

Bachelor of Science in Computational Mathematics

Engineering Cognate

2021-2022 Degree Completion Plan

ONLINE

Important: This degree plan is effective for those starting this degree program in fall 2021 through summer 2022. This degree plan will remain in effect for students who do not break enrollment or who do not change degree programs, concentrations or cognates.

GENERAL EDUCATION/

Communication & Information Literacy (12 hours)	FOUNDATIO	ONAL SKILLS REQUIREMENTS	(39-42	2 hours	<u>)</u>					
ENGL 101 Composition & Rhetoric 3	Course		Hrs	Sem	Grade	Course		<u>Hrs</u>	Sem	Grade
Communications Elective 3 MATH 131 Calculus & Analytic Geometry I³ 4	Communication & Information Literacy (12 hours) ¹					Major Foundational Courses (0-7 hours)				
Information Literacy Elective 3	ENGL 101	Composition & Rhetoric	3			CSIS 110	Introduction to Computing Sciences ³	3		
Information Literacy Elective 3 MAJOR Technological Solutions & Quantitative Reasoning (3-6 hours)¹ INDS 400 Knowledge Synth. For Prof. & Pers. Dev.⁴ 3 UNIV 104 Instructional Tech. for Online Learning 0-3 MATH 132 Calculus & Analytic Geometry II 4 MATH Math Elective (MATH 114 or higher) 3 MATH 251 Introduction to Statistical Analysis 3 MATH 250 Introduction to Discrete Mathematics 3 MATH 250 Introduction to Discrete Mathematics 3 Critical Thinking (7 hours)¹ MATH 410 Matrix & Linear Algebra 3 Critical Thinking Elective 3 MATH 423 Abstract Algebraic Structures 3 Critical Thinking Elective 3 MATH 430 Multivariable Calculus 3 MATH 432 Applied Differential Equations 3 Civic & Global Engagement (3 hours)¹ MATH 441 Probability I 3 Cultural Studies Elective 3 MATH 460 Mathematical Modeling & Simulation 3 Natural Science Elective 5.6 Natural Science Elective 5.6 Natural Science Elective 5.6 Social & Scientific Inquiry (6 hours)¹ Natural Science Elective 5.6 Social Science Elective 3 Social Science Elective 3 Social Science Elective 4 Social Survey of Old & New Testament 4 Engineering Elective 7.8		Communications Elective	3			MATH 131	Calculus & Analytic Geometry I ³	4		
Technological Solutions & Quantitative Reasoning (3-6 hours)¹ UNIV 104 Instructional Tech. for Online Learning 0-3		Information Literacy Elective	3							
Technological Solutions & Quantitative Reasoning (3-6 hours)¹ UNIV 104 Instructional Tech. for Online Learning 0-3		Information Literacy Elective	3			MAJOR				
UNIV 104 Instructional Tech. for Online Learning 0-3 MATH 132 Calculus & Analytic Geometry II 4 MATH Math Elective (MATH 114 or higher) 3 MATH 250 Introduction to Statistical Analysis 3 MATH 250 Introduction to Discrete Mathematics 3 MATH 250 Introduction to Discrete Mathematics 3 MATH 250 Introduction to Discrete Mathematics 3 MATH 410 Matrix & Linear Algebra 3 MATH 410 Matrix & Linear Algebra 3 MATH 423 Abstract Algebraic Structures 3 MATH 430 Multivariable Calculus 3 MATH 430 Multivariable Calculus 3 MATH 432 Applied Differential Equations 3 MATH 432 Applied Differential Equations 3 MATH 441 Probability I 3 MATH 441 Probability I 3 MATH 441 Probability I 3 MATH 440 Mathematical Modeling & Simulation 3 MATH 460 Mathematical Modeling & Simulation 3 MATH 460 Mathematical Elective 56 Natural Science Elective 5 Natural Science Elective 5 Natural Science Elective 5 Matural S							Core (40 hours)			
UNIV 104 Instructional Tech. for Online Learning 0-3 MATH 132 Calculus & Analytic Geometry II 4 MATH Math Elective (MATH 114 or higher) 3 MATH 211 Introduction to Statistical Analysis 3 MATH 250 Introduction to Discrete Mathematics 3 MATH 250 Introduction to Discrete Mathematics 3 MATH 410 Matrix & Linear Algebra 3 MATH 410 Matrix & Linear Algebra 3 MATH 423 Abstract Algebraic Structures 3 MATH 423 Abstract Algebraic Structures 3 MATH 430 Multivariable Calculus 3 MATH 430 Multivariable Calculus 3 MATH 432 Applied Differential Equations 3 MATH 431 Probability I 3 MATH 441 Probability I 3 MATH 441 Probability I 3 MATH 440 Mathematical Modeling & Simulation 3 MATH 460 Mathematical Modeling & Simulation 3 MATH 460 Mathematical Elective 5.6 Natural Science Elective 3 MATH 460 Mathematical Modeling & Simulation 3 Matural Science Elective 5.6 Natural Science Elective 5.6 Natural Science Elective 5.6 Social Science Elective 3 Mathematical Modeling & Simulation 5 Matural Science Elective 5.6 Social Science Elective 4 Mathematical Modeling & Simulation 5 Matural Science Elective 5.6 Social Science Elective 5.6 Soc	Technologica	l Solutions & Quantitative Reasonin	ıg (3-6	hours)	$)^1$	INDS 400	Knowledge Synth. For Prof. & Pers. Dev. ⁴	3		
Critical Thinking (7 hours)¹ RLGN 104 Christian Life & Biblical Worldview² 4 MATH 423 Abstract Algebra 3 MATH 430 Multivariable Calculus 3 MATH 432 Applied Differential Equations 3 MATH 432 Applied Differential Equations 3 MATH 441 Probability I 3 MATH 440 Mathematical Modeling & Simulation 3 MATH 460 Mathematical Modeling & Simulation 3 MATH 460 Matural Science Elective 5.6 Natural Science Elective 5.6 Natural Science Elective 5.6 Social Science Elective 3 MATH 450 Natural Science Elective 5.6 Engineering Elective 5.6 Social Science Flective 4 Engineering Elective 5.6 Engineering Electiv						MATH 132	Calculus & Analytic Geometry II	4		
Critical Thinking (7 hours) ¹ RLGN 104 Christian Life & Biblical Worldview ² 4 MATH 423 Abstract Algebra 3 MATH 430 Multivariable Calculus 3 MATH 432 Applied Differential Equations 3 MATH 441 Probability I 3 MATH 460 Mathematical Modeling & Simulation 3 Matural Science Elective ^{5,6} Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Social Science Elective 3 Mathematical Modeling & Simulation 3 MATH 460 Mathematical Modeling & Simulation 4 MATH 460 Mathematical Modeling & Simulation 4 MATH 460 Mathematical Modeling & Simulation 4 Mathematical Mode	MATH	Math Elective (MATH 114 or higher)	3			MATH 211	Introduction to Statistical Analysis	3		
Critical Thinking (7 hours)¹ RLGN 104 Christian Life & Biblical Worldview² 4						MATH 250	Introduction to Discrete Mathematics	3		
RLGN 104 Christian Life & Biblical Worldview ² 4	Critical Thin	king (7 hours) ¹				MATH 410	Matrix & Linear Algebra	3		
Civic & Global Engagement (3 hours)¹ Cultural Studies Elective 3 MATH 441 Probability I MATH 460 Mathematical Modeling & Simulation Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Natural Science Elective Natural Science Elective Natural Science Elective Cognate (15 hours) Engineering Elective ^{7,8}	RLGN 104	Christian Life & Biblical Worldview ²	4			MATH 423	Abstract Algebraic Structures	3		
Civic & Global Engagement (3 hours)¹ Cultural Studies Elective 3 MATH 441 Probability I MATH 460 Mathematical Modeling & Simulation Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Social Science Elective 3 Natural Science Elective ^{5,6} Social Science Elective 3 Natural Science Elective ^{5,6} Cognate (15 hours) Engineering Elective ^{7,8}		Critical Thinking Elective	3			MATH 430	Multivariable Calculus	3		
Cultural Studies Elective 3						MATH 432	Applied Differential Equations	3		
Cultural Studies Elective MATH 460 Mathematical Modeling & Simulation Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Social Science Elective Cognate (15 hours) Engineering Elective ^{7,8} Engineering Elective ^{7,8} THEO 104 Introduction to Theology Survey ² MATH 460 Mathematical Modeling & Simulation Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Engineering Elective ^{5,6} Engineering Elective ^{7,8} Engineering Elective ^{7,8} Engineering Elective ^{7,8} Engineering Elective ^{7,8}	Civic & Glob	oal Engagement (3 hours) ¹				MATH 441	Probability I	3		
Social & Scientific Inquiry (6 hours) ¹ Natural Science Elective ^{5,6} Natural Science Elective ^{5,6} Natural Science Elective Social Science Elective Social Science Elective Christianity & Contexts (8 hours) ¹ Engineering Elective ^{7,8} Engineering Elective ^{7,8} THEO 104 Introduction to Theology Survey ² Engineering Elective ^{7,8}			3			MATH 460	Mathematical Modeling & Simulation	3		
Natural Science Elective 3 Natural Science Elective 5.6 Social Science Elective 3 Cognate (15 hours) Engineering Elective ^{7,8} BIBL 104 Survey of Old & New Testament 4 Engineering Elective ^{7,8} THEO 104 Introduction to Theology Survey ² 4 Engineering Elective ^{7,8} Engineering Elective ^{7,8} Engineering Elective ^{7,8} Engineering Elective ^{7,8}								_		
Natural Science Elective 3 Natural Science Elective 5.6 Social Science Elective 3 Social Science Elective 4 Social Science Elective 5.6 Social Science	Social & Scie	entific Inquiry (6 hours) ¹					Natural Science Elective ^{5,6}	_		
Christianity & Contexts (8 hours) ¹ BIBL 104 Survey of Old & New Testament 4 Engineering Elective ^{7,8} THEO 104 Introduction to Theology Survey ² 4 Engineering Elective ^{7,8} Engineering Elective ^{7,8} Engineering Elective ^{7,8} Engineering Elective ^{7,8}			3				Natural Science Elective ^{5,6}	_		
Christianity & Contexts (8 hours) ¹ BIBL 104 Survey of Old & New Testament 4 Engineering Elective ^{7,8} THEO 104 Introduction to Theology Survey ² 4 Engineering Elective ^{7,8} Engineering Elective ^{7,8} Engineering Elective ^{7,8} Engineering Elective ^{7,8}		Social Science Elective	3							
BIBL 104 Survey of Old & New Testament 4 Engineering Elective ^{7,8} THEO 104 Introduction to Theology Survey ² 4 Engineering Elective ^{7,8} Engineering Elective ^{7,8}							Cognate (15 hours)			
BIBL 104 Survey of Old & New Testament 4 Engineering Elective ^{7,8} THEO 104 Introduction to Theology Survey ² 4 Engineering Elective ^{7,8} Engineering Elective ^{7,8}	Christianity	& Contexts (8 hours) ¹					Engineering Elective ^{7,8}			
THEO 104 Introduction to Theology Survey ² 4 Engineering Elective ^{7,8} Engineering Elective ^{7,8}			4				Engineering Elective ^{7,8}	_		
Engineering Elective ^{7,8}	THEO 104		4					_		
Engineering Elective ^{7,8}								_		
							Engineering Elective ^{7,8}			
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FREE ELECTIVES (16-26 hours) ⁹						FREE ELEC	CTIVES (16-26 hours) ⁹			
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Graduation Requirements

- 120 Total Hours
- 2.0 Overall grade point average
- $\textbf{30} \ \text{Hours must be upper-level courses (300-400 level)}$
- Grade of 'C' Minimum required for all major foundational courses and all upper-level courses in the major
 - 25% Of major taken through Liberty University
 - 30 Hours must be completed through Liberty University
 - **Grad App** Submission of Degree Completion Application must be completed within the last semester of a student's anticipated graduation date

Notes

All applicable prerequisites must be met

¹Refer to the list of approved general education electives at www.liberty.edu/gened before enrolling in foundational skills requirements

²Students transferring in 45 or more UG credit hours will have the requirement of RLGN 104 waived; Students transferring in 60 or more UG credit hours will also have the requirement of THEO 104 waived

³Courses may also fulfill select General Education Requirements. Please refer to the list of approved general education electives at www.liberty.edu/gened

⁴INDS 400 should be taken in the final semester.

5Choose a 200-400 level BIOL, CHEM, PHSC, or PHYS course not already required in the degree: a minimum of 9 hours total required⁶

⁶Important: The Natural Science Electives required in the Major <u>must be chosen from the same discipline</u> (BIOL, CHEM, PHSC, or PHYS)

⁷Chose a course not already applying to the degree from one of the following disciplines: ENGI, ENGR, or ENGV.

A minimum of 15 hours total is required for the Cognate.

⁹May need up to 9 hours of 300-400 level electives to fulfill upper-level requirement; this is dependent upon courses chosen for the Natural Science Electives and the Cognate Electives. Student should contact academic advisor for more information Suggested Course Sequence on second page

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SUGGESTED COURSE SEQUENCE

FIRST YEAR

First Semester			Second Semester									
BIBL 104		4	RLGN 104	4								
ENGL 101		3	Critical Thinking Elective ¹	3								
UNIV 104		0-3	Information Literacy Elective ¹ [CSIS 110]	3								
Communications Elective ¹		3	Social Science Elective ¹	3								
Math Elective ¹ [MATH 131]		<u>4</u>	MATH 132	<u>4</u>								
	Total	14-17	Total	17								
	S	ECOND Y	/EAR									
Information Literacy Elective ¹		3	THEO 104	4								
Natural Science Elective ¹		3	Cultural Studies Elective ¹	3								
MATH 211		3	MATH 250	3								
Elective		3	Natural Science Elective ^{2,3}	3								
Elective		<u>3</u>	Elective	3								
	Total	15	Total	16								
THIRD YEAR												
MATH 410		3	MATH 423	3								
Engineering Elective ^{4,5}		3	MATH 430	3								
Natural Science Elective ^{2,3}		3	Engineering Elective ^{4,5}	3								
Elective ⁶		3	Natural Science Elective ^{2,3}	3								
Elective		3	Elective ⁶	3								
	Total	15	Total									
FOURTH YEAR												
MATH 432		3	INDS 400	3								
MATH 441		3	MATH 460	3								
Engineering Elective ^{4,5}		3	Engineering Elective ^{4,5}	3								
Engineering Elective ^{4,5}		3	Elective	3								
Elective		<u>1</u>	Elective	<u>3</u>								
	Total	13	Total	15								

Notes

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¹Refer to the list of approved general education electives at www.liberty.edu/gened before enrolling in foundational skills requirements

²Choose a 200-400 level BIOL, CHEM, PHSC, or PHYS course not already required in the degree

³Important: The Natural Science Electives required in the Major must be chosen from the same discipline (BIOL, CHEM, PHSC, or PHYS)

⁷Chose a course not already applying to the degree from one of the following disciplines: ENGI, ENGR, or ENGV.

⁸A minimum of 15 hours total is required for the Cognate.

⁶May need up to 9 hours of 300-400 level electives to fulfill upper-level requirement; this is dependent upon courses chosen for the Natural Science Electives. Student should contact academic advisor for more information