

# **FACULTY OF LIFE SCIENCES**

Syllabus

for the award of the Degree in

## **Bachelor of Science (Medical) (Honours)**

(Offered under 4- year UG Degree Programme)

(Credit Based Continuous Evaluation Grading System under NEP 2020)

**(SEMESTER: I-VI)**

**Session: 2026-27**



**Kanya Maha Vidyalaya, Jalandhar (Autonomous)**

**The Heritage Institution**

**Kanya Maha Vidyalaya, Jalandhar (Autonomous)**  
**Scheme and Curriculum of Examinations of Four-Year Degree**  
**Program**  
**Bachelor of Science (Medical) (Honours)**  
**Session 2026-27**

| Bachelor of Science (Medical) (Honours) Semester I |                                                                                                                    |             |                      |               |               |       |      |    |    |                             |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------|---------------|-------|------|----|----|-----------------------------|
| Course Code                                        | Course Title                                                                                                       | Course Type | Hours per week L-T-P | Credits       |               | Marks |      |    | CA | Examination Time (in Hours) |
|                                                    |                                                                                                                    |             |                      | Credits L-T-P | Total credits | Total | Ext. |    |    |                             |
| BSML-1421                                          | <b>Punjabi (Compulsory)</b><br><sup>1</sup> <b>Basic Punjabi</b><br><sup>2</sup> <b>Punjab History and Culture</b> | C           | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -  | 30 | 3                           |
| BSML-1031                                          |                                                                                                                    |             |                      |               |               |       |      |    |    |                             |
| BSML-1431                                          |                                                                                                                    |             |                      |               |               |       |      |    |    |                             |
| BSML-1212                                          | <b>English Language Skills-I</b>                                                                                   | AEC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -  | 30 | 3                           |
| BSML-1483                                          | <b>Zoology (Diversity of Nonchordates- I (Protozoa - Annelida))</b>                                                | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -  | 30 | 3                           |
| BSMP-1483                                          | <b>Nonchordates- I Lab</b>                                                                                         |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 35 | 15 | 3                           |
| BSML-1084                                          | <b>Chemistry (Inorganic Chemistry -I)</b>                                                                          | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -  | 30 | 3                           |
| BSMP-1084                                          | <b>Inorganic Chemistry -I Lab</b>                                                                                  |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 35 | 15 | 3                           |
| BSML-1075                                          | <b>Botany (Diversity of</b>                                                                                        | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -  | 30 | 3                           |

|            |                                    |      |       |       |   |     |    |    |    |     |
|------------|------------------------------------|------|-------|-------|---|-----|----|----|----|-----|
|            | <b>Cryptogams)</b>                 |      |       |       |   |     |    |    |    |     |
| BSMP-1075  | <b>Diversity of Cryptogams Lab</b> |      | 0-0-4 | 0-0-2 | 2 | 50  | -  | 35 | 15 | 3   |
| BSMP-1676  | <b>NCC (Army Cadets)</b>           | AEC  | 2-0-4 | 2-0-2 | 4 | 100 | 40 | 30 | 30 | 3+3 |
| USEP-0001  | Business Class-I                   | SEC  | 0-0-4 | 0-0-2 | 2 | 50  | -  | 50 | -  | 1   |
| *VACF-1491 | <b>Foundation Course</b>           | VAAC | 2-0-0 | 2-0-0 | 2 | 50  | 35 | -  | 15 | 1   |

<sup>1</sup>Special paper in lieu of Punjabi (Compulsory) for those who have not studied Punjabi upto 8<sup>th</sup>-10<sup>th</sup> Class.

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

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

C-Compulsory

AEC- Ability Enhancement Compulsory Course

DSC- Discipline Specific Course

VAAC- Value Added Audit Course

# Kanya Maha Vidyalaya, Jalandhar (Autonomous)

## Scheme and Curriculum of Examinations of Four-Year Degree

### Program

### Bachelor of Science (Medical) (Honours)

### Session 2026-27

| Bachelor of Science (Medical) (Honours) Semester II |                                                                                                      |             |                      |               |               |       |        |    |    |                             |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------|---------------|-------|--------|----|----|-----------------------------|
| Course Code                                         | Course Title                                                                                         | Course Type | Hours per week L-T-P | Credits       |               | Marks |        |    | CA | Examination Time (in Hours) |
|                                                     |                                                                                                      |             |                      | Credits L-T-P | Total credits | Total | Ext. L | P  |    |                             |
| BSML-2421<br>BSML-2031<br>BSML-2431                 | <b>Punjabi (Compulsory)</b><br><sup>1</sup> Basic Punjabi<br><sup>2</sup> Punjab History and Culture | C           | 4-0-0                | 4-0-0         | 4             | 100   | 70     | -  | 30 | 3                           |
| BSML-2212                                           | <b>Appreciating English Literature-I</b>                                                             | MDC         | 4-0-0                | 4-0-0         | 4             | 100   | 70     | -  | 30 | 3                           |
| BSML-2483                                           | <b>Zoology (Diversity of Nonchordates- II (Arthropoda - Hemichordata))</b>                           | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70     | -  | 30 | 3                           |
| BSMP-2483                                           | <b>Nonchordates- II Lab</b>                                                                          |             | 0-0-4                | 0-0-2         | 2             | 50    | -      | 35 | 15 | 3                           |
| BSML-2084                                           | <b>Chemistry (Organic Chemistry -I)</b>                                                              | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70     | -  | 30 | 3                           |
| BSMP-2084                                           | <b>Organic Chemistry -I Lab</b>                                                                      |             | 0-0-4                | 0-0-2         | 2             | 50    | -      | 35 | 15 | 3                           |
| BSML-2075                                           | <b>Botany (Cell</b>                                                                                  | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70     | -  | 30 | 3                           |

|                                           |                                                                                                                |     |       |       |   |     |    |    |    |     |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----|-------|-------|---|-----|----|----|----|-----|
|                                           | <b>Biology and Genetics)</b>                                                                                   |     |       |       |   |     |    |    |    |     |
| BSMP-2075                                 | <b>Cell Biology and Genetics Lab</b>                                                                           |     | 0-0-4 | 0-0-2 | 2 | 50  | -  | 35 | 15 | 3   |
| BSML-2080/<br>BSMM - 2480/<br>BSMM - 2070 | <b>Chemistry (Chemistry of Cosmetics)/<br/>Zoology (Medical Lab Technology)/<br/>Botany (Medicinal Botany)</b> | SEC | 2-0-2 | 2-0-1 | 3 | 100 | 50 | 20 | 30 | 3+3 |
| VACD-2161                                 | <b>Drug Abuse and Ethical Education</b>                                                                        | VAC | 4-0-0 | 4-0-0 | 4 | 100 | 70 | -  | 30 | 3   |

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

C-Compulsory

MDC- Multidisciplinary Course

DSC- Discipline Specific Course

SEC- Skill Enhancement Course

VAC- Value Added Course

**Kanya Maha Vidyalaya, Jalandhar (Autonomous)**  
**Scheme and Curriculum of Examinations of Four-Year Degree**  
**Program**  
**Bachelor of Science (Medical) (Honours)**  
**Session 2026-27**

| Bachelor of Science (Medical) (Honours) Semester III |                                                                                                                          |             |                      |               |               |       |      |        |    |                             |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------|---------------|-------|------|--------|----|-----------------------------|
| Course Code                                          | Course Title                                                                                                             | Course Type | Hours per week L-T-P | Credits       |               | Marks |      |        | CA | Examination Time (in Hours) |
|                                                      |                                                                                                                          |             |                      | Credits L-T-P | Total credits | Total | Ext. |        |    |                             |
|                                                      |                                                                                                                          |             |                      |               |               |       | L    | P      |    |                             |
| BSML-3421<br>BSML-3031<br>BSML-3431                  | <b>Punjabi (Compulsory)</b><br><sup>1</sup> Basic<br><b>Punjabi</b><br><sup>2</sup> Punjab<br><b>History and Culture</b> | C           | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSML-3212                                            | <b>English Language Skills-II</b>                                                                                        | AEC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSML-3483                                            | <b>Zoology (Diversity of Chordates)</b>                                                                                  | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-3483                                            | <b>Chordates Lab</b>                                                                                                     |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |
| BSML-3084                                            | <b>Chemistry (Physical Chemistry -I)</b>                                                                                 | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-3084                                            | <b>Physical Chemistry -I Lab</b>                                                                                         |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |
| BSML-3075                                            | <b>Botany (Diversity of Phanerogams)</b>                                                                                 | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   |        | 30 | 3                           |

|           |                                     |     |       |       |   |    |    |        |    |   |
|-----------|-------------------------------------|-----|-------|-------|---|----|----|--------|----|---|
| BSMP-3075 | <b>Diversity of Phanerogams Lab</b> |     | 0-0-4 | 0-0-2 | 2 | 50 | -  | 3<br>5 | 15 | 3 |
| VACE-3221 | <b>Environmental Studies</b>        | VAC | 2-0-0 | 2-0-0 | 2 | 50 | 35 | -      | 15 | 3 |

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

C-Compulsory

AEC- Ability Enhancement Compulsory Course

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**Kanya Maha Vidyalaya, Jalandhar (Autonomous)**  
**Scheme and Curriculum of Examinations of Four-Year Degree Program**  
**Bachelor of Science (Medical) (Honours)**  
**Session 2026-27**

| Bachelor of Science (Medical) (Honours) Semester IV |                                                                                                      |             |                      |               |               |       |      |        |    |                             |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------|---------------|-------|------|--------|----|-----------------------------|
| Course Code                                         | Course Title                                                                                         | Course Type | Hours per week L-T-P | Credits       |               | Marks |      |        | CA | Examination Time (in Hours) |
|                                                     |                                                                                                      |             |                      | Credits L-T-P | Total credits | Total | Ext. |        |    |                             |
|                                                     |                                                                                                      |             |                      |               |               |       | L    | P      |    |                             |
| BSML-4421<br>BSML-4031<br>BSML-4431                 | <b>Punjabi (Compulsory)</b><br><sup>1</sup> Basic Punjabi<br><sup>2</sup> Punjab History and Culture | C           | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSML-4212                                           | <b>Appreciating English Literature-II</b>                                                            | MDC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSML-4483                                           | <b>Zoology (Cell Biology)</b>                                                                        | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-4483                                           | <b>Cell Biology Lab</b>                                                                              |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |
| BSML-4084                                           | <b>Chemistry (Inorganic Chemistry -II)</b>                                                           | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-4084                                           | <b>Inorganic Chemistry -II Lab</b>                                                                   |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |
| BSML-4075                                           | <b>Botany (Structure, Development and Reproduction in Flowering Plants)</b>                          | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |

|                                           |                                                                                                         |      |       |       |   |     |    |        |    |     |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------|------|-------|-------|---|-----|----|--------|----|-----|
| BSMP-4075                                 | <b>Structure, Development and Reproduction in Flowering Plants Lab</b>                                  |      | 0-0-4 | 0-0-2 | 2 | 50  | -  | 3<br>5 | 15 | 3   |
| BSMM-4080/<br>BSMM - 4480/<br>BSMM - 4070 | <b>Chemistry (Chemistry of Cosmetics) / Zoology (Medical Lab Technology)/ Botany (Medicinal Botany)</b> | SEC  | 2-0-2 | 2-0-1 | 3 | 100 | 50 | 2<br>0 | 30 | 3+3 |
| VACP-4511                                 | <b>*Personality Development and Gender Sensitization</b>                                                | VAAC | 2-0-0 | 2-0-0 | 2 | 50  | 35 | -      | 15 | 3   |

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

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

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# Kanya Maha Vidyalaya, Jalandhar (Autonomous)

Scheme and Curriculum of Examinations of Three-Year Degree Programme

Session 2026-27

| Bachelor of Science (Medical) (Honours) Semester V |                                                                                                      |             |                      |               |               |       |      |        |    |                             |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------|---------------|-------|------|--------|----|-----------------------------|
| Course Code                                        | Course Title                                                                                         | Course Type | Hours per week L-T-P | Credits       |               | Marks |      |        | CA | Examination Time (in Hours) |
|                                                    |                                                                                                      |             |                      | Credits L-T-P | Total credits | Total | Ext. |        |    |                             |
|                                                    |                                                                                                      |             |                      |               |               |       | L    | P      |    |                             |
| BSML-5421<br>BSML-5031<br>BSML-5431                | <b>Punjabi (Compulsory)</b><br><sup>1</sup> Basic Punjabi<br><sup>2</sup> Punjab History and Culture | C           | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSML-5212                                          | <b>English Language Skills-III</b>                                                                   | MDC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSML-5483                                          | <b>Zoology (Biomolecules)</b>                                                                        | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-5483                                          | <b>Biomolecules Lab</b>                                                                              |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |
| BSML-5084                                          | <b>Chemistry (Organic Chemistry -II)</b>                                                             | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-5084                                          | <b>Organic Chemistry -II Lab</b>                                                                     |             | 0-0-4                | 2-0-0         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |
| BSML-5075                                          | <b>Botany (Plant Physiology and Biochemistry)</b>                                                    | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-5075                                          | <b>Plant Physiology and Biochemistry Lab</b>                                                         |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |

|                                       |                   |      |       |       |   |    |   |    |   |   |
|---------------------------------------|-------------------|------|-------|-------|---|----|---|----|---|---|
| BSMI-5486/<br>BSMI-5084/<br>BSMI-5075 | <b>Internship</b> |      |       |       |   |    |   |    |   |   |
|                                       |                   | CCFR | 0-0-4 | 0-0-2 | 2 | 50 | - | 50 | - | - |

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C-Compulsory

MDC- Multidisciplinary Course

DSC- Discipline Specific Course

CCFR – Co-curricular Field Work and Report Writing

**Kanya Maha Vidyalaya, Jalandhar (Autonomous)**  
**Scheme and Curriculum of Examinations of Three-Year Degree Program**  
**Session 2026-27**

| Bachelor of Science (Medical) (Honours) Semester V |                                                                                                      |             |                      |               |               |       |      |        |    |                             |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------|----------------------|---------------|---------------|-------|------|--------|----|-----------------------------|
| Course Code                                        | Course Title                                                                                         | Course Type | Hours per week L-T-P | Credits       |               | Marks |      |        | CA | Examination Time (in Hours) |
|                                                    |                                                                                                      |             |                      | Credits L-T-P | Total credits | Total | Ext. |        |    |                             |
|                                                    |                                                                                                      |             |                      |               |               |       | L    | P      |    |                             |
| BSML-6421<br>BSML-6031<br>BSML-6431                | <b>Punjabi (Compulsory)</b><br><sup>1</sup> Basic Punjabi<br><sup>2</sup> Punjab History and Culture | C           | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSML-6212                                          | <b>Appreciating English Literature-III</b>                                                           | MDC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSML-6483                                          | <b>Zoology (Animal Physiology)</b>                                                                   | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-6483                                          | <b>Animal Physiology Lab</b>                                                                         |             | 0-0-4                | 0-0-2         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |
| BSML-6084                                          | <b>Chemistry (Physical Chemistry -II: Thermodynamics and Euilibrium)</b>                             | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |
| BSMP-6084                                          | <b>Physical Chemistry -II Lab</b>                                                                    |             | 0-0-4                | 2-0-0         | 2             | 50    | -    | 3<br>5 | 15 | 3                           |
| BSML-6075                                          | <b>Botany (Plant Ecology)</b>                                                                        | DSC         | 4-0-0                | 4-0-0         | 4             | 100   | 70   | -      | 30 | 3                           |

|                                           |                                                                                                         |     |       |       |   |     |    |    |    |     |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------|-----|-------|-------|---|-----|----|----|----|-----|
| BSMP-6075                                 | <b>Plant Ecology Lab</b>                                                                                |     | 0-0-4 | 0-0-2 | 2 | 50  | -  | 35 | 15 | 3   |
| BSMM-6080/<br>BSMM - 6480/<br>BSMM - 6070 | <b>Chemistry (Chemistry of Cosmetics) / Zoology (Medical Lab Technology)/ Botany (Medicinal Botany)</b> | SEC | 2-0-2 | 2-0-1 | 3 | 100 | 50 | 20 | 30 | 3+3 |
| VACH-6401                                 | <b>Human Rights and Constitutional Duties</b>                                                           | VAC | 2-0-0 | 2-0-0 | 2 | 50  | 35 | -  | 15 | 3   |

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

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**Bachelor of Science (Medical) (Honours) Semester-I (Session 2026-27)**

**Course Title:** Punjabi (Compulsory)

**Course Code:** BSML-1421

**(THEORY)**

**COURSE OUTCOMES**

- CO1: 'ਦੋ ਰੰਗ' (ਕਵਿਤਾ ਭਾਗ) ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿ ਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ। ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਕਵਿਤਾ ਦੀ ਵਿਆਖਿਆ, ਵਿਸ਼ਲੇਸ਼ਣ ਤੇ ਮੁਲਾਂਕਣ ਦੀ ਪ੍ਰਕਿਰਿਆ ਤੋਂ ਜਾਣੂ ਕਰਾਉਣਾ ਵੀ ਹੈ ਤਾਂ ਕਿ ਉਹ ਸਮਕਾਲੀ ਸਮਾਜ ਦੀਆਂ ਸਮੱਸਿਆਵਾਂ ਨੂੰ ਸਮਝ ਸਕਣ ਅਤੇ ਆਲੋਚਨਾਤਮਕ ਦ੍ਰਿਸ਼ਟੀ ਬਣਾ ਸਕਣ।
- CO2: 'ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿਧ ਹਸਤੀਆਂ' ਜੀਵਨੀ ਦੀ ਵਿਧਾ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਜੀਵਨੀ ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਜੀਵਨੀ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।
- CO3: ਪੈਰਾ ਰਚਨਾ ਅਤੇ ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ ਦੇਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।
- CO4: ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪਭਾਸ਼ਾ ਵਿਚ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ ਚਿੰਨ੍ਹ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਅਧਿਆਪਨ : ਪਹਿਲੀ ਅਤੇ ਦੂਜੀ ਭਾਸ਼ਾ ਵਜੋਂ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਭਾਸ਼ਾ ਤੋਂ ਵਾਕਫ਼ ਹੋਣਗੇ।

**Bachelor of Science (Medical) (Honours) Semester-I (Session 2026-27)**

**Course Title:** Punjabi (Compulsory)

**Course Code:** BSML-1421

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**L-T-P**

**4-0-0**

**Maximum Marks: 100**

**Theory : 70**

**CA :30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

**ਯੂਨਿਟ-I**

ਦੋ ਰੰਗ (ਕਵਿਤਾਭਾਗ) (ਸੰਪਾ.ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿਲੋਂ ਅਤੇ ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ /ਕਵਿਤਾ ਦਾ ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ)

**ਯੂਨਿਟ-II**

ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ (ਜੀਵਨੀ ਨੰ: 1 ਤੋਂ 9 ਤੱਕ)

(ਸੰਪਾ.ਪ੍ਰਿੰ. ਤੇਜਾ ਸਿੰਘ, ਹਰਨਾਮ ਸਿੰਘ ਸ਼ਾਨ), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

(ਵਿਸ਼ਾ-ਵਸਤੂ/ ਨਾਇਕ ਬਿੰਬ/ ਸਾਰ)

**ਯੂਨਿਟ-III**

(ੳ) ਪੈਰ੍ਹਾ ਰਚਨਾ (ਤਿੰਨ ਵਿਚੋਂ ਇੱਕ)

(ਅ) ਪੈਰ੍ਹਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ।

#### ਯੂਨਿਟ-IV

(ੳ) ਭਾਸ਼ਾ ਵੰਨਗੀਆਂ : ਭਾਸ਼ਾ ਦਾ ਟਕਸਾਲੀ ਰੂਪ, ਭਾਸ਼ਾ ਅਤੇ ਉਪਭਾਸ਼ਾ ਵਿਚ ਅੰਤਰ, ਪੰਜਾਬੀ ਉਪਭਾਸ਼ਾਵਾਂ ਦੇ ਪਛਾਣ ਚਿੰਨ੍ਹ।

(ਅ) ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦਾ ਅਧਿਆਪਨ : ਪਹਿਲੀ ਅਤੇ ਦੂਜੀ ਭਾਸ਼ਾ ਵਜੋਂ

**Bachelor of Science (Medical) (Honours) Semester-I (Session 2026-27)**

**Course Title:** Basic Punjabi (In Lieu of Punjabi (Compulsory))

**Course Code:** BSML-1031

**(THEORY)**

**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। ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ, ਪੈਰ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ ਅਤੇ ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ ਅਤੇ ਮਾਤਰਾਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਲਗਾਤਾਰ (ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ) ਦੀ ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।
- CO2: ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ ਦੀ ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ (ਸਾਧਾਰਨ ਸ਼ਬਦ, ਸੰਯੁਕਤ ਸ਼ਬਦ, ਮਿਸ਼ਰਤ ਸ਼ਬਦ, ਮੂਲ ਸ਼ਬਦ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ) ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।
- CO3: ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਸ਼ਤੇ ਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਆਦਿ ਤੋਂ ਜਾਣੂ ਕਰਵਾਇਆ ਜਾਵੇਗਾ।
- CO4: ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਪੰਜਾਬੀ ਵਿਚ ਹਫ਼ਤੇ ਦੇ ਸੱਤ ਦਿਨਾਂ ਦੇ ਨਾਂ, ਬਾਰਾਂ ਮਹੀਨਿਆਂ ਦੇ ਨਾਂ, ਰੁੱਤਾਂ ਦੇ ਨਾਂ, ਇਕ ਤੋਂ ਸੌ ਤੱਕ ਗਿਣਤੀ ਸ਼ਬਦਾਂ ਵਿਚ ਸਿਖਾਉਣਾ ਹੈ।

**Bachelor of Science (Medical) (Honours) Semester-I (Session 2026-27)**

**Course Title: Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-1031**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**Maximum Marks: 100**

**L-T-P: 4-0-0**

**Theory: 70**

**CA: 30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ**

**ਯੂਨਿਟ-I**

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

**ਯੂਨਿਟ-II**

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

**ਯੂਨਿਟ-III**

ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ : ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਰਿਬਤ ਨਾਤੇ, ਖੇਤੀ ਅਤੇ ਹੋਰ ਧੰਦਿਆਂ ਆਦਿ ਨਾਲ ਸੰਬੰਧਤ।

**ਯੂਨਿਟ-IV**

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

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**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:** BSML-1431

**(THEORY)**

**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 understand the sources and physical features of Punjab

CO 2: To study the earliest civilisation (Indus Valley Civilization) and original home of Aryans

CO 3: To examine the Social, Religious and Economic life during Early and Later Vedic Age

CO 4: To comprehend the Buddhist, Jain and Hindu faith and their relevance in the modern times

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**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:** BSML-1431

**(THEORY)**

Examination Time: 3 Hours

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

Contact Hours: 4 Hrs/ Week

Max. Marks: 100

Theory: 70

CA: 30

**Instructions for the Paper Setter:**

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

**Unit-I**

1. Physical features of 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 life during Early Vedic Age and Later Vedic Age.
6. Economic and Political life during Early Vedic Age and Later Vedic Age.

**UNIT-IV**

- 7 Rise of Buddhism and Teachings of Buddha.
- 8 Rise of Jainism and Teachings of Jainism.

### **Suggested Readings**

- B.N. Sharma, Life in Northern India, Delhi. 1966.
- Budha Parkash, Glimpses of Ancient Punjab, Patiala, 1983.
- Chopra, P.N., Puri, B.N., & Das, M.N. (1974). A Social, Cultural & Economic History of India, Vol. I, New Delhi: Macmillan India.
- L. M Joshi (ed.), History and Culture of the Punjab, Part-I, Patiala, 1989 (3<sup>rd</sup> edition)
- L.M. Joshi and Fauja Singh (ed.), History of Punjab, Vol.I, Patiala 1977.

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** English Language Skills-I

**Course Code:** BSML-1212  
**(THEORY)**

**COURSE OUTCOMES**

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

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

**CO 2:** to develop the art of creative expression by writing a paragraph on any given topic

**CO 3:** comprehend the meaning of texts and answer questions related to situations, episodes, and characters depicted in them through the study of the essays in the text “Prose for Young Learners”

**CO 4:** appreciate the writings of various Indian and foreign story and prose writers and relate them to their socio-cultural milieu through the study of the essays in the text “Prose for Young Learners”

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** English Language Skills-I

**Course Code:** BSML-1212

**(THEORY)**

**Max. Marks: 100**

**Examination Time: 3 Hrs**

**Theory: 70**

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

**CA: 30**

**Instructions for the Examiner:**

**Eight questions are to be set, two from each of the four Units (I-IV). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any section. Each question will carry 14 marks. (14x5=70)**

**UNIT-I**

English Grammar in Use, 5th Edition by Raymond Murphy, CUP (Units: 1-37)

**UNIT-II**

Paragraph Writing and English Grammar in Use (Units: 38-48)

**UNIT-III**

Prose for Young Learners: Essays at Sr. No. 1, 2, 3, 5 and 6

**UNIT-IV**

Prose for Young Learners: Essays at Sr. No. 7, 8, 9, 10 and 11

**Texts Prescribed:**

1. *English Grammar in Use* (Fifth Edition) by Raymond Murphy, CUP
2. *Prose for Young Learners* (Guru Nanak Dev University, Amritsar)

**(1/1)**

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**  
**Course Title:** Zoology (Diversity of Nonchordates- I (Protozoa - Annelida))  
**Course Code:** BSML-1483  
**(THEORY)**

## **Course Outcome**

After passing this course the student will be able to:

- CO1: Gain knowledge about physiology of unicellular life and parasitic protozoan.
- CO2: Understand the important marine water non chordates.
- CO3: Learn about parasitic Platyhelminthes
- CO4: Understand the economic importance and physiology of Ascaris and earthworm

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**  
**Course Title:** Zoology (Diversity of Nonchordates- I (Protozoa - Annelida))

**Course Code:** BSML-1483  
**(THEORY)**

**Credits: 4-0-0**  
**Time: 3 Hours**

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

**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. Each question will carry 14 marks.

**Detailed Type study of the following animals**

**UNIT-I**

Protozoa: *Amoeba proteus*  
*Paramecium caudatum* (with special reference to Kappa particles in *P. aurelia*)  
*Plasmodium vivax*  
Introduction to parasitic protozoans

**UNIT-II**

Parazoa (Porifera): *Sycon*,  
Cnidaria (Coelentrata): *Obelia*

**UNIT-III**

Platyhelminthes: *Fasciola hepatica*,  
*Taenia solium*  
Larvae of *Fasciola hepatica* and *Taenia solium*  
Role of Artificial Intelligence in Identification of parasites

**UNIT-IV**

Aschelminthes: *Ascaris*, Parasitic adaptations in Helminthes  
Annelida: *Pheretima posthuma* (Earthworm)

**Suggested Readings:**

1. Dhami, P.S. & Dhami, J. K. (2001), Invertebrates, R. Chand & Co., New Delhi.
2. Brusca, R. C. and Brusca, G. J. (2003), Invertebrates (2<sup>nd</sup> ed). Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts.
3. Engemann, J. G. and Hegner, R. W. (1981), Invertebrate Zoology (3rd ed.) Macmillan, New York.
4. Gardiner, M. S. (1972), The Biology of Invertebrates, McGraw Hill, New York.
5. Meglitsch, P. A. and Schran, F. R. (1991), Invertebrate Zoology (3<sup>rd</sup> ed). Oxford University Press, New York.

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Zoology (Nonchordates- I Lab)

**Course Code:** BSMP-1483

**(PRACTICAL)**

## **Course Outcome**

After passing this course the student will be able to:

- CO1. Familiarise with Scientific method
- CO2. Recognize and identify the taxonomic diversity of representative non-chordates.
- CO3. Demonstrate competency in basic zoological laboratory techniques, including temporary slide preparation, specimen observation, and microscopic identification.
- CO4. Understand functional anatomy of the digestive, reproductive, and nervous systems of *Pheretima*

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Zoology (Nonchordates- I Lab)

**Course Code:** BSMP-1483  
**(PRACTICAL)**

**Credits: 0-0-2**

**Time: 3 Hours**

**Max Marks: 50**

**Practical: 35**

**CA: 15**

**Instructions for the Practical Examiners:** Question paper is to 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

**Guidelines for conduct of practical Examination: -**

1. Identify and classify the specimens upto order level. Write a note on their habit, habitat, special features and economic importance. 8
2. Identify the slides/micrographs and give two reasons for identification. 5
3. Make a temporary mount of protozoa. 5
4. Draw a well labelled sketch of the given system of the organism and explain to the examiner. 5
5. Report 6
6. Viva-voce & Practical file. 6

**1. Classification up to order level with ecological notes and economic importance (if any) of the following animals (Through Specimens or slides):**

**A. Protozoa:** *Amoeba*, *Euglena*, *Trypanosoma*, *Noctiluca*, *Eimeria*, *Monocystis*, *Paramecium*, *Opalina*, *Vorticella*, *Balantidium*, *Nyctotherus* and *Polystomella*.

**B. Porifera:** *Sycon*, *Grantia*, *Euplectella*, *Hyalonema*, *Spongilla*, *Euspongia*.

**C. Cnidaria:** *Porpita*, *Velella*, *Physalia*, *Aurelia*, *Rhizostoma*, *Metridium*, *Millipora*, *Alcyonium*, *Tubipora*, *Zoanthus*, *Madrepora*, *Favia*, *Fungia* and *Astrangia*.

*Hydra* (W.M.), *Hydra* with buds, *Obelia* (colony and medusa), *Sertularia*, *Plumularia*, *Tubularia*, *Bougainvillea* and *Aurelia*

**D. Platyhelminthes:** *Dugesia*, *Fasciola*, *Taenia*, *Echinococcus*.

Miracidium, Sporocyst, Redia, Cercaria of *Fasciola*, scolex and proglottids of *Taenia* (mature and gravid).

**E. Aschelminthes:** *Ascaris* (male and female), *Trichinella*, *Ancylostoma*.

**F. Annelida:** *Pheretima*, *Nereis*, *Heteronereis*, *Polynoe*, *Eunice*, *Aphrodite*, *Chaetopterus*, *Arenicola*, *Tubifex* and *Pontobdella*

**2. Study of the following permanent stained preparations:**

A. L.S. and T.S. *Sycon*, gemmules, spicules and spongin fibers of a sponge.

- B. T.S. *Hydra* (Testis and ovary region)
- C. T.S. *Fasciola* (Different regions)
- D. T.S. *Ascaris* (Male and Female)
- E. T.S. *Pheretima* (pharyngeal and typhlosolar regions), Setae, septal nephridia, spermathecae and ovary of *Pheretima* (Earthworm).

**3. Preparation of the following slides:**

Temporary preparation of freshwater Protozoan culture.

- 4. Demonstration of digestive, reproductive and nervous systems of earthworm with the help of charts/videos/models.

**Note: Some changes can be made in the practical depending on the availability of material.**

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Chemistry (Inorganic Chemistry-I)

**Course Code:** BSML-1084  
**(THEORY)**

**Course Outcomes:**

Students will be able to

CO1: Predict electronic properties of atoms using current models and theories in chemistry, sketch the probability density curves, identify the periodic trends in physical and chemical properties of elements, describe the arrangement of the elements in the Periodic Table & change from metallic to nonmetallic character.

CO2: Describe VBT, VSEPR theory and predicts the geometry of simple molecules & molecular orbital theory of homonuclear diatomic molecules, explain, predict & draw structures of simple ionic compounds.

CO3: Explains & compares the trends in atomic and physical properties of p-block elements, explain the atomic, physical and chemical properties of alkali metals and alkaline earth metals and concepts of Acids and Bases.

CO4: Detailed studies of Group 13 and 14 of p-block elements.

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Chemistry (Inorganic Chemistry-I)

**Course Code:** BSML-1084  
**(THEORY)**

**Exam Time:** 3Hrs.

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

**Max. Marks:** 100

**(Theory: 70, CA: 30)**

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

**Unit I**

**(15 Hrs.)**

**Atomic Structure-** Idea of de Broglie matter waves, Heisenberg uncertainty principle, atomic orbitals, Schrodinger wave equation, Quantum numbers, Shapes of s, p, d and f orbitals. Aufbau's and Pauli's Exclusion principle, Hund's multiplicity rule. Electronic configurations of the elements and ions.

**Periodic Properties-** Position of elements in the periodic table; effective nuclear charge and its calculations. Details of atomic and ionic radii, ionization energy, electron affinity and electronegativity.

**Unit II**

**(15 Hrs.)**

**Ionic Solids:** Concept of close packing, Ionic structures, radius ratio rule and coordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy and Born–Haber cycle. Fajan's rule, Weak Interactions –Hydrogen bonding, van der Waals forces.

**Chemical Bonding-I:** Covalent Bond–Valence bond theory and its limitations, directional characteristics of covalent bond, various types of hybridization and shapes of simple inorganic molecules and ions, Valence shell electron pair repulsion (VSEPR) theory, homonuclear and heteronuclear diatomic molecules. Multicentre bonding in boranes, Percentage ionic character from dipole moment and electronegativity difference.

### Unit-III

(15 Hrs.)

**s- and p-block elements and their comparative study:** General remarks about each group (I-VIII), trends in electronic configuration, atomic and ionic radii, ionization potential, electron affinity, electronegativity, oxidation states, Melting and boiling point, density, electropositive or metallic character, flame colouration. Lattice energies. Photoelectric effect, inert pair effect, catenation and hetero catenation. Anomalies in first and second row elements. Chemical properties in details.

**Acids and Bases:** Arrhenius, Bronsted-Lowry, the Lux-Flood, solvent system and Lewis concepts of acids and bases

### Unit-IV

(15 Hrs)

**p-Block Elements: Group 13:** General characteristics, Atomic and ionic radii, melting and boiling point, Ionisation energies, Oxidation states, Electropositive character, Tendency to form covalent compounds. **Compounds of group 13:** Hydrides, Oxides and hydroxides, Oxoacid; Structure and Properties of Boric acid, Preparation, properties and structure of Diborane, Borazine, Boron halides: Boron hydrides ( $\text{LiBH}_4$ ,  $\text{NaBH}_4$ ), Anomalous behaviour of Boron and its diagonal relationship with Silicon.

**Group 14:** General characteristics; Atomic radii, Ionisation energies, Melting and boiling point, oxidation state, metallic character, catenation, Allotropy, Tendency to form multiple bonding. **Compounds of group 14:** Hydrides of silicon: preparation and properties, toxic nature of CO, Dioxide of carbon and silicon. Comparison of carbon tetrachloride and silicon tetrachloride. Chemistry of Fullerenes.

### Books Suggested

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

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Chemistry (Inorganic Chemistry-I Lab)

**Course Code:** BSMP-1084  
**(PRACTICAL)**

**Course outcomes**

Students will be able

CO1: To develop technical skills relevant to quantitative analysis

CO2: To separate and identify the various ions present in the mixture

CO3: To understand and master the technique of volumetric analysis

CO4: To analyze an acidic and alkali content in different samples

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Chemistry (Inorganic Chemistry-I Lab)

**Course Code:** BSMP-1084  
**(PRACTICAL)**

Time: 3 Hrs

Marks: 50

**Credits: 0-0-2**

**Practical: 35, CA: 15)**

Semi Micro analysis. Cation analysis, Separation and identification of ions from groups I, II, III, IV, V, and VI. Anionic analysis. Four ions with no interference.

**Volumetric titrations**

1. Determination of strength of  $\text{Na}_2\text{CO}_3$  solution by titrating it against a standard solution of  $\text{HCl}$ .
2. Determination of molarity of  $\text{KMnO}_4$  solution by titrating it against a standard solution of Oxalic acid.
3. Standardise the given  $\text{K}_2\text{Cr}_2\text{O}_7$  solution by titrating it against a standard solution Of Mohr's Salt.
4. Estimation of free alkali present in different soaps/detergents
5. Estimation of  $\text{Cu(II)}$  and  $\text{K}_2\text{Cr}_2\text{O}_7$  using sodium thiosulphate solution (Iodimetrically).
6. Estimation of available chlorine in bleaching powder iodometrically.

**Books Suggested**

1. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson, 2009.

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Botany (Diversity of Cryptogams)

**Course Code:** BSML-1075

**(THEORY)**

**Course outcome:**

After passing this course the student will be able to:

CO1: Understand the classification, characteristic features, life cycle and economic value of algae.

CO2: Develop knowledge about features, classification, life cycle and economic importance of fungi.

CO3: Build up a sound foundation Botany so that the students may be able to apply the acquired knowledge while interacting into the other fields of Botany.

CO4: Acquaint the students about the classification, morphology, biology and economic importance of various Pteridophytes.

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Botany (Diversity of Cryptogams)

**Course Code:** BSML-1075

**(THEORY)**

**Time: 3 Hrs.**

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

**Max. Marks: 100**

**Theory: 70**

**C.A.: 30**

**Instructions for the Paper Setters:-**

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Unit 1**

Algae: General characters, classification and economic importance; important features and life history of Chlorophyceae– *Volvox*, *Oedogonium*; Xanthophyceae–*Vaucheria*; Phaeophyceae– *Ectocarpus*; Rhodophyceae–*Polysiphonia*.

**Unit II**

Fungi: Important features and life history of Mastigomycotina–*Phytophthora*; Zygomycotina–*Mucor*; Ascomycotina–*Saccharomyces*, *Peziza*; Basidiomycotina–*Puccinia*, *Agaricus*; Deuteromycotina–*Colletotrichum*. General account of Lichens.

**Unit III**

Bryophyta: Amphibians of plant kingdom displaying alternation of generations; structure, reproduction, ecology and economic importance. Classification of bryophytes, Structure and reproduction of *Marchantia* (Hepaticopsida), *Anthoceros* (Anthocerotopsida), *Funaria* (Bryopsida).

**Unit IV**

Pteridophyta: First vascular plant; classification; ecology and economic importance of pteridophytes. Important characteristics of Psilopsida, Lycopsida, Sphenopsida and Pteropsida. Structure and reproduction in *Rhynia*, *Lycopodium*, *Selaginella*, *Equisetum*, and *Pteris*

**Suggested Readings:**

1. Alexopoulos, C.J., Mims, C.W. and Blackwell, M. (1996) Introductory Mycology (4th Edition), Wiley - Blackwell, USA.
2. Dube, H.C., (2007) A Textbook of Fungi, Bacteria and Viruses (3rd edition), Scientific Publishers, India
3. Dube, H.C., (2013) An Introduction to Fungi (4th edition), Scientific Publishers., India.
4. Goffinet B. (2008). Bryophyte Biology. Cambridge University Press, UK.
5. Sambamurty, S.S. (2013). A Textbook of Bryophytes, Pteridophytes, Gymnosperms and Paleobotany. I K International Publishing House Pvt Ltd., India
6. Sharma, O.P. (2014). Bryophyta. McGraw Hill Education Pvt Ltd., India.
7. Sharma, O.P., (2004), Text Book of Thallophytes. McGraw Hill Publishing Co., India.
8. Sharma, P.D., (2004), The Fungi, (2nd Edition) Rastogi Publication, India.
9. Srivastava, H.N., (2018), Diversity of Microbes and Cryptogams, Vol. I, Pradeep's Publication.
10. Vashishta, P.C, Sinha, A.K, Kumar, A., (2010). Botany for Degree Students Pteridophyta (Vascular cryptogams). S.S. Chand Publications.

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Botany (Diversity of Cryptogams Lab)

**Course Code:** BSMP-1075  
**(PRACTICAL)**

**Course outcome:**

After passing this course the student will be able to:

CO1: Students will assess various phylogenetic information sources, such as ultrastructure and morphology, to understand algae and fungi.

CO2: Understand the evolutionary history and time-scale of non-vascular plants, including the development of the first terrestrial plants from green algae.

CO3: Identify fungal disease symptoms in host plants and study pathogen morphology through section cutting.

CO4: Identify and classify different types of lichens.

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Botany (Diversity of Cryptogams Lab)

**Course Code:** BSMP-1075  
**(PRACTICAL)**

**Time: 3 Hrs**

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

**Max. Marks: 50**

**Practical: 35**

**C.A.:15**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

**Suggested Laboratory Exercises:-**

Teachers may select plants/material available in their locality/institution

1. Study of the genera included under algae and fungi.
2. Study of morphology, reproductive structures and anatomy of the examples cited in theory under Bryophyta and Pteridophyta
3. Observation of disease symptoms in hosts infected by fungi.
4. Section cutting of diseased material and identification of the pathogens as per the theory syllabus.
5. Study of morphology of Lichens (crustose, foliose and fruticose).

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Business Class-I

**Course Code:** USEP-0001

**(PRACTICAL)**

**Course Outcomes**

After passing this course the student will be able to:

CO1: Launch and manage a business within their chosen track.

CO2: Identify profitable opportunities and develop innovative solutions.

CO3: Implement marketing and sales strategies using both digital and traditional methods.

CO4: Use financial metrics to track performance and make informed business decisions.

**Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Business Class-I

**Course Code:** USEP-0001

**(PRACTICAL)**

**Time:** 3 Hours

**Total Marks:** 50

**Credits:** 0-0-2

**Practical:** 50

**Entrepreneurial Specialization Tracks: Skill Development and Business Implementation:**

Throughout the program, students will select one of the following five specialized tracks using the “Punjab Entrepreneurship Mindset Programme” App, designed to provide a structured pathway for developing entrepreneurial skills and implementing business ventures.

**1. E-commerce:** In this track, students will learn how to build, manage, and scale an online business. From setting up an e-commerce platform to managing digital marketing strategies, inventory, and customer experience, this specialization provides the tools needed to succeed in the rapidly growing digital marketplace.

**2. Content Creation:** This track focuses on empowering students to create, curate, and market digital content across various platforms. Students will learn how to build a personal or brand identity, develop engaging content, and monetize their platforms, whether through social media, video production, blogging, or influencer marketing.

**3. Professional Services:** In this track, students will learn how to capitalize on freelance and contract-based opportunities. They will explore strategies for building a sustainable service-based business, manage client relationships, and maximize the flexibility that comes with this track.

**4. Retail Business:** This track introduces students to the fundamentals of starting and managing small-scale retail ventures. Learners will discover how to identify in-demand products, source suppliers, setup shop (physical or home-based), and attract local customers. Emphasis will be placed on practical steps like pricing, promotion, customer service, and building repeat sales to establish a steady income stream.

The focus is on practical application, with students engaging in real-world projects that culminate in the creation and scaling of a business.

**Registration on the APP:**

**For Android Users:**

**Step1:** Click the following link to download and install the App:

[https://drive.google.com/file/d/1zgfoFWN0Y1zWJNf\\_gMpbGvlyeQl0WPM2/view?usp=drivesdk](https://drive.google.com/file/d/1zgfoFWN0Y1zWJNf_gMpbGvlyeQl0WPM2/view?usp=drivesdk)

**Step2:** Register by providing your details and generate OTP.(If the OTP is not generated, use the last six digits of your mobile number as the OTP).

**Step3:** Open the tasks and complete it by giving your feedback and handling the AI based Quiz.

**For I-Phone Users:**

**Step1:** Click on this link <https://punjabstartup.com/>

**Step2:** Signup to create an account and generate OTP

**Step3:** Filling our personal and educational details. After your account is created, open the tasks and complete it by giving your feedback and handling the AI based Quiz.

| Content Creation   |                                                       |                                                                                                                         |
|--------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Week/<br>Milestone | Milestone                                             | Description                                                                                                             |
| 1                  | Start your journey as a content creator               | Learn how to reach thousands of followers online by creating content                                                    |
| 2                  | Decide your content topic                             | Explore different topics and finalize one topic on which you will create content                                        |
| 3                  | Start your own content channel                        | Launch your official channel on YouTube or Instagram and start building your audience                                   |
| 4                  | Plan your first week content calendar                 | Learn how to create a simple weekly content calendar that would keep your audience engaged and make them follow you     |
| 5                  | Plan and record your first video                      | Learn how to create a clear and catchy script for your first video and shoot it using your phone                        |
| 6                  | Edit and launch your first video                      | Learn how to edit your video with trendy music And cool effects and launch your channel with first video                |
| 7                  | Reach first 100 followers                             | Use WhatsApp and personal Instagram account to tell people about your channel and reach first 100 followers/subscribers |
| 8                  | Master the skill of engaging people with your content | Learn how to connect with your audience so they stay engaged and feel involved                                          |

|    |                                                                  |                                                                                                                           |
|----|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 9  | Follow latest trends and famous influencers to grow your channel | Learn how to use trending to pics and tag well- known channels or creators to boost your reach and attract more followers |
| 10 | Learn how you can make money from your content                   | Discover how to do brand deals and promote brands or products your followers truly care about                             |
| 11 | Make your first partnership                                      | Reach out to 10 brands for partnership and turn one into your first paid deal                                             |
| 12 | Plan your business growth                                        | Create a 1-month plan on what to post on a weekly basis to grow your followers and earn money                             |

| E-Commerce         |                                                      |                                                                                                                                   |
|--------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Week/<br>Milestone | Milestone                                            | Description                                                                                                                       |
| 1                  | Learn how to start selling online                    | Learn what an E-commerce business is and how you can start selling online in less than 30 days 2                                  |
| 2                  | Choose your product                                  | Explore different products and finalize what you want to sell online                                                              |
| 3                  | Find a supplier who will deliver the product for you | Identify suppliers who can send your product directly to the customer and help you launch your E-commerce business                |
| 4                  | Create your E-commerce store                         | Make a simple online store using Instamojo and learn how to upload product images and description on the store 5                  |
| 5                  | Activate payments on your store                      | Learn how to link your bank account to a payment gateway and integrate that with your Instamojo store to Start receiving payments |
| 6                  | Launch your online store                             | Connect your domain name to your Instamojo account, create your launch poster, and officially launch your E-commerce store        |
| 7                  | Get first 100 people visit your online store         | Learn how to write simple and catchy messages to promote your store and send it to 100 people                                     |

|    |                                   |                                                                                                               |
|----|-----------------------------------|---------------------------------------------------------------------------------------------------------------|
| 8  | Make your first sale              | Convert one paying customer and learn how to process the order from beginning to delivery                     |
| 9  | Create and post your first ad     | Learn how to design a simple promotional ad and post it to bring in more people and sales                     |
| 10 | Take feedback from customers      | Engage with your paid customers, take product feedback, and upload success stories or reviews on your website |
| 11 | Get a repeat customer or referral | Build trust with your paid customers to get either a repeat order or a referral                               |
| 12 | Plan your business growth         | Make a 1-month plan to promote and grow your E-commerce store and earn more money                             |

| Professional Service |                                                   |                                                                                                                         |
|----------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Week/<br>Milestone   | Milestone                                         | Description                                                                                                             |
| 1                    | Start your journey in professional services       | Learn what is a service and how you can earn money by offering your skill as a service                                  |
| 2                    | Choose your service skill                         | Choose one skill you are good at and turn it into a service that people will pay for                                    |
| 3                    | Find your ideal customer                          | Talk to people directly or through social media apps, understand who is willing to pay for your service and "WHY"       |
| 4                    | Build your online profile and show what you offer | Explore apps or websites such as WhatsApp Business, Upwork, or Urban Company, and learn how to create an online profile |
| 5                    | Write your service description                    | Learn how to write your service in a simple and powerful way that gets people excited to try it                         |

|    |                                                  |                                                                                                              |
|----|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 6  | Finalize your pricing and launch your service    | Learn how to set the right price that your customer finds fair and launch your service                       |
| 7  | Get first 100 leads for your service             | Learn how to write catchy messages to promote your service in the market and get first 100 leads             |
| 8  | Offer a free service and learn from feedback     | Give your service for free to real users and use their feedback to make it better                            |
| 9  | Make your first sale                             | Get one paying customer for your service and work really hard to get a 5 star rating and a video testimonial |
| 10 | Build trust with customers and get repeat orders | Use your trust and good relationship with existing customers to get your first repeat customer               |
| 11 | Earn your first referral                         | Start offering bonus or other additional services to your existing customers and get Your first referral     |
| 12 | Plan your business growth                        | Make a 1 month plan on how to get more customers and earn more money                                         |

| Retail Business    |                                        |                                                                                                      |
|--------------------|----------------------------------------|------------------------------------------------------------------------------------------------------|
| Week/<br>Milestone | Milestone                              | Description                                                                                          |
| 1                  | Learn how to start retail business     | Understand how retail works, the types of business you can start, and talking to local shop          |
| 2                  | Choose your product and ideal customer | Look at products in demand in your area and choose what you'll focus on based on Your customer needs |
| 3                  | Find a supplier for your product       | Identify suppliers or wholesalers who can give you quality products/raw materials at good prices     |
| 4                  | Setup your business                    | Arrange your shop/home or prepare your product stocked with shopkeepers                              |

|    |                                             |                                                                                                                     |
|----|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 5  | Decide product prices and prepare stock     | Decide the right selling price, maintain a simple record of sales, and get ready to handle cash or digital payments |
| 6  | Launch your business                        | Put up posters near your shop, and share the announcement with friends, family, and local Community groups          |
| 7  | Promote your business in your area          | Learn how to use simple ways to promote your business locally                                                       |
| 8  | Make your first sale                        | Ensure the buying process is smooth and the customer is happy                                                       |
| 9  | Take feedback from customers                | Engage with your paid customers and take product feedback                                                           |
| 10 | Discover other platforms to grow your sales | Learn how to setup a free WhatsApp Business account for your shop and collect Orders there                          |
| 11 | Get a repeat customer or referral           | Build trust with your paid customers to get either a repeat order or a referral                                     |
| 12 | Plan your business growth                   | Make a 1-month plan to promote and grow your retail business and earn more money                                    |

| Miscellaneous      |                                            |                                                                                                |
|--------------------|--------------------------------------------|------------------------------------------------------------------------------------------------|
| Week/<br>Milestone | Milestone                                  | Description                                                                                    |
| 1                  | Start your journey as an entrepreneur      | Learn what entrepreneurship means and how you can start earning by solving problems around you |
| 2                  | Identify and valid a tea problem to solve  | Look around yourself, talk to people, and pick one real problem that many people face          |
| 3                  | Define your customer and their pain points | Find out who will buy from you, what difficulties they face, and why they need your solution   |

|    |                                                            |                                                                                                                     |
|----|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| 4  | Generate business ideas and finalize one idea              | Think of different ways to solve the problem, compare options, and choose one idea to move ahead with               |
| 5  | Define your product or service                             | Decide clearly what product or service you will Provide and how it will solve the customer's problem                |
| 6  | Finalize your pricing and launch your business             | Set a fair price for your product or service and take the first step to launch your business                        |
| 7  | Promote your business and get first 100 leads              | Tell people about your business using word of mouth, posters, or social media, and collect interest from 100 people |
| 8  | Make your first sale                                       | Get your first paying customer and deliver your product or service with full effort                                 |
| 9  | Take feedback from customers and improve                   | Listen to what customers say after using your product/service and make it better step by step                       |
| 10 | Build trust with customers and get your first repeat order | Keep your promise, give good quality, and motivate your customer to buy from you again                              |
| 11 | Earn your first referral and expand your sales             | Ask happy customer store commend you to friends and family so that you can grow your sales                          |
| 12 | Plan your business growth                                  | Make a simple plan for the next month to get more customers, increase sales, and grow your business                 |

### Evaluation Criteria

The evaluation will be conducted by a committee consisting of the class mentor, nodal officer and the principal HOD or his/her nominee.

| Evaluation Component   | Description                                                                                      | Weightage |
|------------------------|--------------------------------------------------------------------------------------------------|-----------|
| Weekly Task Completion | Timely submission of weekly tasks, including activities, reflection prompts, graded quizzes etc. | 60%       |

|                   |                                                                                                      |     |
|-------------------|------------------------------------------------------------------------------------------------------|-----|
| Target Completion | Performance-based evaluation on hitting revenue or Profit targets (e.g. generating L 10,000 revenue) | 20% |
| Final Project     | A comprehensive project depending the theme of the semester                                          | 20% |

**Evaluation mechanism: The score generated by the app will be final. Weekly Component:**

Each week of the course follows a structured format designed to guide students from learning to doing, using simple, mobile-accessible components:

| Component          | Duration   | Description                                                                                                                                                             |
|--------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action Lab         | ~4hrs      | - Hands-on task on the weekly concept - Includes step-by-step guidance, templates, and worksheets - Ends with a submission(e.g., video, reflection, or proof of action) |
| Learning Resources | Self-paced | -Videos, short readings, real-life stories, and tools to deepen understanding at their own pace                                                                         |
| Check-in           | Self-paced | -Quizzes & Reflection prompts                                                                                                                                           |

### Syllabus Overview for Semester 1-5

| Semester | Learning Focus                  | Learner's demonstration    | Revenue Target |
|----------|---------------------------------|----------------------------|----------------|
| 1        | Setup & Launch                  | Understand. Create. Start. | Rs 10,000      |
| 2        | Marketing Basics                | Engage. Share. Grow.       | Rs 40,000      |
| 3        | Operations & Scale              | Earn. Deliver. Expand.     | Rs 80,000      |
| 4        | Organic Growth                  | Attract. Retain. Build.    | Rs 160,000     |
| 5        | AI Automation & Finance mastery | Simplify. Track. Sustain   | Rs 400,000     |

### **Semester 1: Setup & Launch**

In Term 1, students will explore what entrepreneurship means and how it connects to their daily lives. They will learn to identify problems, shape simple business ideas, and test the mineral settings. This semester builds the foundation—mindset, observation, value creation, and action.

### **Semester 2: Marketing Basics**

In Term 2, students will learn how to attract customers and grow their visibility using digital platforms and community-based marketing strategies. Students will also begin to run paid advertising campaigns and learn how to optimize their marketing efforts.

### **Semester 3: Operations & Scale**

This semester focuses on the day-to-day operations of running a business, including order fulfillment, customer service, and logistics. Students will also focus on scaling operations as demand grows, with an emphasis on managing resources effectively.

### **Semester 4: Organic Growth**

Students will learn how to grow their businesses organically, using referrals, partnerships, and community engagement. This semester focuses on building a loyal customer base and using word-of-mouth marketing to increase reach and credibility.

### **Semester 5: AI Automation & Financial Mastery**

The final semester prepares students for long-term sustainability. Students integrate AI to improve productivity, automate routine tasks, and enhance decision-making. They also dive deep into financial planning, learning to set income goals, track expenses, understand profit margins, and create simple financial forecasts. This semester helps students solidify their entrepreneurial identity design systems for financial stability and scalability.

### **Books Recommended:**

1. Simon Sinek, *Start with Why: How Great Leaders Inspire Everyone to Take Action*, Portfolio/Penguin
2. Eric Ries, *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*, Crown Business
3. Jonah Berger, *Contagious: How to Build Word of Mouth in the Digital Age*, Simon & Schuster
4. Phil Knight, *Shoe Dog: A Memoir by the Creator of Nike*, Scribner
5. Jason Fried and David Heinemeier Hansson, *Rework: Change the Way You Work Forever*, Crown Business
6. Héctor García and Francesc Miralles, *Ikigai: The Japanese Secret to a Long and Happy Life*, Penguin Books
7. Tim Ferriss, *Tools of Titans (Selected Chapters)*, Houghton Mifflin Harcourt

8. Peter Thiel and Blake Masters, Zero to One: Notes on Startups, or How to Build the Future, Crown Business
9. Anil Lamba, Romancing the Balance Sheet, Anil Lamba Publications
10. The Better India/Your Story, Young Entrepreneurs Series (Collection of Articles) Real Indian stories of youth starting businesses, snack able reads that show what's possible.

## **Bachelor of Science (Medical) (Honours) Semester–I (Session 2026-27)**

**Course Title:** Foundation Course

**Course Code:** VACF-1491

**(THEORY)**

Course Duration: 30 hours

Course intended for: Semester I students of undergraduate degree programs of all 25 streams.

Course Credits: 2

### **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 thinkers and inventors & discoverers who have impacted human life. For a student, the process of transition from school to college is full of apprehension and skepticism regarding adapting themselves to new 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

### **LEARNING OUTCOMES**

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

- ☐ learn how past societies, systems, ideologies, governments, cultures and technologies were built, how they operated, and how they have changed.
- ☐ understand how the rich history of the world helps us to paint a detailed picture of where we stand to day.
- ☐ understand the Vedic theism, Upanishads Philosophy and doctrines of Jainism, Buddhism and Sikhism.
- ☐ Acquire knowledge of women rights and courage to face day to day challenges.
- ☐ Acknowledge the changes in society, religion and literature in the renaissance period and the importance of empathy and compassion or humanity.

- ☐ Learn about the prominent Indians (Men and Women) who contributed significantly in freedom struggle, education, economic development and in the formation and evolution of our nation.
- ☐ Understand meaning of race and how that concept has been used to justify exclusion, inequality, and violence throughout history and the origin of civil right movements to fight for equality, liberty and fraternity.
- ☐ Critically evaluate the socio-political and economic issues at global level and its implications in the present.
- ☐ Upgrade and enhance learning technological skills and striking a balance between technology and their well being.
- ☐ Take pride in learning the saga of Indian Past Culture and Heritage
- ☐ understand the rich legacy of KMV and its progressive endeavours.

#### MODULE      TITLE CONTACT HOURS

|      |                                                            |     |
|------|------------------------------------------------------------|-----|
| I    | Introduction and Initial Assessment                        | 2   |
| II   | The Human Story                                            | 3   |
| III  | The Vedas and the Indian Philosophy                        | 2.5 |
| IV   | The Journey of Woman The Story and the Dream               | 2.5 |
| V    | Changing Paradigms in Society, Religion & Literature       | 2.5 |
| VI   | Makers of Modern India                                     | 2.5 |
| VII  | Racism: Story of the West                                  | 2.5 |
| VIII | Modern World at a Glance: Political & Economic Perspective | 2.5 |
| IX   | Technology Visa Vis Human Life                             | 2.5 |
| X    | My Nation My Pride                                         | 2.5 |
| XI   | The KMV Experience                                         | 2.5 |
| XII  | Final Assessment, Feedback and Closure                     | 2.5 |

#### EXAMINATION

- Total Marks: 50 (Final Exam :40; Internal Assessment:10)
- Final Exam: multiple choice quiz. Marks–20; Time: 1hour

- Internal Assessment:10 (Assessment:6; Attendance: 4)

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: 50 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 and the Indian Philosophy

- Origin, teachings and significance of The Vedas
- Upnishads and Puranas
- Karma Theory of The Bhagwad Gita

- Maintenance of Buddhism & Jainism
- Teachings of Guru Granth Sahib

#### Module 4 Changing Paradigms in Society, Religion & Literature

- Renaissance: The Age of Rebirth
- Transformation in human thought
- Importance of humanism
- Geocentrism to heliocentrism
- Copernicus, Galileo, Columbus, Darwin and Saint Joan
- Empathy and Compassion

#### Module 5 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 work force participation
- Women in politics
- Status of women-our dream

#### Module 6 Makers of Modern India

- Early engagement of foreigners with India
- Education: The first step to modernization
- Railways: The life line of India
- Raja Ram Mohan Roy, Gandhi, Nehru, Vivekanand, Sardar Patel etc.
- Indira Gandhi, Mother Teresa, Homai Vyarawala etc.
- The Way Ahead

#### Module 7 Racism: Story of the West

- European beginnings of racism
- Racism in the USA -Jim CrowLaws
- Martin Luther King Jr. and the battle against racism
- Apartheid and Nelson Mandela
- Changing face of racism in the modern world

#### Module 8 Modern World at a Glance: Political & Economic Perspective

- Changing world order
- World War I & II
- UNO and The Commonwealth
- Nuclear Powers; Terrorism
- EconomicScenario:IMF,WorldBank
- International Regional Economic Integration

#### Module 9 Technology Visa Vis 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
- Harmonizing technology with ethics and humaneness

#### Module 10 My Nation My Pride

- Indian Past Culture and Heritage
- Major Discoveries (Medicinal and Scientific)
- Vedic Age
- Prominent Achievements
- Art, Architecture and Literature

## Module 11 The KMV Experience

- Rich Legacy of KMV
- Pioneering role in women emancipation and empowerment
- KMV Contribution in the Indian Freedom Struggle
- Moral, cultural and intellectual heritage of KMV
- Land mark 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

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML-2421**

**(THEORY)**

**COURSE OUTCOMES**

- CO1: ‘ਦੋ ਰੰਗ’(ਕਹਾਣੀ ਭਾਗ) ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ। ਇਸ ਦਾ ਹੋਰ ਮਨੋਰਥ ਕਹਾਣੀ ਦੀ 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: ‘ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿਧ ਹਸਤੀਆਂ’ ਜੀਵਨੀ ਦੀ ਵਿਧਾ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਜੀਵਨੀ ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਜੀਵਨੀ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।
- CO3: ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ। ਮੁਹਾਵਰੇ/ਅਖਾਣ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ। ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।
- CO4: ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ, ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ ਪੜ੍ਹਣ ਨਾਲ ਵਿਦਿਆਰਥੀ ਇਸਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਨੂੰ ਆਧਾਰ ਬਣਾ ਕੇ ਇਹਨਾਂ ਸੰਕਲਪਾਂ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

**Bachelor of Science (Medical) (Honours) Semester-II (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML-2421**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**L-T-P**

**4-0-0**

**Maximum Marks: 100**

**Theory : 70**

**CA : 30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

**ਯੂਨਿਟ-I**

ਦੋ ਰੰਗ (ਕਹਾਣੀ ਭਾਗ) (ਸੰਪਾ.ਹਰਜਿੰਦਰ ਸਿੰਘ ਢਿਲੋਂ ਅਤੇ ਪ੍ਰੀਤਮ ਸਿੰਘ ਸਰਗੋਧੀਆ), ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਪਾਤਰ ਚਿਤਰਨ/ ਸਾਰ)

**ਯੂਨਿਟ-II**

ਸੰਸਾਰ ਦੀਆਂ ਪ੍ਰਸਿੱਧ ਹਸਤੀਆਂ (ਜੀਵਨੀ ਨੰ: 10 ਤੋਂ 18 ਤਕ)(ਸੰਪਾ.ਪ੍ਰਿੰ. ਤੇਜਾ ਸਿੰਘ, ਹਰਨਾਮ ਸਿੰਘ ਸ਼ਾਮ), ਪੰਜਾਬੀ ਸਾਹਿਤ ਪ੍ਰਕਾਸ਼ਨ, ਅੰਮ੍ਰਿਤਸਰ।

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਨਾਇਕ ਬਿੰਬ/ ਸਾਰ)

**ਯੂਨਿਟ-III**

(ੳ) ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ

(ਅ) ਮੁਹਾਵਰੇ/ਅਖਾਣ

#### ਯੂਨਿਟ-IV

(ੳ) ਪੰਜਾਬੀ ਧੁਨੀ ਵਿਉਂਤ

(ਅ) ਸ਼ਬਦ ਬਣਤਰ ਅਤੇ ਸ਼ਬਦ ਰਚਨਾ : ਪਰਿਭਾਸ਼ਾ, ਮੁੱਢਲੇ ਸੰਕਲਪ।

**Bachelor of Science (Medical) (Honours) Semester-II (Session 2026-27)**

**Course Title: Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-2031**

**(THEORY)**

**Course outcomes**

- CO1: ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ (ਨਾਂਵ, ਪੜਨਾਂਵ, ਕਿਰਿਆ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ, ਸਬੰਧਕ, ਯੋਜਕ ਅਤੇ ਵਿਸਮਿਕ)ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।
- CO2: ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ(ਸਾਧਾਰਨ ਵਾਕ, ਸੰਯੁਕਤ ਵਾਕ, ਮਿਸ਼ਰਤ ਵਾਕ, ਬਿਆਨੀਆ ਵਾਕ, ਪ੍ਰਸ਼ਨ ਵਾਚਕ ਵਾਕ ਅਤੇ ਹੁਕਮੀ ਵਾਕ) ਦੀ ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਇਸ ਦੀ ਬਣਤਰ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ ਅਤੇ ਉਨ੍ਹਾਂ ਦੀ ਭਾਸ਼ਾ ਤੇ ਪਕੜ ਮਜ਼ਬੂਤ ਹੋਵੇਗੀ।
- CO3: ਪੈਰ੍ਹਾ ਰਚਨਾ ਅਤੇ ਸੰਖੇਪ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।
- CO4: ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ ਚਿੱਠੀ ਪੱਤਰ ਲਿਖਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ। ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ ਦੀ ਵਰਤੋਂ ਨਾਲ ਗੱਲਬਾਤ ਵਿਚ ਪਰਪੱਕਤਾ ਆਉਂਦੀ ਹੈ। ਇਹ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਗੱਲਬਾਤ ਵਿਚ ਨਿਖਾਰ ਲਿਆਉਣ ਦਾ ਕੰਮ ਕਰਨਗੇ।

**Bachelor of Science (Medical) (Honours) Semester-II (Session 2026-27)**

**Course Title: Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-2031**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**Maximum Marks: 100**

**L-T-P: 4-0-0**

**Theory :70**

**CA :30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ**

**ਯੂਨਿਟ-I**

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

**ਯੂਨਿਟ-II**

**ਪੰਜਾਬੀ ਵਾਕ ਬਣਤਰ : ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ**

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

**(ਅ) ਬਿਆਨੀਆ ਵਾਕ, ਪ੍ਰਸ਼ਨ ਵਾਚਕ ਵਾਕ ਅਤੇ ਹੁਕਮੀ ਵਾਕ (ਪਛਾਣ ਅਤੇ ਵਰਤੋਂ)**

**ਯੂਨਿਟ-III**

**ਪੈਰ੍ਹਾ ਰਚਨਾ**

**ਸੰਖੇਪ ਰਚਨਾ**

## ਯੂਨਿਟ-IV

ਚਿੱਠੀ ਪੱਤਰ (ਘਰੇਲੂ ਅਤੇ ਦਫ਼ਤਰੀ)

ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ (ਲਿਸਟ ਨਾਲ ਨੱਥੀ ਹੈ)

### ਅਖਾਣ

ਉਠੇ ਤਾ ਉੱਠ ਨਹੀਂ ਰੇਤੇ ਦੀ ਮੁੱਠ, ਉਦਮ ਅੱਗੇ ਲੱਛਮੀ ਪੱਖੇ ਅੱਗੇ ਪੌਣ , ਉਹ ਦਿਨ ਡੁੱਬਾ ਜਦੋਂ ਘੋੜੀ ਚੜ੍ਹਿਆ ਕੁੱਬਾ , ਉੱਚੀ ਦੁਕਾਨ ਫਿੱਕਾ ਪਕਵਾਨ , ਉਲਟੀ ਵਾੜ ਖੇਤ ਨੂੰ ਖਾਏ , ਉੱਚਾ ਲੰਮਾ ਗੱਭਰੂ ਪੱਲੇ ਠੀਕਰੀਆਂ , ਅਸ਼ਰਫ਼ੀਆਂ ਦੀ ਲੁੱਟ ਤੇ ਕੋਲਿਆਂ ਤੇ ਮੁਹਰਾਂ , ਅੱਗੇ ਸੱਪ ਪਿੱਛੇ ਸ਼ੀਂਹ , ਆਦਰ ਤੇਰੀ ਚਾਦਰ ਨੂੰ ਬਹਿਣਾ ਤੇਰੇ ਗਹਿਣੇ ਨੂੰ , ਆਪੇ ਫਾਥੜੀਏ ਤੈਨੂੰ ਕੌਣ ਛੁਡਾਏ , ਆਪਣੇ ਹੱਥੀਂ ਆਪਣਾ ਆਪੇ ਹੀ ਕਾਜ ਸਵਾਰੀਐ , ਆਰੀ ਨੂੰ ਇੱਕ ਪਾਸੇ ਦੰਦੇ ਜਹਾਨ ਨੂੰ ਦੋਹੀਂ ਪਾਸੀਂ , ਅੱਖੀਂ ਵੇਖ ਕੇ ਮੱਖੀ ਨਹੀਂ ਨਿਗਲੀ ਜਾਂਦੀ , ਅੰਦਰ ਹੋਵੇ ਸੱਚ ਤਾਂ ਕੋਠੇ ਚੜ੍ਹ ਕੇ ਨੱਚ , ਆਪੇ ਮੈਂ ਰੱਜੀ ਪੁੱਜੀ ਆਪੇ ਮੇਰੇ ਬੱਚੇ ਜਿਉਣ , ਆਪ ਕੁਚੱਜੀ ਵਿਹੜੇ ਨੂੰ ਦੇਸ਼ , ਅੰਨ੍ਹਾ ਵੰਡੇ ਰਿਉੜੀਆਂ ਮੁੜ ਮੁੜ ਆਪਣਿਆਂ ਨੂੰ , ਅਕਲ ਵੱਡੀ ਕੇ ਮੱਝ , ਅੰਨ੍ਹਿਆਂ ਵਿੱਚ ਕਾਣਾ ਰਾਜਾ , ਆਪਣੀ ਪੀੜ੍ਹੀ ਹੇਠ ਸੋਟਾ ਫੇਰਨਾ , ਇੱਕ ਅਨਾਰ ਸੌ ਬਿਮਾਰ , ਇੱਕ ਹੱਥ ਨਾਲ ਤਾੜੀ ਨਹੀਂ ਵੱਜਦੀ , ਇੱਕ ਚੁੱਪ ਸੌ ਸੁੱਖ ਝੱਟ ਮੰਗਣੀ ਪੱਟ ਵਿਆਹ , ਸਹਿਜ ਪੱਕੇ ਸੌ ਮੀਠਾ ਹੋਵੇ , ਦਾਲ ਵਿੱਚ ਕਾਲਾ ਹੋਣਾ , ਸੰਗ ਤਾਰੇ ਕੁਸੰਗ ਡੋਬ , ਸੱਦੀ ਨਾ ਬੁਲਾਈ ਮੈਂ ਲਾੜੇ ਦੀ ਤਾਈਂ , ਸਵੈ ਭਰੋਸਾ ਵੱਡਾ ਤੇਸਾ , ਮੈਂ ਦਿਨ ਚੋਰ ਦੇ ਇੱਕ ਦਿਨ ਸਾਧਦਾ , ਸੱਪ ਦਾ ਬੱਚਾ ਸਪੇਲੀਆ , ਸੱਪ ਮਰ ਜਾਵੇ ਲਾਠੀ ਵੀ ਨਾ ਟੁੱਟੇ , ਸਾਈਆਂ ਕਿਤੇ ਵਧਾਈਆਂ ਕਿਤੇ , ਹੰਕਾਰਿਆ ਸੌ ਮਾਰਿਆ , ਹੱਥ ਨੂੰ ਹੱਥ ਧੋਂਦਾ ਹੈ , ਹਾਥੀ ਲੰਘ ਗਿਆ ਪੂਛ ਰਹਿ ਗਈ , ਕੋਹ ਨਾ ਚੱਲੀ ਬਾਬਾ ਤਿਹਾਣੀ , ਕੁੱਛੜ ਕੁੜੀ ਸ਼ਹਿਰ ਢੰਡੇਰਾ , ਕੋਲਿਆਂ ਦੀ ਦਲਾਲੀ ਵਿੱਚ ਮੂੰਹ ਕਾਲਾ , ਕਰੇ ਕੋਈ ਭਰੇ ਕੋਈ , ਖਿੱਦੋ ਫ਼ਰੋਲਿਆਂ ਲੀਰਾਂ ਹੀ ਨਿਕਲਦੀਆਂ ਹਨ , ਖਵਾਜੇ ਦਾ ਗਵਾਹ ਡੱਡੂ , ਖੇਤੀ ਖਸਮਾਂ ਸੇਤੀ , ਖਰਬੂਜ਼ੇ ਨੂੰ ਦੇਖ ਕੇ ਖਰਬੂਜ਼ਾ ਰੰਗ ਬਦਲਦਾ ਹੈ , ਖੂਹ ਪੁੱਟਦੇ ਨੂੰ ਖਾਤਾ ਤਿਆਰ , ਘੜੇ ਨੂੰ ਹੱਥ ਲਾਇਆ ਸਾਰਾ ਟੱਬਰ ਤਿਹਾਇਆ , ਘਰ ਦਾ ਭੇਤੀ ਲੰਕਾ ਢਾਹੇ , ਘਰ ਦੀ ਕੁੱਕੜੀ ਦਾਲ ਬਰਾਬਰ , ਚਿੰਤਾ ਚਿਖਾ ਬਰਾਬਰ , ਛੱਜ ਤਾਂ ਬੋਲੇ ਛਾਣਨੀ ਵੀ ਬੋਲੇ , ਛੋਟੀ ਮੂੰਹ ਵੱਡੀ ਗੱਲ , ਜੋ ਰਾਤੀਂ ਜਾਗਣ ਕਾਲੀਆਂ ਸੌ ਹੀ ਖਾਣ ਸੁਖਾਲੀਆਂ , ਜਾਂਦੇ ਚੋਰ ਦੀ ਲੰਗੋਟੀ ਹੀ ਸਹੀ , ਜਿਸਦੀ ਕੋਠੀ ਦਾਣੇ ਉਹਦੇ ਕਮਲੇ ਵੀ ਸਿਆਣੇ , ਜਿਹੜੇ ਗੱਜਦੇ ਨੇ ਉਹ ਵਰ੍ਹਦੇ ਨਹੀਂ , ਝੱਟ ਮੰਗਣੀ ਪੱਟ ਵਿਆਹ , ਨਵਾਂ ਨੌ ਦਿਨ ਪੁਰਾਣਾ ਸੌ ਦਿਨ , ਪਾਣੀ ਵਿੱਚ ਸੋਟਾ ਮਾਰਿਆ ਪਾਣੀ ਦੋ ਨਹੀਂ ਹੋ ਜਾਂਦੇ , ਵਿੱਦਿਆ ਵਿਚਾਰੀ ਤਾਂ ਪਰਉੱਪਕਾਰੀ , ਵੇਲੇ ਦੀ ਨਮਾਜ਼ ਕੁਵੇਲੇ ਦੀਆਂ ਟੱਕਰਾਂ , ਇੱਕ ਦਰ ਬੰਦ ਸੌ ਦਰ ਖੁੱਲ੍ਹਾ , ਬਿੱਲੀ ਦੇ ਸਿਰ੍ਹਾਣੇ ਦੁੱਧ ਨਹੀਂ ਜੰਮਦਾ , ਰੱਸੀ ਸੜ ਗਈ ਵੱਟ ਨੂੰ ਗਿਆ

## ਮੁਹਾਵਰੇ

ਉਸਤਾਦੀ ਕਰਨੀ, ਉਂਗਲ ਕਰਨੀ, ਉੱਲੂ ਬਣਾਉਣਾ, ਉੱਚਾ ਸਾਹ ਨਾ ਕੱਢਣਾ, ਉੱਡਦੇ ਫਿਰਨਾ, ਉੱਘ ਸੁੱਘ ਮਿਲਣੀ, ਅੱਖਾਂ ਵਿਚ ਰੜਕਣਾ, ਉਂਗਲਾਂ ਤੇ ਨਚਾਉਣਾ, ਉਧੜ-ਧੁੰਮੀ ਮਚਾਉਣਾ, ਉਠ ਦੇ ਮੂੰਹ ਵਿੱਚ ਜ਼ੀਰਾ ਦੇਣਾ, ਅੱਗ ਲਾਉਣਾ, ਆਵਾ ਉਤ ਜਾਣਾ, ਅਸਮਾਨ ਨੂੰ ਟਾਕੀਆਂ ਲਾਉਣਾ, ਅੱਖਾਂ ਵਿੱਚ ਲਾਲੀ ਉਤਰਨੀ, ਅਕਲ ਤੇ ਪਰਦਾ ਪੈਣਾ, ਅੱਖਾਂ ਅੱਗੇ ਖੋਪੇ ਚਾੜ ਦੇਣੇ, ਅੱਖਾਂ ਉੱਤੇ ਬਿਠਾਉਣਾ, ਅੱਲੇ ਫੱਟਾਂ ਤੇ ਲੂਣ ਛਿੜਕਣਾ, ਆਪਣੇ ਅੱਗੇ ਕੰਡੇ ਬੀਜਣਾ, ਆਪਣੇ ਤਰਕਸ਼ ਵਿੱਚ ਤੀਰ ਹੋਣਾ, ਸਿਰ ਚੜ੍ਹਨਾ, ਈਨ ਮੰਨਣੀ, ਈਦ ਦਾ ਚੰਨ ਹੋਣਾ, ਇੱਟ ਨਾਲ ਇੱਟ ਖੜਕਾਉਣਾ, ਸਿਰ ਫਿਰਨਾ, ਸਿਰ ਤੇ ਚੜ੍ਹਨਾ, ਸਬਰ ਦਾ ਘੁੱਟ ਭਰਨਾ, ਸਿਰ ਪੈਰ ਨਾ ਹੋਣਾ, ਸਿਰ ਖੁਰਕਣ ਦੀ ਵੇਹਲ ਨਾ ਹੋਣਾ, ਸੱਠੀ ਦੇ ਚੌਲ ਖੁਆਣੇ, ਹੱਥ ਧੋ ਕੇ ਪਿੱਛੇ ਪੈਣਾ, ਹੱਥੀਂ ਛਾਂਵਾਂ ਕਰਨੀਆਂ, ਹੱਡ ਭੰਨਣੇ, ਹੱਥ ਤੰਗ ਹੋਣਾ, ਹੱਥ ਮਲਣਾ, ਹੱਥ ਪੈਰ ਮਾਰਨਾ, ਹੱਥ ਉੱਤੇ ਹੱਥ ਧਰ ਕੇ ਬੈਠਣਾ, ਹੱਥ ਵਟਾਉਣਾ, ਹਵਾ ਦੇ ਘੋੜੇ ਸਵਾਰ ਹੋਣਾ, ਕੰਨੀਂ ਕਤਰਾਉਣਾ, ਕੰਨ ਤੇ ਜੂੰ ਨਾ ਸਰਕਣਾ, ਕੰਨ ਘੋਸਲ ਮਾਰਨੀ, ਕਣਕ ਨਾਲ ਘੁਣ ਵੀ ਪਿਸਣਾ, ਕੱਖ ਭੰਨ ਕੇ ਦੂਹਰਾਂ ਨਾ ਕਰਨਾ, ਕਲਮ ਦੇ ਧਨੀ ਹੋਣਾ, ਕਿਤਾਬੀ ਕੀੜਾ ਹੋਣਾ, ਖਾਨਾ ਖਰਾਬ ਹੋਣਾ, ਖਾਨਿਓ ਜਾਣਾ, ਖੂਹ ਨਿਖੁੱਟ ਜਾਣਾ, ਗੁੱਡੀ ਚੜ੍ਹਨੀ, ਗਲ ਪੈਣਾ, ਗੰਗਾ ਨਹਾਉਣਾ, ਚੜ੍ਹ ਮੱਚਣੀ, ਚੰਦ ਚਾੜ੍ਹਨਾ, ਚਾਦਰ ਵੇਖ ਕੇ ਪੈਰ ਪਸਾਰਨਾ, ਚਕਮਾ ਦੇਣਾ, ਛੱਕੇ ਛੜਾਉਣਾ, ਛਾਪਾ ਮਾਰਨਾ, ਛਿੱਲ ਲਾਉਣੀ, ਛਿੱਕੇ ਟੰਗਣਾ

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Punjab History and Culture (C. 320 to 1000 A.D.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-2431

**(THEORY)**

**Course Outcomes:**

After completing Semester II and course on Ancient History of Punjab students will be able to understand:

CO 1: The reasons and impact of Alexander's invasions and to comprehend various factors leading to rise and fall of empires and emergence of new dynasties and their administration specifically of Maurya rule in general and Ashok in particular

CO 2: art and architecture of Gupta period and the Indo-Greek style of architecture under Gandhara School

CO 3: To have an insight into the socio-cultural history under Harshvardhan and Punjab under the stated period

CO 4: To enable students to have thorough insight into the various forms/styles of Architecture and synthesis of Indo - Greek Art and Architecture in Punja

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Punjab History and Culture (C. 320 to 1000 A.D.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-2431

**(THEORY)**

Examination Time: 3 Hours

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

Contact Hours: 4 Hrs/ Week

Max. Marks: 100

Theory: 70

CA: 30

**Instructions for the Paper Setter:**

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

**Unit-I**

1. Alexander's Invasion's and Impact
2. Administration of Chandragupta Maurya with special reference to reforms introduced by Ashoka

**Unit-II**

3. The Kushans: Gandhar School of Art
4. Gupta Empire: Golden Period-Social and Cultural life, Art and Architecture)

**Unit-III**

5. The Punjab under Harshvardhana: Society and Religion during the time of Harshvardhana
6. Socio-cultural History of Punjab from 7<sup>th</sup> 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**

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

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title** Appreciating English Literature-I

**Course Code:** BSML-2212

**(THEORY)**

**COURSE OUTCOMES**

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

**CO 1:** change the narration and voice of sentences after understanding fundamental grammatical rules governing them through the study of “English Grammar in Use” by Raymond Murphy

**CO 2:** to learn to write personal letters and enhance the writing skills

**CO 3:** comprehend the meaning of texts and answer questions related to situations, episodes, themes and characters depicted in them through the study of the stories in the text “Tales of Life”.

**CO 4:** appreciate the writings of various Indian and foreign story and Short - Story writers and relate them to their socio-cultural milieu through the study of the stories in the text “Tales of Life”.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title** Appreciating English Literature-I

**Course Code:** BSML-2212

**(THEORY)**

**Examination Time: 3 Hrs**  
**L-T-P (Credits): 4-0-0**

**Max. Marks: 100**  
**Theory: 70**  
**CA: 30**

**Instructions for the Paper Setters:-**

**Eight questions are to be set, two from each of the four Units (I-IV). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question will carry 14 marks. (14x5=70)**

**UNIT-I**

English Grammar in Use, 5th Edition by Raymond Murphy, CUP (Units: 49-81)

**UNIT-II**

Personal letter Writing and English Grammar in Use (Units: 82-97)

**UNIT-III**

Tales of Life (Guru Nanak Dev University, Amritsar): Stories at Sr. No. 1, 2, 3, 5 and 6

**UNIT-IV**

Tales of Life (Guru Nanak Dev University, Amritsar): Stories at Sr. No. 7, 9, 10, 11, 12

**Texts Prescribed:**

1. *English Grammar in Use* (Fifth Edition) by Raymond Murphy, CUP
2. *Tales of Life* (Guru Nanak Dev University, Amritsar)

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**  
**Course Title:** Zoology (Diversity of Nonchordates- II (Arthropoda - Hemichordata))  
**Course Code:** BSML-2483  
**(THEORY)**

**Course Outcomes:**

After passing this course the student will be able to:

CO1. Understand physiology and economic importance of cockroach and social organization of insects.

CO2. Gain knowledge about the general pattern of life history of phylum mollusca

CO3. Learn about life history and larval forms of Echinodermata

CO4. Gain knowledge about affinities of Hemichordates with Non-Chordates and Chordates

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**  
**Course Title:** Zoology (Diversity of Nonchordates- II (Arthropoda - Hemichordata))  
**Course Code:** BSML-2483  
**(THEORY)**

**Credits: 4-0-0**

**Time: 3 Hours**

**Max Marks: 100**

**Theory: 70**

**CA: 30**

**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. Each question will carry 14 marks.

**UNIT-I**

Arthropoda: Type study- *Periplaneta americana* (Cockroach),

Social organizations in insects (Honey bee and Termite)

**UNIT-II**

Mollusca: Type study- *Pila globosa*, Tortion, Pearl formation

**UNIT-III**

Echinodermata: Type study - *Asterias* (Star fish), Study of Echinoderm larvae

**UNIT-IV**

Hemichordata: Type study - *Balanoglossus* (External characters only). Affinities of Hemichordates with Non-Chordates and Chordates

Role of Artificial Intelligence in Study of Nonchordates Diveristy

**Suggested Readings:**

1. Barnes, R.D. (1999), Invertebrate Zoology. W.B. Saunder, Philadelphia.
2. Dharni, P.S. & Dharni, J. K., Invertebrates, R. Chand & Co., New Delhi, 2001.
3. Barth, R. H. and Broshears, R. E (1982), The Invertebrate world. Holt Saunder, Japan.
4. Brusca, R. C. and Brusca, G. J. (2003), Invertebrates (2nd ed), Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts.

5. Engemann, J. G. and Hegner, R. W. (1981), Invertebrate Zoology (3rd ed), Macmillan, New York.
6. Gardiner, M. S. (1972), The Biology of Invertebrates, McGraw Hill, New York.
7. Meglitsch, P. A. and Schran, F. R. (1991), Invertebrate Zoology (3rd ed), Oxford University Press, New York.
8. Pechenik, A. Jan. (2000), Biology of the invertebrates, (4th ed), McGraw Hill Book Co. Singapore.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Zoology (Nonchordates- II Lab)

**Course Code:** BSMP-2483  
**(PRACTICAL)**

**Course Outcomes:**

After passing this course the student will be able to:

- CO1. Identify, classify, and differentiate representative specimens of Arthropoda, Mollusca, Echinodermata, and Hemichordata up to the prescribed taxonomic level, highlighting their ecological and economic significance.
- CO2. Examine and interpret permanent stained preparations to understand the structural organization and functional anatomy of selected invertebrates.
- CO3. Analyze the digestive and nervous systems of Periplaneta and relate anatomical adaptations to their functional significance
- CO4. Develop practical skills in specimen identification, microscopic observation, scientific documentation, and preparation of assignments related to invertebrate zoology.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Zoology (Nonchordates- II Lab)

**Course Code:** BSMP-2483

**(PRACTICAL)**

**Credits: 0-0-2**

**Time: 3 Hours**

**Max Marks: 50**

**Practical: 35**

**CA: 15**

**Instructions for the Practical Examiners:**

Question paper is to 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. Classification up to order level with ecological notes and economic importance (if any) of the following animals:**

**Arthropoda:** *Peripatus*, *Palaemon* (prawn), Lobster, *Cancer* (crab), *Sacculina*, *Eupagurus* (hermit Crab), *Lepas*, *Balanus*, *Cyclops*, *Daphnia*, *Lepisma*, *Periplaneta* (cockroach), *Schistocerca* (locust), *Poeciloceris* (ak grasshopper), *Gryllus* (cricket), Mantis (praying mantis), Cicada, *Forficula* (earwig), Dragonfly, Termite queen, Bug, Moth, Beetles, *Polistes* (wasp), *Apis* (honey bee), *Bombyx*, *Pediculus* (body louse) Millipede and Centipede, *Palamnaeus* (scorpion), *Aranea* (spider) and *Limulus* (king Crab).

**Mollusca:** Anodonta, *Mytilus*, *Ostrea*, *Cardium*, *Pholas*, *Solen* (razor fish), *Pecten*, *Haliotis*, *Patella*, *Aplysia*, *Doris*, *Limax*, *Loligo*, *Sepia*, Octopus, Nautilus shell (Complete and T.S.), *Chiton*, *Dentalium*.

**Echinodermata:** *Asterias*, *Echinus* *Ophiothrix*, *Antedon*.

**Hemichordata:** *Balanoglossus*.

**2. Study of the following permanent stained preparations:**

Trachea and mouth parts of Insects

Radula and osphradium of *Pila*

T.S. Star fish (Arm).

**3. Demonstration of digestive and nervous systems of *Periplaneta* (cockroach) with the help of charts/models/videos.**

**4. Case Study/Review/Assignment on Ecological and Economic Importance of Invertebrates**

Note: Some changes can be made in the practical depending on the availability of material.

**Guidelines for conduct of practical Examination:-**

- |           |                                                                                                                                       |           |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>1.</b> | Identify and classify the specimens upto order level. Write a note on their habit, habitat, special features and economic importance. | <b>10</b> |
| <b>2.</b> | Draw a well labelled sketch of the given system of the animal & explain it to the examiner.                                           | <b>5</b>  |
| <b>3.</b> | Identify the slides/models and give two reasons for identification.                                                                   | <b>5</b>  |
| <b>4.</b> | Case Study/Review/Assignment                                                                                                          | <b>5</b>  |
| <b>5.</b> | Viva-voce & Practical file.                                                                                                           | <b>10</b> |

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Chemistry (Organic Chemistry-I)

**Course Code:** BSML-2084

**(THEORY)**

**Course outcomes:**

Students will be able to

CO1: interpret the bonding, hybridization between different organic compounds, explain the various reaction mechanisms and different electron displacement effects

CO2: interpret the reactions and properties of alkanes, alkenes & alkynes, derive the electrophilic, nucleophilic addition reactions, free radical mechanisms of halogenation of alkanes.

CO3: differentiate between aromatic, anti-aromatic and non-aromatic compounds, explain the effect of various substituents on the reactivity of aromatic compounds

CO4: learn about the basic chemistry of organic compounds along with methods of formation and reactions of alkyl halides and their derivatives.

**Bachelor of Science (Medical) (Honours) Semester-II (Session 2026-27)**

**Course Title:** Chemistry (Organic Chemistry-I)

**Course Code:** BSML-2084

**(THEORY)**

**Exam Time:** 3Hrs.

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

**Max. Marks:** 100

**(Theory: 70, CA: 30)**

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

**UNIT-I**

Hybridization, Use of arrows, Types of reagents, Reactive Intermediates: Carbocations, Carbanions, Free radicals Carbenes, arenes and Nitrenes. Stereochemistry: Fischer Projection, Newmann and Sawhorse Projection formulae and their interconversions, Geometrical isomerism, E/Z notations with C.I.P rules, Optical Activity, enantiomeric and diastereomeric excess, Chirality/Asymmetry, Enantiomers, Diastereoisomers, Racemic mixture and resolution, optical activity in absence of chiral carbon, Relative and absolute configuration: D/L and R/S designations

**UNIT-II**

**Chemistry of alkanes:** methods of formation of alkanes, Free radical substitutions: Halogenation - relative reactivity and selectivity. Cycloalkanes and Conformational Analysis: Baeyer strain theory, Conformation analysis, relative stability and energy diagrams of ethane, propane, butane, cyclohexane and Chair, Boat and Twist boat forms of cyclohexane.

**Chemistry of alkenes/alkynes:** Nomenclature and Formation of alkenes and alkynes, Mechanism of E1 and E2 reactions, Saytzeff and Hofmann eliminations. Mechanisms and Reactions of alkenes, reduction, syn and anti-hydroxylation (oxidation), 1, 2- and 1,4- addition reactions in conjugated dienes and Diels-Alder reaction, mechanism of allylic and benzylic bromination. Reactions of alkynes.

### UNIT-III

Aromaticity: Huckel's rule, Structure of benzene: Molecular formula and Kekule structure. Stability and C-C bond lengths of benzene, resonance structure. Aromatic electrophilic substitution—general pattern of the mechanism, role of  $\sigma$  and  $\pi$  complexes. Mechanism of nitration, halogenation, sulphonation, mercuration and Friedel Crafts reaction. Energy profile diagrams. Activating and deactivating substituents, reactivity and orientation of disubstitution. Side chain reactions of benzene derivatives. Methods of formation and chemical reactions of alkylbenzenes.

### UNIT-IV

Alkyl halides: Methods of preparation, details of nucleophilic substitution reactions – SN1, SN2 and SNi mechanisms with stereochemical aspects and effect of solvent, nucleophilic substitution vs. elimination. Aryl halides: Preparation, including preparation from diazonium salts, nucleophilic aromatic substitution in details; SNAr, Benzyne mechanism. Relative reactivity and mechanism of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions in detail.

#### Books suggested

1. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Solomons, T. W., Fryhle, C.B., Organic Chemistry; 9th edition, Pubs: Wiley India, 2007.
4. Wade Jr., L.G., Singh, M.S., Organic Chemistry; 6th edition, Pubs: Pearson Education, 2008.
5. Fundamentals of Organic Chemistry, Solomons, John Wiley.
6. Introduction to Organic Chemistry, Sreiwieser, Heathcock and Kosover, Macmilan.
7. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 2005.
8. McMurry, J. E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
9. Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Chemistry (Organic Chemistry-I Lab)

**Course Code:** BSMP- 2084  
**(PRACTICAL)**

**Course outcomes:**

Students will be able to analyze the given organic compound through

CO1: understand the basics of Qualitative analysis

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

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

CO4: preparation of their derivatives

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Chemistry (Organic Chemistry-I Lab)

**Course Code:** BSMP- 2084  
**(PRACTICAL)**

**Time: 3 Hrs**

**Marks: 50**

**Credits: 0-0-2**

**(Practical: 35, CA: 15)**

Basic techniques on purification of organic compounds. Determination of melting point and boiling point of organic compounds. Detection of nitrogen, halogens and sulphur in organic compounds. Qualitative analysis of unknown organic compounds containing simple functional groups.

**Books Suggested**

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. & Tatchell, A.R. Practical Organic Chemistry, 5 th Ed. Pearson (2012)
3. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Botany (Cell Biology and Genetics)

**Course Code:** BSMP-2075  
**(THEORY)**

**Course outcome:**

After passing this course the student will be able to: -

CO1: Explain the structure of cell and organelles associated with it.

CO2: Understand cellular envelopes and their functions.

CO3: Understand the chemical basis of hereditary material i.e., DNA, Mitosis, Meiosis and gene interactions

CO4: Understand different methods of gene expression in prokaryotes and eukaryotes AND various methods of genetic mutation and variations in living beings.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Botany (Cell Biology and Genetics)

**Course Code:** BSMP-2075

**(THEORY)**

**Time: 3 Hrs.**

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

**Max. Marks: 100**

**Theory: 70**

**C.A.:30**

**Instructions for the Paper Setters:-**

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Unit-I**

**Nucleus:** Ultrastructure; nuclear membrane; nucleolus; nucleoid in prokaryotes. Histone proteins: structure and function, Extra nuclear Genome: mitochondrial and plastid DNA; plasmids. Structure and function of cellular organelles.

**The Cell Envelopes:** Ultra structure of plasma membrane: bi-layer lipid structure, extrinsic and intrinsic proteins, functions. Ultra structure of cell wall, cell wall composition and its functions.

**Unit-II**

**DNA the Genetic Material:** DNA structure and its types (A, B, Z DNA); replication; DNA–protein interaction; the nucleosome model; genetic code; satellite and repetitive DNA, Cell Division: Mitosis; meiosis.

**Unit-III**

**Genetic Inheritance:** Mendelism; laws of segregation and independent assortment; linkage analysis; Incomplete dominance and co-dominance, multiple alleles, lethal alleles, epistasis, pleiotropy, penetrance and expressivity, polygenic inheritance.

**Unit-IV**

**Gene expression:** Structure of gene; transfer of genetic information; transcription, translation, protein synthesis, tRNA; ribosomes; regulation of gene expression in prokaryotes and eukaryotes.

**Genetic Variations:** Mutations, spontaneous and induced; transposable genetic elements; DNA, damage and repair

**Suggested Readings:-**

1. Johnson, A., Raff, L. and Walter, R. (2008). Molecular Biology of the Cell (5th Edition). Taylor and Francis Group, USA.
2. Brown, T.A. (2011). Genetics: A Molecular Approach (3rd Edition). BIOS Scientific Publishers, UK.

3. Fletcher, H., Hickey, I. and Winter, P. (2010). Instant Notes on Genetics (3rd edition) Taylor and Francis Group, USA.
4. Fukui, K. and Nakayama, S. (1996). Plant Chromosomes; Laboratory Methods, CRC Press, Boca Raton, Florida.
5. Gardner, E.J., Simmons, M.J. and Snustad, D.P. (2012). Principles of Genetics (8th Edition). Wiley Sons, USA.
6. Gunning, B.E.S. and Steer, M.W. (1996). Plant Cell Biology; Structure and Function, Jones and Barllett Publishers, Boston, Massachusetts.
7. Gupta, P.K. (2016). Cell and Molecular Biology, Rastogi Publications, Meerut, India.
8. Harns, N. and Oparka, K.J. (1994). Plant Cell Biology, A Practical Approach. IRL Press, at Oxford University Press, Oxford, UK.
9. Karp, G. (2013). Cell and Molecular Biology: Concepts and Experiments (7th Edition). Wiley Publishers, USA.
10. Kleinsmith, L.J. and Kish, V.M. (1995). Principles of Cell and Molecular Biology (2nd edition). Harper Collins College Publishers, New York, USA.
11. Krebs, B. E., Goldstein, E.S. and Kilpatrick, S.T. (2011). Lewins Genes X. Jones and Bartlett Publishers, LLC, UK.
12. Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Bretscher, A. and Ploegh, H. (2016). Molecular Cell Biology, W.H. Freeman & Co., New York, USA.
13. Plopper, G. (2016). Principles of Cell Biology. Jones and Barnett Learning, Boston, Massachusetts.
14. Sharma, A.K. and Sharma, A. (1999). Plant Chromosomes; Analysis. Manipulation and Engineering, Harwood Academic Publishers, Australia.
15. Singh, B.D. (2007). Molecular Genetics. Kalyani Publishers, India.
16. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics (5th Edition). John Wiley and Sons Inc., U.S.A.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title: Botany (Cell Biology and Genetics Lab)**

**Course Code: BSML-2075**

**(PRACTICAL)**

**Course Outcome:**

After passing this course the student will be able to:

CO1: Study of cell structure and plastids examination.

CO2: Understand microscopic structure of cell through light microscope and electron micrograph.

CO3: Evaluate methodologies in the design of genetics experimental procedures.

CO4: Analyze special chromosome types and apply inheritance laws using genetic data.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**  
**Course Title: Botany (Cell Biology and Genetics Lab)**  
**Course Code: BSML-2075**  
**(PRACTICAL)**

**Time: 3 Hrs**

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

**Max. Marks: 50**

**Theory: 35**

**C.A.:1**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

**Suggested Laboratory Exercises:**

1. To study cell structure from onion leaf peels; demonstration of staining and mounting methods.
2. Comparative study of cell structure in onion cells, *Hydrilla* and *Spirogyra*.
3. Study of cyclosis in *Tradescantia* Staminal Cells.
4. Study of plastids to examine pigment distribution in plants (e.g. *Cassia*, *Lycopersicon* and *Capsicum*).
5. Examination of electron micrographs of eukaryotic cells with special reference to organelles.
6. Study of electron micrographs of viruses, bacteria, cyanobacteria and eukaryotic cells for comparative cellular organization.
7. Examination of various stages of mitosis and meiosis using appropriate plant material (e.g. onion root tips, onion flower buds).
8. Cytological examination of special types of chromosomes: bar body, lampbrush and polytene chromosomes.
9. Working out the laws of inheritance using seed mixtures.
10. Working out the mode of inheritance of linked genes from test cross and/or F2 data.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**  
**Course Title: Botany (Medicinal Botany)**  
**Course Code: BSMM -2070**  
**(Theory)**

**Course Outcomes:**

After completion of course students will be able to:

CO1: Understand the historical significance and foundational concepts of Ayurveda, Siddha, and Unani medicinal systems.

CO2: Identify and conserve endangered and endemic medicinal plants.

CO3: Acquire skills in the propagation techniques of medicinal plants.

CO4: Explore ethnobotany and its application in traditional and modern medicine.

**Bachelor of Science (Medical) (Honours) Semester-II (Session 2026-27)**  
**Course Title: Botany (Medicinal Botany)**  
**Course Code: BSMM -2070**  
**(Theory)**

**Time: 3 Hrs.**  
**Credits (L-T-P): 2-0-0**

**Max. Marks: 100**  
**Theory: 50**  
**C.A.: 30**

**Instructions for the Paper Setters:**

Eight questions of equal marks (10 marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Unit-I**

**1. History, Scope and Importance of Medicinal Plants:** Indigenous Medicinal Sciences; Definition and Scope-Ayurveda: History, origin, *panchamahabhutas*, *saptadhatu* and *tridosha* concepts, *Rasayana*, plants used in ayurvedic treatments, Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. Unani: History, concept: *Umoor-e- tabiya*, tumors treatments/ therapy, polyherbal formulations.

**Unit-II**

**2. Conservation of endangered and endemic medicinal plants:** Definition; Endemic and Endangered medicinal plants, Red list criteria; *In situ* conservation: Biosphere reserves, sacred groves, National Parks; *Ex situ* conservation: Botanical Gardens.

**Unit-III**

**3. Propagation of Medicinal Plants:** Objectives and classification of nurseries; nursery practices including seed sowing, pricking, use of green house for nursery production, plant propagation through cuttings, layering, grafting and budding with suitable examples. Cultivation and propagation of selected medicinal plants :Amla (*Emblica officinalis*), Ashwagandha (*Withania somnifera*), Bahera (*Terminalia belerica*), Harhar (*Terminalia chibula*) and Aloe vera.

**Unit-IV**

**4. Ethnobotany and Folk medicines:**

Definition, scope and significance of ethnobotany; ethnobotany in India; methods of ethnobotanical studies; Palaeo-ethnobotany; ethnic communities of India and traditional ecological knowledge; ethnoecology; folk medicine, ethnomedicine and ethnic communities of India. Application of natural products to certain diseases- Jaundice, cardiac disorders, infertility, diabetics, blood pressure and skin diseases.

### **Suggested Readings**

1. Trivedi P C, 2006. Medicinal Plants: Ethnobotanical Approach, Agrobios, India.
2. Dhaduk, H. L, 2016, Medicinal Plants: Cultivation and Uses. India: DAYA Publishing House.
3. Shankar Gopal Joshi (2000). Medicinal Plants. Oxford & IBH Publishing Co. Pvt. Ltd.,  
New Delhi.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**  
**Course Title: Botany (Medicinal Botany Lab)**  
**Course Code: BSMM -2070**  
**(PRACTICAL)**

**Time: 2 Hrs.**

**Practical: 20**

**Credits (L-T-P): 0-0-1**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

**Suggested Laboratory Exercises**

10. To visit the nurseries for the study of medicinal and aromatic plants.
11. To visit Botanical Garden and Herbal Garden for the identification of Medicinal Plants.
12. To study harvesting, drying, grading, storage, processing techniques for medicinal and aromatic plants.
13. Collection and Identification of locally used ethnobotanicals.
14. To extract essential oils from aromatic plants by hydrodistillation method.
15. To study major ethnomedicinal plants and practices followed in India.
16. Qualitative analysis of secondary metabolites from plant sample.

**Bachelor of Science (Medical) (Honours) Semester–II (Session 2026-27)**

**Course Title:** Drug Abuse and Ethical Education

**Course Code:** VACD-2161

Course Title: Drug Abuse and Ethical Education

Course Duration: 30 hours

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

Course Credits: 4

Course Code: VACD-2161

*Course Description:-*

Drug Abuse and Ethical Education Programme has been introduced as part of the curriculum of second Semester of all streams of undergraduate degree programs. It has been added as a compulsory subject, the awards of which will not be incorporated in the total marks but will earn the student 4 credits.

*Expectations:-*

This academic input has been taken up to sensitize the students to the need of a morally upright character in the present times when youth is being mislead into consumption/ abuse of drugs, thereby ruining their present and future.

By studying Drug Abuse the students will have a better understanding of the concept. They will be able to analyze the physical, psychological and social consequences on individuals and develop strategy for prevention and management to promote healthy life style and community well being

## EXAMINATION

- **Total Marks: 100 (Final Exam: 70; Internal Assessment: 30)**
- Final Exam: multiple choice Questions Marks-70; Time: 3 hours
- Internal Assessment: 30
- Total marks: 100 converted to grade for final result
- Grading system for Audit Course

| Letter Grade | Percentage Score |
|--------------|------------------|
| O            | 90.1-100 %       |
| A+           | 80.1-90 %        |
| A            | 70.1-80 %        |
| B+           | 60.1-70 %        |
| B            | 50.1- 60 %       |
| C            | 45-50 %          |
| P            | 35-44.9 %        |
| F            | Below 35         |
| Ab           | Absent           |

### *Syllabus:*

#### **Module I: Challenges before youth:**

- ❖ Drug Abuse: Meaning; Nature and Types and Extent of Drug Abuse in India and Punjab
- ❖ Consequences of Drug Abuse: Individual; Education; Employment; Income Family; Violence; Society; Crime and Social Disorganization

#### *Module II: Solving the problem:*

- ❖ Prevention of Drug abuse :Role of family and Educational Institutions; Parent child relationship; Family support and Supervision; Counseling and Teacher as role-model.
- ❖ Management of Drug Abuse :Medical and Psychiatric management ; Medication and withdrawal effects; Counseling; Behavioral and Cognitive therapy ; Legislation : NDPs act; Statutory warnings and Strict enforcement of laws

*Module III: Understanding the Self:*

- ❖ Character building : Self awareness; Self growth; Self Control; Self Discipline; Character and Destiny
- ❖ Generation gap: Relation with peer group; siblings and elders

*Module IV: Social Responsibility:*

- ❖ Opposite Sex Relations
- ❖ Globalization and IT Boom- Advantages and Disadvantages

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML-3421**

**(THEORY)**

**COURSE OUTCOMES**

- CO1: ‘ਚੋਣਵੇਂ ਪੰਜਾਬੀ ਨਿਬੰਧ’ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਵਾਰਤਕ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।
- CO2: ‘ਆਧੁਨਿਕ ਇਕਾਂਗੀ’ ਇਕਾਂਗੀ ਸੰਗ੍ਰਹਿ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਇਕਾਂਗੀ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲ ਜੋੜਣਾ ਹੈ।
- CO3: ਸੰਖੇਪ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਸੰਖੇਪ ਵਿਚ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿਚੋਂ ਅਸੁੱਧ ਸ਼ਬਦ ਜੋੜਾਂ ਨੂੰ ਸੁੱਧ ਕਰਨ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।
- CO4: ਪੰਜਾਬੀ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ : ਨਾਂਵ ,ਪੜਨਾਂਵ ,ਕਿਰਿਆ, ਸਬੰਧਕ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ -ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

**Bachelor of Science (Medical) (Honours) Semester-III (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML-3421**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**L-T-P: 4-0-0**

**Maximum Marks: 100**

**Theory: 70**

**CA: 30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

**ਯੂਨਿਟ-I**

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

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

(ਪਾਠਕ੍ਰਮ ਦਾ ਹਿੱਸਾ ਹਨ)

(ਵਿਸ਼ਾ ਵਸਤੂ/ਸਾਰ/ਕਲਾ ਪੱਖ)

**ਯੂਨਿਟ-II**

ਆਧੁਨਿਕ ਇਕਾਂਗੀ

(ਸੰਪਾ. ਰੋਸ਼ਨ ਲਾਲ ਆਹੂਜਾ, ਮਨਜੀਤ ਪਾਲ ਕੌਰ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਵਿਸ਼ਾ ਵਸਤੂ/ਪਾਤਰ ਚਿਤਰਨ/ਰੰਗ ਮੰਚੀ ਪੱਖ/ ਸਾਰ

### ਯੂਨਿਟ-III

(ੳ) ਸੰਖੇਪ ਰਚਨਾ (ਪ੍ਰੈਸੀ)

(ਅ) ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿਚੋਂ ਅਸੁੱਧ ਸ਼ਬਦ ਜੋੜਾਂ ਨੂੰ ਸੁੱਧ ਕਰਨਾ

### ਯੂਨਿਟ-IV

ਪੰਜਾਬੀ ਸ਼ਬਦ ਸ਼੍ਰੇਣੀਆਂ :

(ੳ) ਨਾਂਵ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ਅ) ਪੜਨਾਂਵ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ੲ) ਕਿਰਿਆ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ਸ) ਸਬੰਧਕ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-3031**

**(THEORY)**

**Course outcomes**

- CO1: ਸੰਖੇਪ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਸੰਖੇਪ ਵਿਚ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਦੇਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।
- CO2: ਕਵਿਤਾ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਵਿਤਾ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ।
- CO3: ਕਹਾਣੀ ਭਾਗ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਤਾਂ ਕਿ ਉਹ ਆਧੁਨਿਕ ਦੌਰ ਵਿਚ ਚੱਲ ਰਹੀਆਂ ਕਾਵਿਧਾਰਾਵਾਂ ਅਤੇ ਕਵੀਆਂ ਬਾਰੇ ਗਿਆਨ ਹਾਸਿਲ ਕਰ ਸਕਣ।
- CO4: ਨਿਬੰਧ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਮੁੱਲਵਾਨ ਇਤਿਹਾਸ ਤੋਂ ਜਾਣੂ ਕਰਵਾਉਣਾ ਹੈ।

**Bachelor of Science (Medical) (Honours) Semester-III (Session 2026-27)**

**Course Title Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-3031**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**Maximum Marks: 100**

**L-T-P: 4-0-0**

**Theory :70**

**CA :30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ**

**ਯੂਨਿਟ-I**

**ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉਤਰ**

**ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰੇ ਦਾ ਪੰਜਾਬੀ ਅਨੁਵਾਦ**

**ਯੂਨਿਟ-II**

**ਕਵਿਤਾਵਾਂ**

**(ੳ) ਸਮਾਂ (ਭਾਈ ਵੀਰ ਸਿੰਘ)**

**(ਅ) ਸ਼ੈਰ ਪੰਜਾਬੀ ਦੀ (ਫੀਰੋਜ਼ਦੀਨ ਸ਼ਰਫ਼)**

**(ੲ) ਅੰਬੀ ਦਾ ਬੂਟਾ (ਪ੍ਰੋ.ਮੋਹਨਸਿੰਘ)**

**(ਸ) ਬਿਰਹੇ ਦੀ ਰੜਕ (ਸ਼ਿਵ ਕੁਮਾਰ)**

**(ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ, ਸਾਰ)**

### ਯੂਨਿਟ-III

ਕਹਾਣੀਆਂ

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

### ਯੂਨਿਟ-IV

ਨਿਬੰਧ

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

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Punjab History and Culture (From 1000-1605 A. D.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-3431

**(THEORY)**

**Course Outcomes**

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

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

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

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

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

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Punjab History and Culture (From 1000-1605 A. D.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-3431

**(THEORY)**

Examination Time: 3 Hours

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

Max. Marks: 100

Theory: 70

CA: 30

**Instructions for the Paper Setter:**

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

**Unit -I**

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

**Unit-II**

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

**Unit-III**

5. Guru Nanak: Early Life and Teachings
6. Concept of Sangat andPangat

**Unit-IV**

7. Contribution of Guru Angad Dev, Guru Amar Das and Guru Ram Das
8. Briefly describe the compilation of the Adi Granth and its importance. Guru Arjun Dev and Compilation of Adi Granth

**Suggested Readings:**

- Chopra, P. N., Puri, B.N., &Das. M.N. (1974). A Social, Cultural and Economic History of India, Vol. II. New Delhi: Macmillan India.

- Grewal, J.S. (1994) *The Sikhs of the Punjab*, Cambridge University Press, New Delhi.
- Singh, Fauja (1972), *A History of the Sikhs*, Vol. II, I. Patiala: Punjabi University.
- Singh, Khushwant (2011). *A History of Sikhs- Vol. I (1469-1839)*, New Delhi, Oxford University Press.

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** English Language Skills-II

**Course Code:** BSML-3212

**(THEORY)**

**COURSE OUTCOMES**

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

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

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

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

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

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** English Language Skills-II

**Course Code:** BSML-3212

**(THEORY)**

**Max. Marks: 100**

**Examination Time: 3 Hrs.**

**Theory: 70**

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

**CA: 30**

**Instructions for the Paper Setters:-**

Eight questions are to be set, two from each of the four Units (I-IV). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question will carry 14 marks. (14x5=70)

**UNIT-I**

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

**UNIT-II**

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

**UNIT-III**

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

**UNIT-IV**

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

**Texts Prescribed:**

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

2. *Making Connections* by Kenneth J. Pakenham, 3rd Edn. CUP

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Zoology (Diversity of Chordates)

**Course Code:** BSML-3483

**(THEORY)**

## **Course Outcomes**

After passing this course the student will be able to:

- CO1: Understand general body plan of Herdmania and external characters of Amphioxus.
- CO2: Understand external characters and affinities of Petromyzon as well as body systems of *Labeo*.
- CO3: Understand body plan and various systems of Frog and Uromastix.
- CO4: Understand body systems of Pigeon and Rat.

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Zoology (Diversity of Chordates)

**Course Code:** BSML-3483

**(THEORY)**

**Credits: 4-0-0**

**Time: 3 Hours**

**Max Marks: 100**

**Theory: 70**

**CA: 30**

**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. Each question will carry 14 marks.

**Unit I**

Brief Introduction to Protochordata

Urochordata: Type study- *Herdmania*

Cephalochordata: External features and affinities of *Amphioxus*

**Unit II**

Cyclostomata: External Characters of *Petromyzon*

Affinities of Cyclostomata

Pisces: Type study-*Labeo*

**Unit III**

Amphibia: Type study-Frog

Reptilia: Type study-*Uromastix*

**Unit IV**

Aves: Type study-Pigeon

Mammals: Type study-Rat

**Suggested Reading Material.**

1. Dhami, P.S. & Dhami J.K. (1998), Vertebrates, R. Chand & Co., New Delhi.
2. Hildebrand, M. and Goslow, Jr. G.E. (2001), Analysis of Vertebrates Structure, John Wiley, N. Y.
3. Jollie, M. (1968), Chordate Morphology, Reinhold, New York.
4. Kardong, K. V. (1995), Vertebrates – Comparative Anatomy, Function, Evolution. W.B.C. Pub. , Oxford.
5. Kent, G. C. and Carr, R. K. (2001), Comparative Anatomy of the Vertebrates (9<sup>ed</sup>), McGraw Hill Higher Education, New York.
6. Linzey, D. (2001), Vertebrate Biology, McGraw Hill Publishing Company, New York.
7. Pough, F. H., Heiser, J. B. and McFarland, W. N. (1990), Vertebrate Life (3<sup>ed</sup>), Macmillan Pub. Co., New York.

8. Young, J. Z. (1982), The Life of Vertebrates, New York.
9. Parker, T.J. and Haswell, W.A (1981) Text Book of Zoology, Vol. II (Vertebrates), ELBS and Macmillian Press Ltd.

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Zoology (Chordates Lab)

**Course Code:** BSMP-3483

**(PRACTICAL)**

## **Course Outcomes**

After passing this course the student will be able to:

- CO1. Helps the students to get acquaintance to animal kingdom especially the animal species belonging to phylum Chordata
- CO2: Familiarize organ systems.
- CO3: Know about economically important specimens (preserved).
- CO4: Learn about histology and morphology of chordates

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Zoology (Chordates Lab)

**Course Code:** BSMP-3483

**(PRACTICAL)**

**LTP: 0-0-2**

**Time: 3 Hrs.**

**Max Marks: 50**

**Marks: 35**

**CA: 15**

**Instructions for the Practical Examiners:** Question paper is to 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

**Guidelines for conduct of Practical Examination:**

1. Draw a labelled sketch of the system of the given animal & explain it to the Examiner. 5
2. Identify and classify the specimens upto order level. Write a short note on habitat, special features, feeding, habits and economic importance of the specimens. 10
3. Identify the slides/specimens, give two reasons for identification. 8
4. Assignment/ Visit Report 6
5. Viva-voce & Practical file. 6

**I. Classification up to order level, except in case of Pisces and Aves where classification up to subclass level, habits, habitat, external characters and economic importance (if any) of the following animals is required:**

**Urochordata** : *Herdmania, Molgula, Pyrosoma, Doliolum, Salpa & Oikopleura*.

**Cephalochordata**: *Amphioxus*. Study of the following prepared slides:

T.S. *Amphioxus* through various regions, Pharynx of *Amphioxus*

**Cyclostomata** : *Myxine, Petromyzon & Ammocoetes* Larva.

**Chondrichthyes** : *Zygaena* (hammer head shark), *Pristis* (saw fish), *Narcine* (electric ray), *Trygon*, *Rhinobatus* and *Chimaera* (rabbit fish).

**Actinoptergii** : *Polypterus, Acipenser, Lepidosteus, Muraena, Mystus, Catla, Hippocampus, Syngnathus, Exocoetus, Anabas, Diodon, Tetradon, Echeineis and Solea*.

**Dipneusti (Dipnoi)** : *Protopterus* (African lung fish)

**Amphibia** : *Uraeotyphlus, Necturus, Amphiuma, Amblystoma* and its Axolotl Larva, *Triton, Salamandra, Hyla, Rhacophorus*

**Reptilia** : *Hemidactylus, Calotes, Draco, Varanus, Phrynosoma, Chamaeleon, Typhlops, Python, Eryx, Ptyas, Bungarus, Naja, Hydrus, Vipera, Crocodilus, Gavialis*,

*Chelone*(turtle) and *Testudo* (tortoise),Differences in nonpoisonous and poisonous snakes.

**Aves** : *Casuaris*, *Ardea*, *Anas*, *Milvus*, *Pavo*, *Eudynamics*, *Tyto* and *Alcedo*.

**Mammalia** : *Ornithorynchus*, *Echidna*, *Didelphis*, *Macropus*, *Loris*, *Macaca*, *Manis*, *Hystrix*, *Funambulus*, *Panthera*, *Canis*, *Herpestes*, *Capra*, *Pteropus*.

II. Study of the following systems with the help of charts/models/videos:

***Herdmania*** : General anatomy

***Labeo*** : Digestive and reproductive systems, heart, afferent and branchial arteries, cranial nerves and internal ear.

**Pigeon** : Digestive, arterial, venous and urino-genital systems.

**WhiteRat** : Digestive, arterial, venous and urino-genital systems.

Study of permanent slides of whole mount of Pharynx of *Herdmania* and *Amphioxus*.

Cycloid scales of *Labeo*, blood smear of mammal, Histology of rat/rabbit (compound tissues)

**Note:- Some changes can be made in the practical depending on the availability of material.**

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Chemistry (Physical Chemistry-I)

**Course Code:** BSML-3084

**(THEORY)**

**Course Outcomes:**

Students will be able to

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

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

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

**CO4:** Analyze electrochemical systems using concepts like conductivity, electrode potentials, Nernst equation, and concentration cells, and evaluate electrochemical parameters such as EMF,  $\Delta G$ ,  $\Delta H$ , and equilibrium constants.

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Chemistry (Physical Chemistry-I)

**Course Code:** BSML-3084

**(THEORY)**

**Exam Time:** 3Hrs.

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

**Max. Marks:** 100

**(Theory: 70, CA: 30)**

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

**UNIT I**

**(15 Hrs.)**

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

**UNIT II**

**(15 Hrs.)**

**Colloidal State:** Definition of colloids, classification of colloids. Solids in liquids (Sol): kinetic, optical and electrical properties, stability of colloids, protective action, Hardy Schulze law, gold number. Liquids in liquids (emulsions): Types of emulsions, preparation. Emulsifiers. General applications of colloids. **Solid State:** Definition of space lattice and unit cell, Law of crystallography- (i) Law of constancy of interfacial angles, (ii) Law of rationality of indices, (iii) Symmetry elements in crystals. X-ray diffraction by crystals. Derivation of Bragg's Law in Reciprocal space. Determination of crystal structure of NaCl, KCl by use of Powder method; Laue's method. Liquid crystals, Classification, structure of nematic and cholestric phases.

### UNIT III

(15 Hrs.)

**Solutions, Dilute Solutions and Colligative Properties:** Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, colligative properties, Raoult's law, non-ideal system, azeotropes-HCl-H<sub>2</sub>O and ethanol-water system. Relative lowering of vapour pressure, molecular weight determination. Osmosis, Law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point, Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, degree of dissociation and association of solutes.

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

### UNIT IV

(15

Hrs.)

**Electrochemistry-I:** Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Migration of ions, Transport number, Applications of conductivity measurements, Electrolytic and Galvanic cells-reversible and irreversible cells, conventional representation of electrochemical cells. Standard electrode potential, standard hydrogen electrode, reference electrodes, sign conventions, electrochemical series and its significance. Nernst equation, derivation of cell E.M.F. and single electrode potential. EMF of a cell and its measurements. Calculation of thermodynamic quantities of cell reactions ( $\Delta G$ ,  $\Delta H$  and  $K$ ). Types of reversible electrodes: gas-metal ion, metal ion, metal insoluble salt-anion and redox electrodes. Electrode reactions. EMF of reversible electrodes.

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

**Books Suggested**

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

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Chemistry (Physical Chemistry-I Lab)

**Course Code:** BSMP-3084

**(PRACTICAL)**

**Course outcomes**

Students will be able

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

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

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

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

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Chemistry (Physical Chemistry-I Lab)

**Course Code:** BSMP-3084

**(PRACTICAL)**

Time: 3 Hrs

Marks: 50

**Credits: 0-0-2**

**(Practical: 35, CA: 15)**

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

## Books Suggested

1. Experimental Organic Chemistry, Vol. I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
2. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
3. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
4. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.
5. Experiments in Physical Chemistry, R.C. Das and B. Behra, Tata McGraw Hill.
6. Advanced Practical Physical Chemistry, J.B. Yadav, Goel Publishing House.
7. Advanced Experimental Chemistry, Vol. I, Physical, J.N. Guru and R. Kapoor, S. Chand & Co.
8. Selected Experiments in Physical Chemistry, N.G. Mukherjee, J.N. Ghosh & Sons.
9. Experiments Physical Chemistry, J.C. Ghosh, Bharati Bhavan.
10. Findlay's Practical Physical Chemistry, Author: Alexander Findlay, Publisher: Wiley, 1972, ISBN-10:0470258853.
11. Advanced Practical Physical Chemistry, Author: J. B. Yadav, Publisher: Krishna Prakashan Media (P) Ltd (2015), ISBN-10:8182835925.

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Botany (Diversity of Phanerogams)

**Course Code:** BSML-3075

**(THEORY)**

**Course outcome: -**

After passing this course the student will be able to:

**CO1:** Develop an understanding of the characteristics of seed plants and the evolution of seeds in angiosperms and gymnosperms. Study the salient features, classification, evolutionary trends, and vegetative and reproductive morphology of representative gymnosperms such as *Pinus*, *Cycas* and *Ephedra*.

**CO2:** Acquire knowledge of the principles of Botanical Nomenclature, and the classification of angiosperms with emphasis on salient features of the systems proposed by Bentham and Hooker, Hutchinson, Engler and Prantl.

**CO3:** Understand the diversity, distinguishing characteristics and systematic position of flowering plant families like Apocynaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Chenopodiaceae, Euphorbiaceae, Liliaceae, Orchidaceae and Poaceae.

**CO4:** Gain knowledge of the diversity, diagnostic features and economic importance of flowering plant families like Ranunculaceae, Brassicaceae, Rutaceae, Fabaceae, Apiaceae, Acanthaceae, Asteraceae.

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Botany (Diversity of Phanerogams)

**Course Code:** BSML-3075

**(THEORY)**

**Time:** 3 Hrs.

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

**Max. Marks:** 100

**Theory:** 70

**C.A.:**30

**Instructions for the Paper Setters:-**

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Unit I**

**Seed plants:** Characteristics, distinguishing features of angiosperms and gymnosperms, primitive angiosperms.

**Gymnosperms:** General features, classification, diversity of Gymnosperms including fossil and living gymnosperms; Geological time scale and fossilization. Study of Morphology, anatomy (root, Stem and leaf) and reproduction (life-cycle) of *Pinus*, *Cycas*, and *Ephedra*.

**Unit II**

**Angiosperm Taxonomy:** Brief history, Aims and fundamental components (alpha-taxonomy, Omega-taxonomy, Holotaxonomy); Identification keys. Botanical nomenclature: Taxonomic ranks; Type concept; Principle of priority. Systems of Plant Taxonomy: Artificial, Natural and Phylogenetic systems of classification. Salient features of the systems proposed by Bentham and Hooker, Engler and Prantl, Hutchinson.

**Unit III**

**Diversity of flowering plants** as illustrated by members of the families Apocynaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Chenopodiaceae, Euphorbiaceae, Liliaceae, Orchidaceae and Poaceae.

**Unit IV**

**Diversity of flowering plants** as illustrated by members of the families Ranunculaceae, Brassicaceae, Rutaceae, Fabaceae, Apiaceae, Acanthaceae, Asteraceae.

### **Suggested Readings:-**

1. Angiosperm Phylogeny Group (2003). An update of the Angiosperm Phylogeny Group classification for the orders and families of the flowering plants: APG
2. Bendre, A. (2007). Practical Botany, Rastogi Publications, Meerut.
3. Bhatnagar, S.P. and Moitra, A. (1996). Gymnosperms, New Age International Limited, New Delhi. 2. Gifford, E.M. and Foster, A.S. (1988). Morphology and Evolution of Vascular Plants, W.H. Freeman & Company, New York.
4. Botanical Journal of the Linnaean Society 141: 399-436. 2. Cronquist, A. (1981). An Integrated System of Classification of Flowering Plants. Columbia University Press, New York.
5. Davis, P.H. and Heywood, V.H. (1963). Principles of Angiosperm Taxonomy, Oliver and Boyd, London.
6. Gifford, E.M. and Foster, A.S. (1988). Morphology and Evolution of Vascular Plants, W.H. Freeman & Company, New York.
7. Jeffrey, C. (1982). An Introduction to Plant Taxonomy, Cambridge University Press, Cambridge, London.
8. Jones, S.B., Jr. and Luchsinger, A.E. (1986). Plant Systematics (2nd edition). McGraw- Hill Book Co., New York.
9. Pellant, C. (1994). Fossils, Dragon's World, Great Britain
10. Radford, A.E. (1986). Fundamental of Plant Systematics, Harper and Row, New York
11. Simpson, M.C. (2006). Plant Systematics. Elsevier, Amsterdam
12. Sporne, K.R. (1965). The Morphology of Gymnosperms, Hutchinson & Co. (Publishers) Ltd., London.
13. Taylor, T. N., Taylor, E. L. and Krings, M. (2008). Paleobotany: The Biology and Evolution of Fossil Plants (2nd Edition). Elsevier Inc. Netherlands.
14. Vashistha, P. C. (2016). Botany for degree students. S.Chand and Company, New Delhi

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Botany (Diversity of Phanerogams Lab)

**Course Code:** BSMP-3075

**(PRACTICAL)**

**Course outcome:**

After passing this course the student will be able to:

**CO1:** Demonstrate practical knowledge of vegetative and reproductive structures of *Cycas*, *Pinus* and *Ephedra* through specimen observation, dissection, and slide analysis.

**CO2:** Analyze anatomical features of gymnosperm organs using transverse, longitudinal, and vertical sections, including reproductive structures and developmental stages.

**CO3:** Identify and classify representative angiosperms from major plant families using morphological and floral characteristics.

**CO4:** Demonstrate understanding of taxonomic diversity and key diagnostic features of selected dicot and monocot families.

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Botany (Diversity of Phanerogams Lab)

**Course Code:** BSMP-3075

**(PRACTICAL)**

**Time:** 3 Hrs

**Max. Marks:** 50

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

**Practical:** 35

**C.A.:**15

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

**Suggested Laboratory Exercises:-**

**1. Gymnosperms**

**Cycas** (i) Habit, armour of leaf bases on the stem (if specimen is not available show Photography), very young leaf (circinate vernation) and old foliage leaves, scale leaf, bulbils, male cone (specimen); Microsporophyll, megasporophyll mature seed. (ii) Study through permanent slides—normal root (T.S.), stem (T.S.) (if sections are not available show photographs), ovule (L.S.). (iii) Study through hand sections or dissections-coralloid root (T.S.), rachis (T.S.), leaflet (V.S.), microsporophyll (V.S.), pollen grains (W.M.).

**Pinus** (i) Habit, long and dwarf shoot showing cataphylls and scale leaves, T.S. wood showing growth rings, male cone, 1st year, 2nd year and 3rd year female cones, winged seeds. (ii) Study through permanent slides-root (T.S.), female cone (L.S.) ovule (L.S.), embryo (W.M.) showing polycotyledonous condition. (iii) Study through hand sections or dissections-young stem (T.S.), old stem (wood) (T.L.S. and R.L.S.), needle (T.S. male cone (L.S.), male cone (T.S.), Pollen grains (W.M.).

**Ephedra** (i) Habit and structure of whole and female cones. (ii) Permanent slides-female cone (L.S.). (iii) Hand sections/dissections-node (L.S.), internode (T.S.), macerated stem to see vessel structure; epidermal peel mount of vegetative parts to study stomata, male cone (T.S. and L.S.), Pollen grains.

**2. Angiosperms**

This list is only indicative. Teachers may select plants/material available in their locality/institution.

1. Ranunculaceae: *Ranunculus*, *Delphinium*
2. Brassicaceae: *Brassica*, *Alyssum*, *Iberis*, *Coronopus*.
3. Malvaceae: *Hibiscus*, *Abutilon*.
4. Rutaceae: *Murraya*, *Citrus*.
5. Fabaceae: Faboideae: *Lathyrus*, *Cajanus*, *Melilotus*, *Trigonella*, Caesalpinioideae: *Cassia*, *Caesalpinia*, Mimosoideae: *Prosopis*, *Mimosa*, *Acacia*.
6. Apiaceae: *Coriandrum*, *Foeniculum*, *Anethum*.
7. Acanthaceae: *Adhatoda*, *Peristrophe*.
8. Apocynaceae: *Vinca*, *Thevetia*, *Nerium*.
9. Asclepiadaceae: *Calotropis*.
10. Solanaceae: *Solanum*, *Withania*, *Datura*.
11. Euphorbiaceae: *Euphorbia*, *Phyllanthus*.
12. Lamiaceae: *Ocimum*, *Salvia*.

13. Chenopodiaceae: *Chenopodium*, *Beta*.
14. Liliaceae: *Asphodelus*, *Asparagus*.
15. Poaceae: *Avena*, *Triticum*, *Hordeum*, *Poa*, *Sorghum*.

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Environmental Studies

**Course Code:** VACE-3221

**(Theory)**

**COURSE OUTCOMES:**

After passing this course, students will be able to:

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

**Bachelor of Science (Medical) (Honours) Semester–III (Session 2026-27)**

**Course Title:** Environmental Studies

**Course Code:** VACE-3221

**(Theory)**

**Time: 3 Hrs.**

**Credit: 2-0-0**

**Max. Marks: 50**

**Theory: 35**

**CA: 15**

**Instructions for the Paper Setter:**

Eight questions of equal marks (7 marks) are to be set, two in each out of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Unit I**

**1. The multidisciplinary nature of environmental studies**

- Definition, scope and importance, Need for public awareness

**2. Natural resources and associated problems.**

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

## Unit II

### 3. Ecosystems

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

### 4. Biodiversity and its conservation

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

## Unit III

### 5. Environmental Pollution

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

### 6. Social Issues and the Environment

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

## **Unit IV**

### **7. Human Population and the Environment**

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

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

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

### **References:**

1. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
2. Down to Earth, Centre for Science and Environment, New Delhi.
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**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML- 4421**

**(THEORY)**

**COURSE OUTCOMES**

- CO1: ‘ਗਲੀਏ ਚਿਕੜ ਦੂਰਿ ਘਰੁ’ (ਸਵੈ ਜੀਵਨੀ) ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਸਵੈਜੀਵਨੀ ਸਾਹਿਤ ਰੂਪ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।
- CO2: ‘ਫਾਸਲੇ’ (ਨਾਟਕ) ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰ ਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਨਾਟਕ ਨੂੰ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਨਾਟਕ ਜਗਤ ਨਾਲ ਜੋੜਣਾ ਹੈ।
- CO3: ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰਨ ਦਾ ਮਕਸਦ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਲਿਖਤ ਵਿਚ ਕੀਤੀਆਂ ਜਾਣ ਵਾਲੀਆਂ ਗਲਤੀਆਂ ਨੂੰ ਸੁਧਾਰਨਾ ਹੈ। ਅਖ਼ਬਾਰ ਵਿਚ ਇਸ਼ਤਿਹਾਰ ਲਿਖਣਾ ਸਿਖਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਨੂੰ ਇਸ ਕਲਾ ਵਿਚ ਨਿਪੁੰਨ ਕਰਨਾ ਹੈ।
- CO4: ਪੰਜਾਬੀ ਬਬਦ ਸ਼੍ਰੇਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਦਾ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

**Bachelor of Science (Medical) (Honours) Semester-IV (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML- 4421**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**L-T-P**

**4-0-0**

**Maximum Marks: 100**

**Theory : 70**

**CA :30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿੱਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿੱਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਇੱਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿੱਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

**ਯੂਨਿਟ-I**

ਗਲੀਏ ਚਿਕਤ੍ਰ ਦੂਰਿ ਘਰੁ (ਸਵੈਜੀਵਨੀ): ਸ.ਸ.ਵਣਜਾਰਾ ਬੇਦੀ, ਕਸਤੂਰੀ ਲਾਲ ਐਂਡ ਸੰਨਜ਼, ਅੰਮ੍ਰਿਤਸਰ  
(ਨਾਇਕ ਬਿੰਬ/ਸਵੈ ਜੀਵਨੀ ਦੇ ਤੌਰ ਤੇ ਪਰਖੇ/ਵਾਰਤਕ ਸ਼ੈਲੀ)

**ਯੂਨਿਟ-II**

**ਫ਼ਾਸਲੇ (ਨਾਟਕ) :ਜਤਿੰਦਰ ਬਰਾੜ,**

**(ਵਿਸ਼ਾ ਵਸਤੂ/ਸਾਰ/ਨਾਟਕ ਕਲਾ)**

**ਯੂਨਿਟ-III**

**(ੳ) ਦਿੱਤੇ ਪੈਰ੍ਹੇ ਵਿੱਚੋਂ ਅਸ਼ੁੱਧ ਸ਼ਬਦ ਜੋੜਾਂ ਨੂੰ ਸ਼ੁੱਧ ਕਰਨਾ**

**(ਅ) ਅਖ਼ਬਾਰ ਨੂੰ ਇਸ਼ਤਿਹਾਰ (ਨਿੱਜੀ, ਦਫ਼ਤਰੀ)**

#### ਯੂਨਿਟ-IV

(ੳ) ਪੰਜਾਬੀ ਬਬਦ ਸ਼੍ਰਣੀਆਂ

(ੳ) ਵਿਸ਼ੇਸ਼ਣ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ਅ) ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ੲ) ਯੋਜਕ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

(ਸ) ਵਿਸਮਕ : ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title** Basic Punjabi (In Lieu of Punjabi (Compulsory))

**Course Code:** BSML-4031

**(THEORY)**

**Course outcomes**

CO1: ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦੇ ਵਿਦਿਆਰਥੀ 'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਨਾਮਵਰ ਕਵੀਆਂ ਮੋਹਨ ਸਿੰਘ, ਜਗਤਾਰ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼ ਦੀਆਂ ਰਚਨਾਵਾਂ ਦੀ ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

CO2: ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦੇ ਵਿਦਿਆਰਥੀ 'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਵੱਖੋ ਵੱਖਰੀਆਂ ਧਾਰਾਵਾਂ ਨਾਲ ਸਬੰਧਤ ਮੋਹਨ ਸਿੰਘ, ਜਗਤਾਰ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼ ਦੀਆਂ ਰਚਨਾਵਾਂ ਦੇ ਸਾਰ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

CO3: ਮੁੱਢਲੀ ਪੰਜਾਬੀ ਦੇ ਵਿਦਿਆਰਥੀ 'ਆਤਮ ਅਨਾਤਮ' (ਕਵਿਤਾ ਭਾਗ) ਦੇ ਵੱਖੋ ਵੱਖਰੀਆਂ ਧਾਰਾਵਾਂ ਨਾਲ ਸਬੰਧਤ ਮੋਹਨ ਸਿੰਘ, ਜਗਤਾਰ, ਸੁਰਜੀਤ ਪਾਤਰ, ਪਾਸ਼ ਕਵੀਆਂ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾ ਤੋਂ ਜਾਣੂ ਹੋਣਗੇ।

CO4: ਲੇਖ ਰਚਨਾ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ। ਸ਼ਬਦ ਜੋੜਾਂ ਦੇ ਨਿਯਮ ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰਨ ਦਾ ਮਕਸਦ ਵਿਦਿਆਰਥੀਆਂ ਦੁਆਰਾ ਲਿਖਤ ਵਿਚ ਕੀਤੀਆਂ ਜਾਣ ਵਾਲੀਆਂ ਗਲਤੀਆਂ ਨੂੰ ਸੁਧਾਰਨਾ ਹੈ।

**Bachelor of Science (Medical) (Honours) Semester-IV (Session 2026-27)**

**Course Title Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-4031**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**Maximum Marks: 100**

**L-T-P: 4-0-0**

**Theory :70**

**CA :30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ**

**ਯੂਨਿਟ-I**

**ਆਤਮ ਅਨਾਤਮ (ਕਵਿਤਾ ਭਾਗ)(ਸੰਪਾਦਕ ਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ )**

**ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।**

**ਪ੍ਰਸੰਗ ਸਹਿਤ ਵਿਆਖਿਆ**

**ਯੂਨਿਟ-II**

**ਆਤਮ ਅਨਾਤਮ (ਕਵਿਤਾ ਭਾਗ)(ਸੰਪਾਦਕ ਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)**

**ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।**

**(ਸਾਰ/ਵਿਸ਼ਾ ਵਸਤੂ )**

**ਯੂਨਿਟ-III**

**ਆਤਮ ਅਨਾਤਮ (ਕਵਿਤਾ ਭਾਗ)(ਸੰਪਾਦਕ ਡਾ. ਸੁਹਿੰਦਰ ਬੀਰ ਅਤੇ ਡਾ.ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ)**

**ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।**

**(ਕਵੀਆਂ ਦੇ ਜੀਵਨ ਅਤੇ ਰਚਨਾ ਬਾਰੇ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ)**

## ਯੂਨਿਟ-IV

ਲੇਖ ਰਚਨਾ

ਅਸੁੱਧ ਸ਼ਬਦ ਜੋੜਾਂ ਨੂੰ ਸੁੱਧ ਕਰਕੇ ਲਿਖਣਾ

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Punjab History and Culture (From 1605 to 1849 A.D.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-4431

**(THEORY)**

**Course Outcomes:**

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

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

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

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

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

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Punjab History and Culture (From 1605 to 1849 A.D.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-4431

**(THEORY)**

Examination Time: 3 Hours

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

Contact Hours: 4 Hrs/ Week

Max. Marks: 100

Theory: 70

CA: 30

**Instructions for the Paper Setters**

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

**UNIT I**

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

**UNIT II**

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

**UNIT III**

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

**UNIT IV**

7. Maharaja Ranjit Singh: - Civil, Military and Land Revenue Administration.
8. Fair, Festivals and Folk Music in the Punjab during the medieval period (Jarag, Baisakhi and Diwali)

**Suggested Readings:**

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

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Appreciating English Literature-II

**Course Code:** BSML-4212

**(THEORY)**

**COURSE OUTCOMES**

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

**CO 1:** change the narration and voice of sentences after understanding fundamental grammatical rules governing them through the study of “English Grammar in Use” by Raymond Murphy

**CO 2:** develop an understanding of the poems taught, relate to the socio-cultural background of England through the study of the poems in the prescribes text “Moments in Time”

**CO 3:** understand the tone, style and central idea through the study of the poems in the prescribes text “Moments in Time”

**CO 4:** to enhance the writing skills through Business letters writing and E mail writing

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Appreciating English Literature-II

**Course Code:** BSML-4212

**(THEORY)**

**Max. Marks: 100**

**Examination Time: 3 Hrs.**

**Theory: 70**

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

**CA: 30**

**Instructions for the Paper Setters:-**

Eight questions are to be set, two from each of the four Units (I-IV). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question will carry 14 marks. (14x5=70)

**UNIT-I**

English Grammar in Use, 5th Edition by Raymond Murphy, CUP (Revision of Units: 26-37, 42-48, 92-97, 113-120)

**UNIT-II**

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

**UNIT-III**

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

**UNIT-IV**

Paragraph writing, Business Letters, Writing Emails

**Texts Prescribed:**

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

2. *Moments in Time*

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Zoology (Cell Biology)

**Course Code:** BSML-4483

**(THEORY)**

## **Course Outcome**

After passing this course the student will be able to:

- CO1: Perform a variety of molecular and cellular biology techniques
- CO2: Describe cellular membrane structure and function, fine structure and function of cell organelles.
- CO3: Knowledge about structure and function of cell organelles.
- CO4: Learn elementary idea about Cancer and Immunity.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Zoology (Cell Biology)

**Course Code:** BSML-4483

**(THEORY)**

**Credits: 4-0-0**

**Time: 3 Hours**

**Max Marks: 100**

**Theory: 70**

**CA: 30**

**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. Each question will carry 14 marks.

**UNIT-I**

Methods in Cell Biology

- a. Principles of light and phase contrast microscopy
- b. Electron microscopy (TEM and SEM)
- c. Fixation and fixatives
- d. Staining techniques.

**UNIT-II**

Organization of Cell: Extra nuclear and nuclear, ultrastructure and functions of cell organelles

- a. Plasma Membrane: Structure, osmosis, active and passive transport, endocytosis and exocytosis.
- b. Endoplasmic reticulum: Structure, types and associated enzymes.
- c. Mitochondria: Structure, mitochondrial enzymes and role of mitochondria in respiration and mitochondrial DNA.

**UNIT-III**

Organization of Cell:

- a. Golgi complex: Structure and functions.
- b. Ribosomes: Types of ribosomes, their structure and functions.
- c. Lysosomes: Polymorphism and their function.
- d. Centrosome: Structure and functions.

**UNIT-IV**

Nucleus: Structure and functions of nuclear membrane, nucleolus and chromosomes.

An elementary idea of cell transformation in cancer

An elementary idea of cellular basis of immunity

**Suggested Readings:**

1. Cooper, G. M. (2004), The cell, A Molecular Approach, ASM press, Washington, D. C.
2. Karp, G. (1984). Cell Biology (4<sup>th</sup> ed), McGraw Hill, New York.
3. Pawar, C.B (1999), Cell Biology, Himalaya Publishing House, Bombay.
4. Dhami P. K. (2000) Zoology I, Pradeep Publishers.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Zoology (Cell Biology Lab)

**Course Code:** BSMP-4483

**(PRACTICAL)**

**Course Outcomes**

After passing this course the student will be able to:

- CO1: Understand the techniques of Chromatography
- CO2: Learn about protein estimation through Gel electrophoresis
- CO3: Understand the Electron microscopy
- CO4: Learn about structures of cell organelles through micrographs

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Zoology (Cell Biology Lab)

**Course Code:** BSML-4483

**(THEORY)**

**LTP: 0-0-2**

**Time: 3 Hrs.**

**Max Marks: 50**

**Marks: 35**

**CA: 15**

**Instructions for the Practical Examiners:** Question paper is to 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. CHROMATOGRAPHY**

A. Paper chromatography.

B. Thin layers chromatography

2. Gel electrophoresis through photographs or through research laboratories

3. Familiarity with TEM & SEM.

4. Study of different ultra structures of cell organelles through micrographs.

**Guidelines for conduct of practical Examination:**

1 Write the principle, Procedure and Application of Chromatography and show the results to the Examiner. **8**

Write a note on Principle, Procedure and applications of Gel Electrophoresis. **8**

2 Write a note on microscopy **5**

3 Identify the slides/micrographs and give two reasons for identification. **6**

4 Viva-voce & Practical file. **8**

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Chemistry (Inorganic Chemistry- II)

**Course Code:** BSML-4084  
**(THEORY)**

**Course outcomes:**

Students will be able to

**CO1 :** Explain the periodic trends, chemical properties, and structures of p-block elements and their compounds, including sulphur and halogen oxoacids, interhalogens, and industrial processes like the Contact Process for sulphuric acid.

**CO2 :** Compare and contrast the electronic structure, oxidation states, and magnetic properties of d- and f-block elements, including the effects of lanthanide and actinide contraction and their analytical applications.

**CO3 :** Analyze the structure, bonding, stability, and stereochemistry of coordination compounds using Werner's theory, valence bond theory, and ligand field considerations.

**CO4:** Interpret electronic spectra of transition metal complexes using Orgel diagrams and selection rules, and describe the structure, bonding, and reactivity of organometallic compounds including their role in catalysis

**Bachelor of Science (Medical) (Honours) Semester-IV (Session 2026-27)**

**Course Title:** Chemistry (Inorganic Chemistry- II)

**Course Code:** BSML-4084

**(THEORY)**

**Exam Time:** 3Hrs.

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

**Max. Marks:** 100

**(Theory: 70, CA: 30)**

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

**UNIT -I**

**(15 Hrs.)**

**p-Block Elements: Group 16:** General characteristics: atomic radii, Ionisation energies, Melting and boiling point, Electron affinity, Oxidation state, Catenation, Elemental state, Allotropy, Hydrides of group 16, Chemical properties of SO<sub>2</sub>, structure of SO<sub>2</sub> & SO<sub>3</sub>, Oxoacid of sulphur: structure and basicity. Preparation of sulphuric acid by contacts process and its chemical properties

**Group 17:** General characteristics: atomic radii, Ionisation energies, melting and boiling point, Electron affinity, Electronegativity, Non-metallic character, colour, Oxidation state and reactivity, Hydrides of group 17, Relative acidic strength of hydro acids and Oxoacids of group 17, structure of interhalogen compounds and polyhalides.

**Important compounds of p-block:** Carbides, fluorocarbons, Silicones and phosphazenes, triphosphazenes.

**UNIT -II**

**(15 Hrs.)**

**Chemistry of Transition Elements:** General characteristics of Transition Elements. Properties of the elements of the first transition series, Relative stability of their oxidation state. Coordination number and geometry. General characteristics of elements of Second and Third Transition Series. Difference in the properties of first transition elements with second and third transition series elements in respect of ionic radii, oxidation states, magnetic behaviour.

**f-block elements:** Lanthanoids: Electronic configurations, oxidation states, ionic radii, lanthanide contraction, colour, spectral and magnetic properties, lanthanum compounds. Actinoids: electronic configurations, oxidation states, ionic radii, actinide contraction, colour, spectral and magnetic properties. Comparison of lanthanoids and actinoids and their analytical applications.

### UNIT-III

(15 Hrs.)

**Coordination Compounds:** Nomenclature of coordination compounds, Werner's coordination theory, effective atomic number, polydentate, chelating ligands and chelation, factors affecting stability of chelates, structural and stereoisomerism in coordination compounds with co-ordination number 4 and 6, resolution of racemic mixture, Valence bond theory of transition metal complexes, hybridization and geometry of complexes of Cr, Fe, Co, Cu and its ions, Magnetic properties and colour of coordination compounds.

Transition Metal complexes: an elementary idea of crystal field theory, Jahn-Teller effects. methods of determining magnetic susceptibility by Gouy's and Faraday method. L-S coupling, correlation of  $\mu_s$  and  $\mu_{eff}$  values, Nucleophilic Substitution reactions in square planar complexes

### UNIT-IV

(15 Hrs.)

**Electronic Spectra of Transition Metal Complexes:** Types of electronic transitions, selection rules and relaxations, splitting of Russel-Saunders states in octahedral and tetrahedral, spectrochemical series, Orgel diagram of one electron-one hole system and two electron-two hole system in octahedral and tetrahedral complexes. Limitation of Orgel diagram.

**Organometallic Compounds:** Definition, nomenclature and classification of organometallic compounds.  $\sigma$  and  $\pi$  complexes, types of organoligands, EAN rule, bonding in organometals, Preparation, properties, bonding and applications of alkyl lithium and organoaluminium compounds (AlR<sub>3</sub>). Metal olefin complexes, bonding in metal-ethylenic complexes, Mechanism of homogeneous hydrogenation reactions of alkene. Metal carbonyls: examples and bonding.

## Books suggested

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

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Chemistry (Inorganic Chemistry- II Lab)

**Course Code:** BSMP-4084

**(THEORY)**

**Course outcomes:**

Students will be able to analyze the given organic compound through

**CO1:** Perform volumetric titrations for the quantitative analysis of substances such as acetic acid, antacids, and water hardness using appropriate indicators and standard solutions.

**CO2:** Apply redox titration techniques (e.g., permanganometry, dichromate method, iodometry) to estimate metal ions like calcium, iron, and copper with accuracy and precision.

**CO3:** Execute gravimetric analysis procedures for the estimation of metal ions like copper, nickel, and silver through selective precipitation and weighing of pure compounds.

**CO4:** Synthesize and characterize simple inorganic compounds such as Prussian Blue, potash alum, and copper acetylacetonate, demonstrating understanding of coordination chemistry and crystallization techniques

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Chemistry (Inorganic Chemistry- II Lab)

**Course Code:** BSMP-4084

**(THEORY)**

**Time: 3 Hrs**

**Credits: 0-0-2**

**Marks: 50**

**(Practical: 35, CA: 15)**

**Volumetric Analysis**

1. Determination of acetic acid in commercial vinegar using NaOH.
2. Determination of alkali content-antacid tablet using HCl.
3. Estimation of calcium content in chalk as calcium oxalate by permanganometry.
4. Standardisation of EDTA with  $\text{Pb}(\text{NO}_3)_2$  /  $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$  and Estimation of hardness of water by EDTA.
5. Estimation of ferrous and ferric by dichromate method.
6. Estimation of copper using sodium thiosulphate.

**Gravimetric Analysis**

Analysis of Cu as  $\text{CuSCN}$ ; Ni as Ni (dimethylglyoxime) and Determination of silver (I) as its chloride

**Inorganic Preparations**

Synthesis of Iron(III) Hexacyanoferrate(II)  $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$  (Prussian Blue).

Preparation of Potassium Aluminum Sulfate  $\text{KAl}(\text{SO}_4)_2 \cdot 12 \text{H}_2\text{O}$  (Potash

Alum) Preparation of bis Acetylacetonate Copper(II)  $\text{Cu}(\text{O}_2\text{C}_5\text{H}_7)_2$ .

**Books Suggested**

1. Vogel's Textbook of Quantitative Inorganic Analysis (revised), J. Bassett, R.C. Denney, G.H. Jeffery and J. Mandham, ELBS.
2. Standard Methods of Chemical. Analysis, W.W. Scott: The Technical Press.
3. Experimental Inorganic Chemistry, W.G. Palmer, Cambridge.
4. Laboratory Manual in Organic Chemistry, R.K. Bansal, Wiley Eastern.
5. Vogel's Textbook of Practical Organic Chemistry, B.S. Furniss, A.J. Hannaford, V. Rogers, P.W.G. Smith and A.R. Tatchell, ELBS.
6. Experiments in General Chemistry, C.N.R. Rao and U.C. Aggarwal, East-West Press.
7. Experimental Organic Chemistry, Vol. I & II, P.R. Singh, D.S. Gupta and K.S. Bajpai, Tata McGraw Hill.
8. Marr, G. and Rockett, B.W. Practical Inorganic Chemistry, 1972.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**  
**Course Title: Botany (Structure, Development and Reproduction**  
**In Flowering Plants)**  
**Course Code: BSML-4075**  
**(THEORY)**

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-2027)**  
**Course Title: Botany (Structure, Development and Reproduction**  
**In Flowering Plants)**  
**Course Code: BSML-4075**

**Course outcome:**

After passing this course the student will be able to: -

CO 1: Understand the structural organization and development of the shoot system in flowering plants, including meristematic activity, tissue differentiation, and secondary growth.

CO 2: Explain the structure and function of wood, secondary phloem, and leaves, including their roles in transport, photosynthesis, stress adaptation, and senescence.

CO 3: Understand root structure, development, and modifications, along with methods and economic significance of vegetative reproduction, including grafting and budding.

CO 4: Understand flower structure, pollination mechanisms, fertilization processes, and seed and fruit development, including their ecological roles and dispersal strategies.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title: Botany (Structure, Development and Reproduction  
In Flowering Plants)**

**Course Code: BSML-4075  
(THEORY)**

**Time: 3 Hrs.**

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

**Max. Marks: 100**

**Theory: 70**

**C.A.:30**

**Instructions for the Paper Setters:-**

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Unit I**

**The basic body plan of a flowering plant:** Diversity in plant form; branching pattern; monopodial and sympodial growth; canopy architecture.

**The Shoot System:** The shoot apical meristem and its histological organization; meristematic and permanent tissue, formation of internodes. Cambium and its functions; formation of secondary xylem.

**Unit II**

**General account of wood structure:** Role in conduction of water and minerals; characteristics of growth rings, sapwood and heart wood; secondary phloem-structure function relationships; periderm.

**Leaf:** Origin, development, arrangement and diversity in size and shape; internal structure in relation to photosynthesis and water loss; adaptations to water stress; senescence and abscission.

**Unit III**

**The Root System:** The root apical meristem; differentiation of primary and secondary tissues and their roles; structural modification for storage, respiration, reproduction and for interaction with microbes.

**Vegetative Reproduction:** Methods of vegetative propagation, detailed study and types of grafting and budding, economic aspects.

**Unit IV**

**Flower:** A modified shoot; structure, development and varieties of flower; functions, structure of anther and pistil; the male and female gametophytes; types of pollination; attractions and reward for pollinators; (sucking and foraging types); pollen-pistil interaction self-incompatibility.

**Double fertilization:** formation of seed endosperm and embryo; fruit development and maturation Significance of seed; ecological adaptation; dispersal strategies.

### **Suggested Readings:-**

1. Beck, C.B. (2010). An Introduction to Plant Structure and Development: Plant anatomy for the Twenty First Century (2nd Edition). Cambridge University Press, UK.
2. Bhojwani, S.S. and Bhatnagar, P. (2000). The Embryology of Angiosperms (4th revised and enlarged edition), Vikas Publishing House, New Delhi.
3. Cutler, D. F., Botha, T. and Stevenson, D. M. (2007). Plant Anatomy: An Applied Approach. Blackwell Publishing, Oxford, UK.
4. Dickison, W.C. (2000). Integrative Plant Anatomy. Academic Press, California, USA.
5. Hartmann, H.T. and Kestler, D.E. (1976). Plant Propagation: Principles and Practices, 3rd edition, Prentice Hall of India Pvt. Ltd., New Delhi.
6. Mauseth, J.D. (1988). Plant Anatomy, The Benjamin/Cummings Publishing Company Inc., Menlo Park, California, USA.
7. Peau, K (1977) Anatomy of Seed Plants, 3rd edition. John Wiley & Sons, New York.
8. Pegeri, K. and Vander Pijl (1979). The Principles of Pollination Biology, Pergamon Press, Oxford.
9. Raven, P.H., Evert, R.F. and Eichhorn, S.E. (1999). Biology of Plants, 5th edition. W.H. Freeman and Co., Worth Publishers, New York.
10. Rudall, P. J. (2007). Anatomy of Flowering Plants: An Introduction to Structure and Development (3rd Edition). Cambridge University Press, UK.
11. Steeves, T.A. and Sussex, I.M. (1989). Patterns in Plant Development (2nd Edition). Cambridge University Press, Cambridge.
12. Thomas, P. (2000) Trees: Their Natural History, Cambridge University Press, Cambridge.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**  
**Course Title: Botany (Structure, Development and Reproduction**  
**In Flowering Plants Lab)**  
**Course Code: BSMP-4075**  
**(PRACTICAL)**

**Course Outcome**

After passing this course the student will be able to:

CO1: Develop knowledge about the role of herbarium techniques in plant identification.

CO2: Understand different life forms exhibited by flowering plants.

CO3: Understand anatomy of different plant parts using free hand razor technique.

CO4: Examine flower and their mode of pollination.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title: Botany (Structure, Development and Reproduction  
In Flowering Plants Lab)**

**Course Code: BSMP-4075  
(PRACTICAL)**

**Time: 3 Hrs**

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

**Max. Marks: 50**

**Practical: 35**

**C.A.:15**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

**Suggested Laboratory Exercises**

1. Study of any commonly occurring dicotyledonous plant (for example *Solanum nigrum* or *Kalanchoe*) to the body plan, organography and modular type of growth.
2. Life forms exhibited by flowering plants (by a visit to a forest or a garden, Study of tree like habit in cycads, bamboo, banana, traveller's tree (*Revenala madagascariensis*) and *Yucca* and comparison with true trees as exemplified by conifers and dicotyledons.
3. L.S. Shoot tip to study the cytohistological zonation and origin of leaf primordia.
4. Monopodial and sympodial types of branching in stems (especially rhizomes).
5. Anatomy of primary and secondary growth in monocots and dicots using free hand razor technique (*Solanum*, *Boerhavia*, *Helianthus*, *Mirabilis*, *Nyctanthus*, *Draceana*, Maize) hand sections (or prepared slides). Structure of secondary phloem and xylem. Growth rings in wood, microscopic study of wood in T.S., T.L.S. and R.L.S.
6. Field study of diversity in leaf shape, size, thickness and surface properties. Internal structure of leaf. Structure and development of stomata (using epidermal peels of leaf).
7. Anatomy of the root. Primary and secondary structure.
8. Examination of a wide range of flowers available in the locality and methods of their pollination.
9. Structure of anther, microsporogenesis (using slides) and pollen grains (using whole mounts). Pollen viability using in vitro pollen germination.
10. Structure of ovule and embryo sac development using serial sections from permanent slides.
11. Nuclear and cellular endosperm. Embryo development in monocots and dicots (using permanent slides/dissections).
12. Simple experiments to show vegetative propagation (leaf cuttings in *Bryophyllum*, *Sansevieria*, *Begonia*; stem cuttings in rose, *Salix*, money plant, Sugarcane and *Bougainvillea*).
13. Germination of non-dormant and dormant seeds.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Zoology (Medical Lab Technology)

**Course Code:** BSMM-4480

**(THEORY)**

**Course outcomes:**

After completion of course students will be able to:

- CO1: Comply with safety regulations and universal precautions during lab investigations and perform basic laboratory techniques on biological specimens.
- CO2: Know about routine clinical laboratory investigations including collection of different samples and perform other routine hematological procedures.
- CO3: Describe basic scientific principles in learning new techniques and procedures in bacteriology and microbiology.
- CO4: Apply knowledge and technical skills associated histopathology, staining techniques and biochemical estimations.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**  
**Course Title: Zoology (Medical Lab Technology)**  
**Course Code: BSMM-4480**  
**(THEORY)**

**Credits: 2-0-1**

**Max Marks: 100**

**Time: 3 Hours**

**Theory: 50**  
**Practical: 20**  
**CA: 30**

**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. Each question will carry 10 marks.

**UNIT-I**

Antigen and antibody interactions- Serodiagnostic assays (Precipitation, agglutination immunodiffusion, ELISA, RIA)

Vaccines

Laboratory Techniques: Colorimetry, Microscopy, Autoclaving, Centrifugation and Spectrophotometry

**UNIT- II**

Collection, transportation and preservation of different clinical samples.

Haematology, collection of blood (venous and capillary), anticoagulants (merits and demerits), Romanowsky's stains, total RBC count, erythrocyte sedimentation rate, TLC, DLC, platelet count

**UNIT- III**

Bacteriology: sterilization (dry heat, moist heat, autoclave, filtration), disinfection, staining techniques, (gram stain, AFB stain, etc), culture media (defined and synthetic media & routine laboratory media), bacterial culture (aerobic and anerobic) and antibiotic sensitivity.

**UNIT- IV**

Histopathology: Common fixatives and staining techniques.

Biochemistry: Principal/theory and significance of estimation of urea, sugar, cholesterol, creatinine, enzymes (transaminase, phosphatase, amylase and lipase), uric acid in blood, estimation of proteins, sugar, bile salts, ketone bodies in urine and liver function test.

**Suggested Readings:**

1. Baker, F.J. and Silvertown, R.E. (1985) Introduction to Medical Laboratory Technology, (6th ed), Butlerworth and Co. Ltd.
2. Chatterjee, K.D. (1995), Parasitology, Protozoology and Helminthology (12th ed).
3. Cheesborough, M. (1987), Medical Laboratory Technology for Tropical countries (2nd ed), Butlerworth and Co., Ltd.
4. Garcia, L.S. (2001), Diagnostic Medical Parasitology, (4th ed), ASM Press Washington.
5. Kimball, J.W. (1986), Introduction of Immunology, MacMillan Publishing Co., New York.
6. Kuby, J. (2000), Immunology, W.H. Freeman & Co., USA.
7. Roitt, I. (1984), Essential Immunology, Blackwell Scientific Publications, Oxford.
8. Talib, V.H. (1999), Essential Laboratory Manual, Mehta Publishers, New Delhi.

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Zoology (Medical Lab Technology Lab)

**Course Code:** BSMM-4480

**(PRACTICAL)**

**Course outcomes:**

After completion of course students will be able to:

- CO1: Apply knowledge and technical skills associated with medical laboratory technology for delivering quality clinical investigations support.
- CO2: Perform basic clinical laboratory procedures using appropriate laboratory techniques and instrumentation in accordance with current laboratory safety protocol and quality patient health care.
- CO3: Understanding of sterilization techniques and will also learn about various histopathology techniques, handling and processing of tissue specimens as well as staining procedures.
- CO4: Understanding of estimation of protein & sugar

**Bachelor of Science (Medical) (Honours) Semester–IV (Session 2026-27)**

**Course Title:** Zoology (Medical Lab Technology Lab)

**Course Code:** BSMM-4480

**(PRACTICAL)**

**Credits: 0-0-1**

**20**

**Time: 3 Hours**

**Practical:**

1. Demonstration of safety rules in laboratory like proper handling of patients, specimens and disposal of syringes, needles etc.
2. Demonstration of the use of autoclave, centrifuge and spectrophotometer.
3. Cleaning and sterilization of glass ware, using hot air oven, autoclave etc.
4. Physico-chemical examination of urine.
5. Preparation of thick and thin blood smear.
6. Counting of WBC, RBC and DLC.
7. ESR and haematocrit
8. Demonstration of fixation, embedding, cutting of tissue sections, and their staining (routine haemotoxylin and eosin). Visit to a pathology Lab and preparation of report.

**Note:-** Some changes can be made in the practical depending on the availability of material.

**Bachelor of Science (Medical) (Honours) Semester–V (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML- 5421**

**(THEORY)**

**COURSE OUTCOMES**

- CO1: ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀਆਂ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।
- CO2: ਨਾਵਲ ‘ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ’(ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ)ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਲ ਕਰਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਨਾਵਲ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲ ਜੋੜਣਾ ਹੈ।
- CO3: ਪੈਰਾ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।
- CO4: ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ : ਭਾਵੇਂਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ (ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ), ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ : ਮੇਲ ਤੇ ਅਧਿਕਾਰ, ਕਾਰਕ ਤੇ ਕਾਰਕੀ ਸੰਬੰਧ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

**Bachelor of Science (Medical) (Honours) Semester-V (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML- 5421**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**Maximum Marks: 100**

**L-T-P: 4-0-0**

**Theory: 70**

**CA: 30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

**ਯੂਨਿਟ-I**

**ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ**

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

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਪਾਤਰ ਚਿਤਰਨ)

**ਯੂਨਿਟ-II**

**ਨਾਵਲ : ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ(ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ)**

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ /ਬਿਰਤਾਂਤਕ ਜੁਗਤਾਂ)

**ਯੂਨਿਟ-III**

**ਲੇਖ ਰਚਨਾ (ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਵਿਦਿਅਕ ਸਰੋਕਾਰਾਂ ਸਬੰਧੀ)**

**ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ**

#### ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ :

(ੳ) ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ : ਭਾਵੰਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ (ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ)

(ਅ) ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ : ਮੇਲ ਤੇ ਅਧਿਕਾਰ

(ੲ) ਕਾਰਕ ਤੇ ਕਾਰਕੀ ਸਬੰਧ

**Bachelor of Science (Medical) (Honours) Semester–V (Session 2026-27)**

**Course Title Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-5031**

**(THEORY)**

**COURSE OUTCOMES**

- CO1: ਵਿਦਿਆਰਥੀ ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ, ਲੋਕ ਕਾਵਿ, ਲੋਕ ਵਾਰਤਕ ਬਿਰਤਾਂਤ ਦੀ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।
- CO2: ਵਿਦਿਆਰਥੀ ਸੁਹਾਗ, ਘੋੜੀਆਂ, ਸਿੱਠਣੀਆਂ ਦੀ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।
- CO3: ਵਿਦਿਆਰਥੀ ਗਿੱਧਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ), ਭੰਗੜਾ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ), ਝੂਮਰ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਬਾਰੇ ਜਾਣ ਸਕਣਗੇ।
- CO4: ਵਿਦਿਆਰਥੀ ਲੋਕ ਖੇਡਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ), ਲੋਕ ਤਮਾਸ਼ੇ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ), ਲੋਕ ਕਲਾਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ) ਦਾ ਵਿਹਾਰਕ ਅਧਿਐਨ ਕਰ ਸਕਣ ਦੇ ਸਮਰੱਥ ਹੋ ਸਕਣਗੇ।

**Bachelor of Science (Medical) (Honours) Semester-V (Session 2026-27)**

**Course Title Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-5031**

**(THEORY)**

**ਸਮਾਂ: 3 ਘੰਟੇ**

**Maximum Marks : 100**

**L-T-P: 4-0-0**

**Theory: 70**

**CA: 30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ**

**ਯੂਨਿਟ-I**

ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ  
(ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ, ਡਾ. ਹਰਿੰਦਰ ਕੌਰ ਸੋਹਲ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।  
ਸਾਹਿਤ ਅਤੇ ਲੋਕ ਸਾਹਿਤ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)  
ਲੋਕ ਕਾਵਿ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)  
ਲੋਕ ਵਾਰਤਕ ਬਿਰਤਾਂਤ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

**ਯੂਨਿਟ-II**

ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ  
(ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ, ਡਾ. ਹਰਿੰਦਰ ਕੌਰ ਸੋਹਲ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।  
ਸੁਹਾਗ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)  
ਘੋੜੀਆਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)  
ਸਿੱਠਣੀਆਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

**ਯੂਨਿਟ-III**

ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ  
(ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ, ਡਾ. ਹਰਿੰਦਰ ਕੌਰ ਸੋਹਲ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

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

#### ਯੂਨਿਟ-IV

ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ  
(ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ, ਡਾ. ਹਰਿੰਦਰ ਕੌਰ ਸੋਹਲ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।  
ਲੋਕ ਖੇਡਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)  
ਲੋਕ ਤਮਾਸ਼ੇ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)  
ਲੋਕ ਕਲਾਵਾਂ (ਮੁੱਢਲੀ ਜਾਣ ਪਛਾਣ)

**Bachelor of Science (Medical) (Honours) Semester–V (Session 2026-27)**

**Course Title:** Punjab History and Culture (From 1849-1947 A.D)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-5431

**(THEORY)**

**Course Outcomes: -**

After completing the course students will be able to understand:

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

CO 2:- various agrarian, industrial and educational policies introduced by the British in Punjab

CO 3:- analyse and evaluate the socio-religious reforms movements of Punjab

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

**Bachelor of Science (Medical) (Honours) Semester–V (Session 2026-27)**

**Course Title:** Punjab History and Culture (From 1849-1947 A.D)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-5431

**(THEORY)**

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA: 30

**Instructions for the Paper Setters**

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

**Unit- I**

1. First Anglo-Sikh War, Second Anglo-Sikh war and Annexation
2. Punjab Under Board of Administration

**Unit-II**

1. British Policy towards agriculture and industry
2. Spread of modern education

**Unit-III**

3. Socio-religious reform movements: Namdhari, Singh Sabha, Arya Samaj and Ad Dharm
4. Ghadr Movement

**Unit-IV**

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

**Suggested Readings**

- Chopra, P.N. & Das, M.N. (1974), *A Social, Cultural & Economic History of India*. Vol.III, Macmillan India, 1974.
- Grewal, J.S., *The Sikhs of the Punjab*, New Cambridge House, New Delhi, 2005.

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

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**  
**ENGLISH LANGUAGE SKILLS-III**  
**Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL -5212**

**Examination Time: 3 Hrs.**

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

**Instructions for the Paper Setters:-**

**Eight questions are to be set, two from each of the four Units (I-IV). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question will carry 14 marks. (14x5=70)**

**Max. Marks: 100**

**Theory: 70**

**CA: 30**

**Unit I**

*All My Sons* by Arthur Miller

**Unit II**

*Poems of Nature and Culture:*

William Wordsworth: "The World is Too Much with Us"

Gordon Lord Byron: "She Walks in Beauty"

P.B. Shelly: "Ozymandias"

Alfred Lord Tennyson: "In Memoriam"

Robert Browning: "Meeting at Night"

Mathew Arnold: "Dover Beach"

WB Yeats: "Words"

Wilfred Owen: "Strange Meeting"

**Unit III**

Robert Graves: "The Portrait"

W.H. Auden: "The Unknown Citizen"

Dylan Thomas: "Do not go Gentle into that Good Night"

**(1/2)**

Ted Hughes: "The Thought-Fox"

Sylvia Plath: "Mirror"

Seamus Heaney: "Honeymoon Flight"

Rabindranath Tagore: "False Religion"

Nissim Ezekiel: "Night of Scorpion"

**Unit IV**

Formal letter and Application Writing, Resume Writing and Precis Writing

**Texts Prescribed:**

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

**Bachelor of Science (Medical) Semester—V (Session 2026-27)**

**Course Title:** Zoology (Biomolecules)

**Course Code:** BSML- 5483  
**(THEORY)**

**Examination Time:** 3 Hrs.

**L-T-P:** 4-0-0

**Max Marks:** 100

**Theory:** 70

**CA:** 30

**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. Each question will carry 14 marks.

**UNIT- I**

**Chemistry of Life**

Water as an essential substance for life.

Atoms and Molecules (Types of bonds and interaction).

**UNIT- II**

**Amino Acids-** Classification of amino acids, Amphoteric amino acids, Acid base properties of amino acids, primary, secondary, tertiary.

**Peptides:** Ionisation behavior of peptides

**Proteins:** Structural and functional proteins, levels of proteins structural and quaternary protease Structure

**UNIT- III**

**Carbohydrates:** Mono, di and polysaccharides.

**Lipids:** Storage and structural lipids.

Lipids as signals, cofactors and pigments.

**UNIT- IV**

**Nucleotides and Nucleic acids**

Nucleic acids types Chemistry of nucleic acids

Functions of nucleotides and nucleic acids

**Suggested Readings:**

- Abeles, R.H., Fray, P.A. and Jencks, W.P. (1992) Biochemistry, Jones and Bartlett Publishers, London.
- Berg, J. M., Tymoczko, J.L. and Stryer (2002) Biochemistry (5th Ed.) W.H. Freeman and Co., NY.
- Cohn, E.E., Stump. P.K., Bruening, G. and Doi, R.H. (1987) Outlines of Biochemistry (5th Ed) Johan Wiley & Sons, NY.
- Elliott, W.H. and Elliot, D.C. (2001) Biochemistry & Molecular Biology (Second Edition) Oxford University Press, New York.
- Horton, H.R., Moran, L.A., Ochs, R.S. Rawn, J.D. and Scrimgeour, K.G. (2002) Principles of Biochemistry (3rd Ed.) Prentice Hall Upper Saddle River N.J. 07458.
- Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W (2009) Harper's Illustrated Biochemistry (Twenty Sixth Edition) Mc Graw Hill.
- Nelson, David L. and Cox, Michael M. (2000). Lehninger Principles of Biochemistry (3rd Edition) Mc Millan Worth Publishers.
- Rawn, J.D. (1983) Biochemistry. Harper and Raw Publishers, New York.

- Vasudevan, D. M. and Sree Kumari, S. (2001) Text Book of Biochemistry (3rd Ed.) Jaypee Brothers Medical Publisher (P) Ltd. New Delhi.
- Voet, D. and Voet, J.G. (2015) Biochemistry (4th Ed.) John Wiley and Sons, NY.
- Zubay, G. (1998). Biochemistry (4th Edition) Wm.C. Brown Publishers, USA.

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**

**Course Title:** Zoology (Biomolecules Lab)

**Course Code:** BSMP-5483

**(PRACTICAL)**

**Time:** 3 hrs

**L-T-P:** 0-0-2

**Max. Marks:** 50

**Practical:** 35

**CA:** 15

**Instructions for the Practical Examiners:** Question paper is to 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. To study different types of buffers and their preparations.
2. To study pH of different types of solution.
3. To study Molarity, Molality, Normality and related numericals.
4. To analyse carbohydrate content in a given sample.
5. To analyse lipid content in a given sample.
6. To study protein content of a given sample.
7. To study extraction of DNA from given sample.

**Note:-** Some changes can be made in the practical depending on the availability of material.

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**

**Course Title:** Zoology (Internship)

**Course Code:** BSMI-5486

**L-T-P: 0-0-2**

**Max. Marks: 50**

Students shall undertake Community Engagement and Service/ field based learning through an internship of four weeks during the fifth semester after completion of classes or during the summer vacation at the end of the fourth semester.

The internship shall be carried out in one of the areas related to the courses of study. Students participating in NCC or NSS activities may submit a certificate of participation for a minimum duration of four weeks in lieu of the internship.

Every student shall submit an internship report in the prescribed format along with the original internship completion certificate and permission letter issued by the college to carry out the internship/ community outreach.

The viva voce examination shall be conducted on the basis of the final internship report submitted and the presentation by the student.

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**  
**COURSE CODE: BSNL/BSML-5084**

**COURSE TITLE: Chemistry (Organic Chemistry-II: Chemistry of O/N Containing Compounds)**

**Course outcomes:**

Students will be able to

**CO1:** Explain the classification, nomenclature, preparation, properties, and reaction mechanisms of alcohols, phenols, ethers, epoxides, and sulphur-containing organic compounds.

**CO2:** Describe the structure, preparation, properties, and reaction mechanisms of aldehydes, ketones, and carboxylic acids, including important name reactions and synthetic applications.

**CO3:** Discuss the structure, reactivity, preparation, and nucleophilic acyl substitution reactions of carboxylic acid derivatives and nitrogen-containing organic compounds.

**CO4:** Analyze the preparation, stereochemistry, basicity, and reactions of amines and heterocyclic compounds, including electrophilic and nucleophilic substitution mechanisms in heterocyclic systems.

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**  
**COURSE CODE: BSNL/BSML-5084**  
**COURSE TITLE: Chemistry (Organic Chemistry-II: Chemistry of O/N Containing Compounds)**

**Exam Time: 3Hrs.**

**Max.Marks:100**

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

**(Theory: 70, CA: 30)**

**Instructions for the Paper Setter**

Eight questions of equal marks (14 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

**Unit I**

**Alcohols:** Classification, Monohydric and Dihydric alcohols alcohols. Acidic nature, methods of formation, chemical reactions, oxidative cleavage  $[Pb(OAc)_4]$  and  $[HIO_4]$  and pinacol-pinacolone rearrangement.

**Phenols:** Structure and bonding, Preparation of phenols, physical properties and acidic character, Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols: electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement, Gatterman synthesis, Reimer Tiemann reaction.

**Ethers and epoxides:** Preparation and chemical reactions ethers and epoxides.

**Sulphur containing compounds:** Preparation and reactions of thiols and thioethers

**Unit II**

**Aldehydes and Ketones:** Structure of the carbonyl group. Synthesis of aldehydes and ketones, Physical properties. Mechanism of nucleophilic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations. Condensation with ammonia and its derivatives. Wittig reaction. Mannich reaction. Use of acetals as protecting group. Cannizzaro reaction. Halogenation of enolizable ketones. Addition reactions of unsaturated carbonyl compounds, Active methylene compounds.

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

**Unit III**

**Carboxylic Acids Derivatives:** Structure of acid chlorides, esters, amides and acid anhydrides, Relative stability & reactivity of acyl derivatives. Physical properties, interconversion of acid derivatives by nucleophilic acyl substitution. Preparation of carboxylic acid derivatives, chemical reactions.

**Organic Compounds of Nitrogen:** Preparation of nitroarenes. Chemical reaction and mechanisms of nucleophilic substitution in nitroarenes and their reduction in acidic, neutral and alkaline media.

#### Unit IV

**Organic Compounds of Nitrogen:** Methods of preparation of amines by Reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction and Hofmann bromamide reaction. Physical properties. Stereochemistry of amines, separation of a mixture of primary, secondary and tertiary amines. Structural features effecting basicity of amines. Amine salts as phase-transfer catalysts.

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

#### Books Suggested

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

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**  
**COURSE CODE: BSNP/BSMP-5084**  
**COURSE TITLE: Chemistry (Organic Chemistry-II: Lab Preparations-I)**

**Course outcomes:**

Students will be able to

**CO1:** Apply chromatographic techniques such as Thin Layer Chromatography (TLC) and Column Chromatography for separation, identification, and analysis of organic compounds.

**CO2:** Perform the synthesis of important organic compounds such as p-nitroacetanilide, methyl orange, quinoline, antipyrine, and flavone using standard laboratory procedures.

**CO3:** Demonstrate functional group transformations including acetylation, bromination, reduction, and derivative formation in organic synthesis.

**CO4:** Interpret reaction outcomes, calculate R<sub>f</sub> values, determine purity of synthesized compounds, and develop practical laboratory skills in organic chemistry techniques and safety practices.

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**

**COURSE CODE: BSNP/BSMP-5084**

**COURSE TITLE: Chemistry (Organic Chemistry-II: Lab Preparations-I)**

Time: 3 Hr

Marks: 50

**Credits: 0-0-2**

**(Practical: 35, CA: 15)**

**Thin Layer Chromatography:** Determination of R<sub>f</sub> values and identification of organic compounds.

**Column Chromatography:** Separation of o & p nitrophenol

**Synthesis of Organic Compounds**

1. Preparation of p-nitroacetanilide
2. Preparation of Methyl Orange
3. Preparation of quinoline (Skraup Synthesis)
4. Preparation of 1,2-dihydro-1,5-dimethyl-2-phenyl-3H-pyrazole-3-one (antipyrine)
5. Synthesis of flavone (2-Phenyl-4H-1-benzopyran-4-one, 2-Phenylchromone)
6. Acetylation of amines and phenols
7. Bromination of Acetanilide.
8. Reduction of meta dinitrobenzene and p-nitrobenzaldehyde.
9. Semicarbazone of ethyl methyl ketone and benzaldehyde

**Suggested Books**

1. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009)
2. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Vogel's text book of practical organic chemistry, 5th Ed., Pearson (2012)
3. Ahluwalia, V.K. & Aggarwal, R. Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis, University Press (2000).
4. Ahluwalia, V.K. & Dhingra, S. Comprehensive Practical Organic Chemistry: Qualitative Analysis, University Press (2000).
5. Experimental organic chemistry by Laurence M. Harwood, C. J. Moody, Black well Scientific Publications, Oxford, 1989.
6. Manual of Biochemistry Workshop, 2012, Department of Chemistry, University of Delhi.
7. Arthur, I. V. Quantitative Organic Analysis, Pearson.

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**

**COURSE CODE: BSNI/BSMI-5084/CCFC-5522**

**COURSE TITLE: Summer Internship (02 Weeks)/ Community Outreach-I/NCC/NSS**

**Course outcomes:**

Students will be able to

**CO1:** Apply theoretical knowledge in real-life situations through community engagement, field-based learning, internships, and minor projects.

**CO2:** Develop practical, analytical, communication, and problem-solving skills through hands-on training and experiential learning activities.

**CO3:** Prepare and present a structured internship/project report and PowerPoint presentation following prescribed academic and professional standards.

**CO4:** Demonstrate professional competence, teamwork, ethical responsibility, and the ability to effectively communicate internship outcomes during viva voce examination.

**Bachelor of Science (Medical) Semester–V (Session 2026-27)**  
**COURSE CODE: WILI-5732**  
**COURSE TITLE: Internship**

**Exam Time: 3Hrs.**

**Max.Marks:50**

**Credit ( L-T-P): 0-0-2**

**(Practical: 50)**

Students shall undertake Community Engagement and Service/ field based learning through an internship of four weeks during the fifth semester after completion of classes or during the summer vacation at the end of the fourth semester.

The internship shall be carried out in one of the areas related to the courses of study. Students participating in NCC or NSS activities may submit a certificate of participation for a minimum duration of four weeks in lieu of the internship.

Every student shall submit an internship report in the prescribed format along with the original internship completion certificate and permission letter issued by the college to carry out the internship/ community outreach.

The viva voce examination shall be conducted on the basis of the final internship report submitted and the presentation by the student.

**Bachelor of Science (Medical) (Honours) Semester V (Session 2026-27)**  
**Course Title: - Botany (Plant Physiology and Biochemistry)**  
**Course Code: - BSML-5075**

**Course Outcome:**

After passing this course student will be able to:

**CO1:** Understand plant-water relations, stomatal physiology, mineral nutrition, nutrient deficiency symptoms, and the mechanisms of phloem transport and source–sink interactions in plants.

**CO2:** Gain knowledge of photosynthesis, including major carbon fixation pathways, and understand the physiological processes involved in seed germination, flowering, senescence, fruit ripening, and hormonal regulation of plant growth and development.

**CO3:** Develop an understanding of cellular respiration, ATP production, Krebs cycle, electron transport system, oxidative phosphorylation, and the role of metabolic pathways in energy generation.

**CO4:** Understand the principles of nitrogen and lipid metabolism, including nitrogen fixation, nitrate assimilation, fatty acid biosynthesis,  $\beta$ -oxidation, and lipid storage and mobilization in plants.

**Bachelor of Science (Medical) (Honours) Semester V (Session 2026-27)**  
**Course Title: -Botany (Plant Physiology and Biochemistry)**  
**Course Code: - BSML-5075**

**Time: 3 Hrs.**

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

**Max. Marks: 100**

**Theory: 70**

**C.A.:30**

**Instructions for the Paper Setters: -**

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Unit I**

**Plant-Water Relation:** Importance of water to plant life, physical properties of water, (imbibition) diffusion and osmosis, absorption, transport of water and transpiration, physiology of stomata.

**Mineral Nutrition:** Essential macro-and micro-elements and their role, mineral uptake, deficiency and toxicity symptoms (hydroponics).

**Transport of Organic Substances:** Mechanism of phloem transport, source-sink relationship, factors affecting translocation.

**Unit II**

**Photosynthesis:** Significance, historical aspects, photosynthetic pigments, action and absorption spectra and enhancement effects, concept of two photosystems, z-scheme, photophosphorylation, Calvin cycle, C<sub>4</sub> pathway, CAM plants, photorespiration.

**Growth and Development:** seed germination and factors of their regulation, plant movements, the concept of photoperiodism, physiology of flowering, physiology of senescence, fruit ripening, plant hormones.

**Unit III**

**Respiration:** ATP-the biological energy currency, aerobic and anaerobic respiration, Krebs' cycle, electron transport mechanism (chemi-osmotic theory), redox potential, oxidative phosphorylation, pentose phosphate pathway.

**Unit IV**

**Nitrogen and Lipid Metabolism:** Biology of nitrogen fixation, importance of nitrate reductase and its regulation, ammonium assimilation, structure and function of lipids, fatty acid biosynthesis,  $\beta$ -oxidation, saturated and unsaturated fatty acids, storage and mobilization of fatty acids.

**Suggested Readings: -**

1. Bowsher, C. and Tobin, A. (2021). *Plant Biochemistry*. 2nd Edition. Garland Science/CRC Press.
2. Buchanan, B.B., Gruissem, W. and Jones, R.L. (2015). *Biochemistry and Molecular Biology of Plants*. 2nd Edition. Wiley-Blackwell.

3. Devlin, R.M. and Witham, F.H. (1983). *Plant Physiology* (4th Edition). CBS Publishers / Indian reprint.
4. Epstein, E. and Bloom, A.J. (2004/2005). *Mineral Nutrition of Plants: Principles and Perspectives*. 2nd Edition. Sinauer Associates/Oxford University Press.
5. Heldt, H.W. and Piechulla, B. (2010/2011). *Plant Biochemistry*. 4th Edition. Academic Press/Elsevier.
6. Hopkins, W.G. and Hüner, N.P.A. (2008/2009). *Introduction to Plant Physiology*. 4th Edition. Wiley.
7. Jain, V.K. (2025). *Fundamentals of Plant Physiology* (21st Edition). S. Chand Publishing.
8. Jain, V.K. (2025). *Fundamentals of Plant Physiology*. 21st Edition. S. Chand Publishing.
9. Marschner, P. ed. (2011/2012). *Marschner's Mineral Nutrition of Higher Plants*. 3rd Edition. Academic Press/Elsevier.
10. Noggle, G.R. and Fritz, G.J. (1983). *Introductory Plant Physiology* (2nd Edition). Prentice Hall.
11. Pandey, S.N. and Sinha, B.K. (2009). *Plant Physiology* (4th Edition). Vikas Publishing House.
12. Pandey, S.N. and Sinha, B.K. (2009). *Plant Physiology*. 4th Edition. Vikas Publishing House.
13. Salisbury, F.B. and Ross, C.W. (1991/1992). *Plant Physiology*. 4th Edition. Wadsworth Publishing Company.
14. Taiz, L., Møller, I.M., Murphy, A. and Zeiger, E. (2022/2023). *Plant Physiology and Development*. 7th Edition. Oxford University Press.
15. Verma, V. (2007). *Textbook of Plant Physiology*. Ane Books India.

**Bachelor of Science (Medical) (Honours) Semester V (Session 2026-27)**  
**Course Title: - Botany (Plant Physiology and Biochemistry Lab)**  
**Course Code: - BSMP-5075**  
**(THEORY)**

**Course Outcomes:**

**After passing this course student will be able to:**

**CO1:** Students will develop practical skills to investigate plant-water relations, including osmosis, imbibition, water potential, permeability of plasma membranes, transpiration, and ascent of sap through laboratory experiments.

**CO2:** Students will acquire proficiency in biochemical techniques such as protein estimation, enzyme assays, chromatography, and pigment separation for the analysis of plant metabolites and physiological processes.

**CO3:** Students will be able to perform experiments related to photosynthesis, respiration, growth, and plant hormone bioassays, and interpret the physiological responses of plants under different environmental conditions

**CO4:** Students will develop the ability to record observations, analyse experimental data, and apply scientific methods for understanding fundamental concepts of plant physiology and biochemistry.

**Bachelor of Science (Medical) (Honours) Semester V (Session 2026-27)**  
**Course Title: - Botany (Plant Physiology and Biochemistry) Lab**  
**Course Code: - BSMP-5075**  
**(THEORY)**

**Time: 3 Hrs**

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

**Max. Marks: 50**

**Theory: 35**

**C.A.:15**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

**Suggested Laboratory Exercises:**

1. To study the permeability of plasma membrane using different concentrations of organic solvents.
2. To study the effects of temperature on permeability of plasma membrane.
3. To prepare the standard curve of protein and determine the protein content in unknown samples.
4. To study the enzyme activity of catalase and peroxidase as influenced by pH and temperature.
5. Separation of chloroplast pigments by solvent method.
6. Determining the osmotic potential of vacuolar sap by plasmolytic method.
7. Determining the water potential of any tuber.
8. Separation of amino acids in a mixture by paper chromatography and their identification by comparison with standards.
9. Bioassay of auxin, cytokinin, GA, ABA and ethylene using appropriate plant material.
10. Demonstrate the ascent of sap using a dye.
11. Demonstrate the transpiration pull by mercury method.
12. Demonstration of osmosis by potato osmoscope.
13. Comparison of loss of water from two surfaces of leaf by  $\text{CoCl}_2$  method/four leaf method.
14. Demonstration of imbibition by plaster of paris method.
15. Demonstration that  $\text{O}_2$  is evolved during photosynthesis.
16. Separation of pigments by paper chromatography/TLC method.
17. Demonstration of phototropism movements.
18. Demonstration the measurements of growth by arc auxanometer.

**Suggested Readings: -**

1. Bajracharya, D. (1999). Experiments in Plant Physiology: A Laboratory Manual. Narosa Publishing House, New Delhi.
2. Devi, P. (2000). Principles and Methods of Plant Molecular Biology, Biochemistry and Genetics. Agrobios, Jodhpur, India.

3. Harborne, J.B. (1998). *Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis* (3rd Edition). Chapman & Hall, London.
4. Hopkins, W.G. and Hüner, N.P.A. (2008). *Introduction to Plant Physiology* (4th Edition). John Wiley & Sons, USA.
5. Jayaraman, J. (1981). *Laboratory Manual in Biochemistry*. Wiley Eastern Ltd., New Delhi.
6. Kochhar, S.L. and Gujral, S.K. (2012). *Comprehensive Practical Plant Physiology*. Macmillan Publishers India Ltd., Delhi.
7. Moore, T.C. (1974). *Research Experiences in Plant Physiology: A Laboratory Manual*. Springer-Verlag, Berlin.
8. Plummer, D.T. (1996). *An Introduction to Practical Biochemistry* (3rd Edition). Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
9. Roberts, J. and Tucker, G.A. (eds.) (2000). *Plant Hormone Protocols*. Humana Press, New Jersey, USA.
10. Sadasivam, S. and Manickam, A. (2008). *Biochemical Methods* (3rd Edition). New Age International Publishers, New Delhi.
11. Sawhney, S.K. and Singh, R. (2000). *Introductory Practical Biochemistry*. Narosa Publishing House, New Delhi.
12. Scott, R.P.W. (1995). *Techniques and Practice of Chromatography*. Marcel Dekker, New York.
13. Taiz, L., Møller, I.M., Murphy, A. and Zeiger, E. (2022). *Plant Physiology and Development* (7th Edition). Oxford University Press/Sinauer Associates.
14. Wilson, K., Hofmann, A., Walker, J.M. and Clokie, S. (2018). *Wilson and Walker's Principles and Techniques of Biochemistry and Molecular Biology* (8th Edition). Cambridge University Press.
15. Witham, F.H., Blaydes, D.F. and Devlin, R.M. (1971). *Experiments in Plant Physiology*. Van Nostrand Reinhold Company, New York.

**Bachelor of Science (Medical) (Honours) Semester–VI (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML- 6421**

**(THEORY)**

**COURSE OUTCOMES**

- CO1: ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਕਹਾਣੀਆਂ ਪ੍ਰਤੀ ਦਿਲਚਸਪੀ, ਸੂਝ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ।
- CO2: ਨਾਵਲ ‘ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ’(ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ)ਨੂੰ ਸਿਲੇਬਸ ਵਿਚ ਸ਼ਾਮਿਲ ਕਰਕੇ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਨਾਵਲ ਪੜ੍ਹਣ ਦੀ ਰੁਚੀ ਨੂੰ ਪੈਦਾ ਕਰਨਾ ਹੈ ਅਤੇ ਇਸ ਸਾਹਿਤ ਰੂਪ ਨਾਲ ਜੋੜਣਾ ਹੈ।
- CO3: ਪੈਰਾ ਰਚਨਾ ਕਰਨ ਨਾਲ ਵਿਦਿਆਰਥੀ ਆਪਣੀ ਗੱਲ ਨੂੰ ਕਹਿਣ ਦੀ ਜਾਚ ਸਿੱਖਣਗੇ ਅਤੇ ਇਹ ਦਿਮਾਗੀ ਕਸਰਤ ਵਿਚ ਸਹਾਈ ਹੋਵੇਗੀ। ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਬੁੱਧੀ ਨੂੰ ਤੀਖਣ ਕਰਦਿਆਂ ਉਨ੍ਹਾਂ ਦੀ ਲਿਖਣ ਪ੍ਰਤਿਭਾ ਨੂੰ ਉਜਾਗਰ ਕਰਨਾ ਹੈ।
- CO4: ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ : ਭਾਵੇਂਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ (ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ), ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ : ਮੇਲ ਤੇ ਅਧਿਕਾਰ, ਕਾਰਕ ਤੇ ਕਾਰਕੀ ਸੰਬੰਧ ਨੂੰ ਪੜ੍ਹਾਉਣ ਦਾ ਮਨੋਰਥ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਭਾਸ਼ਾ ਦੀ ਅਮੀਰੀ ਅਤੇ ਬਾਰੀਕੀਆਂ ਨੂੰ ਸਮਝਣ ਲਈ ਵੱਖਰੇ-ਵੱਖਰੇ ਸਿਧਾਂਤਾਂ ਦਾ ਵਿਕਾਸ ਕਰਨਾ ਹੈ।

**Bachelor of Science (Medical) (Honours) Semester–VI (Session 2026-27)**

**Course Title Punjabi (Compulsory)**

**Course Code: BSML- 6421**

**(THEORY)**

**ਸਮਾਂ : 3 ਘੰਟੇ**

**Maximum Marks: 100**

**L-T-P: 4-0-0**

**Theory: 70**

**CA: 30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ**

**ਯੂਨਿਟ-I**

**ਚੋਣਵੀਆਂ ਪੰਜਾਬੀ ਕਹਾਣੀਆਂ**

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

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ/ਪਾਤਰ ਚਿਤਰਨ)

**ਯੂਨਿਟ-II**

**ਨਾਵਲ : ਏਹੁ ਹਮਾਰਾ ਜੀਵਣਾ(ਦਲੀਪ ਕੌਰ ਟਿਵਾਣਾ)**

(ਵਿਸ਼ਾ-ਵਸਤੂ/ਸਾਰ /ਬਿਰਤਾਂਤਕ ਜੁਗਤਾਂ)

**ਯੂਨਿਟ-III**

**ਲੇਖ ਰਚਨਾ (ਸਮਾਜਕ, ਸਭਿਆਚਾਰਕ, ਇਤਿਹਾਸਕ ਅਤੇ ਵਿਦਿਅਕ ਸਰੋਕਾਰਾਂ ਸਬੰਧੀ)**

**ਸਰਲ ਅੰਗਰੇਜ਼ੀ ਪੈਰ੍ਹੇ ਦਾ ਪੰਜਾਬੀ ਵਿਚ ਅਨੁਵਾਦ**

#### ਯੂਨਿਟ-IV

ਵਿਆਕਰਣ :

- (ੳ) ਵਿਆਕਰਨਕ ਇਕਾਈਆਂ : ਭਾਵੰਸ਼, ਉਪਵਾਕ ਅਤੇ ਵਾਕ (ਪਰਿਭਾਸ਼ਾ ਅਤੇ ਵਰਗੀਕਰਨ)
- (ਅ) ਵਾਕਾਤਮਕ ਜੁਗਤਾਂ : ਮੇਲ ਤੇ ਅਧਿਕਾਰ
- (ੲ) ਕਾਰਕ ਤੇ ਕਾਰਕੀ ਸਬੰਧ

**Bachelor of Science (Medical) (Honours) Semester–VI (Session 2026-27)**

**Course Title Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-6031**

**(THEORY)**

**COURSE OUTCOMES**

CO1: ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦਾ ਪਿਛੋਕੜ, ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਭੂਗੋਲਿਕ ਸਥਿਤੀ, ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਨਿਖੜਵੇਂ ਲੱਛਣ ਦਾ ਅਧਿਐਨ ਕਰਨਗੇ।

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

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

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

**Bachelor of Science (Medical) (Honours) Semester–VI (Session 2026-27)**

**Course Title Basic Punjabi (In Lieu of Punjabi (Compulsory))**

**Course Code: BSML-6031**

**(THEORY)**

**ਸਮਾਂ: 3 ਘੰਟੇ**

**Maximum Marks: 100**

**L-T-P: 4-0-0**

**Theory: 70**

**CA: 30**

**ਅੰਕ ਵੰਡ ਅਤੇ ਪਰੀਖਿਅਕ ਲਈ ਹਦਾਇਤਾਂ**

1. ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਚਾਰ (A-D) ਸੈਕਸ਼ਨ ਹੋਣਗੇ। ਸੈਕਸ਼ਨ A-D ਤੱਕ ਦੇ ਪ੍ਰਸ਼ਨ ਕ੍ਰਮਵਾਰ ਯੂਨਿਟ I-IV ਵਿਚੋਂ ਪੁੱਛੇ ਜਾਣਗੇ। ਹਰ ਯੂਨਿਟ ਵਿਚੋਂ ਦੋ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ।
2. ਵਿਦਿਆਰਥੀ ਨੇ ਕੁੱਲ ਪੰਜ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਹਨ। ਹਰ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਇਕ ਪ੍ਰਸ਼ਨ ਕਰਨਾ ਲਾਜ਼ਮੀ ਹੈ। ਪੰਜਵਾਂ ਪ੍ਰਸ਼ਨ ਕਿਸੇ ਵੀ ਸੈਕਸ਼ਨ ਵਿਚੋਂ ਕੀਤਾ ਜਾ ਸਕਦਾ ਹੈ।
3. ਹਰੇਕ ਪ੍ਰਸ਼ਨ ਦੇ 14 ਅੰਕ ਹਨ।
4. ਪੇਪਰ ਸੈੱਟ ਕਰਨ ਵਾਲਾ ਜੇਕਰ ਚਾਹੇ ਤਾਂ ਪ੍ਰਸ਼ਨਾਂ ਦੀ ਵੰਡ ਅੱਗੋਂ ਵੱਧ ਤੋਂ ਵੱਧ ਚਾਰ ਉਪ ਪ੍ਰਸ਼ਨਾਂ ਵਿਚ ਕਰ ਸਕਦਾ ਹੈ।

**ਪਾਠਕ੍ਰਮ**

**ਯੂਨਿਟ-I**

ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ  
(ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ, ਡਾ. ਹਰਿੰਦਰ ਕੌਰ ਸੋਹਲ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।  
ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦਾ ਪਿਛੋਕੜ  
ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੀ ਭੂਗੋਲਿਕ ਸਥਿਤੀ  
ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦੇ ਨਿਖੱੜਵੇਂ ਲੱਛਣ

**ਯੂਨਿਟ-II**

ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ  
(ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ, ਡਾ. ਹਰਿੰਦਰ ਕੌਰ ਸੋਹਲ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।

ਪੰਜਾਬ ਦੇ ਮੇਲੇ  
ਪੰਜਾਬ ਦੇ ਤਿਉਹਾਰ  
ਪੰਜਾਬ ਦੇ ਪ੍ਰਮੁੱਖ ਧਾਰਮਿਕ ਸਥਾਨ

**ਯੂਨਿਟ-III**

ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ  
(ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ, ਡਾ. ਹਰਿੰਦਰ ਕੌਰ ਸੋਹਲ)

ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।  
ਜਨਮ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ  
ਵਿਆਹ ਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ  
ਮੌਤਨਾਲ ਸੰਬੰਧਿਤ ਰੀਤਾਂ ਰਸਮਾਂ

#### ਯੂਨਿਟ-IV

ਪੰਜਾਬੀ ਲੋਕਧਾਰਾ ਅਤੇ ਸਭਿਆਚਾਰ  
(ਡਾ. ਮਨਜਿੰਦਰ ਸਿੰਘ, ਡਾ. ਹਰਿੰਦਰ ਕੌਰ ਸੋਹਲ)  
ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ।  
ਪੰਜਾਬ ਦਾ ਖਾਣਪੀਣ  
ਪੰਜਾਬ ਦਾ ਪਹਿਰਾਵਾ  
ਪੰਜਾਬ ਦੇ ਲੋਕ ਵਿਸ਼ਵਾਸ

**Bachelor of Science (Medical) (Honours) Semester–VI (Session 2026-27)**

**Course Title:** Punjab History and Culture (1947- 2000 A.D.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-6431

**(THEORY)**

**Course Outcomes:**

After completing this paper the students will be able to

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

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

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

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

**Bachelor of Science (Medical) (Honours) Semester–VI (Session 2026-27)**

**Course Title:** Punjab History and Culture (1947- 2000 A.D.)

(Special paper in lieu of Punjabi Compulsory)

(For those students who are not domicile of Punjab)

**Course Code:** BSML-6431

**(THEORY)**

Examination Time: 3 Hours

Max. Marks: 100

Theory: 70

CA: 30

**Instructions for the Paper Setters**

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

**UNIT I**

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

**UNIT II**

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

**UNIT III**

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

**UNIT IV**

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

**Suggested Readings**

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

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

**Bachelor of Science (Medical) (Honours) Semester VI (Session 2026-27)**  
**APPRECIATING ENGLISH LITERATURE-III**  
**Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL -6212**

**COURSE OUTCOMES**

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

- CO 1:** comprehend, appreciate and critically analyse a novel through the story of the novel *The Guide* by R.K. Narayan
- CO 2:** analyze and appreciate the dramatic technique and plot development through the study of the prescribed plays from the book *Glimpses of Theatre*
- CO 3:** understand art of characterisation and themes through the study of the prescribed plays from the book *Glimpses of Theatre*
- CO 4:** enhance their writing skills by writing essay on any given topics well as to write report on any incident witnessed

**Bachelor of Science (Medical) (Honours) Semester VI (Session 2026-27)**  
**APPRECIATING ENGLISH LITERATURE-III**  
**Course Code: BARL/BSML/BSNL/BCSL/BECL/BCRL/BBRL -6212**

**Examination Time: 3 Hrs.**  
**L-T-P (Credits): 4-0-0**

**Max. Marks: 100**  
**Theory: 70**  
**CA: 30**

**Instructions for the Paper Setters:-**

**Eight questions are to be set, two from each of the four Units (I-IV). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section. Each question will carry 14 marks. (14x5=70)**

**Unit I**

Study of the novel, *The Guide* by R.K. Narayan

**Unit II**

One Act Plays from *Glimpses of Theatre*:

- i) *The Will*
- ii) *Villa for Sale*
- iii) *Progress*

**Unit III**

One Act Plays from *Glimpses of Theatre*:

- iv) *The Monkey's Paw*
- v) *Sorry, Wrong Number*
- vi) *No eggs! No eggs!*

**Unit IV**

Essay Writing, Business Letter Writing, Report Writing

**Texts Prescribed:**

1. *The Guide* by R.K. Narayan
2. *Glimpses of Theatre*, Guru Nanak Dev University Amritsar

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**Course Title:** Zoology (Animal Physiology)

**Course Code:** BSML-6483

**(THEORY)**

**Course Outcome**

After successfully completing this course, students will be able to:

**CO1:** Understand the mechanisms of digestion, respiration, and transport of gases in animals.

**CO2:** Explain the functioning of circulatory system including heart, blood, blood pressure regulation and Excretion.

**CO3:** Describe muscle contraction, nerve impulse transmission, and neural integration.

**CO4:** Analyze endocrine system functions and behavioral physiology including reflexes and hormonal control.

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**Course Title:** Zoology (Animal Physiology)

**Course Code:** BSML-6483

**(THEORY)**

**Max. Time:** 3 Hrs.

**L-T-P:** 4-0-0

**Max Marks:** 100

**Theory:** 70

**CA:** 30

**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. Each question will carry 12 marks.

**UNIT-I**

**Digestion:** Digestion of dietary constituents, regulation of digestive processes and absorption. Extra and intra cellular digestion, enzymatic digestion and symbiotic digestion.

**Respiration:** Transport of O<sub>2</sub> and CO<sub>2</sub>, Oxygen dissociation curve of haemoglobin, Bohr effect, chloride (-) shift, Haldane effect and control of breathing.

**UNIT-II**

**Heart:** Origin and regulation of heart beat, cardiac cycle, electrocardiogram, cardiac output, Blood pressure and micro-circulation.

**Blood:** Composition and functions of blood and lymph. Blood clotting. Blood groups including Rh factor, haemopoiesis and haemostasis.

**Excretion:** Urine formation and osmoregulation.

**UNIT-III**

**Muscles:** Ultrastructure, chemical and physical basis of skeletal muscle contraction.

**Neural Integration:** Structure of neuron, resting membrane potential, Origin and propagation of impulse along the axon, synapse and myoneural function.

**UNIT-IV**

**Physiology of Behavior:** Taxes and reflexes, instinctive and motivate learning and reasoning

**Endocrine:** Structure and physiology of thyroid, parathyroid, adrenal, hypothalamus, pituitary, pancreas and gonads.

**Suggested Readings:**

1. Guyton, A.S.(1994), Text Book of Medical Physiology, 7th Edition, W.B. Saunders Company.
2. Hill, R. W., Wyse, G. K. and Anderson, N. (2004), Animal physiology, Sinauer Associate, INC. Pub. Saunderland, Massachusettes, USA.
3. Hoar, W. S. (1984), General and Comparative Physiology, Prentice Hall of India Pvt. Limited, New Delhi, India.
4. Prosser, C.L. (1984), Comparative Animal Physiology, Satish Book Enterprise Books seller & Publishers, Agra.
5. Purves, W. K., Oriane, G. H., Space, H. C. and Salava, D. (2001), Life – The Science of Biology (6th ed.), Sinauer Assoc. Inc., USA.
6. Randall, D., Burggren, K.L. and French, K. (2002), Eckert Animal Physiology: Mechanisms and Adaptations, W.H. Freeman and Company, New York.
7. Taneja, S.K. (1997), Biochemistry & Animal Physiology, Trueman Book Co. Willmer, P. Stone, G. and Johnston, I (2000). Environmental Physiology of Animals, Blackwell Science.
8. Withers, P.C. (1992), Comparative Animal Physiology, Saunder College Publishing, New York.

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**Course Title:** Zoology (Animal Physiology Lab)

**Course Code:** BSMP-6483  
**(Practical)**

**Course Outcomes**

After passing this course the student will be able to:

**CO1:** Perform basic physiological experiments such as osmosis, diffusion, and enzyme activity.

**CO2:** Analyze blood parameters including blood groups, haemoglobin estimation, and coagulation time.

**CO3:** Measure physiological variables like blood pressure and interpret results.

**CO4:** Conduct biochemical analysis of urine and understand excretory functions.

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**Course Title:** Zoology (Animal Physiology Lab)

**Course Code:** BSMP-6483

**(Practical)**

**Time:** 3 hrs.

**L-T-P:** 0-0-2

**Max. Marks:** 50

**Practical:** 35

**CA:** 15

**Instructions for the Practical Examiners:** Question paper is to 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. Demonstration of osmosis and diffusion.
2. Demonstrate the presence of amylase in saliva, denaturation by pH and temperature.
3. Determination of coagulation and bleeding time of blood in man/rat/rabbit.
4. Determination of blood groups of human blood sample.
5. Recording of blood pressure of man.
6. Analysis of urine for urea, chloride, glucose and uric acid.
7. Estimation of haemoglobin content.

**(Note:- Some changes can be made in the practical depending on the availability of material.)**

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**COURSE CODE: BSNP/BSMP-6084**

**COURSE TITLE: Chemistry (Physical Chemistry-II: Lab)**

Students will be able to

**CO1:** Explain the fundamental concepts of thermodynamics, thermochemical processes, and the applications of the First Law of Thermodynamics in chemical systems.

**CO2:** Analyze the Second and Third Laws of Thermodynamics, entropy changes, spontaneity criteria, and thermodynamic functions governing equilibrium processes.

**CO3:** Interpret the principles of chemical, phase, and ionic equilibria, including equilibrium constants, phase rule, buffer systems, and acid–base equilibria.

**CO4:** Describe the basic principles of quantum mechanics and apply quantum mechanical models to explain atomic structure, molecular motion, and energy quantization.

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**COURSE CODE: BSNL/BSML-6084**

**COURSE TITLE: Chemistry (Physical Chemistry-II: Thermodynamics and Equilibrium)**

**Exam Time: 3Hrs.**

**Max.Marks:100**

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

**(Theory: 70, CA: 30)**

**Instructions for the Paper Setter**

Eight questions of equal marks (14 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

**Unit I**

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

**First Law of Thermodynamics:** Statement and definitions, Heat capacity at constant volume and pressure and their relationship. Joule's law, Joule-Thomson coefficient and inversion temperature, Calculation of  $w$ ,  $q$ ,  $\Delta U$  &  $\Delta H$  for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process.

**Thermochemistry:** Standard state, types of enthalpies of reactions, Hess's Law of heat summation. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy. Kirchhoff's equation.

**Unit II**

**Thermodynamics-II: Second Law of Thermodynamics:** Statements, Carnot cycle and its efficiency, Carnot theorem. Thermodynamic scale of temperature, Entropy as a state function, entropy as a function of  $V$  &  $T$ ;  $P$  &  $T$ , entropy change in physical change, Clausius inequality, entropy as a criterion of spontaneity and equilibrium. Entropy changes in ideal gases and mixing of gases.

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

**Unit III**

**Chemical Equilibrium:** Determination of  $K_p$ ,  $K_c$ ,  $K_a$  and their relationship, Clausius-Clapeyron equation

**Introduction to Phase Equilibrium:** Phase, component and degree of freedom, derivation of Gibbs phase rule, phase equilibria of one component system, two component systems-solidliquid equilibria, Solid solutions-compound formation with congruent and incongruent melting point, Lower and upper consolute temperature, Nernst distribution law.

**Introduction to Ionic equilibria:** Strong, moderate and weak electrolytes, degree of ionization, ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect; dissociation constants of mono-, di-and triprotic acids, calculation of hydrolysis constant, derivation of Henderson equation, applications of buffers in analytical chemistry, applications of solubility product principle Qualitative treatment of acid – base titration curves, Theory of acid–base indicators.

#### Unit IV

**Quantum Mechanics:** Black-body radiation, Planck's radiation law, Photoelectric effect, heat capacity of solids, Bohr's model of hydrogen atom (no derivation) and its defects, Compton effect. Sinusoidal wave equation, Hamiltonian operator, physical interpretation of the wave function, postulates of quantum mechanics, particle in a one-dimensional box, quantization of energy levels, extension to two and three-dimensional boxes, degeneracy. Simple harmonic oscillator model of vibrational motion, setting up Schrodinger equation and discussion of solution and wave functions. Rigid rotator model of rotation of diatomic molecules transformation to spherical polar coordinates spherical harmonics and their discussion. Qualitative investigation H-atom, setting up Schrodinger equation, radial and angular part, radial distribution functions of 1s, 2s, 2p, 3s, 3p and 3d.

#### Books Suggested

1. Atkins, P., Paula, J.de, Atkins, Physical Chemistry; 8th edition, Pubs: Oxford University Press, 2008.
2. Puri, B.R., Sharma, L.R., Pathania, M.S., Principles of Physical Chemistry; 43rd edition, Pubs: Vishal Publishing Co., 2008.
3. Barrow, G.M., Physical Chemistry; 6th edition, Pubs: McGraw Hill Company Inc., 1996.
4. Berry, R.S., Rice, S.A., Ross, J., Physical Chemistry; 2nd edition, Pubs: Oxford University Press, 2000.
5. Albert, R.A., Silbey, R.J., Physical Chemistry; I edition, Pubs: John Wiley & Sons Inc., 1992.
6. Dogra, S.K., Dogra, S., Physical Chemistry Through Problems, Pubs: Wiley Eastern Ltd., 1991.
7. Moore, W.J., Basic Physical Chemistry; Pubs: Prentice Hall of India Pvt. Ltd., 1983.
8. Metz, C.R., Theory and Problems of Physical Chemistry; Schaum's outline series, 2<sup>nd</sup> edition, Pubs: McGraw-Hall Book Company, 1989.
9. Banwell, C.N., McCash, E.M., Fundamentals of Molecular Spectroscopy; 4th edition, Pubs: Tata McGraw Hill Publishing Co. Ltd., 1999.
10. Atkins, P. Friedman, R., Molecular Quantum Mechanics; 4th edition Pubs: Oxford University Press, 2007.
11. Levine, I.N., Quantum Chemistry; 5th edition, Pubs: Prentice Hall International Inc., 2000.
12. Glasstone, B. (2003) Thermodynamics for Chemists, East West Press, New Delhi. ISBN-10: 8176710148.
13. Rock, P.A. (1983) Chemical Thermodynamics, University Science Books, Sausalito, CA. ISBN 10: 1891389327
14. Maron S.H., Prutton C.F. (1965) Principles of Physical Chemistry, 4th Edition, Mac Millan Publishing Company, New York.
15. Kapoor, K.L (2006) A Text Book of Physical Chemistry, 6th Volume, Macmillan Publishers India Ltd., New Delhi. ISBN10: 0230332765

16. Laidler, K.J. (1995) The world of Physical Chemistry, 3rd Volume, Oxford University Press, London. ISBN-10: 0198559194
17. Jou D., Llebot J.E. (1990) Introduction to the Thermodynamics of Biological Processes, Prentice Hall. ISBN: 9780135028810
18. Rajaram J., Kuriacose J. C. (1986) Thermodynamics for Students of Chemistry, Shoban Lal Nagin Chand & Co. Delhi ISBN-13: 1234567145987.

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**COURSE CODE: BSNP/BSMP-6084**

**COURSE TITLE: Chemistry (Physical Chemistry-II : Lab)**

**Course outcomes:**

Students will be able to

**CO1:** Apply principles of thermodynamics and thermochemistry to determine heat capacity, enthalpy of neutralization, heat of solution, lattice energy, and related physicochemical parameters through experimental methods.

**CO2:** Perform and interpret physicochemical experiments involving phase equilibria, solubility studies, distribution law, and molecular weight determination using standard laboratory techniques.

**CO3:** Develop practical skills in electroanalytical and instrumental methods such as potentiometry, conductometry, and colorimetry for quantitative chemical analysis and verification of fundamental laws.

**CO4:** Analyze experimental data, calculate physicochemical constants, and evaluate the relationship between theoretical concepts and laboratory observations with scientific accuracy and critical thinking.

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**COURSE CODE: BSNP/BSMP-6084**

**COURSE TITLE: Chemistry (Physical Chemistry-II: Lab)**

**Time: 3 Hrs**

**Marks: 50**

**Credits: 0-0-2**

**(Practical: 35, CA: 15)**

1. Determination of heat capacity of the calorimeter and enthalpy of neutralization of hydrochloric acid with sodium hydroxide.
2. Determination of heat of solution of  $\text{Na}_2\text{SO}_4$ .
3. Determination of Lattice energy of  $\text{NaCl}$  (using Born-Haber cycle).
4. Study of the solubility of benzoic acid in water and determination of  $\Delta H$ .
5. To determine the dissociation constant of picric acid by studying its distribution between benzene and water.
6. To determine the molecular weight of naphthalene by Rast method.
7. To prepare and draw phase diagram of microemulsions comprising sodium dodecyl sulfate, water and hexanol.
8. Potentiometry: (a) Titration of  $\text{HCl}$  solution with  $\text{NaOH}$  solution using quinhydrone solution; (b) Titration of  $\text{CH}_3\text{COOH}$  solution with  $\text{NaOH}$ ; (c) Titration of oxalic acid solution with  $\text{NaOH}$ .
9. Conductometry: (a) To find strength of given strong acid; (b) To find dissociation constant of weak electrolyte.
10. Colorimetry: To verify the Lambert – Beer's Law.

**Suggested Books**

1. Khosla, B. D.; Garg, V. C. & Gulati, A., Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
2. Athawale, V. D. & Mathur, P. Experimental Physical Chemistry, New Age International: New Delhi (2001).
3. Findlay's Practical Physical Chemistry, Author: Alexander Findlay Publisher: Wiley, 1972, ISBN-10:0470258853.
4. Advanced Practical Physical Chemistry, Author: J. B. Yadav, Publisher: Krishna Prakashan Media (Pvt) Ltd (2015), ISBN-10: 8182835925.
5. Quantitative Organic Analysis by Vogel, Author: A. I. Vogel, Publisher: Wiley, John & Sons, Incorporated, ISBN-13: 780582442504

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**COURSE CODE: BSNL/BSML-6080**

**COURSE TITLE: Chemistry of Cosmetics**

**Course outcomes:**

Students will be able to

**CO1:** Understand the role of raw materials used in cosmetic formulations and explain the basic application of AI in selection of cosmetic ingredients and formulation development.

**CO2:** Describe the chemistry, preparation, and applications of essential oils and understand the use of AI tools in their identification and quality testing.

**CO3:** Prepare and explain different cosmetic products and recognize the applications of AI in personalized skin and hair care products.

**CO4:** Understand methods of quality control, preservation, testing, and packaging of cosmetics and Classify and analyze chemical compounds using ChemDraw and ChemMine Tools.

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**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**COURSE CODE: BSNL/BSML-6080**

**COURSE TITLE: Chemistry of Cosmetics**

**Exam Time: 3Hrs.**

**Max.Marks:100**

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

**(Theory: 70, CA: 30)**

### **Instructions for the Paper Setter**

Eight questions of equal marks (14 each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

### **Unit I**

**Raw Materials for various types of Cosmetics:** Surfactants and their types; Additives (thickeners, foam stabilizers, pearlescent agents, conditioning agents, etc.) Oil components (Mineral oil, Natural oils, and Synthetic oils); Waxes (Natural and Synthetic); Silicone oils; Cream bases; Emulsifiers; Humectants; Aerosol Propellants.

### **Unit II**

**Essential Oils:** Chemistry and methods of preparation, Production of essential oils with special reference to the following; Eugenol, Geraniol, Sandalwood oil, eucalyptus oil, rose oil, Jasmone, Civetone, Muscone.

### **Unit III**

**Preparation and uses of the following:** Hair dye; hair spray; shampoo; suntan lotions; Face powder; Lipstick, Talcum powder; Nail enamel; Creams (Cold, Vanishing and Shaving creams); Antiperspirants and artificial flavours; Dental products.

### **Unit IV**

**Quality control, preservation, testing and packaging of cosmetics:** Inspection of raw materials, containers, finished products and packaging material; environmental problems; testing of cosmetics by spectroscopic techniques.

**AI in Chemistry:** Chemical Compound Classification, Drawing chemical structures by Chemdraw, Clustering Dataset: PubChem / ChEMBL chemical datasets. (<https://pubchem.ncbi.nlm.nih.gov/source/ChEMBL>)

Tool: ChemMine Tools (free web-based). (<https://chemminetools.ucr.edu/>)

Activity: Input chemical structures or SMILES notations, Predict chemical similarity clusters.

### **Suggested Books**

- 1) Earnest Guenther, "The Essential Oils" vol. I Robert E. Kreiger Publishing Co. Huntington, New York, 1972.
- 2) M.S. Balsem, S.D. Genshon, M.M. Rieger, E. Sagarin, S.J. Strianase, "Cosmetics, Science and Technology, Vol. I, II and III, Wiley-Inter science, A Division of John Wiley and Sons., Inc., New York, London, Sydney, Toronto, 1972, Ed. By M.S. Balsam and M. S. Sagarin.
- 3) J. Stephan Jelli nick," Formulation and Functions of Cosmetics", Wiley Inter science, a Division of John Wiley & Sons., Inc.
- 4) Chemistry and Technology of the Cosmetics and Toiletries Industryed. By D.F. Williams & W.H., Schmitt, Blackie Academic & Professional, London, 1st Edn., 1992.
- 5) Harry's Cosmetic ology, sixth edn. The principles and Practice of Modern cosmetics, Vol. I by R.G. Harry Chemical Publishing Co., Inc., New York, 1973.
- 6) W.A. Poucher, Poucher's Perfumes, Cosmetics and Soaps: Vol 3, Chapman & Hall, 2012, UK.
- 7) E. Board of consultants & Engineers, Cosmetics Processes and Formulations Handbook.
- 8) H. Bennett, F.A.I.C. The new cosmetic formulary, Chemical Publishing Company, INC. New York. 1970
- 9) N. Board, Handbook on Herbal Products (Medicines, Cosmetics, Toiletries, Perfumes) National Institute of Industrial Research, 2000, New Delhi.

**Bachelor of Science (Medical) (Honours) Semester VI (Session 2026-27)**

**Course Title: - Botany (Plant Ecology)**

**Course Code: - BSML-6075**

**Course Outcomes:**

After passing this course student will be able to:

**CO1:** Understand the influence of environmental factors such as atmosphere, water, light, temperature, soil, and biota on plant growth and distribution, and explain the morphological, anatomical, and physiological adaptations of plants to different ecological conditions.

**CO2:** Acquire knowledge of community ecology, including community characteristics, ecological parameters, biodiversity indices, life forms, biological spectrum, and ecological succession, and evaluate their significance in ecosystem functioning.

**CO3:** Understand the principles of population and ecosystem ecology, including population growth patterns, ecotypes, ecosystem structure, energy flow, food chains, food webs, ecological pyramids, and biogeochemical cycles.

**CO4:** Gain knowledge of the biogeographical regions and major vegetation types of India and analyze the concepts of landscape ecology, biodiversity hotspots, land-use dynamics, and the impact of habitat characteristics on biodiversity conservation.

**Bachelor of Science (Medical) (Honours) Semester VI (Session 2026-27)**

**Course Title: - Botany (Plant Ecology)**

**Course Code: - BSML-6075**

**Time: 3 Hrs.**

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

**Max. Marks: 100**

**Theory: 70**

**C.A.:30**

**Instructions for the Paper Setters: -**

Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each Section. The fifth question may be attempted from any Section.

**Unit I**

**Plants and Environment:** Atmosphere (gaseous compositions), water (properties of water cycle), light (global radiation, photosynthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties) and biota.

Morphological, anatomical and physiological responses of plants to water (hydrophytes and xerophytes), temperature (thermoperiodicity and vernalization), light (photoperiodism, heliophytes and sciophytes) and salinity.

**Unit II**

**Community Ecology:** Community characteristics, absolute and relative frequency, density and dominance, basal area and importance value index (IVI), Whittaker's classification of biodiversity, indices of alpha, beta and gamma diversity, life forms, biological spectrum, ecological succession.

**Unit III**

**Population Ecology:** Concept and characteristics of population; population density, natality, mortality, immigration and emigration; age structure and sex ratio; population dispersion patterns; population growth curves, exponential and logistic growth, carrying capacity; survivorship curves; population regulation; r- and K-selection; ecotypes and ecads.

**Ecosystem:** Structure, abiotic and biotic components, food chain, food web, ecological pyramids, energy flow, biogeochemical cycles of carbon, nitrogen and phosphorus.

**Unit IV**

**Biogeographical Regions of India**

**Vegetation types of India:** Forests and grasslands

**Landscape Ecology:** Definition & concept; effect of patch size and shape on biodiversity; dynamics of land use; hotspots.

## **Bachelor of Science (Medical) (Honours) Semester VI (Session 2026-27)**

### **Suggested Readings:**

1. Begon, M., Townsend, C.R. and Harper, J.L. (2021). Ecology: From Individuals to Ecosystems (5th Edition). Wiley-Blackwell.
2. Bowman, W.D., Hacker, S.D. and Cain, M.L. (2024/2025). Ecology (6th Edition). Oxford University Press.
3. Kumar, H.D. Modern Concept of Ecology (8th Edition). Vikas Publishing House, New Delhi.
4. MacKenzie, A., Ball, A.S. and Virdee, S.R. (2002). BIOS Instant Notes in Ecology (2nd Edition). Viva Books Pvt. Ltd., New Delhi.
5. Odum, E.P. and Barrett, G.W. (2005/2012 Indian reprint). Fundamentals of Ecology (5th Edition). Cengage Learning India Pvt. Ltd., New Delhi.
6. Primack, R.B. (2014). Essentials of Conservation Biology (6th Edition). Sinauer Associates.
7. Relyea, R. (2025). Ecology: The Economy of Nature (10th Edition). Macmillan Learning.
8. Sharma, P.D. (2025). Ecology and Environment (13th Edition). Rastogi Publications, Meerut.
9. Sher, A.A. and Molles, M.C. (2026). Ecology: Concepts and Applications (9th Edition / Current Release). McGraw Hill.
10. Singh, J.S., Singh, S.P. and Gupta, S.R. (2014). Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
11. Smith, T.M. and Smith, R.L. (2022). Elements of Ecology (9th Edition). Pearson.
12. Turner, M.G. and Gardner, R.H. (2015). Landscape Ecology in Theory and Practice: Pattern and Process (2nd Edition). Springer.

**Bachelor of Science (Medical) (Honours) Semester VI (Session 2026-27)**

**Course Title: - Botany (Plant Ecology Lab)**

**Course Code: - BSMP-6075**

**Course Outcomes:**

After passing this course student will be able to:

**CO1:** Develop practical skills in vegetation analysis by applying ecological techniques to study species frequency, density, dominance, biomass, vegetation cover, and Importance Value Index (IVI) in different plant communities.

**CO2:** Assess biodiversity and community structure using ecological indices and vegetation profiling methods, and interpret the effects of environmental factors on plant distribution and abundance.

**CO3:** Acquire proficiency in analyzing soil, including bulk density, porosity, moisture content, and water-holding capacity. Water characteristics pH, salinity, temperature, transparency, and dissolved oxygen.

**CO4:** Understand plant adaptations to different habitats and evaluate environmental pollution through indicators such as leaf area injury, dust-holding capacity, and comparative studies of polluted and unpolluted ecosystems.

**Bachelor of Science (Medical) (Honours) Semester VI (Session 2026-27)**  
**Course Title: - Botany (Plant Ecology Lab)**  
**Course Code: - BSMP-6075**

**Time: 3 Hrs**

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

**Max. Marks: 50**

**Theory: 35**

**C.A.:15**

**Instructions for the paper setter:** Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same may be submitted for the record to COE Office, Kanya Maha Vidyalaya, Jalandhar.

**Suggested Laboratory Exercises**

1. To determine minimum number of quadrats required for reliable estimate of biomass in grasslands through species area curves.
2. To study the frequency of herbaceous species in grassland and to compare the frequency distribution with Raunkiaer's Standard Frequency Diagram.
3. To estimate Importance Value Index for grassland species on the basis of relative frequency, relative density and relative dominance in protected and grazed grassland.
4. To measure the vegetation cover of grassland through point frame method.
5. To measure the above ground plant biomass in a grassland.
6. To study the morphological anatomical features of hydrophytes (*Hydrilla*, *Eichhornia*) Xerophytes (*Nerium*, *Calotropis*).
7. To determine diversity indices (richness, Simpson, Shannon-Weaver) in grazed and protected grassland.
8. To estimate bulk density and porosity of grassland and woodland soils.
9. To determine moisture content and water holding capacity of grassland and woodland soil.
10. To study the vegetation structure through profile diagram.
11. To estimate transparency, pH and temperature of different water bodies.
12. To measure dissolved oxygen content in polluted and unpolluted water samples.
13. To estimate salinity of different water samples.
14. To determine the percent leaf area injury of different leaf samples collected around polluted sites.
15. To estimate dust-holding capacity of the leaves of different plant species.

**Suggested Readings:**

1. Allen, S.E., Grimshaw, H.M., Parkinson, J.A. and Quarmby, C. (1974). Chemical Analysis of Ecological Materials. Blackwell Scientific Publications.
2. APHA, AWWA and WEF. (2022). Standard Methods for the Examination of Water and Wastewater (24th Edition). American Public Health Association, Washington, DC.

3. Gupta, P.K. (2018). Methods in Environmental Analysis: Water, Soil and Air. Agrobios.
4. Kapur, P. and Govil, S.R. (2000/2004 reprint). Experimental Plant Ecology. CBS Publishers & Distributors, New Delhi.
5. Krebs, C.J. (2014). Ecological Methodology (3rd Edition). Benjamin Cummings / online revised chapters.
6. Ludwig, J.A. and Reynolds, J.F. (1988). Statistical Ecology: A Primer on Methods and Computing. Wiley-Interscience, New York.
7. Maiti, S.K. (2003). Handbook of Methods in Environmental Studies, Vol. 1: Water and Wastewater Analysis. ABD Publishers.
8. Maiti, S.K. (2003). Handbook of Methods in Environmental Studies, Vol. 2: Air, Noise, Soil and Overburden Analysis. ABD Publishers.
9. Michael, P. (1984/1986 reprint). Ecological Methods for Field and Laboratory Investigations. Tata McGraw-Hill Publishing Co. Ltd., New Delhi.
10. Misra, K.C. (1989). Manual of Plant Ecology. Oxford & IBH Publishing Co., New Delhi.
11. Moore, P.D. and Chapman, S.B. (1986). Methods in Plant Ecology (2nd Edition). Blackwell Scientific Publications.
12. Saxena, M.M. (1998). Environmental Analysis: Water, Soil and Air. Agro Botanical Publishers.
13. Sharma, P.D. (2025). Ecology and Environment (13th Edition). Rastogi Publications, Meerut.
14. Trivedy, R.K. and Goel, P.K. (1986). Chemical and Biological Methods for Water Pollution Studies. Environmental Publications, Karad

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**

**Human Rights and Constitutional Duties**

**Course Code: VACH-6401**

**CO: (Course Outcomes)**

After completion of Semester VI, the students will be able to understand the concept of Human Rights and Constitutional Duties, which will enable:

CO 1: the students will learn about the basic characteristics and classification of Rights and Duties.

CO 2: the students will inculcate the knowledge about the international framework of Human Rights in the context of Universal Declaration of Human Rights as well as the national initiatives.

CO 3: this course will guide the students about the relationship between Human Rights and Constitutional Duties as well as the provisions under chapter III and IV of the Indian Constitution.

CO 4: the students will also learn about the relationship between Human Rights and Psychology, Human Rights Education and Human Duties for Psychologists and Their Social Responsibility in the society.

This course outcome will help the students in their further higher education programs and competitive exams.

**Bachelor of Science (Medical) Semester–VI (Session 2026-27)**  
**Session 2026-27**  
**Value Added Course**  
**(Human Rights and Constitutional Duties)**  
**Course Code: VACH-6401**

**Examination Time: 1 Hrs.**

**L-T-P: 2-0-0**  
**Total Marks: 50**  
**Theory Marks: 35**  
**CA: 15**

**Instructions for the Examiner:**

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

**Unit I**

**Introduction to Human Rights**

**Foundational Aspects:** Meaning, Nature, Characteristic, Classification.

**International Framework:** Constituents of the Universal Declaration of Human Rights (UDHR).

**Unit II**

**Constitutional Realisation in India:** Fundamental Rights (Part III, Constitution of India).

**Protective Mechanism in India:** The composition, Powers and Functions of the National Human Rights Commission of India (NHRC).

**Unit III**

**Introduction to Human Duties**

**Conceptual Perspective:** Meaning, Nature & Characteristics of Human Duties.

**Intellectual discourses:** Classification of Human Duties; Relevance of Human Duties.

**Unit IV**

**Constitutional Recognition in India:** Fundamental Duties in Indian Constitution, Part IV A.

**Human Rights Education:** An Ethical Perspective

**Recommended Books:**

1. United Nations. *The United Nations and Human Rights 1945-1995*. Geneva: United Nations Blue Books Series, Vol. VII, 1996.
2. Sastry, S. N. *Introduction to Human Rights and Duties*. Pune: University of Pune Press, 2011.
3. Mertus, Julie. *The United Nations and Human Rights-A Guide for a New Era*. London: Routledge, 2009.
4. Donnelly, Jack. *Universal Human Rights in Theory and Practice*. New York: Cornell University Press, 2013.
5. Hammarberg, Thomas. *Taking Duties Seriously- Individual Duties in International Humanitarian Law*. Versoix: International Council on Human Policy, 1999.
6. Miller P. Frederic, et al. *Fundamental Rights, Directive Principles and Fundamental Duties in India*. New York: VDM Publishing, 2009.

7. Cinganelli, Davis Louis. *Human Rights- Theory and Measurements*. London: Macmillan Press, 1988.
8. Ishay, M. R. *The History of Human Rights*. New Delhi: Orient Longman, 2004.
9. Mohapatra, Arun Ray. *National Human Rights Commission of India: Formation, Functioning and Future Perspectives*. New Delhi: Atlantic, 2004.
10. Deol, Satnam Singh. *Human Rights in India-Theory and Practice*. New Delhi: Serials Publications, 2011.
11. Rubin, Neal S. and Flores, Roseanne L. (eds.), *The Cambridge Handbook of Psychology and Human Rights (Cambridge Handbooks in Psychology)*, Cambridge University Press, 2020.