# III. Computing, Mathematics, and Physics

## Contents

# Students with Advanced Placement credit:

Requirements for the following courses can be met through Advanced Placement exam credit. The College awards the following credit for AP scores:

| AP Subject | AP Exam Score | Hrs Credit | MC Courses Credited |
|---|---|---|---|
| Computer Science A | 3,4,5 | 3 | CIS 181 |
| Math: Calculus AB | 3 | 3 | MATH 108 |
| | 4, 5 | 4 | MATH 111 |
| Math: Calculus BC | 3 with AB subscore 3 | 3 | MATH 108 |
| | 3 with AB subscore 4,5 | 4 | MATH 111 |
| | 4,5 | 8 | MATH 111, 112 |
| Statistics | 3,4,5 | 3 | STAT 269 |
| Math: Calculus AB | 3 | 3 | MATH 108 |
| | 4, 5 | 4 | MATH 111 (enroll in 112) |
| Math: Calculus BC | 3 with AB subscore 3 | 3 | MATH 108 |
| | 3 with AB subscore 4,5 | 4 | MATH 111 (enroll in 112) |
| | 4,5 | 8 | MATH 111, 112 (enroll in 211) |
| Physics 1 | 3, 4, 5 | 4 | PHYS 201* (enroll in 202) |
| Physics 2 | 3, 4, 5 | 4 | PHYS 202* |
| Physics C: Mechanics | 3,4,5 | 4 | PHYS 211 (enroll in PHYS 212) |
| Physics C: Electricity & Magnetism | 3,4,5 | 4 | PHYS 212 |
| Statistics | 3,4,5 | 3 | STAT 269 (enroll in STAT 291)** or STAT 281 |

* Mathematics majors are required to take the PHYS 211/212 sequence rather than PHYS 201/202. However, if a student in the mathematics major receives AP credit for both PHYS 201 and 202, the 211/212 requirements are waived.

** AP Statistics is not a calculus-based course or exam. Mathematics majors who receive AP credit for Statistics are still required to take STAT 291 for the major requirement.

# 8-semester Plans

## Actuarial Science (B.S.)

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| | **First Year – Fall** | | | **First Year - Spring** | |
| COMM 105 | Fundamentals of Oral Communication* | 3 | MATH 112 | Calculus II with lab | 4 |
| MATH 111 | Calculus I with lab | 4 | MATH 198 | Introduction to Mathematical Proof | 2 |
| MATH 196 | Mathematics Seminar | 2 | ACCT 131 | Survey of Accounting | 3 |
| ECON 120 | Principles of Macroeconomics | 3 | Varies | 2nd semester of language* | 3 |
| IDFY 101 | First-Year Seminar* | 3 | IDCR 151 | Created and Called for Community* | 3 |
| Varies | 1st semester of language* | 3 | | | |
| | | | | | |
| | **TOTAL** | 18 | | **TOTAL** | 15 |
| | **Sophomore –Fall** | | | **Sophomore – Spring** | |
| MATH 211 | Calculus III with lab | 4 | MATH 261 | Linear Algebra | 3 |
| STAT 291 | Probability and Statistics | 3 | Varies | 3rd semester of Language or Cross Cultural* | 3 |
| ENGL 1xx | Literature meeting QuEST* | 3 | Varies | Philosophy or Religion meeting QuEST* | 3 |
| ECON 220 | Principles of Microeconomics | 3 | STAT 292 | Inferential Statistics | 3 |
| BIBL 201/203/204 | Bible* | 3 | CIS 181 | Computer Programming I | 3 |
| | | | | | |
| | **TOTAL** | 16 | | **TOTAL** | 15 |
| | **Junior – Fall** | | | **Junior – Spring** | |
| FINA 350 | Financial Management | 3 | THEO 205-238 | Christian Beliefs* | 3 |
| HIST 1xx | US/European History meeting QuEST* | 3 | INTE 391 | Internship | 3 |
| MATH 350 or STAT 417 | Mathematics of Finance I OR Mathematical Statistics** | 3 | MATH 351 or STAT 345 | Mathematics of Finance II OR Time Series Analysis** | 3 |
| PHYS 211 | General Physics I with lab | 4 | Varies | Art, Music, Theatre or Dance meeting QuEST* | 3 |
| | | | | | |
| | **TOTAL** | 13 | | **TOTAL** | 12 |
| | **Senior – Fall** | | | **Senior – Spring** | |
| MATH 350 or STAT 417 | Mathematics of Finance I OR Mathematical Statistics** | 3 | MATH 351 or STAT 345 | Mathematics of Finance II OR Time Series Analysis** | 3 |
| IDNW 2xx | Non-western Studies* | 2-3 | MATH 496 | Mathematical Capstone | 2 |
| WELL 1xx | Wellness* | 1 | Varies | Ethics/WV/Pluralism* | 3 |
| MATH 362 | Algebraic Structures | 3 | MATH 412 | Real Analysis | 3 |
| FINA 307/351/405 | Upper Level Finance Elective | 3 | | | |
| | | | | | |
| | **TOTAL** | 12-13 | | **TOTAL** | 12 |

* QuEST requirement

** These pairs of courses are offered in alternate years. MATH 350/351 should be taken Fall/Spring whichever year it is offered and STAT 417/345 should be taken Fall/Spring in the alternate year.

NOTE: The major includes 10-11 free elective credits. These should be used to fill the lower credit semesters. Also, the Department suggests that student in this major could consider a minor in a related area to make best use of the elective credits and additional space in this plan.

# Computer and Information Science (B.S.) Business Information Systems Concentration

## 8-semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| **First Year – Fall** | | | **First Year – Spring** | | |
| CIS 180 | Introduction to CIS | 3 | CIS 190 | Strategic Use of Info Technology | 3 |
| CIS 181 | Computer Programming I | 3 | COMM 105 | Oral Communication* | 3 |
| IDFY 101 | First Year Seminar* | 3 | IDCR 151 | Created and Called for Community* | 3 |
| LANG 101 | Language 101* | 3 | LANG 102 | Language 102* | 3 |
| PHIL/RELI xxx | Philosophy and Religion* | 3 | LAB xxx | Lab Science* | 3-4 |
| | | | | | |
| | **TOTAL** | 15 | | **TOTAL** | 15-16 |
| **Sophomore – Fall** | | | **Sophomore – Spring** | | |
| BUSA 360 | Operations Management § | 3 | CIS 284 | Computer Programming II § | 3 |
| ACCT 141 | Financial Accounting | 3 | BUSA 120 | Principles of Management | 3 |
| ECON 120 | Macroeconomics | 3 | MATH 107 | Applied Mathematics for Management § | 3 |
| SOCI/HIST | Social Science / History 1 of 2* | 3 | MRKT 230 | Marketing Principles | 3 |
| LANG 201 | Language 201* | 3 | BIBL 20x | Knowledge of the Bible* | 3 |
| | | | | | |
| | **TOTAL** | 15 | | **TOTAL** | 15 |
| **Junior – Fall** | | | **Junior – Spring** | | |
| CIS 332 | Database Concepts | 3 | CIS 381 | Information Systems and Managers | 3 |
| STAT 281 | Applied Statistics for Managers | 3 | CIS xxx | CIS Elective (excluding CIS 171) 2 of 3 | 3 |
| CIS xxx | CIS Elective (excluding CIS 171) 1 of 3 | 3 | ENGL xxx | Literature* | 3 |
| SOCI/HIST | Social Science / History 2 of 2* | 3 | THEO 2xx | Christian Beliefs* | 3 |
| ART xxx | Arts* | 3 | WELL xxx | Wellness* | 1 |
| IDNW xxx | Non-Western Studies* | 2-3 | | | |
| | **TOTAL** | 17-18 | | **TOTAL** | 13 |
| **Senior – Fall** | | | **Senior – Spring** | | |
| CIS 411 | Systems Analysis and Design Concepts | 3 | IDS xxx | Ethics / Pluralism / World Views* | 3 |
| CIS xxx | CIS elective (excluding CIS 171) 3 of 3 | 3 | | Free elective 3 of 5 | 3 |
| INTE 394 | Internship | 4 | | Free elective 4 of 5 | 3 |
| | Free elective 1 of 5 | 3 | | Free elective 5 of 5 | 3 |
| | Free elective 2 of 5 | 3 | | | |
| | | | | | |
| | **TOTAL** | 16 | | **TOTAL** | 12 |

*QuEST requirement

†Offered alternate years as indicated

§ Concentration choice option: other courses in other semesters may fulfill this same requirement

Note:  CIS 471 and CIS 472 is replacing CIS 412 and CIS 432.

# Computer and Information Science (B.S.) Computer Science Concentration

## 8-semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| **First Year – Fall** | | | **First Year – Spring** | | |
| CIS 180 | Introduction to CIS | 3 | CIS 284 | Computer Programming II | 3 |
| CIS 181 | Computer Programming I | 3 | IDCR 151 | Created and Called for Community* | 3 |
| IDFY 101 | First Year Seminar* | 3 | COMM 105 | Oral Communication* | 3 |
| LANG 101 | Language 101* | 3 | LANG 102 | Language 102* | 3 |
| PHIL/RELI xxx | Philosophy and Religion* | 3 | SOCI/HIST | Social Science / History 1 of 2* | 3-4 |
| | | | | | |
| | | | | | |
| | **TOTAL** | 15 | | **TOTAL** | 15-16 |
| **Sophomore – Fall** | | | **Sophomore – Spring** | | |
| CIS 385 | Data Structures and Algorithms | 3 | MATH 180 | Discrete Math | 3 |
| MATH 111 | Calculus I | 3 | CIS 482 | Organization of Programming Languages | 3 |
| LANG 201 | Language 201* | 3 | PHYS 202 | Introductory Physics II § | 3 |
| ENGL xxx | Literature* | 3 | SOCI/HIST | Social Science / History 2 of 2* | 3 |
| BIBL 20x | Knowledge of the Bible* | 3 | THEO 2xx | Christian Beliefs* | 3 |
| | | | | | |
| | | | | | |
| | **TOTAL** | 15 | | **TOTAL** | 15 |
| **Junior – Fall** | | | **Junior – Spring** | | |
| CIS 332 | Database Concepts | 3 | CIS 381 | Information Systems and Managers | 3 |
| CIS 384 | Elements of Computer Systems | 3 | IDNW xxx | Non-Western Studies | 3 |
| CIS 418 | Artificial Intelligence † § (even fall) | 3 | ART xxx | Arts* | 3 |
| STAT 291 | Statistics for Math Sciences § | 3 | WELL xxx | Wellness* | 1 |
| ENGR 342 | Embedded Systems Design | 4 | | Free Elective 1 of 6 | 3 |
| | | | | | |
| | | | | | |
| | **TOTAL** | 16 | | **TOTAL** | 13 |
| **Senior – Fall** | | | **Senior – Spring** | | |
| CIS 411 | Systems Analysis and Design Concepts | 3 | CIS 416 | OS & Comp Architecture † (odd spring) | 3 |
| INTE 394 | Internship | 4 | IDS xxx | Ethics / Pluralism / World Views* | 3 |
| | Free elective 2 of 6 | 4 | | Free elective 5 of 6 | 3 |
| | Free elective 3 of 6 | 3 | | Free elective 6 of 6 | 3 |
| | Free elective 4 of 6 | 3 | | | |
| | | | | | |
| | **TOTAL** | 17 | | **TOTAL** | 12 |

*QuEST requirement

†Offered alternate years as indicated

§ Concentration choice option: other courses in other semesters may fulfill this same requirement

Note: CIS 471 and CIS 472 is replacing CIS 412 and CIS 432.

# Computer and Information Science (B.S.) Software Development Concentration

## 8-semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| **First Year – Fall** | | | **First Year – Spring** | | |
| CIS 180 | Introduction to CIS | 3 | CIS 191 | Web Development I: Client Side | 3 |
| CIS 181 | Computer Programming I | 3 | CIS 284 | Computer Programming II | 3 |
| IDFY 101 | First Year Seminar* | 3 | IDCR 151 | Created and Called for Community* | 3 |
| LANG 101 | Language 101* | 3 | COMM 105 | Oral Communication* | 3 |
| SOCI/HIST | Social Science / History 1 of 2* | 3 | LANG 102 | Language 102* | 3 |
| | | | | | |
| | **TOTAL** | **15** | | **TOTAL** | **15** |
| **Sophomore – Fall** | | | **Sophomore – Spring** | | |
| CIS 283 | Business Systems Applications † (odd fall) | 3 | CIS 482 | Organization of Programming Languages | 3 |
| CIS 291 | Web Development II: Server Side | 3 | MATH 111 | Calculus I § | 4 |
| CIS 385 | Data Structures and Algorithms | 3 | MATH 180 | Discrete Math | 3 |
| LANG 201 | Language 201* | 3 | LAB xxx | Lab Science* | 3 |
| ENGL xxx | Literature* | 3 | PHIL/RELI xxx | Philosophy and Religion* | 3 |
| WELL xxx | Wellness | 1 | | | |
| | **TOTAL** | **16** | | **TOTAL** | **16** |
| **Junior – Fall** | | | **Junior – Spring** | | |
| CIS 332 | Database Concepts | 3 | CIS 381 | Information Systems and Managers | 3 |
| CIS 384 | Elements of Computer Systems§ | 3 | SOCI/HIST | Social Science / History 2 of 2* | 4 |
| CIS 335 | Software Engineering † (even fall) | 4 | THEO 2xx | Christian Beliefs* | 3 |
| CIS 418 | Artificial Intelligence † § (even fall) | 3 | ART xxx | Arts* | 3 |
| | Free Elective 1 of 6 | 3 | | | |
| | **TOTAL** | **16** | | **TOTAL** | **13** |
| **Senior – Fall** | | | **Senior – Spring** | | |
| CIS 411 | Systems Analysis and Design Concepts | 3 | IDS xxx | Ethics / Pluralism / World Views* | 3 |
| INTE 394 | Internship | 3 | | Free elective 4 of 6 | 3 |
| IDNW xxx | Non-Western Studies* | 2-3 | | Free elective 5 of 6 | 3 |
| BIBL 20x | Knowledge of the Bible* | 3 | | Free elective 6 of 6 | 3 |
| | Free elective 2 of 6 | 3 | | | |
| | Free elective 3 of 6 | 3 | | | |
| | **TOTAL** | **17-18** | | **TOTAL** | **12** |

*QuEST requirement

†Offered alternate years as indicated

§ Concentration choice option: other courses in other semesters may fulfill this same requirement

Note:  CIS 471 and CIS 472 is replacing CIS 412 and CIS 432.

# Computer and Information Science (B.S.) Web Development Concentration

8-semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| **First Year – Fall** | | | **First Year – Spring** | | |
| CIS 180 | Introduction to CIS | 3 | CIS 191 | Web Development I: Client Side | 3 |
| CIS 181 | Computer Programming I | 3 | IDCR 151 | Created and Called for Community* | 3 |
| IDFY 101 | First Year Seminar* | 3 | COMM 105 | Oral Communication* | 3 |
| LANG 101 | Language 101* | 3 | LANG 102 | Language 102* | 3 |
| SOCI/HIST | Social Science / History 1 of 2* | 3 | ENGL xxx | Literature* | 3 |
| | | | MATH 107§ | Applied Mathematics for Management | 3 |
| | TOTAL | 15 | | TOTAL | 18 |
| **Sophomore – Fall** | | | **Sophomore – Spring** | | |
| CIS 291 | Web Development II: Server Side | 3 | ART 112 | Intro to Graphic Design § | 3 |
| BUSA 120 | Principles of Management | 3 | MRKT 230 | Marketing Principles | 3 |
| LANG 201 | Language 201* | 3 | LAB xxx | Lab Science* | 3 |
| SOCI/HIST | Social Science / History 2 of 2* | 3 | PHIL/RELI xxx | Philosophy and Religion* | 3 |
| BIBL 20x | Knowledge of the Bible* | 3 | CIS 150** | Introduction to CyberSecurity | 3 |
| CIS 255 | NIX System Administration and Security | 3 | | | |
| | TOTAL | 18 | | TOTAL | 15 |
| **Junior – Fall** | | | **Junior – Spring** | | |
| CIS 283§ | Business Systems Applications † (odd fall) | 3 | CIS 381 | Information Systems and Managers | 3 |
| CIS 332 | Database Concepts | 3 | CIS 343 | E-Commerce † (odd spring) | 3 |
| BUSA 380 | Small Business Development | 3 | ART 337 | Graphic Design & Professional Practice § | 3 |
| ART 211 | Computer Art and Imaging § | 3 | THEO 2xx | Christian Beliefs* | 3 |
| IDNW xxx | Non-Western Studies* | 2-3 | WELL xxx | Wellness* | 1 |
| CIS 257** | Information Assurance | 3 | | | |
| | TOTAL | 17-18 | | TOTAL | 13 |
| **Senior – Fall** | | | **Senior – Spring** | | |
| CIS 411 | Systems Analysis and Design Concepts | 3 | IDS xxx | Ethics / Pluralism / World Views* | 3 |
| INTE 394 | Internship | 3 | | Free elective 4 of 6 | 3 |
| | Free elective 1 of 6 | 4 | | Free elective 5 of 6 | 3 |
| | Free elective 2 of 6 | 3 | | Free elective 6 of 6 | 3 |
| | Free elective 3 of 6 | 3 | ART 312 | Digital Imaging§ | 3 |
| | TOTAL | 16 | | TOTAL | 15 |

*QuEST requirement

†Offered alternate years as indicated

§ Concentration choice option: other courses in other semesters may fulfill this same requirement

**Option 1 of 3: Other course combinations may fulfill this same requirement

Note:  CIS 471 and CIS 472 is replacing CIS 412 and CIS 432.

# Computer Science with Teaching Certification (B.A.)
## 8-Semester Plan

Superscript indicates course prerequisite
Unless indicated, CIS courses are offered every semester

| Semester 1 | Semester 2 |
|---|---|
| CIS 180 Intro to CIS (3) | CIS 284 Programming II (3) [CIS181 prereq] |
| CIS 181 Programming I (3) | CIS 150 Introduction to Cybersecurity (3) |
| IDFY First Year Seminar (3) | *CIS 150 if offered spring semesters* |
| COMM 105 Oral Communication (3) | CIS 191 Web Development Client Side (3) |
| LANG 101 (3) | LANG 102 (3) |
| | IDCC Created and Called for Community (3) |
| 15 credits | WELL (1) |
| | 16 credits |

| Semester 3 | Semester 4 |
|---|---|
| CIS 251 Hardware & Software (3) | LANG 201 or CC (3) |
| *CIS 251 offered in 'odd falls' only* | ARTS (3) |
| CIS 291 Web Development Server Side (3) [CIS 191 prereq] | EDUC 208 Teaching English LL in K-12 Schools (3) |
| *CIS 291 offered fall semesters* | EDSP 207 Introduction to Special Education (3) |
| CIS 283 Business Systems Applications (3) | TEP 210 Sophomore Field Experience (0) |
| *CIS 283 offered fall semesters* | EDUC 203 Educational Psychology (3) |
| STAT 269 Introductory Statistics (3) | Literature (ENGL 122-176) (3) |
| Bible (3) | |
| 15 credits | 18 credits |

| Semester 5 | Semester 6 |
|---|---|
| CIS 332 Database Concepts (3) [CIS284] | CIS 411 Sys Analysis & Design Concepts (3) |
| *CIS 332 is offered fall semesters* | *CIS 411 offered spring semesters* |
| CIS 384 Elements of Computer Systems (3) [CIS284] | MATH 180 Discrete Math (3) |
| *CIS 384 offered fall semesters* | *MATH 180 offered spring semesters* |
| CIS 415 Data Communications and Networking (3) | MATH 307 (2) |
| *CIS 415 offered even fall semesters* | *MATH 307 offered spring semesters* |
| PHIL/REL (3) | EDSP 307 Inclusion Practices(3) [EDSP 331 & TEP 310 concurrent] |
| EDUC 346 Socio-Cultural Perspectives on Educ (3) | EDUC 331 Instructional Design & Assessment Middle/Secondary (3) [EDSP 307 & TEP 310 concurrent] |
| HDFS 311 Adolescent Development (3) | TEP 310 Junior Field Exp. (0) [EDSP 307 & EDUC 331 concurnt] |
| | Laboratory Science (3-4) |
| 18 credits | 17-18 credits |

| Semester 7 | Semester 8 |
|---|---|
| **Professional Semester** | CIS 381 Information Systems and Managers (3) |
| EDUC 420 Professional Issues in Education (2) [TEP 435 concurrent] | CIS 385 Data Structures and Algorithms (3) [CIS284 prereq] |
| TEP 435 Student Teaching Secondary (9) | Non-Western (2-3) |
| TEP 407 Student Teaching Seminar (1) [TEP 435 concurrent] | Christian Beliefs (3) |
| TEP 410 Sec Pre-Student Teach Exp (0) [TEP 435 concurrent] | History (3) |
| 12 credits | 14-15 credits |

# Cybersecurity (B.S.) (Odd year start)
## 8 Semester Plan

| Course # | Course Name | Credits | Course # | Course Name | Credits |
|---|---|---|---|---|---|
| | **First Year – Fall** | | | **First Year – Spring** | |
| CIS 180 | Introduction to CIS | 3 | CIS 284 | Programming II | 3 |
| CIS 181 | Programming I | 3 | CIS 150 | Introduction to Cybersecurity | 3 |
| IDFY 101 | First Year Seminar | 3 | IDCR 151 | Created and Called for Community | 3 |
| COMM 105 | Oral Communication | 3 | Varies | 2nd Language | 3 |
| Varies | 1st Language | 3 | Varies | Philosophy or Religion | 3 |
| | | | | | |
| | **Total** | **15** | | **Total** | **15** |
| | | | | | |
| | **Sophomore – Fall** | | | **Sophomore – Spring** | |
| CIS 332 | Database Concepts | 3 | CIS 255 | NIX System Administration & Security | 3 |
| CIS 385 | Data Structures and Algorithms | 3 | MATH 180 | Discrete Math | 3 |
| CIS 265 | Digital Forensics | 3 | ENGL xxx | Literature | 3 |
| STAT 291 | Statistics for Math Sciences | 3 | Varies | 3rd Language | 3 |
| BIBL 2xx | Knowledge of the Bible | 3 | | | |
| | | | | | |
| | **Total** | **16** | | **Total** | **12** |
| | | | | | |
| | **Junior – Fall\*** | | | **Junior – Spring\*** | |
| CIS 335 | Software Engineering | 3 | | | |
| CIS 257 | Information Assurance | 3 | CIS 364 | Ethical Hacking | 3 |
| Varies | Internship or free elective | 2-6 | CIS 462 | Secure Software | 3 |
| Varies | Lab Science | 3 | Varies | Internship or free elective | 2-6 |
| WELL xxx | Wellness | 1 | Varies | Social Science | 3 |
| | | | Varies | History | 3 |
| | **Total** | **12-15** | | **Total** | **14-18** |
| | | | | | |
| | **Senior – Fall\*** | | | **Senior – Spring\*** | |
| CIS 411 | System Analysis & Design Concepts | 3 | CIS 455 | Network Security | 3 |
| CIS 415 | Data Communications and Networking | 3 | Varies | Internship or free elective | 2-6 |
| Varies | Internship or free elective | 2-6 | Varies | Ethics/World Views/Pluralism | 3 |
| Varies | Christian Beliefs | 3 | ART xxx | Arts | 3 |
| Varies | Free Elective | 3 | Varies | Free Elective | 3 |
| | | | | | |
| | **Total** | **14-18** | | **Total** | **14-18** |

*QuEST requirement

*4 credits of INTE 391 or INTE 394 can be taken any semester Junior or Senior year

**Semesters should not exceed 18 credits

# Cybersecurity (B.S.) (Even Year Start)
## 8 Semester Plan

*QuEST requirement

| Course # | Course Name | Credits | Course # | Course Name | Credits |
|---|---|---|---|---|---|
| **First Year – Fall** | | | **First Year – Spring** | | |
| CIS 180 | Introduction to CIS | 3 | CIS 284 | Programming II | 3 |
| CIS 181 | Programming I | 3 | CIS 150 | Introduction to Cybersecurity | 3 |
| IDFY 101 | First Year Seminar | 3 | IDCR 151 | Created and Called for Community | 3 |
| COMM 105 | Oral Communication | 3 | Varies | 2nd Language | 3 |
| Varies | 1st Language | 3 | Varies | Philosophy or Religion | 3 |
| | | | | | |
| | Total | 15 | | Total | 15 |
| | | | | | |
| **Sophomore – Fall** | | | **Sophomore – Spring** | | |
| CIS 332 | Database Concepts | 3 | CIS 364 | Ethical Hacking | 3 |
| CIS 385 | Data Structures and Algorithms | 3 | MATH 180 | Discrete Math | 3 |
| CIS 257 | Information Assurance | 3 | ENGL xxx | Literature | 3 |
| STAT 291 | Statistics for Math Sciences | 3 | Varies | 3rd Language | 3 |
| BIBL 2xx | Knowledge of the Bible | 3 | Varies | History | 3 |
| | | | | | |
| | | | | | |
| | Total | 15 | | Total | 15 |
| | | | | | |
| **Junior – Fall\*** | | | **Junior – Spring\*** | | |
| CIS 415 | Data Communications and Networking | 3 | CIS 255 | NIX System Administration & Security | 3 |
| CIS 265 | Digital Forensics | 3 | CIS 455 | Network Security | 3 |
| Varies | Internship or free elective | 2-6 | Varies | Internship or free elective | 2-6 |
| Varies | Lab Science | 3 | Varies | Social Science | 3 |
| WELL xxx | Wellness | 1 | ART xxx | Arts | 3 |
| | | | | | |
| | Total | 12-15 | | Total | 14-18 |
| | | | | | |
| **Senior – Fall\*** | | | **Senior – Spring\*** | | |
| CIS 411 | System Analysis & Design Concepts | 3 | CIS 416 | Operating Systems and Architecture | 3 |
| CIS 335 | Software Engineering | 3 | CIS 462 | Secure Software | 3 |
| Varies | Internship or free elective | 2-6 | Varies | Internship or free elective | 2-6 |
| Varies | Christian Beliefs | 3 | Varies | Ethics/World Views/Pluralism | 3 |
| Varies | Free Elective | 3 | Varies | Free Elective | 3 |
| | | | | | |
| | Total | 14-18 | | Total | 14-18 |

*INTE 391 or INTE 394 can be taken any semester Junior or Senior year
**Semesters should not exceed 18 credits

# Digital Media (B.A.) Mobile Application and Game Design Concentration
## 8-semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| | **First Year – Fall** | | | **First Year – Spring** | |
| CIS 180 | Introduction to CIS | 3 | CIS 191 | Web Development I: Client Side | 3 |
| CIS 181 | Computer Programming I | 3 | CIS 284 | Computer Programming II | 3 |
| COMM 203 | Basic Video and Editing Techniques | 3 | IDCR 151 | Created and Called for Community* | 3 |
| IDFY 101 | First Year Seminar* | 3 | COMM 105 | Oral Communication* | 3 |
| LANG 101 | Language 101* | 3 | LANG 102 | Language 102* | 3 |
| | | | | | |
| | | | | | |
| | **TOTAL** | 15 | | **TOTAL** | 18 |
| | **Sophomore – Fall** | | | **Sophomore – Spring** | |
| ART 236 | Graphic Design and Visual Culture § | 3 | ART 171 | Foundations of Drawing § | 3 |
| CIS 291 | Web Development II: Server Side | 3 | ARTH 210 | Topics in Non-Western Art § | 3 |
| COMM 217 | Intro to Film | 3 | CIS 287 | Intro to Game Design † (even J-Term) | 3 |
| SOCI/HIST | Social Science / History 1 of 2* | 3 | COMM 382 | History and Theory of Digital Media | 3 |
| LANG 201 | Language 201* | 3 | BIBL 20x | Knowledge of the Bible* | 3 |
| DIGM 210 or | Video and Church Media Seminar | 1 | WELL xxx | Wellness* | 1 |
| | | | | | |
| | **TOTAL** | 16 | | **TOTAL** | 16 |
| | **Junior – Fall** | | | **Junior – Spring** | |
| CIS 315 | Intro to Mobile App Design † (odd fall) | 3 | MUCM 353 | Sound Design | 3 |
| ART 336 | Design for New Media § | 3 | LAB xxx | Laboratory Science* | 3-4 |
| SOCI/HIST | Social Science / History 2 of 2* | 3 | ENGL xxx | Literature* | 3 |
| THEO 2xx | Christian Beliefs* | 3 | PHIL/RELI xxx | Philosophy/Religion* | 3 |
| | Free Elective | 3 | | Free Elective | 3 |
| DIGM 210 or | Video and Church Media Seminar | 1 | | | |
| | | | | | |
| | **TOTAL** | 16 | | **TOTAL** | 15-16 |
| | **Senior – Fall** | | | **Senior – Spring** | |
| DIGM 490 | Senior Seminar and Project | 4 | CIS 381 | Information Systems and Managers | 3 |
| | Digital Media Elective from list | 3 | | Digital Media Elective from list | 3 |
| IDS XXX | Ethics/Pluralism/World Views* | 3 | | Free Elective | 3 |
| | Free Elective | 3 | | Free Elective | 3 |
| | Free Elective | 3 | | Free Elective | 3 |
| | | | | | |
| | **TOTAL** | 16 | | **TOTAL** | 15 |

*QuEST requirement

†Offered alternate years as indicated

§ Concentration choice option: other courses in other semesters may fulfill this same requirement

# Mathematics (B.A.)
## 8 Semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| **First Year – Fall** | | | **First Year - Spring** | | |
| COMM 105 | Fundamentals of Oral Communication* | 3 | MATH 112 | Calculus II with lab | 4 |
| MATH 111 | Calculus I with lab* | 4 | MATH 198 | Introduction to Mathematical Proof | 2 |
| MATH 196 | First-Year Math Seminar | 3 | PHYS 211 | General Physics I with lab | 4 |
| IDFY 101 | First-Year Seminar* | 3 | Varies | 2nd semester of Language* | 3 |
| Varies | 1st semester of Language* | 3 | IDCR 151 | Created and Called for Community* | 3 |
| | | | | | |
| | **TOTAL** | 16 | | **TOTAL** | 17 |
| **Sophomore –Fall** | | | **Sophomore – Spring** | | |
| MATH 211 | Calculus III with lab | 4 | MATH 261 | Linear Algebra | 3 |
| STAT 291 | Probability and Statistics | 3 | Varies | 3rd semester of Language or Cross Cultural* | 3 |
| ENGL 1xx | Literature meeting QuEST* | 3 | Varies | Philosophy or Religion* | 3 |
| PHYS 212 | General Physics II with lab | 4 | STAT 292 | Inferential Statistics | 3 |
| CIS 181 | Computer Programming I | 3 | ECON 120 | Macroeconomics | 3 |
| | | | | | |
| | **TOTAL** | 17 | | **TOTAL** | 15 |
| **Junior – Fall** | | | **Junior – Spring** | | |
| MATH 362 | Algebraic Structures | 3 | MATH 308/382 | Differential Equations/Geometry** | 3 |
| HIST 1xx | US/European History meeting QuEST* | 3 | MATH 412 | Real Analysis [O] | 3 |
| MATH/STAT 3xx/4xx | Upper Level Math/Stat Elective | 3 | THEO 205-238 | Christian Beliefs* | 3 |
| BIBL 201/203/204 | Bible* | 3 | Varies | Art, Music, Dance, Theatre meeting QuEST* | 3 |
| | | | | | |
| | **TOTAL** | 12 | | **TOTAL** | 12 |
| **Senior – Fall** | | | **Senior – Spring** | | |
| MATH/STAT 3xx/4xx | Upper Level Math/Stat Elective | 3 | MATH 308/382 | Differential Equations/Geometry** | 3 |
| IDNW 2xx | Non-western Studies* | 3 | MATH 496 | Mathematical Capstone | 2 |
| Varies | Free Elective | 3 | Varies | Ethics/WV/Pluralism* | 3 |
| Varies | Free Elective | 3 | Varies | Free Elective | 3 |
| | | | WELL 1xx | Wellness* | 1 |
| | | | | | |
| | **TOTAL** | 12-13 | | **TOTAL** | 12 |

*Fulfills QuEST requirement

**Offered spring of odd-numbered years.

[O]May be taken in either the 3rd or 4th year of spring.

# Mathematics with Teaching Certification (B.A.)
## 8 Semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| **First Year – Fall** | | | **First Year - Spring** | | |
| COMM 105 | Fundamentals of Oral Communication* | 3 | MATH 112 | Calculus II with lab | 4 |
| MATH 111 | Calculus I with lab* | 4 | MATH 198 | Introduction to Mathematical Proof | 2 |
| MATH 196 | Mathematics Seminar | 2 | ENGL 122-176 | Literature meeting QuEST* | 3 |
| CIS 181/191 | Comp. Prog. I/Web Dev. 1: Client Side | 3 | Varies | 2nd semester of Language* | 3 |
| IDFY 101 | First-Year Seminar*^ | 3 | IDCR 151 | Created and Called for Community* | 3 |
| Varies | 1st semester of Language* | 3 | WELL 1xx | Wellness* | 1 |
| | | | *Submit the three required security clearances (FBI, Child Abuse, Criminal) by 3/31. Take PAPA exam (formerly Praxis 1).* | | |
| | | **TOTAL** | **18** | **TOTAL** | **16** |
| **Sophomore –Fall** | | | **Sophomore – Spring** | | |
| MATH 211 | Calculus III with lab | 4 | MATH 261 | Linear Algebra | 3 |
| STAT 291 | Probability and Statistics | 3 | Varies | 3rd semester of Language or Cross Cultural* | 3 |
| EDUC 346 | Sociocultural Perspectives in Ed (spring) | 3 | PHYS 211 | General Physics I with lab | 4 |
| EDSP 207** | Introduction to Special Education | 3 | STAT 292 | Inferential Statistics | 3 |
| EDUC 203** | Educational Psychology | 3 | EDUC 208 | Teaching English Language Learners | 3 |
| TEP 210** | Sophomore Field Experience | 0 | *Submit Teacher Education Program application electronically by 3/31. Clearances completed last year must be less than one year old with applying.* | | |
| | | **TOTAL** | **16** | **TOTAL** | **16** |
| **Junior – Fall** | | | **Junior – Spring** | | |
| MATH 362 | Algebraic Structures | 3 | MATH 308/382 | Differential Equations/Geometry*** | 3 |
| HIST xxx | US/European History meeting QuEST* | 3 | MATH 412 | Real Analysis | 3 |
| PHYS 212 | General Physics II with lab | 4 | MATH 307** | Secondary Math Instruction | 2 |
| Varies | Philosophy or Religion* | 3 | EDUC 331** | Instruct. Design & Assessment | 3 |
| BIBL 201/203/204 | Bible* | 3 | EDSP 307** | Inclusion Practices | 3 |
| | | | TEP 310** | Junior Field Experience | |
| | | | HDFS 311 | Adolescent Development | 3 |
| | | | *Submit Professional Semester application electronically by 1/15.* | | |
| | | **TOTAL** | **16** | **TOTAL** | **17** |
| **Senior – Fall** | | | **Senior – Spring** | | |
| *Professional Semester* | | | MATH 308/382 | Differential Equations/Geometry*** | 3 |
| TEP 410** | Secondary Pre-student Teaching | 0 | MATH 496 | Mathematical Capstone (take in Junior Spring if Student Teaching in Senior Spring) | 2 |
| TEP 435** | Student Teaching | 9 | IDNW 2xx | Non-western Studies* | 2-3 |
| EDUC 420** | Professional Issues in Education | 2 | THEO 205-238 | Christian Beliefs* | 3 |
| TEP 407** | Student Teaching Seminar | 1 | Varies | Art, Music, Theatre or Dance meeting QuEST* | 3 |
| | | | *Take Praxis II exam.* | | |
| | | **TOTAL** | **12** | **TOTAL** | **13-14** |

*Fulfills QuEST requirement

**Courses to be taken concurrently.

***Offered spring of odd-numbered years.

^This course, or its transfer equivalent, is required for admission into the Teacher Education Program

# Physics with Teaching Certification (B.A.)
## 8 Semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| | **First Year – Fall** | | | **First Year - Spring** | |
| COMM 105 | Oral Communication* | 3 | MATH 112 | Calculus II | 4 |
| CHEM 105 | General Chemistry I* | 4 | ENGL 122-176 | Literature meeting QuEST* | 3 |
| CIS 181 | Computer Programming I | 3 | PHYS 211 | General Physics I | 4 |
| MATH 111 | Calculus I* | 4 | | | |
| FYS 101 | Varies | 3 | | | |
| | | | | *Submit the three required security clearances (FBI, Child Abuse, Criminal) by 3/31 to cwickey@messiah.edu or B414.* | |
| | **TOTAL** | 17 | | **TOTAL** | 11 |
| | **Sophomore –Fall** | | | **Sophomore – Spring** | |
| MATH 211 | Calculus III | 4 | PHYS 251 | Modern Physics | 4 |
| PHYS 212 | General Physics II | 4 | EDSP 207** | Introduction to Special Education+ | 3 |
| EDUC 346 | Sociocultural Perspectives on Education | 3 | EDUC 203** | Educational Psychology+ | 3 |
| PHIL 101 or 102 | Gen. Ed. Philosophy* | 3 | TEP 210** | Sophomore Field Experience+ | 0 |
| | | | MATH 270 | Advanced Math for the Sciences | 3 |
| | | | ENGR 212 | Programming for Engineers | 2 |
| | | | | *Submit Teacher Education Program app by 3/31 to B414.* | |
| | **TOTAL** | 14 | | **TOTAL** | 15 |
| | **Junior – Fall** | | | **Junior – Spring** | |
| STAT 291 or ENGR 242 | Probability and Statistics  OR Experimental Methods | 3 | PHYS 402 † | Quantum Mechanics | 3 |
| ENGR 367 | Electromagnetics | 3 | PHYS 307 | Secondary Mathematics/Physics Instruction | 2 |
| EDUC 331* | Instructional Design & Assessment | 3 | ENGR 371 | Thermodynamics | 3 |
| EDSP 307** | Inclusion Practices | 3 | HDFS 311 | Adolescent Development | 3 |
| TEP 310** | Junior Field Experience | 0 | Varies | Electives | 6 |
| EDUC 208 | Teaching English Language Learners | 3 | | | |
| SCIE 307** | Teaching Lab Sciences in Secondary Education | 2 | | | |
| | | | | *Submit Professional Semester application electronically by 1/15.* | |
| | **TOTAL** | 17 | | **TOTAL** | 17 |
| | **Senior – Fall** | | | **Senior – Spring** | |
| | *Professional Semester* | | | | |
| TEP 410** | Pre-student Teaching | 0 | PHYS 494 | Senior Physics Seminar | 2 |
| TEP 435** | Student Teaching | 9 | CHEM 495 | Capstone; Natural Sciences | 3 |
| EDUC 420** | Professional Issues in Education | 2 | PHYS 328 † | Classical Mechanics | 3 |
| PHYS 407** | Secondary Physics Curriculum/ Instru. | 1 | PHYS 317 † | Optics | 3 |
| Varies | Elective | 3 | Varies | Elective | 3 |
| | **TOTAL** | 15 | | **TOTAL** | 14 |

*Fulfills QuEST requirement

**Must be taken concurrently

^This course, or its transfer equivalent, is required for admission into the Teacher Education Program

† Offered in alternating years

# Physics (B.S.)
## 8 Semester Plan

| Course # | Course Name | Credits | Course # | Course Name | Credits |
|---|---|---|---|---|---|
| First Year – Fall | | | First Year – Spring | | |
| IDFY 101* | First year seminar | 3 | IDCR 151* | Created and Called | 3 |
| Varies* | 1st language requirement | 3 | Varies* | 2nd language requirement | 3 |
| COMM 105* | Foundations of Oral Communication | 3 | Varies* | 1st social science/history | 3 |
| MATH 111 | Calculus I | 4 | MATH 112 | Calculus II | 4 |
| CHEM 105 | General Chemistry I | 4 | PHYS 211 | General Physics I | 4 |
| | | | | | |
| | Total | 17 | | Total | 17 |
| | | | | | |
| Sophomore – Fall | | | Sophomore – Spring | | |
| Varies* | 3rd language requirement | 3 | ENGL 1xx* | Literature meeting QuEST | 3 |
| BIBL 2xx* | Bible | 3 | PHIL 101* | Problems in Philosophy | 3 |
| MATH 308** | Differential Equations | 3 | ENGR 212 | Programming For Engineers | 3 |
| MATH 211 | Calculus III | 4 | PHYS 251 | Modern Physics | 4 |
| PHYS 212 | General Physics II | 4 | MATH 261** | Linear Algebra | 3 |
| | | | | | |
| | Total | 17 | | Total | 16 |
| | | | | | |
| Junior – Fall | | | Junior – Spring | | |
| Varies* | 2nd social science/history | 3 | WELL 1xx* | Wellness | 1 |
| Varies* | Christian Beliefs | 3 | ENGR 242 | Experimental Methods | 3 |
| PHYS 421† | Particle Physics | 3 | PHYS 402† | Quantum Mechanics | 3 |
| ENGR 367 | Electromagnetics | 3 | ENGR 371 | Thermodynamics | 3 |
| CHEM393 | Research Methods | 3 | PHYS322*** | Independent Research | 3 |
| | | | | | |
| | Total | 15 | | Total | 13 |
| | | | | | |
| Senior – Fall | | | Senior – Spring | | |
| Varies* | Ethics, World View or Pluralism | 3 | PHYS 494 | Senior Physics Seminar | 2 |
| PHYS 425† | Solid State Physics | 3 | PHYS 328† | Classical Mechanics | 3 |
| PHYS 422*** | Senior Research | 3 | PHYS 317† | Optics | **3** |
| Varies* | Interdisciplinary | 3 | CHEM 495 | Capstone Natural Sciences | 3 |
| | | | Varies | Free Elective | 3 |
| | | | | | |
| | Total | 12 | | Total | 14 |

* Fulfills QuEST requirement

** Requirement can alternatively be met in as single semester by MATH 270

*** Recommended, but not required for degree

† Offered in alternating years

# Physics (B.A.)
## 8 Semester Plan

| Course # | Course Name | Credits | Course # | Course Name | Credits |
|---|---|---|---|---|---|
| First Year – Fall | | | First Year – Spring | | |
| IDFY 101* | First year seminar | 3 | IDCR 151* | Created and Called | 3 |
| Varies* | 1st language requirement | 3 | Varies* | 2nd language requirement | 3 |
| COMM 105* | Foundations of Oral Communication | 3 | Varies* | 1st social science/history | 3 |
| MATH 111 | Calculus I | 4 | MATH 112 | Calculus II | 4 |
| CHEM 105 | General Chemistry I | 4 | PHYS 211 | General Physics I | 4 |
| | **Total** | 17 | | **Total** | 17 |
| Sophomore – Fall | | | Sophomore – Spring | | |
| Varies* | 3rd language requirement | 3 | ENGL 1xx* | Literature | 3 |
| BIBL 2xx* | Bible | 3 | PHIL 101* | Problems in Philosophy | 3 |
| MATH 308** | Differential Equations | 3 | ENGR 212 | Programming For Engineers | 3 |
| MATH 211 | Calculus III | 4 | PHYS 251 | Modern Physics | 4 |
| PHYS 212 | General Physics II | 4 | MATH 261** | Linear Algebra | 3 |
| | **Total** | 17 | | **Total** | 16 |
| Junior – Fall | | | Junior – Spring | | |
| Varies* | 2nd social science/history | 3 | WELL 1xx* | Wellness | 1 |
| Varies* | Christian Beliefs | 3 | ENGR 242 | Experimental Methods | 3 |
| ENGR 367 | Electromagnetics | 3 | PHYS 402† | Quantum Mechanics | 3 |
| CHEM 393 | Research Methods | 3 | ENGR 371 | Thermodynamics | 3 |
| Varies | Free Elective | 3 | PHYS322*** | Independent Research | 3 |
| | **Total** | 15 | | **Total** | 13 |
| Senior – Fall | | | Senior – Spring | | |
| Varies* | Ethics, World View or Pluralism | 3 | PHYS 494 | Senior Physics Seminar | 2 |
| PHYS 422*** | Senior Research | 3 | PHYS 328† | Classical Mechanics | 3 |
| Varies* | Interdisciplinary | 3 | PHYS 317† | Optics | 3 |
| Varies | Free Elective | 3 | CHEM 495 | Capstone Natural Sciences | 3 |
| | | | Varies | Free Elective | 3 |
| | **Total** | 12 | | **Total** | 14 |

\* Fulfills QuEST requirement

\*\* Requirement can alternatively be met in as single semester by MATH 270

\*\*\* Recommended, but not required for degree

† Offered in alternating years

# Math and Physics (B.A.) double-major
## 8 Semester Plan

| Course # | Course name | Credits | Course # | Course name | Credits |
|---|---|---|---|---|---|
| **First Year – Fall** | | | **First Year - Spring** | | |
| CIS 181 | Computer Programming I | 3 | MATH 112 | Calculus II | 4 |
| ECON 120 | Introduction to Macroeconomics | 3 | MATH 198 | Introduction to Mathematical Proof | 2 |
| MATH 111 | Calculus I | 4 | PHYS 211 | General Physics I | 4 |
| MATH 196 | Mathematics Seminar | 2 | IDCR 151 | Created and Called for Community* | 3 |
| IDFY 151 | First Year Seminar* | 3 | Varies | 2nd semester of Language* | 3 |
| Varies | First semester of language* | 3 | | | |
| | **TOTAL** | **18** | | **TOTAL** | **16** |
| **Sophomore –Fall** | | | **Sophomore – Spring** | | |
| MATH 211 | Calculus II | 4 | MATH 261 | Linear Algebra | 3 |
| MATH 308 | Differential Equations | 3 | PHYS 251 | Modern Physics | 4 |
| STAT 291 | Probability and Statistics | 3 | STAT 292 | Inferential Statistics | 3 |
| PHYS 212 | General Physics II | 4 | BIBL 20x | Knowledge of the Bible* | 3 |
| CHEM 105 | General Chemistry I | 4 | WELL 1xx | Wellness Course* | 1 |
| | **TOTAL** | **18** | | **TOTAL** | **18** |
| **Junior – Fall** | | | **Junior – Spring** | | |
| MATH 362 | Algebraic Structures | 3 | PHYS 402 | Quantum Mechanics | 3 |
| RELI/PHIL | Religion/Philosophy* | 3 | MATH/STAT 3XX | Mathematics Course | 3 |
| ENGR 367 | Electromagnetics | 3 | THEO 2xx | Christian Beliefs* | 3 |
| HIST xxx | History meeting QuEST* | 3 | IDNW xx | Non-Western Studies* | 2-3 |
| ENGL xxx | Literature meeting QuEST* | 3 | Varies | Social Science meeting QuEST* | 3 |
| COMM 105 | Fundamentals of Oral Communication* | 3 | | | |
| | **TOTAL** | **18** | | **TOTAL** | **17-18** |
| **Senior – Fall** | | | **Senior – Spring** | | |
| CHEM 495 | Capstone Natural Sciences | 3 | MATH 412 | Real Analysis | 3 |
| Varies | Mathematics Course **OR** Linear Systems | 3 | MATH 494 or PHYS 494 | Senior Math Seminar **OR** Senior Physics Seminar | 2-3 |
| IDS XXX | Ethics/Pluralism/World Views* | 3 | PHYS 328 | Classical Mechanics | 3 |
| Varies | Art, Music, Theatre or Dance meeting QuEST* | 3 | Varies | Free Elective | 3 |
| ENGR 371 or CHEM 337 | Thermodynamics **OR** Physical Chemistry I | 3 | Varies | Free Elective | 3 |
| | **TOTAL** | **15** | | **TOTAL** | **14-15** |

*QuEST requirement