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## Engineering

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The mission of the Benedictine College Engineering Department is to provide a multidisciplinary engineering undergraduate education built on an authentically Catholic liberal arts foundation. Graduates of the program will be professionals who are excellent problem solvers, committed to the highest ethical standards, and proficient communicators. They will understand the role of engineering as a profession and their duty, as engineers, to promote the common good of society.

The Benedictine College (BC) Engineering Department offers Bachelor of Science degrees in Chemical, Civil, Mechanical, and General Engineering. In addition to these degrees, students can major in Electrical Engineering at Benedictine College through our dual-degree program with the University of North Dakota (UND). In this collaborative program, students stay at Benedictine College while they complete an electrical engineering degree from UND via their ABET-accredited distance engineering degree program. In addition, students earn a second degree from Benedictine College in a major such as computer science, general engineering, physics, etc.

As we continue to develop and expand the engineering program, a program fee of \$120 per semester is charged to each student who is in any of the engineering disciplines. This program fee helps support the continued improvement and expansion of the engineering program.

### **B.S. Degree in Chemical Engineering**

#### *Required general education courses*

PHIL-3250, Ethics

THEO-2000, Christian Moral Life

#### *Science and Mathematics*

CHEM-1200/1201, General Chemistry I/Lab\*

CHEM-1210/1211, General Chemistry II/Lab\*

CHEM-2200/2201, Organic Chemistry I/Lab\*

CHEM-2210, Organic Chemistry II\*

CHEM-3500, Biochemistry I

CHEM-3800/3801, Physical Chemistry I:

Thermodynamics/Lab

MATH-1300, Calculus I\*

MATH-1350, Calculus II\*

MATH-2300, Calculus III\*

MATH-3100, Differential Equations

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\* These courses must be completed with a "C-" or better.

PHYS-2100/2101, Classical Physics I/Lab  
PHYS-2110/2111, Classical Physics II/Lab

### *Engineering Courses*

CENG-2010, Chemical Engineering  
Fundamentals\*<sup>^</sup>  
CENG-3050, Separations  
CENG-3210, Reactor Design  
CENG-3350, Chemical Engineering  
Laboratory I  
CENG-4080, Chemical Process Dynamics and  
Control  
CENG-4210, Reactor Design  
CENG-4350, Chemical Engineering  
Laboratory II  
CENG-4600, Plant Design I  
CENG-4610, Plant Design II  
CENG-COMP, Senior Comprehensive Exam  
EENG-2060, Circuit Analysis  
ENGR-1200, Introduction to Engineering  
ENGR-2300, Statics  
ENGR-3150, Statistical Analysis of Data  
ENGR-3170, Engineering Economy and  
Society  
ENGR-3250, Thermodynamics  
ENGR-3300, Fluid Mechanics  
ENGR-3400, Materials Laboratory or  
CHEM-3501, Biochemistry I Laboratory  
ENGR-3410, Thermofluids Laboratory  
ENGR-3500, Properties of Materials  
ENGR-3600, Heat and Mass Transfer  
Technical Electives (4 courses)

GPA of 2.00 must be maintained in all engineering courses taken to date.

### **Technical Electives**

- Any CHEM-3000+ course not already utilized for the chemical engineering major
- Any CENG-3000+ course not already utilized for the chemical engineering major
- CSCI-2300, Computer Programming for Scientists and Engineers or ENGR-2000, Computer Applications in Engineering
- Other courses approved by the engineering department

### **B.S. Degree in Civil Engineering**

#### *Required general education courses*

PHIL-3250, Ethics  
THEO-2000, Christian Moral Life

### *Science and Mathematics*

CHEM-1200/1201, General Chemistry I/Lab  
CHEM-1210/1211, General Chemistry II/Lab  
Basic Science Elective  
MATH-1300, Calculus I  
MATH-1350, Calculus II  
MATH-2300, Calculus III  
MATH-3100, Differential Equations  
PHYS-2100/2101, Classical Physics I/Lab  
PHYS-2110/2111, Classical Physics II/Lab

### *Engineering Courses*

CIVL-2020, Introduction to Digital Terrain  
Modeling  
CIVL-2130/2140, General Surveying/  
General Surveying Laboratory  
CIVL-2020, Introduction to Digital Terrain  
Modeling  
CIVL-3010, Soil Mechanics and Civil  
Materials Laboratory  
CIVL-3020, Environmental and Hydraulic  
Engineering Laboratory  
CIVL-3510, Structural Mechanics  
CIVL-4120, Soil Mechanics  
CIVL-4140, Foundation Engineering  
CIVL-4160, Transportation Engineering  
CIVL-4210, Hydrology  
CIVL-4230, Hydraulic Engineering  
CIVL-4310, Environmental Engineering  
CIVL-4320, Environmental Engineering II  
CIVL-4510, Steel Design  
CIVL-4530, Reinforced Concrete  
CIVL-4600, Civil Engineering Design I  
CIVL-4610, Civil Engineering Design II  
CIVL-4700, Civil Engineering Seminar  
CIVL-COMP, Senior Comprehensive  
Exam  
ENGR-1200, Introduction to Engineering  
ENGR-1100, Technical Drawing  
ENGR-2000, Computer Applications in  
Engineering  
ENGR-2300, Statics  
ENGR-2310, Dynamics  
ENGR-2320, Mechanics of Materials

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\* These courses must be completed with a “C-” or better.

<sup>^</sup> These courses must be completed with a “C-” or better to proceed to the next class in Chemical Engineering.

ENGR-3150, Statistical Analysis of Data  
ENGR-3170, Engineering Economy and Society  
ENGR-3300, Fluid Mechanics  
ENGR-3400, Materials Laboratory  
Engineering Elective (3 credits)  
Civil Engineering Technical Elective (3 credits)

Basic Science Elective: Choose from PHYS-1500 (Physical Geography), BIOL-1107 (Principles of Biology), BIOL-3355 (Ecology), or GEOE203 (UND Geology for Engineers)

Engineering Elective: Choose from any ENGR-3000+ course not already utilized for the civil engineering major

Civil Engineering Technical Elective: Choose from CIVL-4440 (Contracts and Specifications) or CIVL-4550 (Architectural Engineering)

GPA of 2.00 must be maintained in all engineering courses taken to date.

### **B.S. Degree in General Engineering with an emphasis in Electrical Engineering**

#### *Required general education courses*

PHIL-3250, Ethics  
THEO-2000, Christian Moral Life

#### *Science and Mathematics*

CHEM-1200/1201, General Chemistry I/Lab\*  
CHEM-1210/1211, General Chemistry II/Lab\*  
CSCI-2300 Programming for Scientists and Engineers

MATH-1300, Calculus I\*

MATH-1350, Calculus II\*

MATH-2300, Calculus III

MATH-2500, Linear Algebra

MATH-3100, Differential Equations

PHYS-2100/2101, Classical Physics I/Lab\*

PHYS-2110/2111, Classical Physics II/Lab\*

PHYS-3500, Electronics

#### *Engineering Courses*

EENG-2010, Introduction to Digital Electronics

EENG-2020, Introduction to Digital Electronics Laboratory

EENG-2060, Circuit Analysis\*^

EENG-3060, Circuits Laboratory I

EENG-3070, Circuits Laboratory II

EENG-3080, Electronics Laboratory I  
EENG-3090, Electronics Laboratory II  
EENG-3130, Linear Electric Circuits  
EENG-3210, Electronics I  
EENG-4210, Electronics II  
ENGR-1200, Introduction to Engineering  
ENGR-2300, Statics  
ENGR-2320, Mechanics of Materials  
ENGR-3150, Statistical Analysis of Data  
ENGR-3170, Engineering Economy & Society  
ENGR-3250, Thermodynamics  
ENGR-3300, Fluid Mechanics  
ENGR-3400, Materials Laboratory  
ENGR-4600, Engineering Design I  
ENGR-4800, Engineering Design II  
ENGR-COMP, Senior Comprehensive Exam

#### *Electrical Engineering Electives (24 credits):*

The electrical engineering emphasis area requires a total 24 credit hours from the courses listed below (other courses may be approved by the BC Engineering Department). These courses include those offered by the UND Department of Electrical Engineering (Ee prefix). The UND courses will be offered on campus at BC through the UND Distance Engineering Degree Program at no extra cost to the student. Many students will elect to complete an ABET-accredited B.S. in Electrical Engineering from UND concurrently with earning a B.S. in General Engineering from BC.

Ee 314, Signals and Systems

Ee 316, Electric and Magnetic Fields

Ee 401, Electric Drives

Ee 405, Control Systems I

Ee 409, Distributed Networks

Ee 421, Electronics II

Ee 452, Embedded Systems

### **B.S. Degree in Mechanical Engineering**

#### *Required general education courses*

PHIL-3250, Ethics

THEO-2000, Christian Moral Life

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\* These courses must be completed with a "C-" or better.

^ These courses must be completed with a "C-" or better to proceed to the next class in Electrical Engineering.

### *Science and Mathematics*

CHEM-1200/1201, General Chemistry I/Lab  
CHEM-1210/1211, General Chemistry II/Lab  
MATH-1300, Calculus I  
MATH-1350, Calculus II  
MATH-2300, Calculus III  
MATH-3100, Differential Equations  
PHYS-2100/2101, Classical Physics I/Lab  
PHYS-2110/2111, Classical Physics II/Lab

### *Engineering Courses*

EENG-2060, Circuit Analysis  
EENG-3060, Circuits Laboratory I  
ENGR-1100, Technical Drawing  
ENGR-1200, Introduction to Engineering  
ENGR-1220, Introduction to Engineering Design Laboratory  
ENGR-2000, Computer Applications in Engineering  
ENGR-2300, Statics  
ENGR-2310, Dynamics  
ENGR-2320, Mechanics of Materials  
ENGR-3150, Statistical Analysis of Data  
ENGR-3170, Engineering Economy and Society

ENGR-3250, Thermodynamics  
ENGR-3300, Fluid Mechanics  
ENGR-3400, Materials Laboratory  
ENGR-3410, Thermofluids Laboratory  
ENGR-3500, Properties of Materials  
ENGR-3600, Heat and Mass Transfer  
MENG-3220, Design of Machinery  
MENG-3240, Junior Design  
MENG-4180, Manufacturing Processes Lab  
MENG-4240, System Dynamics & Controls  
MENG-4600, Mechanical Engineering Design I  
MENG-4610, Mechanical Engineering Design II  
MENG-4700, Senior Seminar  
MENG-4730, Mechanical Measurements Laboratory  
Engineering Elective (3 credits)  
Mechanical Engineering Electives (12 credits)  
MENG-COMP, Senior Comprehensive Exam

GPA of 2.00 must be maintained in all engineering courses taken to date

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## **Suggested sequence of courses for a Bachelor of Science degree in Chemical Engineering**

### **Freshman Year**

ENGR-1200, Introduction to Engineering	2	ENGR-2000, Comp Apps in Engr (Tech Elect)	2
CHEM-1200, General Chemistry I	3	CHEM-1210, General Chemistry II	3
CHEM-1201, General Chemistry I Lab	1	CHEM-1211, General Chemistry II Lab	1
MATH-1300, Calculus I	4	MATH-1350, Calculus II	4
PHYS-2100, Classical Physics I	4	PHYS-2110, Classical Physics II	4
PHYS-2101, Classical Physics I Lab	0	PHYS-2111, Classical Physics II Lab	0
ENGL-1010, English Composition	3	THEO-1100, Introduction to Theology	3
GNST-1000, BC Experience	cr		
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	17		17

### **Sophomore Year**

CENG-2010, Chem. Engr. Fundamentals	3	CENG-3050, Separations	3
ENGR-3500, Properties of Materials	3	CHEM-2210, Organic Chemistry II	3
ENGR-2300, Statics	3	CHEM-3800, Physical Chemistry I	3
CHEM-2200, Organic Chemistry I	3	CHEM-3801, Physical Chemistry I Lab	1
CHEM-2201, Organic Chemistry I Lab	1	MATH-3100, Differential Equations	3
MATH-2300, Calculus III	4	ENGR-3250, Thermodynamics	3
		EXSC-1115, Wellness for Life	1
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	17		17

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## Suggested sequence of courses for a Bachelor of Science degree in Chemical Engineering (Continued)

### Junior Year

ENGR-3150, Statistical Data Analysis	4	CENG-4210, Reactor Design	3
ENGR-3300, Fluid Mechanics	4	ENGR-3410, Engineering Lab II	2
ENGR-3400, Engineering Lab I	2	ENGR-3600, Heat and Mass Transfer	4
PHIL-1750, Principles of Nature	3	EXSC Fitness class	1
Foreign Language	4	Foreign Language	4
		THEO-2000, Christian Moral Life	3
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	17		17

### Senior Year

CENG-4600, Plant Design I	3	CENG-4610, Plant Design II	3
CENG-4080, Chemical Process Dynamics	3	Technical Elective	3
CHEM-3500, Biochemistry I	3	Technical Elective	3
PHIL-3250, Ethics	3	Aesthetic Foundation	3
ENGR-3170, Engineering Economy & Society	3	Aesthetic Foundation	3
CENG-3350, Chemical Engineering Lab I	2	Historical Foundation	3
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	17		18

### Final Semester

CENG-SRCOMP, Senior Comprehensive Exam	cr
Technical Elective	3
CENG-4350, Chemical Engineering Lab II	3
Historical Foundation	3
Philosophical Inquiry	3
EENG-2060, Circuit Analysis	3
Faith Foundation	3
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	18

**Program Total 155**

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## Suggested sequence of courses for a Bachelor of Science degree in Civil Engineering

### Freshman Year

ENGR-1200, Introduction to Engineering	2	ENGR-1100, Technical Drawing	2
PHYS-2100, Classical Physics I	4	PHYS-2110, Classical Physics II	4
PHYS-2101, Classical Physics I Lab	0	PHYS-2111, Classical Physics II Lab	0
CHEM-1200, General Chemistry I	3	CHEM-1210, General Chemistry II	3
CHEM-1201, General Chemistry Lab	1	CHEM-1211, General Chemistry Lab	1
MATH-1300, Calculus I	4	MATH-1350, Calculus II	4
ENGL-1010, English Composition	3	THEO-1100, Introduction to Theology	3
GNST-1000, BC Experience	cr		
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	17		17

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## Suggested sequence of courses for a Bachelor of Science degree in Civil Engineering (Continued)

### Sophomore Year

ENGR-2000, Computer Apps in Engineering	2	ENGR-2310, Dynamics	3
ENGR-2300, Statics	3	ENGR-2320, Mechanics of Materials	3
CIVL-2130/2140, General Surveying/Lab	3	MATH-3100, Differential Equations	3
MATH-2300, Calculus III	4	Aesthetic Experience	3
PHIL-1750, Principles of Nature	3	CIVL-2020, Intro to Digital Terrain Modeling	1
EXSC-1115, Wellness for Life	1	PHIL-3250, Ethics	3
		EXSC Fitness Course	1
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	16		17

### Junior Year

CIVL-3510, Structural Mechanics	4	CIVL-4510, Steel Design	3
ENGR-3150, Statistical Data Analysis	4	CIVL-4310, Environmental Engineering	3
ENGR-3300, Fluid Mechanics	4	CIVL-4230, Hydraulic Engineering	3
THEO-2000, Christian Moral Life	3	Historical Foundation	3
CIVL-4120, Soil Mechanics	3	CIVL-4140, Foundation Engineering	3
		Faith	3
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	18		18

### Senior Year

CIVL-4600, Civil Engineering Design I	2	CIVL-4610, Civil Engineering Design II	2
CIVL-4530, Reinforced Concrete	3	Basic Science Elective	4
ENGR-3400, Engineering Lab I	2	CIVL-4160, Transportation Engineering	3
CIVL-4320, Environmental Engineering II	3	CIVL-3010, Soil Mech. & Civil Materials Lab	2
Foreign Language	4	Foreign Language	4
CIVL-4210, Hydrology	3	ENGR-3170, Engineering Econ. & Society	3
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	17		18

### Ninth Semester

CIVL-4700, Civil Engineering Seminar	1
CIVL-3020, Env. & Hyd. Engineering Lab	2
CIVL-SRCOMP, Senior Comp. Examination	0
Engineering Elective	3
Civil Engineering Technical Elective	3
Philosophical Inquiry	3
Historical Foundation	3
Aesthetic Experience	3
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**Program Total 156**

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## Suggested sequence of courses for a Bachelor of Science degree in Electrical Engineering (UND) — B.S. in General Engineering (BC) Dual Degree

### Freshman Year

ENGR-1200, Introduction to Engineering	2	ENGR-1100, Technical Drawing	2
CHEM-1200, General Chemistry I	3	CHEM-1210, General Chemistry II	3
CHEM-1201, General Chemistry Lab	1	CHEM-1211, General Chemistry II Lab	1
MATH-1300, Calculus I	4	MATH-1350, Calculus II	4
PHYS-2100, Classical Physics I	4	PHYS-2110, Classical Physics II	4
PHYS-2101, Classical Physics I Lab	0	PHYS-2111, Classical Physics II Lab	0
*ENGL-1010, English Composition	3	THEO-1100, Introduction to Theology	3
GNST-1000, BC Experience	cr		
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	17		17

### Sophomore Year

EENG-2060, Circuit Analysis	3	EENG-2010, Intro to Digital Electronics	2
EENG-3060, Circuits Laboratory I	1	EENG-2020, Digital Electronics Laboratory	1
ENGR-2300, Statics	3	EENG-3130, Linear Electric Circuits	3
MATH-2300, Calculus III	4	EENG-3070, Circuits Laboratory II	1
THEO-2000, Christian Moral Life	3	MATH-3100, Differential Equations	3
PHIL-1750, Principles of Nature	3	CSCI-2300, Programming for Engrs & Scientists	3
EXSC Fitness Class	1	MATH-2500, Linear Algebra	3
		EXSC-1115, Wellness for Life	1
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	18		17

### Summer (Online classes)

Aesthetic Foundation	3
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### Junior Year

<b>EE 314, Signals and Systems</b>	<b>3</b>	<b>EE 409, Distributed Networks</b>	<b>3</b>
<b>EE 316, Electric &amp; Magnetic Fields</b>	<b>3</b>	<b>EE 452, Embedded Systems</b>	<b>3</b>
EEGR-3210, Electronics I	3	EEGR-4210, Electronics II	3
EEGR-3080, Electronics Laboratory I	2	EEGR-3090, Electronics Laboratory II	2
ENGR-3150, Statistical Data Analysis	4	ENGR-3250, Thermodynamics	3
PHIL-3250, Ethics	3	Foreign Language	4
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	18		18

### Senior Year

<b>EE 480, Senior Design I</b>	<b>3</b>	<b>EE 481, Senior Design II</b>	<b>3</b>
EENG Elective	3	EENG Elective	3
ENGR-3170, Engineering Economy & Society	3	<b>EE 401, Electric Drives</b>	<b>3</b>
ENGR-3300, Fluid Mechanics	4	<b>EE 405, Control Systems I</b>	<b>3</b>
Foreign Language	4	ENGR-2320, Mechanics of Materials	3
		Faith Foundation	3
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	17		18

In addition to ENGL-1010, all Math, Chemistry, Physics, Engineering, Civil Engineering, or CE Technical

Electives transferred to UND must be completed with a grade of C- or better.

GPA of 2.00 must be maintained in all engineering courses taken to date.

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## Suggested sequence of courses for a Bachelor of Science degree in Electrical Engineering (UND) — B.S. in General Engineering (BC) Dual Degree (Continued)

<b>Ninth Semester</b>	
ENGR-3400, Engineering Lab I	2
EENG Elective	3
ENGR-COMP, Senior Comp Examination	0
Historical Foundation	3
Historical Foundation	3
Philosophical Inquiry	3
Aesthetic Experience	3
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<b>Program Total</b>	<b>160</b>

In addition to ENGL-1010, all Math, Chemistry, Physics, Engineering, Civil Engineering, or CE Technical Electives transferred to UND must be completed with a grade of C– or better.  
GPA of 2.00 must be maintained in all engineering courses taken to date.

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## Suggested sequence of courses for a Bachelor of Science degree in Mechanical Engineering

<b>Freshman Year</b>	
ENGR-1200, Introduction to Engineering	2
PHYS-2100, Classical Physics I	4
PHYS-2101, Classical Physics I Lab	0
CHEM-1200, General Chemistry I	3
CHEM-1201, General Chemistry Lab	1
MATH-1300, Calculus I	4
ENGL-1010, English Composition	3
GNST-1000, BC Experience	cr
	<hr style="width: 100%; border: 0.5px solid black;"/>
<b>Program Total</b>	<b>18</b>
<b>Sophomore Year</b>	
ENGR-2000, Computer App in Engineering	2
ENGR-2300, Statics	3
ENGR-3500, Properties of Materials	3
MATH-2300, Calculus III	4
EENG-2060, Circuit Analysis	3
EENG-3060, Circuits Laboratory I	1
	<hr style="width: 100%; border: 0.5px solid black;"/>
<b>Program Total</b>	<b>16</b>
<b>Junior Year</b>	
MENG-3220, Design of Machinery	3
ENGR-3150, Statistical Data Analysis	4
ENGR-3300, Fluid Mechanics	4
ENGR-3400, Engineering Lab I	2
ENGR-3170, Engineering Economy & Society	2
MENG-4180, Manufacturing Processes Lab	3
	<hr style="width: 100%; border: 0.5px solid black;"/>
<b>Program Total</b>	<b>17</b>



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**Suggested sequence of courses for a Bachelor of Science degree in  
Mechanical Engineering (Continued)**

**Senior Year**

MENG-4600, Mechanical Engineering Design I	3	MENG-4610, Mechanical Engineering Design II	3
PHIL-3250 Ethics	3	Historical Foundation	3
MENG Elective	3	Aesthetic Experience	3
MENG-4730, Mechanical Measurements Lab	2	MENG Elective	3
Foreign Language	4	Foreign Language	4
MENG-4700, Mechanical Engineering Seminar	1	EXSC Fitness Class	1
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	16		17

**Ninth Semester**

Aesthetic Experience	1		
MENG Elective	3		
ENGR-SRCOMP, Senior Comp Examination	0		
MENG Elective	3		
Philosophical Inquiry	3		
Historical Foundation	3		
Faith	3		
	<hr/>		
	18		
		<b>Program Total</b>	<b>152</b>