

# The Arthur E. Imperatore School of Sciences and Arts

## Undergraduate Programs

The Imperatore School of Sciences and Arts (ISSA) is a dynamic teaching, learning and research community. As part of a multifaceted mission, ISSA is proud of its commitment to providing exciting, top-quality programs for undergraduates at Stevens to study sciences, computer science and the humanities. The quality of our programs derives from the quality of our world-class faculty. Undergraduate students are a welcomed part of our community. They are afforded ready access to faculty and to ongoing research activities on campus and off campus, and, as they pursue their studies, undergraduates are encouraged to participate in research and Technogenesis activities.

The faculty at ISSA has recently revised our offerings to emphasize project-based learning, to promote and reward independent study and scientific initiative, to expand research opportunities for undergraduates, and to promote the undergraduate thesis as a capstone for an undergraduate course of study. These changes are reflected in this catalog, and they are designed to enhance the undergraduate experience of the student with a serious interest in studying the sciences, computer science, and the humanities.

Three distinct curricula define our undergraduate program: the Bachelor of Science in the natural sciences, the Bachelor of Science in computer science, and the Bachelor of Arts for study in the humanities and social sciences.

### BACHELOR OF SCIENCE (Natural Sciences)

The science program at Stevens offers a remarkable opportunity for a career in today's scientific world. It prepares you to work at the frontiers of knowledge and to make significant contributions to science and the well-being of mankind. Careers in biology, chemistry, medicine, physics, mathematics and statistics, among others, are accessible through the science program.

The concepts, techniques and attitudes that are common to all sciences form the core courses of the Science program. You develop an awareness of the interactions among the various scientific disciplines and their individual contributions to the advancement of knowledge - the total picture of science. Additional courses in a chosen concentration prepare you exceptionally well with both the tools and knowledge to enter a profession immediately upon graduation, or to embark on advanced study leading to a graduate degree.

Studies during your freshman year include courses in biology, chemistry, computer science, mathematics and physics, and a sequence of courses in humanities. Studies in the humanities continue throughout the four-year program. In the next three years you may choose a concentration in the area of chemistry, chemical biology, mathematics, computational science, or physics. Upon successful completion of your studies, you are awarded the Bachelor of Science degree.

The minimal formal requirements for the science program are listed in the semester-by-semester schedule, including the Notes, on the following page. Courses may be taken in different order than listed. Consult the individual department schedule for more specific details.

#### Freshman Year

		Term I		
		Hrs. Per Wk.		
		Class	Lab	Sem. Cred.
Hu	Humanities (Group A or B)	3	0	3
Ma 115	Math Analysis I	3	0	3
PEP 111	Mechanics	3	0	3
CS 105	Intro. to Scientific Computing	2	2	3
<i>OR</i>				
CS 115	Intro to Computer Science	3	2	4
Ch 115	General Chemistry I	3	0	3

Ch 117	General Chemistry Lab I	0	3	1
PE 200	Physical Education I	0	2	1
<b>TOTAL</b>		<b>14</b>	<b>(15) 7</b>	<b>17(18)</b>

### Term II

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities (Group A or B)	3	0	3
Ma 116	Math Analysis II	3	0	3
PEP 112	Electricity and Magnetism	3	0	3
Ch 281	Biology and Biotechnology	3	0	3
Ch 116	General Chemistry II	3	0	3
Ch 118	Gen. Chemistry Lab II	0	3	1
PE 200	Physical Education II	0	2	1
<b>TOTAL</b>		<b>15</b>	<b>5</b>	<b>17</b>

### Sophomore Year

#### Term III

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities *	3	0	3
Ma 221	Differential Equations	4	0	4
Mgt	Economics ***	3	0	3
TE	Technical Elective	3	0(4)	3(4)
PEP 221	Physics Lab I	0	3	1
PE 200	Physical Education III	0	2	1
<b>TOTAL</b>		<b>13</b>	<b>5(9)</b>	<b>15(16)</b>

#### Term IV

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities *	3	0	3
SE	Science Elective **	3	3	3
	Thermodynamics †	3	0	3
TE	Technical Elective	3	0(4)	3(4)
PEP 222	Physics Lab II	0	3	1
PE 200	Physical Education IV	0	2	1
<b>TOTAL</b>		<b>12</b>	<b>8(12)</b>	<b>14(15)</b>

### Junior Year

**Term V**

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities	3	0	3
Ma 222	Probability & Statistics	3	0	3
TE	Technical Elective	3	0(3)	3(4)
TE	Technical Elective	3	0(4)	3(4)
PE 200	Physical Education V	0	2	1
<b>TOTAL</b>		<b>12</b>	<b>2(9)</b>	<b>13(15)</b>

**Term VI**

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities	3	0	3
PEP 242	Modern Physics	3	0	3
TE	Technical Elective	3	0	3
TE	Technical Elective	3	0(3)	3(4)
PE 200	Physical Education VI	0	2	1
<b>TOTAL</b>		<b>12</b>	<b>2(5)</b>	<b>13(14)</b>

**Senior Year****Term VII**

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities	3	0	3
TE	Technical Elective	3	0(3)	3(4)
TE	Technical Elective	3	0(3)	3(4)
TE	Technical Elective	3	0	3
E	Elective	3	0	3
<b>TOTAL</b>		<b>15</b>	<b>0(6)</b>	<b>15(17)</b>

**Term VIII**

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities	3	0	3
TE	Technical Elective	3	0(3)	3(4)
TE	Technical Elective	3	0(3)	3(4)
TE	Technical Elective	3	0	3
E	Elective	3	0	3



Ch 282	Intro Biology Lab	0	3	1
Hu	Humanities	3	0	3
PE 200	Physical Education II	0	2	1
<b>TOTAL</b>		<b>15</b>	<b>5</b>	<b>17</b>

### Sophomore Year

Term III				
		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
CS 383	Comp Org & Prog.	3	2	4
CS 385	Data Str. & Alg. II	3	0	3
CS 335	Computer Structures	3	0	3
Hu	Humanities	3	0	3
Hu	Humanities	3	0	3
PE 200	Physical Education III	0	2	1
<b>TOTAL</b>		<b>15</b>	<b>4</b>	<b>17</b>

Term IV				
		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
CS 488	Comp Architecture	3	0	3
CS 434	Theory of Computation	3	0	3
	Elective*	3	0	3
Ma 222	Probability & Statistics	3	0	3
Hu	Humanities	3	0	3
PE 200	Physical Education IV	0	2	1
<b>TOTAL</b>		<b>15</b>	<b>2</b>	<b>16</b>

### Junior Year

Term V				
		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
CS 492	Operating Systems	3	0	3
CS 496	Programming Languages	3	0	3
	Elective*	3	0	3
Hu	Humanities	3	0	3
PE 200	Physical Education V	0	2	1
<b>TOTAL</b>		<b>12</b>	<b>2</b>	<b>13</b>

### Term VI

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
CS 442	Database Mgmt. Systems	3	0	3
CS 494	Compiler Design	3	0	3
	Elective*	3	0	3
Hu	Humanities	3	0	3
PE 200	Physical Education VI	0	2	1
<b>TOTAL</b>		<b>12</b>	<b>2</b>	<b>13</b>

### Senior Year

#### Term VII

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
CS 551	Software Eng. & Pract. I	3	1	3
CS	CS Elective	3	0	3
	Elective*	3	0	3
	Elective*	3	0	3
Hu	Humanities	3	0	3
<b>TOTAL</b>		<b>15</b>	<b>1</b>	<b>15</b>

#### Term VIII

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
CS 552	Software Eng. & Pract. II	3	1	3
CS	CS Elective	3	0	3
	Elective*	3	0	3
	Free Elective	3	0	3
Hu	Humanities	3	0	3
<b>TOTAL</b>		<b>15</b>	<b>1</b>	<b>15</b>

Humanities Electives must include at least one of these courses: HPL 339, HPL 455, HSS 371, HHS 429.

\* Must include a total of six electives, of which one must either be Mgt 243, Mgt 111 or BT 121; one must be a science elective; and the remaining four must be CS courses or courses from a department-approved Application Area sequence.

Descriptions of the various concentrations and their requirements and options, where offered, appear in the section on Academic Departments. With each description, there is a sample schedule; you may see at what point you take the electives that form the concentration. Indicated above each sample is the elective sequence it depicts.

## BACHELOR OF ARTS

Stevens offers a distinctive B.A. degree program in the humanities. You can earn a traditional liberal arts degree in one of five fields of the humanities - English and American literature, history, philosophy, science and technology studies, or an interdisciplinary program of study - and complement it with a secondary concentration in the sciences, including computer science, as well as management, pre-medicine, or another humanities or social science subject. Thus, in addition to pursuing studies in one of the autonomous humanistic disciplines, you can also achieve a significant competence in a scientific, technological, or professional field. This degree program serves as a bridge between the two cultures - the literary-humanistic and the scientific-technological - and prepares you upon graduation, in a unique way, for the professional world of the future.

In the first two years you study the broad core that includes various sequences chosen among literature, history, philosophy and social sciences, together with courses in computing, mathematics, and the sciences. During this time, you also identify two areas of concentration. The major concentration must be in one of the humanistic fields.

For a secondary concentration you may build on the basic courses in computing, mathematics and science, and draw on the resources and courses available in other departments at Stevens. Secondary concentration programs have been prepared in computer science, economics, management, mathematics, physics and environmental engineering, as well as programs suitable for pre-law and pre-medical studies. Or you may complete a minor in a second field of the humanities or social sciences.

The last two years of the program are focused on the major and secondary concentrations, and a Senior Thesis is required as a culmination of the major concentration. While a limited number of electives are designated for the secondary concentration, the open electives can be utilized if greater depth is desired in the field.

The formal requirements for the humanities program are listed in the following semester-by-semester schedule, including the Notes.

#### Freshman Year

		Term I		
		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities A*	3	0	3
Hu	Humanities B*	3	0	3
CS 105	Intro to Scientific Computing	2	2	3
<i>OR</i>				
CS 115	Intro to Computer Science	3	2	4
	Mathematics			
	or			
	Science	3	0(3)	3(4)
PE 200	Physical Education I	0	2	1
<b>TOTAL</b>		<b>11(12)</b>	<b>4(7)</b>	<b>13(15)</b>

		Term II		
		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities A*	3	0	3
Hu	Humanities B*	3	0	3
Hu	Major Concentration	3	0	3
	Economics or Psychology	3	0	3

	Mathematics			
	or			
	Science	3	0(3)	3(4)
PE 200	Physical Education II	0	2	1
	<b>TOTAL</b>	<b>15</b>	<b>2(5)</b>	<b>16(17)</b>

### Sophomore Year

Term III				
		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities A*	3	0	3
Hu	Humanities B*	3	0	3
	Mathematics			
	or			
	Science <sup>§</sup>	3	0(3)	3(4)
	Secondary Concentration *	3	0(3)	3(4)
	Elective	3	0	3
PE 200	Physical Education III	0	2	1
	<b>TOTAL</b>	<b>15</b>	<b>2(8)</b>	<b>16(18)</b>

Term IV				
		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Humanities A*	3	0	3
Hu	Humanities B*	3	0	3
	Mathematics			
	or			
	Science <sup>§</sup>	3	0(3)	3(4)
	Secondary Concentration *	3	0(3)	3(4)
	Elective	3	0	3
PE 200	Physical Education IV	0	2	1
	<b>TOTAL</b>	<b>15</b>	<b>2(8)</b>	<b>16(18)</b>

### Junior Year

Term V				
		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Major Concentration	3	0	3
Hu	Major Concentration	3	0	3
	Secondary Concentration	3	0	3
	Elective	3	0	3



	Elective	3	0	3
PE 200	Physical Education V	0	2	1
	<b>TOTAL</b>	<b>15</b>	<b>2</b>	<b>16</b>

#### Term VI

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hum 301	Writing Seminar	3	0	3
Hu	Major Concentration	3	0	3
	Major Concentration	3	0	3
	Secondary Concentration	3	0	3
	Elective	3	0	3
PE 200	Physical Education VI	0	2	1
	<b>TOTAL</b>	<b>15</b>	<b>2</b>	<b>16</b>

#### Senior Year

#### Term VII

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu	Major Concentration	3	0	3
Hu	Major Concentration	3	0	3
	Secondary Concentration	3	0	3
	Elective	3	0	3
	Elective	3	0	3
	<b>TOTAL</b>	<b>15</b>	<b>0</b>	<b>15</b>

#### Term VIII

		Hrs. Per Wk.		
		Class	Lab	Sem.
		Cred.		
Hu 498	Senior Thesis	4	0	4
Hu	Major Concentration	3	0	3
	Elective	3	0	3
	Elective	3	0	3
	<b>TOTAL</b>	<b>13</b>	<b>0</b>	<b>13</b>

#### Notes:

\* A year-long sequence from group A: Literature and Philosophy and a yearlong sequence from Group B: History and Social Science is required for each of the first two years.

<sup>§</sup> One year of Mathematics is required. One year of Science courses is required (either 3-0-3 or 3-3-4). In the program schedule it is assumed the Mathematics courses are taken in the Freshman year and the Science courses in the Sophomore year, but the order may be reversed if prerequisites are met.

All students must satisfy an English Language proficiency requirement as described in this catalog.

### **DOUBLE DEGREE PROGRAM**

You may also elect to pursue a B.A. degree concurrently with a B.E. degree or a B.S. degree in one of the sciences. For example, you may earn a B.E. in environmental engineering and a B.A. in history, or a B.S. in chemical biology and a B.A. in philosophy, or a combination of a B.E. or B.S. degree with a B.A. degree in one of the three other humanities concentrations. Normally this would require eight additional courses and a senior thesis. At Stevens, you have the opportunity to consult advisors in the humanities department in your selection of courses for such a double degree program.