

# FORENSIC SCIENCE 4+1 MS CHEMISTRY TRACK

A Bachelor of Science in Applied Science degree in Forensic Science requires a minimum of 120 semester hours. The program is designed to be rigorous and multi-disciplinary, and allows for fewer electives in lower level courses but an increased flexibility in upper-division coursework. Students must complete the following coursework within their first 3 semesters at YSU, and must maintain at least a 2.5 GPA in order to remain in the FS program:

- STEM 1520 or YSU 1500
- ENGL 1550
- CRJS 1500
- FSCI 1510
- CHEM 1515
- CHEM 1515L
- Two MATH courses, if applicable (may include MATH 1510, MATH 1510C, MATH 1511, MATH 1511C, MATH 1513, MATH 1570, MATH 1571)

A minor is intended to contrast with or deepen a major or General Education. Forensic Science is an interdisciplinary major. Courses that are required for, and count toward, the Forensic Science major cannot be counted toward a minor.

| COURSE   | TITLE   | S.H. |
|--|---|------|
| <b>FIRST YEAR REQUIREMENT -STUDENT SUCCESS</b>                                     |   |      |
| YSU 1500   | Success Seminar   | 1-2  |
| or YSU 1500S   | Youngstown State University Success Seminar                   |      |
| or HONR 1500   | Intro to Honors   |      |
| <b>General Education Requirements</b>  |   |      |
| ENGL 1550  | Writing 1   | 3-4  |
| or ENGL 1549   | Writing 1 with Support  |      |
| ENGL 1551  | Writing 2   | 3    |
| Mathematics  |   |      |
| MATH 1571  | Calculus 1 (required for major)                               | 4    |
| or MATH 1570   | Applied Calculus 1  |      |
| Arts and Humanities (Select 2 courses)   |   |      |
| Natural Science (2 courses; 1 with lab) <small>met with BIOL 2601 and 2602</small> |   |      |
| BIOL 2601  | General Biology 1: Molecules and Cells (required for major)   | 3    |
| BIOL 2601L   | General Biology I: Molecules and Cells Laboratory             | 1    |
| BIOL 2602  | General Biology 2: Organisms and Ecology (required for major) | 3    |
| BIOL 2602L   | General Biology: Organisms and Ecology Laboratory             | 1    |
| Social Sciences (2 courses below required for major)                               |   |      |
| CRJS 1500  | Introduction to Criminal Justice                              | 3    |
| ANTH 1500  | Introduction to Anthropology (required for major)             | 3    |
| <b>General Education Electives (9 s.h.)</b>  |   |      |
| CMST 1545  | Communication Foundations                                     | 3    |
| Any 2 Gen Ed Courses   |   |      |
| 6  |   |      |
| <b>Core Requirements (64 s.h.)</b>   |   |      |
| <b>Chemistry</b>   |   |      |
| CHEM 1515  | General Chemistry 1   | 3    |
| CHEM 1515L   | General Chemistry 1 Laboratory                                | 1    |
| CHEM 1516  | General Chemistry 2   | 3    |
| CHEM 1516L   | General Chemistry 2 Laboratory                                | 1    |
| CHEM 3719  | Organic Chemistry 1   | 3    |

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|--|--|---|
| CHEM 3719L   | Organic Chemistry 1 Laboratory   | 1 |
| CHEM 3720  | Organic Chemistry 2  | 3 |
| CHEM 3720L   | Organic Chemistry 2 Laboratory   | 1 |
| CHEM 2604  | Quantitative Analysis  | 5 |
| CHEM 2604L   | Quantitative Analysis Laboratory   | 0 |
| <b>Additional Biology</b>  |  |   |
| BIOL 3721  | Genetics   | 3 |
| <b>Physics</b>   |  |   |
| PHYS 1501 & 1501L  | Fundamentals of Physics 1 and Fundamentals of Physics Laboratory 1                     | 5 |
| or PHYS 2610 & 2610L   | General Physics 1 and General Physics Laboratory 1                                     |   |
| PHYS 1502 & 1502L  | Fundamentals of Physics 2 and Fundamentals of Physics Laboratory 2                     | 4 |
| <b>Statistics</b>  |  |   |
| STAT 3717  | Statistical Methods  | 4 |
| <b>Criminal Justice and Forensic Sciences</b>  |  |   |
| FSCI 1510  | Survey of Forensic Science   | 3 |
| CRJS 2602  | Criminal Courts  | 3 |
| FSCI 3714  | Forensic Science: Crime Scene Investigation  | 2 |
| FSCI 3714L   | Forensic Science CSI Lab   | 1 |
| FSCI 3716  | Forensic Science Evidence Analysis   | 2 |
| FSCI 3716L   | Forensic Science Evidence Analysis Laboratory  | 1 |
| FSCI 3720  | Forensic Fire and Explosion Investigation  | 3 |
| FSCI 4852  | Trace Evidence   | 3 |
| or FSCI 4853   | Forensic Firearms Examination  |   |
| or FSCI 4854   | Death Investigation  |   |
| CRJS 4807  | Criminal Justice Internship  | 6 |
| or STEM 4890   | STEM Internship  |   |
| FSCI 5814  | Practice and Ethics in Forensic Science  | 3 |
| <b>Concentrations (Pick One -Biology, Chemistry, Anthropology, or Flexible Option) 16</b>                                    |  |   |
| <b>CHEMISTRY (Select at least 16 s.h.) at least 9 hours must be at the 5800/6900 level for 4+1 (See below for full list)</b> |  |   |
| CHEM 3729  | Inorganic Chemistry  |   |
| CHEM 3739 & 3739L  | Physical Chemistry 1 and Physical Chemistry 1 Laboratory                               |   |
| CHEM 3740 & 3740L  | Physical Chemistry 2 and Physical Chemistry 2 Laboratory                               |   |
| CHEM 3764  | Chemical Toxicology  |   |
| CHEM 3785 & 3785L  | Biochemistry 1 and Biochemistry Laboratory   |   |
| CHEM 3786  | Biochemistry 2   |   |
| CHEM 4891  | Special Topics   |   |
| CHEM 5804 & 5804L  | Chemical Instrumentation and Chemical Instrumentation Laboratory                       |   |
| CHEM 5821  | Intermediate Organic Chemistry   |   |
| CHEM 5822 & 5822L  | Advanced Organic Laboratory and Advanced Organic Laboratory                            |   |
| <b>BIOLOGY (Select at least 16 s.h.)</b>   |  |   |
| BIOL 3702 & 3702L  | Microbiology and Microbiology Laboratory   |   |
| BIOL 3703 & 3703L  | Clinical Immunology and Clinical Immunology Laboratory                                 |   |
| BIOL 3705 & 3705L  | Introduction to Human Gross Anatomy and Introduction to Human Gross Anatomy Laboratory |   |
| BIOL 3711  | Cell Biology: Fine Structure   |   |

|  |  |
|--|--|
| BIOL 3730 & 3730L  | Human Physiology and Human Physiology Laboratory                                       |
| BIOL 4800 & 4800L  | Bioinformatics and Bioinformatics Laboratory   |
| BIOL 4839  | Selected Topics in Physiology  |
| CHEM 3785 & 3785L  | Biochemistry 1 and Biochemistry Laboratory   |
| CHEM 3786  | Biochemistry 2   |
| BIOL 4850  | Problems in Biology  |
| BIOL 4890 & 4890L  | Molecular Genetics and Molecular Genetics Laboratory                                   |
| BIOL 5827  | Gene Manipulation  |
| <b>ANTHROPOLOGY (Select at least 16 s.h.)</b>  |  |
| ANTH 2600  | Human Osteology  |
| ANTH 3702  | Archaeology  |
| ANTH 3703  | Biological Anthropology  |
| ANTH 3778  | Archaeological Techniques  |
| ANTH 3779  | Fieldwork in Historical and Industrial Sites Archaeology                               |
| ANTH 3780  | Forensic Anthropology 1  |
| ANTH 4881  | Forensic Anthropology 2  |
| BIOL 3705 & 3705L  | Introduction to Human Gross Anatomy and Introduction to Human Gross Anatomy Laboratory |
| <b>Optional courses to meet 120 hours (16 hours). Students may take a flexible option of any 3700 or higher level courses to meet the degree requirements.</b> |  |
| FSCI 4850  | Special Topics in Forensic Sciences  |
| FSCI 4853  | Forensic Firearms Examination  |
| FSCI 4854  | Death Investigation  |
| CSCI 4870  | Biometrics   |
| CHEM 3719R   | Organic Chemistry Recitation 1   |
| CHEM 3720R   | Organic Chemistry Recitation 2   |
| PHLT 3731  | Drug Use and Abuse   |
| PHLT 5810  | Agents of Mass Casualty  |
| PHLT 5812  | Crisis Management in Public Health   |
| ENST 3700 & 3700L  | Environmental Chemistry and Environmental Chemistry Lab                                |
| ENST 3730  | Air Quality  |
| ENST 3751 & 3751L  | Water Quality Analysis and Water Quality Analysis Lab                                  |
| ENST 3752  | Soil Quality and Analysis  |
| ENST 3781  | Environmental Sampling Methods   |
| <b>Total Semester Hours</b>  | <b>120-122</b>   |

There may be other courses that qualify for upper division electives, but you must discuss these options with an academic advisor and get pre-approval.

#### Dual Credit Requirements

#### Accelerated 4+1 Program

Undergraduate Forensic Science students can apply for admission into the accelerated 4+1 MS in Chemistry graduate program after completing 78 undergraduate semester hours with a GPA of 3.0 or higher. After being admitted to the accelerated 4+1 MS program, students will be allowed a maximum of nine semester hours of graduate coursework, specified as 5000 level or higher, to be double counted toward both a bachelor's and master's degrees. The courses chosen to count for both undergraduate and graduate coursework must be approved by the Graduate Program Director. An additional three hours of graduate coursework can be completed as an undergraduate and used exclusively for graduate credit. This allows the student to graduate

with a master's degree with one year of additional full-time study beyond the bachelor's degree, as the total hours counted towards the Master's degree is greater than or equal to 30 hours.

#### Courses Counting Towards Requirements

Select 3 of these courses, as only 3 can be double counted. Can select a 4th that would only count for the Master's degree.

| COURSE     | TITLE                               | S.H. |
|------------|-------------------------------------|------|
| CHEM 6911  | Advanced Analytical Chemistry 1     | 3    |
| CHEM 6912  | Advanced Analytical Chemistry 2     | 3    |
| CHEM 6921  | Advanced Biochemistry 1             | 3    |
| CHEM 6941  | Advanced Organic Chemistry 1        | 3    |
| CHEM 6991K | Special Topics Organometallics      | 1-3  |
| CHEM 6991Q | Special Topics Quantum Chemistry    | 1-3  |
| CHEM 6980  | Introduction to Chemical Research   | 3    |
| CHEM 5804  | Chemical Instrumentation            | 4    |
| CHEM 5804L | Chemical Instrumentation Laboratory | 0    |
| CHEM 5822  | Advanced Organic Laboratory         | 4    |
| CHEM 5822L | Advanced Organic Laboratory         | 0    |

#### Year 1

| Fall                  |  | S.H.         |
|-----------------------|--|--------------|
| YSU 1500              | Success Seminar                                | 1-2          |
| or YSU 1500S          | or Youngstown State University Success Seminar |              |
| or HONR 1500          | or Intro to Honors                             |              |
| ENGL 1550             | Writing 1                                      | 3-4          |
| or ENGL 1549          | or Writing 1 with Support                      |              |
| FSCI 1510             | Survey of Forensic Science                     | 3            |
| CRJS 1500             | Introduction to Criminal Justice               | 3            |
| CHEM 1515             | General Chemistry 1                            | 3            |
| CHEM 1515L            | General Chemistry 1 Laboratory                 | 1            |
| <b>Semester Hours</b> |  | <b>14-16</b> |

#### Spring

|                       |                                |           |
|-----------------------|--------------------------------|-----------|
| ENGL 1551             | Writing 2                      | 3         |
| CRJS 2602             | Criminal Courts                | 3         |
| ANTH 1500             | Introduction to Anthropology   | 3         |
| CHEM 1516             | General Chemistry 2            | 3         |
| CHEM 1516L            | General Chemistry 2 Laboratory | 1         |
| Gen Ed Elective       |                                | 3         |
| <b>Semester Hours</b> |                                | <b>16</b> |

#### Year 2

| Fall                  |   | S.H.      |
|-----------------------|---|-----------|
| CMST 1545             | Communication Foundations                   | 3         |
| FSCI 3714             | Forensic Science: Crime Scene Investigation | 2         |
| FSCI 3714L            | Forensic Science CSI Lab                    | 1         |
| MATH 1571             | Calculus 1                                  | 4         |
| CHEM 3719             | Organic Chemistry 1                         | 3         |
| CHEM 3719L            | Organic Chemistry 1 Laboratory              | 1         |
| <b>Semester Hours</b> |   | <b>14</b> |

#### Spring

|            |   |   |
|------------|---|---|
| FSCI 3716  | Forensic Science Evidence Analysis            | 2 |
| FSCI 3716L | Forensic Science Evidence Analysis Laboratory | 1 |
| FSCI 3720  | Forensic Fire and Explosion Investigation     | 3 |
| CHEM 3720  | Organic Chemistry 2                           | 3 |
| CHEM 3720L | Organic Chemistry 2 Laboratory                | 1 |

|                             |   |                |
|-----------------------------|---|----------------|
| Concentration Electives     |   | 4              |
| <b>Semester Hours</b>       |   | <b>14</b>      |
| <b>Year 3</b>               |   |                |
| <b>Fall</b>                 |   |                |
| BIOL 2601                   | General Biology 1: Molecules and Cells            | 3              |
| BIOL 2601L                  | General Biology I: Molecules and Cells Laboratory | 1              |
| FSCI 4850                   | Special Topics in Forensic Sciences               | 3              |
| STAT 3717                   | Statistical Methods                               | 4              |
| Concentration Electives     |   | 5              |
| <b>Semester Hours</b>       |   | <b>16</b>      |
| <b>Spring</b>               |   |                |
| BIOL 2602                   | General Biology 2: Organisms and Ecology          | 3              |
| BIOL 2602L                  | General Biology: Organisms and Ecology Laboratory | 1              |
| CHEM 2604                   | Quantitative Analysis                             | 5              |
| CHEM 2604L                  | Quantitative Analysis Laboratory                  | 0              |
| Arts and Humanities         |   | 3              |
| Concentration Electives     |   | 4              |
| <b>Semester Hours</b>       |   | <b>16</b>      |
| <b>Year 4</b>               |   |                |
| <b>Fall</b>                 |   |                |
| CRJS 4807                   | Criminal Justice Internship                       | 6              |
| PHYS 1501                   | Fundamentals of Physics 1                         | 4              |
| PHYS 1501L                  | Fundamentals of Physics Laboratory 1              | 1              |
| Concentration Electives     |   | 3              |
| Gen Ed Elective             |   | 3              |
| <b>Semester Hours</b>       |   | <b>17</b>      |
| <b>Spring</b>               |   |                |
| FSCI 5814                   | Practice and Ethics in Forensic Science           | 3              |
| BIOL 3721                   | Genetics  | 3              |
| PHYS 1502                   | Fundamentals of Physics 2                         | 3              |
| PHYS 1502L                  | Fundamentals of Physics Laboratory 2              | 1              |
| Arts & Humanities           |   | 3              |
| <b>Semester Hours</b>       |   | <b>13</b>      |
| <b>Total Semester Hours</b> |   | <b>120-122</b> |

Request a Graduation Evaluation after you have completed 80-85 s.h. from the STEM Advising/Deans Office, 2325 Moser Hall, 330-941-2512.

## Learning Outcomes

1. Students will demonstrate knowledge on the influence of the CJ system at the subsystem levels (policing, courts, and corrections).
2. Students can analyze scientific situations, and apply the scientific method within the CJ judicial system.
3. Students can explain biology principles and how they relate to forensic science.
4. Students can explain chemistry principles and how they relate to forensic science.
5. Students can explain basic physics and math principles, and how they relate to forensic science.