### SOFTWARE ENGINEERING CORE REQUIREMENTS

<table>
<thead>
<tr>
<th>COURSE NO</th>
<th>COURSE TITLE</th>
<th>PREREQUISITE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 1400</td>
<td>Fundamentals of Programming</td>
<td>MAT 1000 or 1010, CS 1030 recommended</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 1410</td>
<td>Object-Oriented Programming</td>
<td>CS 1400</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 2300</td>
<td>Discrete Mathematical Structures I</td>
<td>CS 1410, MATH 1050</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 2420</td>
<td>Intro to Algorithms and Data Structures</td>
<td>CS 1410</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 2450</td>
<td>Software Engineering</td>
<td>CS 2300, 2420</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 2600</td>
<td>Computer Networks I</td>
<td>CS 2810</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 2810</td>
<td>Computer Organization and Architecture</td>
<td>CS 1400</td>
<td>3.0</td>
</tr>
<tr>
<td>COMP 301R</td>
<td>Digital Lecture Series</td>
<td>ENGL 2010, UAS</td>
<td>1.0</td>
</tr>
<tr>
<td>CS 305G</td>
<td>Global Social and Ethical Issues in Computing</td>
<td>ENGL 2010, (CS 1030 or 1400), UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 3060</td>
<td>Operating Systems Theory</td>
<td>CS 2420, 2810, UAS [COSC or Computer Engineering Major]</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 3240</td>
<td>Discrete Mathematical Structures II</td>
<td>CS 2810, COSC, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 3250*</td>
<td>Java Software Development</td>
<td>COSC, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>or 3280*</td>
<td>C# .NET Software Development</td>
<td>COSC, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>or 3270*</td>
<td>Python Software Development</td>
<td>COSC, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>or 3370*</td>
<td>C++ Software Development</td>
<td>COSC, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 3320*</td>
<td>Numerical Software Development</td>
<td>CS 2810, MATH 1210, COSC, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 3410*</td>
<td>Human Factors in Software Development</td>
<td>(CS 3250 or 3260 or 3270 or 3370), UAS</td>
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</tr>
<tr>
<td>CS 3450*</td>
<td>Principles and Patterns of Software Design</td>
<td>(CS 3250 or 3260 or 3270 or 3370), UAS</td>
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</tr>
<tr>
<td>CS 3520*</td>
<td>Database Theory</td>
<td>COSC, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 4230*</td>
<td>Software Testing and Quality Engineering</td>
<td>CS 2450, (CS 3250 or 3260 or 3270 or 3370), ECE 3710, UAS</td>
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</tr>
<tr>
<td>CS 4400*</td>
<td>Software Engineering II</td>
<td>CS 2450, 2600, 3520, (CS 3250 or 3260 or 3270 or 3370), UAS, Pre or Coreq; CS 3450</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 4450*</td>
<td>Analysis of Programming Languages</td>
<td>CS 3240, (CS 3250 or 3260 or 3270 or 3370), UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 4550*</td>
<td>Software Engineering III</td>
<td>CS 4230, 4400, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>ECE 3710*</td>
<td>Applied Probability &amp; Statistics for Engineers &amp; Scientists</td>
<td>MATH 1210, UAS</td>
<td>3.0</td>
</tr>
<tr>
<td>MATH 1210*</td>
<td>Calculus I</td>
<td>MATH 1050 &amp; 1060 (Min. grade of C) (within two years)</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Complete a minimum of 12 credits from the following or any CS 3000 or 4000 level course not already required*.

<table>
<thead>
<tr>
<th>COURSE NO</th>
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<th>PREREQUISITE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2550*</td>
<td>Web Programming I (3)</td>
<td>CS 1410</td>
<td>12.0</td>
</tr>
</tbody>
</table>

**Specialized Area of Study**

Complete a minimum of 12 credits (at least 9 must be upper division) in a discipline other than Computer Science. See department list for details. Note that these credits may not also be used to fulfill general education requirements.

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* Minimum grade of "C-" required in courses marked with asterisk*  
UAS University Advanced Standing: Completion of min of 24 credits of 1000 or higher, completion of ENGL 2010 & MATH 1050 or higher, & min 2.0 GPA.  
COSC: Matriculation into Advanced Standing required: (CS 1400, 1410, 2300, 2420 Min grade C+) & MATH 1210, ENGL 1010 Min grade C. Each class may not be repeated more than once.  
NOTE: For each of the following, a maximum of three hours may be counted towards graduation without prior written CS Department approval: CS 339R, CS 439R, CS 479R, CS 481R, CS 489R, CS 491R, and CS 496R.

Advisors:  
Arlene Arenaz (801) 863-5748 arlenea@uvu.edu  
Patti Miner (801) 863-8408 minerpa@uvu.edu  
Fred Orchard (801) 863-6238 fred.orchard@uvu.edu
GENERAL EDUCATION REQUIREMENTS

<table>
<thead>
<tr>
<th>COURSE NO</th>
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<th>PREREQUISITE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 1010</td>
<td>Introduction to Writing</td>
<td>ENGL 1000 with C- or higher (or appropriate test scores within 3 years)</td>
<td>3.0</td>
</tr>
<tr>
<td>ENGL 2010</td>
<td>Intermediate Writing</td>
<td>ENGL 1010 with C- or higher (or appropriate test scores within 3 years)</td>
<td>3.0</td>
</tr>
<tr>
<td>PHIL 2050</td>
<td>Ethics &amp; Values</td>
<td>ENGL 1010. ENGL 2020 highly recommended</td>
<td>3.0</td>
</tr>
</tbody>
</table>

American Institutions: HIST 1700 American Civilization or HIST 1740 US Economic History or POLS 1000 American Heritage or POLS 1100 American Natl Govt or (HIST 2700 & 2710 US History) 3.0

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</tr>
</thead>
<tbody>
<tr>
<td>HLTH 1100</td>
<td>Personal Health and Wellness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PES 1097</td>
<td>Fitness for Life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMM 1020*</td>
<td>Public Speaking</td>
<td>COMM 1020 required for Software Engineering also counts as Humanities</td>
<td>3.0</td>
</tr>
<tr>
<td>COMM 2110*</td>
<td>Interpersonal Communication</td>
<td>COMM 2110 required for Software Engineering also counts as Social Science</td>
<td>3.0</td>
</tr>
</tbody>
</table>

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<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOLOGY (select from list below)</td>
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</table>

Physical Science Distribution (select from list below) 3.0

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<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>FINE ARTS (select from list below)</td>
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<td></td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits Required for Degree 122.0

* Minimum grade of "C-" required in courses marked with asterisk.

GRADUATION REQUIREMENTS:

1. Completion of a minimum of 120 semester credits, with a minimum of 40 upper-division credits.
2. Overall grade point average of 2.0 or above. Approved matriculation. Combined GPA of 2.5 or higher in all remaining discipline core and emphasis requirements and the General Education requirements marked with an asterisk.
3. Residency hours - minimum of 30 credit hours through course attendance at UVU. 10 of these hours must be within the last 45 hours earned. At least 12 of the credit hours earned in residence must be in approved CS Department courses.
4. All transfer credit must be approved in writing by UVU. No more than 80 semester hours and no more than 20 hours in CS type courses of transfer credit from a two-year college.
5. No more than 30 semester hours may be earned through independent study and/or extension classes.
6. Successful completion of at least one Global/Intercultural course. CS 305G satisfies this requirement.

Matriculation into Advanced Standing (COSC) Requirements: Students must be Formally Matriculated to this program before they can graduate. Please see your advisor for more information.

Completion of the following:

- CS 1400 Minimum grade C+
- CS 1410 Minimum grade C+
- CS 2300 Minimum grade C+
- CS 2420 Minimum grade C+
- MATH 1210 Minimum grade C
- ENGL 1010 Minimum grade C

Overall UVU GPA must be minimum 2.5. Each class may not be repeated more than once.

*FINISHING REQUIREMENTS:

- Minimum grade of "C-" required in courses marked with asterisk.
- A combination of no more than 80 semester hours and no more than 20 hours in CS type courses of transfer credit from a two-year college.
- No more than 30 semester hours may be earned through independent study and/or extension classes.
- Successful completion of at least one Global/Intercultural course. CS 305G satisfies this requirement.

Please see your advisor for more information.
Specialized Area of Study for the Software Engineering Bachelor of Science Degree

Required: Minimum of 12 credits (within the same Area). Minimum of 9 credits must be Upper Division (3000 or higher.)

• Accounting (12 credits. Minimum of 9 credits must be Upper Division)
  ACC 2010 Financial Accounting
  ACC 2020 Managerial Accounting
  ACC 3010 Intermediate Accounting I
  ACC 3020 Intermediate Accounting II
  ACC 3300 Cost Management

• Biology (12 credits. Minimum of 9 credits must be Upper Division)
  BIOL 1610 College Biology I
  BIOL 1615 College Biology I Laboratory
  BIOL 1620 College Biology II
  BIOL 1625 College Biology II Laboratory
  BIOL 3300 Developmental Biology
  BIOL 3400 Cell Biology
  BIOL 3405 Cell Biology Laboratory
  BIOL 3500 Conservation Biology
  BIOL 3505 Conservation Biology Laboratory
  BIOL 3800 Conservation Biology
  BIOL 4300 Bioinformatics & Genome Analysis

• Business Management (12 credits. Minimum of 9 credits must be Upper Division)
  ACC 3000 Financial Managerial & Cost Accounting Concepts
  ECON 2020 Macroeconomics
  ENTR 3170 Entrepreneurship
  ENTR 3180 Small Business Development
  ENTR 3190 Early-Stage Financing
  MGMT 3000 Organizational Behavior
  MGMT 330G Survey of International Business
  MGMT 3400 Human Resource Management
  MKTG 2200 Written Business Communications
  MKTG 3600 Principles of Marketing

• Chemistry (12 credits. Minimum of 9 credits must be Upper Division)
  CHEM 1210 Principles of Chemistry I
  CHEM 1215 Principles of Chemistry I Laboratory
  CHEM 1220 Principles of Chemistry II
  CHEM 1225 Principles of Chemistry II Laboratory
  CHEM 3000 Analytical Chemistry
  CHEM 3020 Environmental Chemistry
  CHEM 3060 Physical Chemistry I
  CHEM 3070 Physical Chemistry II
  CHEM 3100 Advanced Inorganic Chemistry
  CHEM 3115 Physical & Inorganic Chemistry Laboratory
  CHEM 3800 Energy Use on Earth
  CHEM 4000 Instrumental Analysis
  CHEM 4005 Instrumental Analysis Laboratory
  CHEM 4030 Radiochemistry

• Electrical Engineering (12 credits. Minimum of 9 credits must be Upper Division)
  ECE 1020 Computer Engineering Problem Solving with Matlab
  ECE 2250 Circuit Theory
  ECE 2255 Circuit Theory Lab
  ECE 2700 Digital Design Lab
  ECE 2705 Digital Design I Lab
  ECE 3730 Embedded Systems I
  ECE 3740 Digital Design II
  ECE 3750 Engineering Analysis
  ECE 3760 Electronic Systems
  ECE 3765 Electronic Systems Lab
  ECE 3770 Signals and Systems
  ECE 4730 Embedded Systems II
  ECE 4750 Digital Signal Processing
  ECE 4760 VLSI Design
  ECE 4765 VLSI Design Lab
  ECE 4770 Artificial Neural Networks
  ECE 4780 Wireless & Mobile Communications

• Physical Sciences (12 credits. Minimum of 9 credits must be Upper Division)
  PHYS 2210 Physics for Scientists & Engineers I
  PHYS 2215 Physics for Scientists & Engineers I Lab
  PHYS 2220 Physics for Scientists & Engineers II
  PHYS 2225 Physics for Scientists & Engineers II Lab
  PHYS 3110 Modern Physics I
  PHYS 3115 Introduction to Experimental Physics I
  PHYS 3230 Principles of Electronics for the Physical Sciences
  PHYS 3300 Mathematical Physics
  PHYS 3400 Classical Mechanics
  PHYS 3500 Thermodynamics
  PHYS 3800 Energy Use on Earth
  PHYS 4100 Biophysics
  PHYS 4210 Advanced Experimental Techniques
  PHYS 4300 Computational Physics
  PHYS 4410 Electrodynamics & Magnetism
  PHYS 4420 Electromagnetics
  PHYS 4510 Quantum Mechanics I
  PHYS 4520 Quantum Mechanics II
  PHYS 4600 Optics
  PHYS 4700 Acoustics
  PHYS 4800 Solid State Physics

Cr. Prerequisites

3 ENGL 1010, MAT 1000
3 ACC 2010
3 ACC 2010 (min B-), ACC 2020(min C), IM 2600, MATH 1050, UAS
3 ACC 3010, MKTG 2200, UAS
3 ACC 2020, (MGM 2340 or MATH 2040), IM 2600, UAS
4 ENGL 1010 (min C-) or ACT score 21+, Corequisite BIOL 1615
1 Corequisite BIOL 1610
3 BIOL 1610 (min C-), Corequisite BIOL 1625
1 Corequisite BIOL 1620
3 BIOL 1610 (min C-), UAS
3 BIOL 1610 (min C-), CHEM 1220 (min C-), UAS
3 BIOL 1610 (min C-), CHEM 1220 (min C-), UAS Corequisite BIOL 3400
3 BIOL 1610, UAS Corequisite BIOL 3505
3 BIOL 1610, UAS Corequisite BIOL 3500
3 BIOL 1010 or 1620 (min C-), UAS. (BIOL 3700 recommended)
4 BIOL 3500 (min C-), UAS
4 ENGL 2010 or 2020, & MAT 1010 or higher, UAS
3 MATH 1050
3 ENGL 1010, UAS
3 ENGL 1010, UAS
3 UAS
3 MKTG 2200, UAS
3 (ENGL 2010 or 2020 or MKTG 2200), ECON 2010, UAS
3 ENGL 2010 or 2020, UAS
3 UAS
4 MATH 1050, Prior Chem experience rec. Corequisite CHEM 1215
1 Corequisite CHEM 1210
4 CHEM 1210 (min C-), Corequisite CHEM 1225
1 CHEM 1215, Corequisite CHEM 1220
4 CHEM 1220, 1225, UAS. Corequisite CHEM 3005
3 CHEM 1225, UAS
4 PHYS 2220, MATH 2210, UAS
3 CHEM 3060, UAS
4 Pre or Coreq: CHEM 3000, UAS
1 CHEM 3000 & 3060, Corequisite: CHEM 3100 & 3070, UAS
3 MATH 1050, (PHYS/1010 or PHSC/1000 or CHEM/1010 or GEO/1010 or 2040 or METO/1010), UAS
2 CHEM 3000, 3070, UAS. Corequisite CHEM 3115
2 CHEM 3000 & 2325, UAS. Corequisite: CHEM 4000
3 CHEM 1215, MATH 2200, UAS
3 MATH 1050 or higher
3 ECE 1020, MATH 1210, PHYS 2210. Corequisite: ECE 2255
1 COREQUITE ECE 2250
3 ECE 1020, MATH 1210, PHYS 2210. Corequisite: ECE 2250
3 ECE 2705, UAS
3 ECE 2700, UAS
3 ECE 1020, MATH 1220, UAS
3 ECE 2250, PHYS 2220. Coreq: ECE 3765, UAS
1 ECE 2255, PHYS 2220. Coreq: ECE 3760, UAS
3 ECE 3750, UAS
3 ECE 3760, UAS
3 ECE 3770, UAS
3 ECE 3710, 3770, UAS
3 ECE 3760, UAS, corequisite: ECE 4765
1 ECE 3765, UAS, corequisite: ECE 4760
3 CHEM 1210, UAS
3 MATH 1210, UAS
3 ECE 2250, MATH 1210, UAS
4 MATH 1210, Corequisite: PHYS 2215
1 Corequisite: PHYS 2210
4 PHYS 2210 MATH 1220, corequisite: PHYS 2225
1 Corequisite: PHYS 2210
3 PHYS 2220, UAS. Coreq: PHYS 3115
2 PHYS 2220, UAS. Coreq: PHYS 3110
3 PHYS 2220, MATH 2210, UAS
3 MATH 2210, UAS. Corequisite: MATH 2280
3 PHYS 2220, UAS. Corequisite: PHYS 3300 recommended
3 PHYS 2220, MATH 2210, UAS
3 MATH 1050, (PHYS/1010 or 1000 or CHEM/1010 or GEO/1010 or METO/1010), UAS
3 BIOL 1610, PHYS 3110 & 3115, or instructor approval, UAS
3 (PHYS/3125, PHYS 3230 or instructor approval), UAS
3 PHYS 3125, PHYS 3300, UAS
3 PHYS 3110 & 3115, PHYS 3300, UAS
3 PHYS 4510, UAS
3 PHYS 3300, 4410, UAS
3 PHYS 3110 & 3115, PHYS 3300, UAS
3 PHYS 3120, PHYS 3125, 4510, UAS