

## MINOR in science program ( $\geq 618xxxx$ )

AM

Minor in APPLIED MATHEMATICS: for $\geq 618xxxx$	
To minor in Applied Mathematics, students need to complete one course in Major Elective and the following nine courses	
Required courses: 32 credits	Credit
IC xx (see AM major elective course list)	4 (x-x-x)
ICMA 106 Calculus I	4 (4-0-8)
ICMA 151 Statistics for Science I	4 (4-0-8)
ICMA 213 Calculus II	4 (4-0-8)
ICMA 214 Ordinary Differential Equations	4 (4-0-8)
ICMA 216 Calculus IIIA	2 (2-0-4)
ICMA 217 Calculus IIIB	2 (2-0-4)
ICMA 223 Linear Algebra A	2 (2-0-4)
ICMA 224 Linear Algebra B	2 (2-0-4)
ICMA 322 Advanced Calculus	4 (4-0-8)

BI

Minor in BIOLOGICAL SCIENCES: for $\geq 618xxxx$	
To minor in Biological Sciences, students need to complete 10 credits of the Required courses and 18 credits of the Elective courses. Sixteen (16) credits are permitted to overlap with the Major courses.	
Required courses: 10 credits	Credit
ICBI 101 Biology	4 (4-0-8)
ICBI 102 Integrated Laboratory in Biological Sciences I	2 (0-4-2)
ICBI 103 Biology II	4 (4-0-8)
Elective courses: 18 credits	Credit
Biological Sciences and ICBI 498 Research and Seminar in Biological Sciences. The following ICBI 2xx courses can also be counted toward elective courses.	
Note: some ICBI 3xx and ICBI 4xx elective courses require additional pre-requisites that students are needed to take into	
ICBI 207 Ethics for Bioscience	4 (4-0-8)
ICBI 211 Genetics and Molecular Biology I	4 (4-0-8)
ICBI 214 General Microbiology	4 (4-0-8)
ICBI 271 General Microbiology Laboratory	2 (0-4-2)
ICBI 215 General Biochemistry	4 (4-0-8)
ICBI 272 General Biochemistry Laboratory	2 (0-4-2)
ICBI 216 Cell Biology	4 (4-0-8)
ICBI 221 Animal Biology	4 (3-2-7)
ICBI 231 Plant Biology	4 (3-2-7)
ICBI 262 Practical Field Ecology and Conservation	4 (3-2-7)

CH

**Minor in CHEMISTRY: for ≥618xxxx**

To minor in Chemistry, students must complete 18 credits of required courses and 8 credits of elective courses as detailed below.

To minor in Chemistry, students need to complete the following courses and complete at least 8 credits from any ICCH xxx Chemistry Required Courses and/or ICCH xxx Track Required Courses for Chemistry track or Cosmetic track and/or other courses approved by the PD on a case-by-case basis. Maximum of 12 credits can be shared with major course of the student.

<b>Chemistry Minor Courses: 26 credits</b>	<b>Credit</b>
ICCH 210 General Chemistry I	4 (4-0-8)
ICCH 211 General Chemistry II	4 (4-0-8)
ICCH 224 Integrated Laboratory Techniques in Chemistry I	2 (0-4-2)
ICCH 221 Organic chemistry I	4 (4-0-8)
ICCH 222 Organic chemistry II	4 (4-0-8)

CS

**Minor in COMPUTER SCIENCE: for ≥618xxxx**

To minor in Computer Science, students must complete 16 credits of required courses and 12 credits of elective courses as detailed below.

<b>Required courses: 16 credits</b>	<b>Credit</b>
ICCS 101 Introduction to Computer Programming	4(3-2-7)
ICCS 161 Introduction to Data Science	4(3-2-7)
ICCS 204 Data Structures and Object-Oriented Programming	4(3-2-7)
ICCS 206 Discrete Mathematics	4 (4-0-8)
<b>Elective courses: 12 credits</b>	<b>Credit</b>
Minor Elective Courses	
Students can take any of the ICCS 3xx and 4xx courses to fulfill the elective requirement, except cooperative education courses (ICCS 407, ICCS 408, and ICCS 409) and senior project courses (ICCS 380, ICCS 381, ICCS 382). In addition, any of the following four ICCS 2xx courses can count towards the elective credits:	
ICCS 205 Numerical Computation	4 (4-0-8)
ICCS 225 Database Foundations	4 (4-0-8)
ICCS 227 Principles of Computer Systems and Architecture	4 (4-0-8)
ICCS 271 Interaction Design	4 (4-0-8)

Minor in ENVIRONMENTAL SCIENCE: for $\geq 618xxxx$			
To minor in Environmental Science, students need to take these following courses no less than 20 credits.			
Required courses: 16 credits			Credit
ICBI 101 Biology			4 (4-0-8)
ICEN 212 Ecological Systems Analysis			4 (4-0-8)
ICEN 361 Principles of Environmental Impact Assessment			4 (4-0-8)
ICEN 391 Sustainable Development			4 (4-0-8)
Elective courses: 16 credits			
ICEN 211 Fundamentals and Applications of Environme	4 (3-2-7)	ICEN 413 Environmental Remediation Technology	4 (4-0-8)
ICEN 241 Environmental Pollution I	4 (4-0-8)	ICEN 414 Waste Utilization	4 (4-0-8)
ICEN 301 Basic Environmental Statistics	4 (4-0-8)	ICEN 415 Biodiversity	4 (4-0-8)
ICEN 312 Environmental Toxicology	4 (4-0-8)	ICEN 416 Ecotoxicology	4 (4-0-8)
ICEN 313 Waste Minimization and Clean Technology	4 (4-0-8)	ICEN 421 Water and Wastewater Treatment	4 (4-0-8)
ICEN 314 Tropical Ecology	4 (3-2-7)	ICEN 422 Solid and Hazardous Wastes Management	4 (4-0-8)
ICEN 317 Aquatic Ecology	4 (0-8-4)	ICEN 431 Land Use and Urban Environmental Planning	4 (4-0-8)
ICEN 318 Aquatic Ecology Field Course	4 (0-8-4)	ICEN 432 Global Geomorphology	4 (4-0-8)
ICEN 319 Conservation Biology	4 (4-0-8)	ICEN 441 Occupational Health and Safety	4 (4-0-8)
ICEN 320 Population and Community Ecology	4 (3-2-7)	ICEN 460 Ecotourism	4 (2-4-6)
ICEN 331 Soil, Land Use and Degradation	4 (4-0-8)	ICEN 461 Energy Conservation and Development	4 (4-0-8)
ICEN 332 Introduction to Oceanography	4 (3-2-7)	ICEN 462 Coastal and Marine Resources	4 (4-0-8)
ICEN 352 Environmental and Resource Economics	4 (4-0-8)	ICEN 464 Water Resources Management	4 (4-0-8)
ICEN 341 Environmental Quality Analysis I	4 (2-4-6)	ICEN 465 Resource Inventory and Baseline Studies Met	4 (3-2-7)
ICEN 362 Natural Resource Conservation and Managem	4 (4-0-8)	ICEN 466 Environmental Management Systems	4 (4-0-8)
ICEN 392 Environmental Issues: Past, Present and Futur	4 (4-0-8)	ICEN 467 Environmental Risk Assessment and Managem	4 (4-0-8)
ICEN 401 Applied Mathematics for Environment Studies	4 (4-0-8)	ICEN 468 Environmental Management Policy	4 (4-0-8)
ICEN 402 Geoinformatics	4 (3-2-7)	ICEN 469 Heritage Conservation	4 (2-4-6)
ICEN 403 Principle of Environmental Informatics	4 (4-0-8)	ICEN 483 Physical Planning and Environment	4 (4-0-8)
ICEN 411 Climate Change and Its Impact	4 (4-0-8)	ICEN 484 Climate Change Mitigation and Adaptation to	4 (4-0-8)

Minor in FOOD SCIENCE AND TECHNOLOGY: for $\geq 618xxxx$	
Food Science Minor: 32 credits	
- To minor in Food Science, students need to complete 32 credits of Food Science major courses.	
- Out of those 32 credits, 12 must come from the Required Major Courses specified below. The other 20 credits may be combination of any Food Science Major Required and Major Elective courses.	
- A maximum of 8 credits may overlap with the students' Major courses.	
The 12 credits of the Required Major courses compose of the followings.	
ICFS 111 Introduction to Food Science and Technology	4 (3-2-7)
ICFS 317 Food Chemistry	4 (3-2-7)
ICFS 341 Food Processing	4 (3-2-7)

Minor in PHYSICS: for $\geq 618xxxx$			
To minor in Biological Sciences, students need to complete at least 32 credits			
Required courses: 24 credits			Credit
ICPY 101 Physics I			4 (4-0-8)
ICPY 102 Physics II			4 (4-0-8)
ICPY 321 Intermediate Mechanics			4 (4-0-8)
ICPY 322 Electricity and Magnetism			4 (4-0-8)
ICMA 106 Calculus I			4 (4-0-8)
ICPY 231 Mathematical Methods for Physics IA			2 (2-0-4)
ICPY 232 Mathematical Methods for Physics IB			2 (2-0-4)
Elective courses: 8 credits			
ICPY 200 Modern Physics	4 (4-0-8)	ICPY 455 Special Topics in Physics III	4 (4-0-8)
ICPY 221 Computer Programming for Physics	4 (4-0-8)	ICPY 456 Special Topics in Physics IV	4 (4-0-8)
ICPY 233 Mathematical Methods for Physics IIA	2 (2-0-4)	ICPY 457 Special Topics in Laboratory Physics II	4 (3-2-7)
ICPY 234 Mathematical Methods for Physics IIB	2 (2-0-4)	ICPY 461 Quantum Mechanics II	4 (4-0-8)
ICPY 323 Electrodynamics	4 (4-0-8)	ICPY 463 Quantum Mechanics III	4 (4-0-8)
ICPY 324 Wave and Optics	4 (4-0-8)	ICPY 471 Atomic and Molecular Physics	4 (4-0-8)
ICPY 333 Mathematical Methods for Physics III	4 (4-0-8)	ICPY 472 Solid State Physics	4 (4-0-8)
ICPY 334 Numerical Methods	4 (4-0-8)	ICPY 473 Nuclear Physics	4 (4-0-8)
ICPY 342 Integrated Laboratory in Physics II	2 (0-4-2)	ICPY 474 Astrophysics	4 (4-0-8)
ICPY 343 Integrated Laboratory in Physics III	2 (0-4-2)	ICPY 484 Cosmology	4 (4-0-8)
ICPY 355 Special Topics in Physics I	4 (4-0-8)	ICPY 486 Observational Astronomy	4 (4-0-8)
ICPY 356 Special Topics in Physics II	4 (4-0-8)	ICPY 487 Data Analysis in Astronomy	4 (4-0-8)
ICPY 357 Special Topics in Laboratory Physics I	4 (3-2-7)	ICPY 488 Special Topics in Astronomy	4 (4-0-8)
ICPY 361 Quantum Mechanics I	4 (4-0-8)	ICPY 490 Computational Physics	4 (4-0-8)
ICPY 371 Thermal Physics	4 (4-0-8)	ICPY 492 Electronics	4 (4-0-8)
ICPY 451 Analytical Mechanics	4 (4-0-8)	ICPY 496 Biophysics	4 (4-0-8)
ICPY 452 Statistical Mechanics	4 (4-0-8)		