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| **2023-2024** | **Bachelor of Science (B.S.) Degree – Double Major 1. Biology Major – Molecular and Biochemistry Concentration 2. Chemistry Major Name:** **ID:**  |
| Courses in **BOLD** are required by this majorCourses in *ITALIC* are strongly recommended**+** denotes courses offered only every other year.ALSO REQUIRED FOR GRADUATION:•120 credit hours•39 Upper division credits•2.00 GPA•Completion of all requirements**Learning Outcomes****Key:****GE#X**=General Education**LL**=Life & Leadership**SS**=Strategic SkillsUpdate 2/8/2022bs |
| **First Year Fall** | **Learning Outcome** | **Sem Hours** | **Date Met** | **First Year Spring** | **Learning Outcome** | **Sem Hours** | **Date Met** |
| **BIOL1500 Biology** **I** **w/ lab** |  | **4** |  | **BIOL1520 Biology II w/ lab** |  | **4** |  |
| **CHEM1410 General Chemistry I Workshop** | GE3D | **4** |  | **CHEM1420 General Chemistry II Workshop** |  | **4** |  |
| ***MATH1510 Calculus I*** | GE2B | **4** |  | **CHEM1450 Introduction to Organic and Biochemistry**  |  | **1** |  |
| UNIV1100 Digital fluency and citizenship  | SS | 3 |  | ***MATH1520 Calculus 2*** |  | **4** |  |
| LEAD1100 Self leadership I | LL | 2 |  | ENGL1100 Composition I or HONR2010 Honors 201 OR UNIV1200 Health and wholeness  | GE1A or SS | 3 |  |
|  |  |  |  | LEAD1200 Self Leadership II |  | 2 |  |
| **Total Hours** |  | **17** |  | **Total Hours** |  | **18** |  |
| **Notes:** Join clubs and organizations on campus (Science club, etc.).  Start your networking circle by signing up for GU4U - <https://my.graceland.edu/ICS/Alumni_and_Friends/GU4U/>.  Find winter break or summer job shadowing and volunteer opportunities.    \*If you have transferred in a composition course, please take a liberal learning course in its place.  |
| **Second Year Fall** | **Learning Outcome** | **Sem****Hours** | **Date Met** | **Second Year Spring** | **Learning Outcome** | **Sem Hours** | **Date Met** |
| **BIOL2100 Cell Biology and Genetics w/ lab** |  | **4** |  | **BIOL2360 Microbiology w/ lab** |  | **4** |  |
| **CHEM3410/3411 Org Chem I w/lab** |  | **4** |  | **CHEM3420/3421 Org Chem II w/lab** |  | **4** |  |
| **PHYS1410 Elements of Physics I w/lab** |  | **4** |  | **PHYS1420 Elements of Physics II w/lab**  |  | **4** |  |
| ENGL1100 Composition I or HONR201 Honors 201 OR UNIV1200 Health and wholeness | GE1A or SS | 3 |       | COMM1100 Foundations of Public Speaking or HONR2010 Honors 201 | GE1B | 3 |       |
| LEAD2100 Group Leadership I  | LL | 2 |       | LEAD2200 Group Leadership II  | LL | 2 |  |
| **Total Hours** |  | **17** |  | **Total Hours** |  | **17** |  |
| **Notes:** Find student leadership positions or join a club or organization on campus (Science club, etc.).  Check in with faculty regarding any standardized tests/requirements for grad school.  Find winter break or summer job shadowing and volunteer opportunities.  \*If you have transferred in a composition course, please take a liberal learning course in its place.  |
| **Third Year Fall*****(check your degree audit!)*** | **Learning Outcome** | **Sem****Hours** | **Date Met** | **Third Year Spring** | **Learning Outcome** | **Sem Hours** | **Date Met** |
| **+BIOL3310 Molecular Genetics w/ lab** |  | **4** |  | **+BIOL4400 Immunology** |  | **3** |  |
| **MATH1360 Statistics for Sciences** |  | **3** |  | **BIOL/CHEM4111 Capstone Research I** |  | **1** |  |
| **+CHEM3610 Physical Chemistry I w/ lab** |  | **4** |  | **+CHEM3620 Physical Chemistry II w/ lab** |  | **4** |  |
|  Arts§  | GE3A | 3 |  | ENGL2110 Composition II  | **GE1C** | 3 |  |
| LEAD3100 Organizational Leadership I  | LL | 2 |  | UNIV2100 Social Responsibility | **SS** | 3 |  |
|  |  |  |  | LEAD3200 Organizational Leadership II  | **LL** | 2 |  |
| **Total Hours** |  | **16** |  | **Total Hours** |  | **16** |  |
| **Notes:** Research and apply for an internship fall of the junior year to be completed summer after junior year.  Connect with your faculty advisor for assistance with navigating this process.  Connect with your faculty advisor in the fall of the junior year to learn more about graduate school applications and standardized test requirements for professional school.  If you want to attend graduate school right after senior year, many applications open during the summer.  Check in with your advisor during your junior year about career opportunities outside graduate programs. |
| **Fourth Year Fall*****(apply for graduation!)*** | **Learning Outcome** | **Sem****Hours** | **Date Met** | **Fourth Year Spring** | **Learning Outcome** | **Sem Hours** | **Date Met** |
| **+BIOL/CHEM4310 Biochemistry w/ lab**  |  | **4** |  | **+BIOL4460 Cell and Cancer Biology** |  | **3** |  |
| **BIOL/CHEM4120 Capstone Research II** |  | **1-2\*\*** |  | **BIOL/CHEM4130 Capstone Research III** |  | **1-2\*\*** |  |
| **+CHEM4330 Instrumental Analysis w/ lab** |  | **4** |  | **+CHEM3300 Analytical Chemistry w/ lab** |  | **4** |  |
| History and Humanities §  | GE3BGE3C | 6 |  | Social Sciences §  | GE3E | 3 |  |
| LEAD4100 Life and LeadershipPracticum I  | LL | *2* |  | LEAD4200 Life and Leadership Practicum II  | LL | 2 |  |
| **Total Hours** |  | **17-18**  |  | **Total Hours** |  | **13-14** |  |
| **Notes:** Check in with your advisor during your senior year about career opportunities outside graduate programs, including opportunities for a gap year that help make you a more competitive graduate school applicant.  \*\*Capstone Research II and III can be taken for 1-2 credits depending on how robust of a project you and your mentor design.   |

DISCLAIMER: These plans are to be used as guides only and are subject to changes in curriculum requirements. Refer to your Graceland Catalog for complete and accurate information. Some courses listed on the plans may have prerequisites that have not been stated. **The student has the ultimate responsibility for scheduling and meeting the graduation requirements.**

**Notes:**

-For students who plan to attend professional or graduate school, check with your graduate program for additional requirements (including anatomy, physiology, nutrition, sociology and/or psychology course).  Please meet with your faculty advisor to discuss.

-For students who plan to attend medical school, PA school or dental school, it is recommended to also take BIOL3420 Human Anatomy w/ lab and BIOL3440 Human Physiology w/ lab.

-For students who plan to attend veterinary school, it is recommended to also take BIOL3420, BIOL3440 and +BIOL2430 Animal Biology.

-For students whose graduate school contains a cadaver lab, a pottery course is recommended to fulfill their arts liberal learning course.