

*Progressive Education Society's*  
**Modern College of Arts, Science and Commerce (*Autonomous*),**  
**Shivajinagar, Pune 5**

**(An Autonomous College Affiliated to Savitribai Phule Pune University)**

**Framework of Syllabus**  
**For**  
**B. Sc. (Chemistry)**

(Based on NEP 2020 framework)  
(To be implemented from the Academic Year 2023-24)

## Semester 1 (First Year)

| Course Type             | Course                     | Course Code                  | Course / Paper Title                            | Hours / Week | Credit | CIA | ESE | Total |
|-------------------------|----------------------------|------------------------------|-------------------------------------------------|--------------|--------|-----|-----|-------|
| Major Mandatory (4 + 2) | Major Paper 1              | 23ScCheU1101                 | Physical & Inorganic Chemistry                  | 2            | 4      | 40  | 60  | 100   |
|                         |                            |                              |                                                 | 2            |        |     |     |       |
|                         | Major Paper 2              | 23ScCheU1102                 | Lab Course on 23ScCheU1101                      | 4            | 2      | 20  | 30  | 50    |
| Major Electives         | -                          |                              |                                                 |              |        |     |     |       |
| Minor                   | -                          |                              |                                                 |              |        |     |     |       |
| OE (2 + 2)              |                            | 23ScCheU1401                 | General chemistry -I                            | 2            | 4      | 40  | 60  | 100   |
|                         |                            | 23ScCopU1402                 | Democracy, Election and Governance              | 2            |        |     |     |       |
| VSC (2)                 | Major Specific Practical I | 23ScCheU1501                 | Lab Course on Chemistry of Cosmetic Ingredients | 4            | 2      | 20  | 30  | 50    |
| SEC (2)                 | Skill Paper 1 (Practical)  | 23ScCheU1601                 | Lab Course on Basic Analytical Skills-I         | 4            | 2      | 20  | 30  | 50    |
| AEC(2),                 | English Theory             | 23ScCopU1701<br>23ScCopU1702 | Technical English / English Communication I     | 2            | 2      | 20  | 30  | 50    |
| VEC (2)                 | EVS Theory                 | 23ScCopU1801                 | Environment Science I                           | 2            | 2      | 20  | 30  | 50    |
| IKS (2)                 | Major Specific Theory      | 23SCpCopU1901                | Generic IKS                                     | 2            | 2      | 20  | 30  | 50    |
| CC (2)                  | CC-I Course                | 23ScCopU1001                 | Online Course Based on Yoga                     | 2            | 2      | 20  | 30  | 50    |
| Total                   |                            |                              |                                                 | 28           | 22     | 220 | 330 | 550   |

## Semester 2 (First Year)

| Course Type                    | Course                      | Course Code                                                                                                           | Course / Paper Title                                                                                            | Hours / Week | Credit    | CIA        | ESE        | Total      |
|--------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------|-----------|------------|------------|------------|
| <b>Major Mandatory (4 + 2)</b> | Major Paper 3               | 23ScCheU2101                                                                                                          | Physical & Organic Chemistry                                                                                    | 2            | 4         | 40         | 60         | 100        |
|                                |                             |                                                                                                                       |                                                                                                                 | 2            |           |            |            |            |
|                                | Major Paper 4 (Practical)   | 23ScCheU2102                                                                                                          | Lab Course on 23ScCheU2101                                                                                      | 4            | 2         | 20         | 30         | 50         |
| <b>Major Electives</b>         | -                           |                                                                                                                       |                                                                                                                 |              |           |            |            |            |
| <b>Minor</b>                   | Minor Paper I (Practical)   | 23ScCheU2301                                                                                                          | Practical Course-I Fundamentals of Chemistry                                                                    | 4            | 2         | 20         | 30         | 50         |
| <b>OE (2 + 2)</b>              |                             | 23ScCheU2401                                                                                                          | General Chemistry- II                                                                                           | 2            | 4         | 40         | 60         | 100        |
|                                |                             | 23ScCheU2402                                                                                                          | Fundamentals of Music                                                                                           | 2            |           |            |            |            |
| <b>VSC (2)</b>                 | Major Specific Practical II | 23ScCheU2501                                                                                                          | Drug Analysis                                                                                                   | 4            | 2         | 20         | 30         | 50         |
| <b>SEC (2)</b>                 | Skill Paper II (Practical)  | 23ScCheU2601                                                                                                          | Lab Course on Basic Instrumentation Skills                                                                      | 4            | 2         | 20         | 30         | 50         |
| <b>AEC(2),</b>                 | English Theory              | 23ScCheU2703                                                                                                          | Technical English / English Communication II                                                                    | 2            | 2         | 20         | 30         | 50         |
| <b>VEC (2)</b>                 | EVS Theory                  | 23ScCheU2801                                                                                                          | Environment Science II                                                                                          | 2            | 2         | 20         | 30         | 50         |
| <b>IKS (2)</b>                 |                             |                                                                                                                       |                                                                                                                 |              |           |            |            |            |
| <b>CC (2)</b>                  | CC-II Course                | 23CpCopU2001 / 23CpCopU2011 / 23CpCopU2021 / 23CpCopU2031 / 23CpCopU2041 / 23CpCopU2051 / 23CpCopU2061 / 23CpCopU2071 | Physical Education / Cultural Activities / NSS / NCC / Fine Arts / Applied Arts / Visual Arts / Performing Arts | 2            | 2         | 20         | 30         | 50         |
| <b>Total</b>                   |                             |                                                                                                                       |                                                                                                                 | <b>30</b>    | <b>22</b> | <b>220</b> | <b>330</b> | <b>550</b> |

### Semester 3 (Second Year)

| Course Type                    | Course                              | Course code  | Course / Paper Title                          | Hours / Week | Credit    | CIA        | ESE        | Total      |
|--------------------------------|-------------------------------------|--------------|-----------------------------------------------|--------------|-----------|------------|------------|------------|
| <b>Major Mandatory (4 + 4)</b> | Major Core Paper 5 (Theory)         | 23ScCheU3101 | Physical, Inorganic & Organic Chemistry       | 2            | 4         | 40         | 60         | 100        |
|                                |                                     |              |                                               | 2            |           |            |            |            |
|                                | Major Paper 6 (Practical)           | 23ScCheU3102 | Lab Course on 23ScCheU3101                    | 4            | 2         | 20         | 30         | 50         |
|                                | Major Paper 7 (Practical)           | 23ScCheU1901 | Ancient Metallurgy in India                   | 2            | 2         | 20         | 30         | 50         |
| <b>Major Electives</b>         | -                                   |              |                                               |              |           |            |            |            |
| <b>Minor (4)</b>               | Minor Paper II (Theory + Practical) | 23ScCheU3301 | Fundamentals of Biochemistry (T + P)          | 2            | 4         | 40         | 60         | 100        |
|                                |                                     |              |                                               | 4            |           |            |            |            |
| <b>OE (2)</b>                  |                                     | 23ScCheU3401 | General Chemistry -III                        | 2            | 2         | 20         | 30         | 50         |
| <b>VSC (2)</b>                 | Major Specific Practical III        | 23ScCheU3501 | Lab Course on Raw material Analytical Methods | 4            | 2         | 20         | 30         | 50         |
| <b>SEC (2)</b>                 | --                                  |              | --                                            | --           | --        | --         | --         | --         |
| <b>AEC(2),</b>                 | MIL                                 | 23ScCopU3703 | MIL-I (Hindi ) / MIL-I (Marathi)              | 2            | 2         | 20         | 30         | 50         |
| <b>VEC (2)</b>                 | --                                  |              | --                                            | --           | --        | --         | --         | --         |
| <b>IKS (2)</b>                 | --                                  |              | --                                            | --           | --        | --         | --         | --         |
| <b>FP/CEP (2)</b>              | FP –I                               | 23ScCheU3002 | Field Project I                               | 4            | 2         | 20         | 30         | 50         |
| <b>CC(2)</b>                   | CC III                              | 23ScCopU3001 | Fitness                                       | 2            | 2         | 20         | 30         | 50         |
| <b>Total</b>                   |                                     |              |                                               | <b>32</b>    | <b>22</b> | <b>220</b> | <b>330</b> | <b>550</b> |

#### Semester 4 (Second Year)

| Course Type                    | Course                               | Course Code                  | Course / Paper Title                             | Hours / Week | Credit    | CI A       | ESE        | Total      |
|--------------------------------|--------------------------------------|------------------------------|--------------------------------------------------|--------------|-----------|------------|------------|------------|
| <b>Major Mandatory (4 + 4)</b> | Major Core Paper 8 (Theory)          | 23ScCheU4101                 | Physical, Inorganic & Organic Chemistry          | 2            | 4         | 40         | 60         | 100        |
|                                |                                      |                              |                                                  | 2            |           |            |            |            |
|                                | Major Paper 9 (Practical)            | 23ScCheU4102                 | Lab course on 23ScCheU4101                       | 4            | 4         | 40         | 60         | 100        |
|                                |                                      |                              |                                                  | 4            |           |            |            |            |
| <b>Major Electives</b>         | -                                    |                              |                                                  |              |           |            |            |            |
| <b>Minor (4)</b>               | Minor Paper III (Theory + Practical) | 23ScCheU4301                 | Fundamentals of Bioinorganic Chemistry (T + P)   | 2            | 4         | 40         | 60         | 100        |
|                                |                                      |                              |                                                  | 4            |           |            |            |            |
| <b>OE (2)</b>                  |                                      | 23ScCheU4401                 | General Chemistry -IV                            | 2            | 2         | 20         | 30         | 50         |
| <b>VSC (2)</b>                 | --                                   |                              | --                                               | --           | --        | --         | --         | --         |
| <b>SEC (2)</b>                 | Skill Paper III (Practical)          | 23ScCheU4601                 | Lab Course on Computer Applications in Chemistry | 4            | 2         | 20         | 30         | 50         |
| <b>AEC(2),</b>                 | MIL                                  | 23ScCopU4701<br>23ScCopU4702 | MIL-II (Hindi ) / MIL-II (Marathi)               | 2            | 2         | 20         | 30         | 50         |
| <b>VEC (2)</b>                 | --                                   |                              | --                                               | --           | --        | --         | --         | --         |
| <b>IKS (2)</b>                 | --                                   |                              | --                                               | --           | --        | --         | --         | --         |
| <b>FP / CEP(2)</b>             | CEP –I                               | 23ScCheU4003                 | Community Engagement Project I                   | 4            | 2         | 20         | 30         | 50         |
| <b>CC(2)</b>                   | CC-4                                 | 23ScCopU4001                 | Health and Wellness                              | 2            | 2         | 20         | 30         | 50         |
| <b>Total</b>                   |                                      |                              |                                                  | <b>32</b>    | <b>22</b> | <b>220</b> | <b>330</b> | <b>550</b> |

### Semester 5 (Third Year)

| Course Type                        | Course                                   | Course Code  | Course / Paper Title                        | Hours / Week | Credit    | CIA        | ESE        | Total      |
|------------------------------------|------------------------------------------|--------------|---------------------------------------------|--------------|-----------|------------|------------|------------|
| <b>Major Mandatory (4 + 4 + 2)</b> | Major Core Paper 10 (Theory + Practical) | 23ScCheU5101 | Organic Chemistry (T + P)                   | 2            | 4         | 40         | 60         | 100        |
|                                    | Major Paper 11 (Theory)                  | 23ScCheU5102 | Physical Chemistry                          | 4            | 4         | 40         | 60         | 100        |
|                                    | Major Paper 12 (Practical)               | 23ScCheU5103 | Lab Course on 23ScCheU5102                  | 4            | 2         | 20         | 30         | 50         |
| <b>Major Electives</b>             | Elective I (Theory + Practical)          | 23ScCheU5201 | Green Chemistry (T + P)                     | 2            | 4         | 40         | 60         | 100        |
|                                    |                                          |              |                                             | 4            |           |            |            |            |
|                                    | Elective II (Theory + Practical)         | 23ScCheU5202 | Instrumental methods of Analysis (T + P)    | 2            | 4         | 40         | 60         | 100        |
|                                    |                                          |              |                                             | 4            |           |            |            |            |
| <b>Minor (4)</b>                   | Minor Paper IV (Theory + Practical)      | 23ScCheU5301 | Fundamentals of Chromatographic Separations | 2            | 4         | 40         | 60         | 100        |
|                                    |                                          |              |                                             | 4            |           |            |            |            |
| <b>OE (2)</b>                      | --                                       |              | --                                          | --           | --        | --         | --         | --         |
| <b>VSC (2)</b>                     | Major Specific Practical IV              | 23ScCheU5501 | Lab Course on Paint and dyes                | 4            | 2         | 20         | 30         | 50         |
| <b>SEC (2)</b>                     | --                                       |              | --                                          | --           | --        | --         | --         | --         |
| <b>AEC(2),</b>                     | --                                       |              | --                                          | --           | --        | --         | --         | --         |
| <b>VEC (2)</b>                     | --                                       |              | --                                          | --           | --        | --         | --         | --         |
| <b>IKS (2)</b>                     | --                                       |              | --                                          | --           | --        | --         | --         | --         |
| <b>FP / CEP(2)</b>                 | FP –II (Project)                         | 23ScCheU5002 | Field Project II                            | 4            | 2         | 20         | 30         | 50         |
| <b>Total</b>                       |                                          |              |                                             | <b>30</b>    | <b>22</b> | <b>220</b> | <b>330</b> | <b>550</b> |

### Semester 6 (Third Year)

| Course Type                        | Course                                | Course Code  | Course / Paper Title                          | Hours / Week | Credit    | CIA        | ESE        | Total      |
|------------------------------------|---------------------------------------|--------------|-----------------------------------------------|--------------|-----------|------------|------------|------------|
| <b>Major Mandatory (4 + 4 + 2)</b> | Major Core Paper 13 (Theory)          | 23ScCheU6101 | Inorganic Chemistry                           | 2            | 4         | 40         | 60         | 100        |
|                                    | Major Paper 14 (Theory + (Practical)) | 23ScCheU6102 | Organic Chemistry (T + P)                     | 2            | 4         | 40         | 60         | 100        |
|                                    |                                       |              |                                               | 4            |           |            |            |            |
|                                    | Major Paper 15 (Practical)            | 23ScCheU6103 | Lab Course on 23ScCheU6101                    | 4            | 2         | 20         | 30         | 50         |
| <b>Major Electives</b>             | Elective III (Theory+ Practical)      | 23ScCheU6201 | Environmental Chemistry ( T + P)              | 2            | 4         | 40         | 60         | 100        |
|                                    |                                       |              |                                               | 4            |           |            |            |            |
|                                    | Elective IV (Theory +Practical)       | 23ScCheU6202 | Industrial Chemicals and Environment ( T + P) | 2            | 4         | 40         | 60         | 100        |
|                                    |                                       |              |                                               | 4            |           |            |            |            |
| <b>Minor (4)</b>                   | Minor Paper V (Theory + Practical)    | 23ScCheU6301 | Advanced Analytical Techniques (T + P)        | 2            | 4         | 40         | 60         | 100        |
|                                    |                                       |              |                                               | 4            |           |            |            |            |
| <b>OE (2)</b>                      | --                                    |              | --                                            | --           | --        | --         | --         | --         |
| <b>VSC (2)</b>                     | --                                    |              | --                                            | --           | --        | --         | --         | --         |
| <b>SEC (2)</b>                     | --                                    |              | --                                            | --           | --        | --         | --         | --         |
| <b>AEC(2),</b>                     | --                                    |              | --                                            | --           | --        | --         | --         | --         |
| <b>VEC (2)</b>                     | --                                    |              | --                                            | --           | --        | --         | --         | --         |
| <b>IKS (2)</b>                     | --                                    |              | --                                            | --           | --        | --         | --         | --         |
| <b>FP / CEP(2)</b>                 | --                                    |              | --                                            | --           | --        | --         | --         | --         |
| <b>OJT(4)</b>                      | OJT                                   | 23CpCopU6004 | On Job Training                               | 8            | 4         | 40         | 60         | 100        |
| <b>Total</b>                       |                                       |              |                                               | <b>32</b>    | <b>22</b> | <b>220</b> | <b>330</b> | <b>550</b> |

OE : Open Elective,

AEC: Ability Enhancement Course,

VEC: Value Education Courses,

CC : Co-Curricular Courses,

IKS : Indian Knowledge System,

OJT : On Job Training,

FP : Field Project,

VSC : Vocational Skill Courses,

CEP : Community Engagement Project