, toluene, o-, m-, p- anisidine, o-, m-, p-nitrophenols, acetophenone. Simple numerical of structure elucidation of NMR spectroscopic data.

UNIT- IV

VII. Mass Spectrometery

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

VIII. Applications of Mass Spectroscopy

IX. Cleavage associated with common functional groups , Aldehydes, Ketones, Cyclic and Acyclic Esters, Alcohols, Olefins, Aromatic compounds, Amines, Interpretation of the spectrum of unknown simple molecules.

Books Recommended:

1. Organic Spectroscopy By W. Kemp; Publisher- Palgrave, New York
2. D.H. Williams and I. Fleming. Spectroscopic Methods in Organic Chemistry.
3. Spectrometric Identification of Organic Compounds - R.M. Silverstein & F. X. Webster; Publisher: John Willey and Sons,Inc.
4. Introductory Problems in Spectroscopy- By R.C. Banks, E.R. Matjeha and G. Mercer; Publisher : The Benzamine / Cummings Publishing Company Inc.
5. Introduction to Spectroscopy – D. L. Pavia, G. M .Lampman, and G. S. Kriz Publisher: Brooks / Cole, a part of cengage learning

INTERDICIPLINARY COURSE ID-II

Bachelor of Science (Honours) Physics

Semester–IV

Session- 2021-22

Course Title: Statistical Methods **Course Code: BOPL-4175**

Course Outcomes

Upon completion of this course, students should be able to:

CO 1: Understand the concept of error propagation and uncertainties experimental measurements and results.

CO 2: see the impact of number of observations on the experimental results.

CO 3: Fit regression curves depicting relation among the physical quantities.

CO 4: Understand the probabilities, expectations and corelations.

Bachelor of Science (Honours) Physics
Semester–IV
Session- 2021-22

Course Title: Statistical Methods **Course Code: BOPL-4175**
Examination Time: 3 Hours **Max. Marks: 50**
Theory: 40
CA : 10
Instructions for the Paper Setters:

Eight questions of equal marks (10 marks each) are to be set, two in each of the four Sections (AD). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The students can use only Non Programmable & Non Storage Type Calculator and statistical tables.

The question paper must contain 30% of the article/ theory from the syllabus.

Unit-I

Errors and Uncertainties in Measurements: Experimental observations and data, Accuracy, Precision, Systematic Errors, Random Errors, Significant Figures and Roundoff, error as uncertainties, Minimizing Uncertainties, using uncertainties in experimental results.

Unit-II

Describing data: Introduction to Origin, Mean, Median, Mode, variance, standard Deviation, probable error, simple applications.

Unit-III

Correlation Analysis: Meaning, types, scatter diagram, Karl Pearsons method, significance of correlation coefficient; regression Analysis: regression coefficients, their properties (without derivations), regression equations, least square method (linear and polynomial).

Unit-IV

Probability distribution: Meaning of probability, Mathematical Expectations, introduction to binomial, Poisson and normal (Gaussian) distribution (properties without derivation), simple applications.

NOTE: Internal assessment may be based on applications in **Origin** on mean, standard deviation, probability distributions (normal, Poisson, Gaussian), curve fitting, coefficient of linear correlation.

Text Books:

1. Gupta, S.C. and Kapoor, V.K.: Fundamentals of Mathematical Statistics

2. Hogg R.V. , Mckean, J.W. and Craig A.T.: Introduction to Mathematical Statistics

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-IV

PHYSICS LAB-IV

Course No. BOPP-4396

COURSE OUTCOMES

CO1: to measure an accessible (Horizontal and vertical) and inaccessible height using sextant.

CO2: demonstrate the verification of laws of probability distribution.

CO3: demonstrate adiabatic expansion, thermo emf, thermal conductivity and thermal expansion measurements.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-IV

COURSE CODE: BOPP-4396

PHYSICS LAB-IV

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**
Pass Marks: 35% **Total Teaching hours: 90**

General Guidelines for Practical Examination

I. The distribution of marks is as follows:

i) One experiment 20 Marks **ii) Brief Theory 6 Marks**

iii) Viva–Voce 7 Marks **iv) Record (Practical file) 7 Marks**

II. There will be one sessions of 3 hours duration. The paper will have one session and 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 be allotted to more than three examinee in any group.

1. To measure an accessible (Horizontal and vertical) height using sextant.
2. To measure inaccessible height by using sextant.
3. Verify laws of probability distribution by throwing of similar coins.
4. To study adiabatic expansion of gas and hence to calculate value of γ.
5. To determine the heating efficiency of an electric kettle with varying voltage.
6. To determine Stefan's constant using Boltzmann's Law.
7. To find the coefficient of Thermal Conductivity of a bad conductor by Lee's method.
8. To plot a calibration curve of a given thermocouple (copper constantan) using a potentiometer.
9. To measure thermal expansion of crystal using interference fringes.
10. To measure the thermo e.m.f. as a function of temperature of the hot junction.

Reference Books :

1. Practical Physics Vol.II, T.S. Bhatia, Gursharan Kaur, Iqbal Singh, Vishal Publications
2. Practical Physics, C.L. Arora, S. Chand & Co.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)

(Semester-IV)
COURSE CODE: BOPP-4087
Chemistry Lab-IV
(Practical)

Course Outcomes

Students will be able to

CO1: know the principle and mechanism of Conductometric titrations and polarimetric experiments

CO2: determine the heat of of neutralization and Heat of solution Calorimetrically

CO3: know the principle and working of Abbe's Refractometer

CO4:determine the composition of unknown mixture of two liquids by refractive index measurements.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-IV
COURSE CODE: BOPP-4087
CHEMISTRY LAB-IV

Maximum Marks: 50 (External 40 + Internal 10) **Examination Time: 3 Hours**
Total Teaching hours: 60

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.

1. Refractometry: Determine refractive index of a given liquid as a criterion for its purity. (Benzene i.e. commercial) benzene + A.R. acetone).

2. Polarimetry: Determine the %age composition of an optically active solution.

3. Calorimetry:
   a) Determination of Heat of neutralization
      (i) Strong acid-strong base
      (ii) Weak acid-strong base.
   b) Determination of Heat of solution of KCl, NH_4Cl, KNO_3

4. Conductometry:
   a) Determination of cell constant.
   b) Determination of specific and equivalent conductance of electrolyte (NaCl andHCl).
   c) Precipitation titration of Na_2SO_4 vs. $BaCl_2$.
   d) Neutralization titrations NaOH vs. HCl and NaOH vs. CH_3COOH.

5. Determination of adsorption isotherm of oxalic acid on charcoal

Books Recommended:

1. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.
2. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill.
3. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
4. Advanced Experimental Chemistry, Vol. I, Physical, J.N. Guru and R. Kapoor, S. Chand & Co.
5. Selected Experiments in Physical Chemistry, N.G. Mukherjee, J.N. Ghosh & Sons.
6. Experiments Physical Chemistry, J.C. Ghosh, Bharati Bhavan.

BACHELOR OF SCIENCE (HONURS) PHYSICS (SESSION 2021-22)
SEMESTER-IV

SOCIAL OUTREACH PROGRAMME

AUDIT COURSE (Value Based)

Course Title: Social Outreach Programme

Course Duration: 30 hours

Course intended for: Semester IV students of undergraduate degree programmes of all streams.

Course Credits: 2

Course Code: SECS- 4522

Course Description:-

The Social outreach programme proposes to equip the students for community upliftment work. It will strive to prepare citizens who will make a marked difference in the society. The students will be provided with numerous opportunities to build their knowledge and skills on the fundamental values of social fairness and compassion.

The programme will focus on integrating academic work with community services. It will equip the students to learn to connect knowledge gained in classroom with real life situation by getting hands on experience through community services. It will also foster the development of civic responsibility. The students will get an opportunity to

- Engage in social service.
- Reflect upon larger issues that affect communities through readings and discussions.
- Integrate academic learning and community engagement through practical field work.
- Develop awareness, knowledge and skills for working with diverse groups in the society.

Expectations:-

The students are expected to be actively engaged in working on any of the projects listed below as volunteers. Evaluation will be based on consistency, commitment and results achieved in areas taken up.

List of Projects under Social Outreach Programmes :

- Working as Motivators under the Swatch Bharat Campaign of the Government,
- Literacy drive : (i). Teaching in the Charitable School Adopted by the College
  (ii). Work in projects undertaken by Rotary Club of Jalandhar . for inducting students in child labour Schools.
- Enroll as NSS Volunteers for various projects (Cleanliness, Women health awareness)
- Counseling camps in villages
- Tree plantation (i) Maintaining the trees in the park adopted by the college . in Vikas Puri, Jalandhar
  (ii)Enroll for projects undertaken by JCI Jalandhar City
- Enroll in the Gandhian Studies Centre as student Volunteer for surveys in villages.
- Women Empowerment Programmes in collaboration with JCI Jalandhar Grace
- Generating awareness on voting among the youth.
- Drug Abuse (Generate awareness among the school children)
- Environment Awareness(Reduce Pollution)
- Old Age Homes/Orphanages
- Operating the Empathy Corner outside the college gate.
- Disaster Management/Relief Work

Evaluation /Assessment:

In the beginning of the semester the students after enrolling for one of the Projects offered will be given deadlines for the project.

- Students will be responsible for getting their hours of service recorded with the faculty and also map the progress of their subjects (children, old people, saplings etc.) .
- The respective departments will monitor the involvement of their students
- The students will submit a report of the project taken up by them.
- There will be no written examination, The students will be given grade on the basis of evaluation of the projects by an evaluation committee, comprising of the Dean of the respective streams, Head and two teachers of the concerned department.