

INTEGRATED Ph.D. CURRICULUM

Department of Chemistry

I Semester

| Course No. | Course Title | Credit |
|------------|---------------------------------|--------|
| CHM 301 | Symmetry and Group Theory | 4 |
| CHM 311 | Organic Chemistry I | 4 |
| CHM 313 | Organic Chemistry Laboratory II | 3 |
| CHM 321 | Physical Chemistry of Solutions | 4 |
| CHM 3** | Departmental Elective I | 4 |
| *** ** | Open Elective I | 3/4 |
| Total | | 22/23 |

II Semester

| Course No. | Course Title | Credit |
|------------|-----------------------------------|--------|
| CHM 302 | Chemistry of Transition Metals | 4 |
| CHM 304 | Inorganic Chemistry Laboratory II | 3 |
| CHM 312 | Organic Chemistry II | 4 |
| CHM 322 | Principles of Quantum Chemistry | 4 |
| CHM 3** | Departmental Elective II | 4 |
| *** ** | Open Elective II | 3/4 |
| Total | | 22/23 |

III Semester

| Course No. | Course Title | Credit |
|------------|----------------------------------|--------|
| CHM 401 | Non-transition Metal Chemistry | 4 |
| CHM 411 | Physical Organic Chemistry | 4 |
| CHM 421 | Statistical Mechanics | 4 |
| CHM 423 | Physical Chemistry Laboratory II | 3 |
| CHM 6** | Departmental Elective III | 4 |
| CHM 6** | Departmental Elective IV | 4 |
| Total | | 23 |

IV Semester

| Course No. | Course Title | Credit |
|-------------------|--------------------------|---------------|
| CHM 422 | Molecular Spectroscopy | 4 |
| CHM 6** | Departmental Elective V | 4 |
| CHM 6** | Departmental Elective VI | 4 |
| *** ** | Open Elective III | 4 |
| *** ** | Open Elective IV | 4 |
| Total | | 20 |

V Semester

| Course No. | Course Title | Credit |
|-------------------|---------------------|---------------|
| CHM 5** | Project Work | 16 |
| Total | | 16 |

VI Semester

| Course No. | Course Title | Credit |
|-------------------|---------------------|---------------|
| CHM 6** | Project Work | 16 |
| Total | | 16 |

VII Semester

| Course No. | Course Title | Credit |
|-------------------|---------------------|---------------|
| CHM 800 | Project Work | 16 |
| Total | | 16 |

Department of Mathematics

I Semester

| Course No. | Course Title | Credit |
|------------|--------------------------|--------|
| MTH 311 | Advanced Linear Algebra | 4 |
| MTH 401 | Fields and Galois Theory | 4 |
| MTH 403 | Real Analysis II | 4 |
| MTH 407 | Complex Analysis I | 4 |
| Total | | 16 |

II Semester

| Course No. | Course Title | Credit |
|------------|---------------------------------|--------|
| MTH 302 | Modules | 4 |
| MTH 304 | Metric Spaces and Topology | 4 |
| MTH 306 | Ordinary Differential Equations | 4 |
| MTH 404 | Measure and Integration | 4 |
| Total | | 16 |

III Semester

| Course No. | Course Title | Credit |
|------------|--------------------------------|--------|
| MTH 405 | Partial Differential Equations | 4 |
| MTH 503 | Functional Analysis | 4 |
| MTH 605 | Topology I | 4 |
| MTH 5** | Departmental Elective I | 4 |
| Total | | 16 |

IV Semester

| Course No. | Course Title | Credit |
|------------|--|--------|
| MTH 503 | Functional Analysis | 4 |
| MTH 508 | Introduction to Differentiable Manifolds | 4 |
| MTH 5** | Departmental Elective II | 4 |
| MTH 5** | Departmental Elective III | 4 |
| Total | | 16 |

V Semester

| Course No. | Course Title | Credit |
|-------------------|--------------------------|---------------|
| MTH 5** | Departmental Elective IV | 4 |
| MTH 5** | Departmental Elective V | 4 |
| MTH 5** | Departmental Elective VI | 4 |
| MTH 6** | Reading Course | 4 |
| Total | | 16 |

VI Semester

| Course No. | Course Title | Credit |
|-------------------|---------------------------|---------------|
| MTH 6** | Departmental Elective VII | 4 |
| MTH 6** | Seminar | 4 |
| MTH 6** | Reading Course # | 4 |
| MTH 6** | Reading Course # | 4 |
| Total | | 16 |

VII Semester

| Course No. | Course Title | Credit |
|-------------------|----------------------------|---------------|
| MTH 6** | Departmental Elective VIII | 4 |
| Total | | |

VIII Semester

| Course No. | Course Title | Credit |
|-------------------|--------------------------|---------------|
| MTH 6** | Departmental Elective IX | 4 |
| Total | | |

Department of Physics

I Semester

| Course No. | Course Title | Credit |
|------------|---------------------------------|--------|
| PHY 301 | Mathematical Methods I | 4 |
| PHY 303 | Quantum Mechanics I | 4 |
| PHY 305 | Classical Mechanics | 4 |
| PHY 309 | Thermal Physics | 4 |
| PHY 337 | Integrated Physics Laboratory I | 4 |
| Total | | 20 |

II Semester

| Course No. | Course Title | Credit |
|------------|-----------------------------------|--------|
| PHY 302 | Mathematical Methods II | 4 |
| PHY 304 | Quantum Mechanics II | 4 |
| PHY 306 | Statistical Mechanics | 4 |
| PHY 312 | Numerical Methods and Programming | 4 |
| PHY 338 | Integrated Physics Laboratory II | 4 |
| Total | | 20 |

III Semester

| Course No. | Course Title | Credit |
|-------------|------------------------------|--------|
| PHY 401/605 | Electrodynamics | 4 |
| PHY 403/607 | Condensed Matter Physics | 4 |
| PHY 405 | Condensed Matter Physics Lab | 3 |
| PHY4** | Departmental Elective I | 4 |
| *** ** | Open Elective I | 3/4 |
| Total | | 18/19 |

IV Semester

| Course No. | Course Title | Credit |
|-------------------|------------------------------|---------------|
| PHY 402/606 | Atomic and Molecular Physics | 4 |
| PHY 404/608 | Nuclear and Particle Physics | 4 |
| PHY 432 | Integrated Ph.D. Project | 4 |
| PHY 4** | Departmental Elective II | 3/4 |
| *** ** | Open Elective II | 3/4 |
| Total | | 18/20 |

V Semester

| Course No. | Course Title | Credit |
|-------------------|--------------------------|---------------|
| PHY 701 | Project Work | 8 |
| PHY 5**/6** | Departmental Elective I | 4 |
| PHY 5**/6** | Departmental Elective II | 4 |
| *** ** | Open Elective III | 3/4 |
| Total | | 19/20 |

VI Semester

| Course No. | Course Title | Credit |
|-------------------|---------------------|---------------|
| PHY 702 | Project Work | 16 |
| *** ** | Open Elective IV | 3/4 |
| Total | | 19/20 |

VII Semester

| Course No. | Course Title | Credit |
|-------------------|---------------------|---------------|
| PHY 800 | Project Work | 16 |
| Total | | 16 |