Accelerated Undergraduate/Graduate (BS/MS) Dual Degree Program in Computer Science (BS) and Computing Security (MS)

The BS degree in Computer Science requires 126 semester hours and the MS degree in Computing Security requires 30 semester hours. Undergraduate Computer Science majors who enter the accelerated BS in Computer Science/MS in Computing Security dual degree program are **permitted to double count up to 9 semester hours of overlapping courses**. Students working toward a BS degree in Computer Science will: (1) be well prepared in Mathematics; (2) possess sound programming skills as well as a theoretical foundation in computing; and (3) have additional opportunities to expand their knowledge in areas relevant to computing security through their choice of courses used for Computer Science Electives. The 9 semester hours of overlapping courses come from taking graduate level Computing Security courses which fulfill graduate program requirements and which are also used to satisfy credit hour requirements for the BS degree. Specifically, we recommend three graduate-level Computing Security courses (of up to 9 semester hours) be chosen to fulfill Free Electives required for the BS degree in Computer Science. Other than the 9 semester hours of courses that students may double count toward their BS degree in Computer Science and the MS degree in Computing Security, students complete all other BS degree requirements.

Undergraduate students with the proper prerequisites are permitted and encouraged to take graduate-level Computer Science courses. Students enrolled in the accelerated BS in Computer Science/MS in Computing Security dual degree program must complete ***all*** of their degree requirements for the BS degree in Computer Science before being permitted to register for their capstone requirement in the MS degree in Computing Security.

Undergraduate students who apply to RIT in Computer Science are accepted initially into the BS degree program. Students interested in the accelerated BS in Computer Science/MS in Computing Security dual degree program request entry into this program using a Change of Program form. **We encourage students to wait until at least the end of their second year at RIT before making this request**. Students should consult their academic advisor prior to officially filing the form. The Graduate Program Coordinator in Computing Security, with consultation ***if needed*** with appropriate individuals in Computer Science, determines whether or not a student is admitted into the accelerated BS in Computer Science/MS in Computing Security dual degree program.

We will not define all possible combinations of Computer Science and Computing Security courses and program paths that might be used for a BS in Computer Science/MS in Computing Security combination, although we illustrate one possible scenario below. Rather, we will advise students and guide them in putting together appropriate collections of courses that help them meet their goals once they are admitted to the accelerated BS in Computer Science/MS in Computing Security dual degree program.

The following pages have been taken directly from the document filed with New York State that proposed the accelerated BS in Computer Science/MS in Computing Security dual degree program under semesters. These pages have been ***updated*** to reflect several modest curriculum

changes that have taken place since that time. Table 1a and the notes that follow it depict the BS and MS degrees for a student planning to complete the accelerated BS in Computer Science/MS in Computing Security dual degree program. In this scenario, a student working toward their BS degree in Computer Science has chosen to take the following three courses to be used as Free Electives. These three courses belong to "system and network security" which is one of several recommended focus areas for students in the MS degree in Computing Security to consider.

- CSEC 731 (Web Server and Application Security Audits)
- CSEC 744 (Information Security Risk Management)
- CSEC 742 (Computer System Security)

The student in this scenario has opted to complete a thesis for their capstone requirement in the MS degree in Computing Security. While we have not specified any courses chosen by this student to fulfill Computer Science Electives, there are certainly a number of courses that a student might take, some of which would be directly related to computing security. We list some possible choices below:

- CSCI 455 (Principles of Computer Security)
- CSCI 462 (Introduction to Cryptography)
- CSCI 531 (Introduction to Security Measurement)
- CSCI 532 (Introduction to Intelligent Security Systems)
- CSCI 622 (Data Security and Privacy)
- CSCI 642 (Secure Coding)
- CSCI 762 (Advanced Cryptography)

Again, it should be stressed that this table only demonstrates the feasibility of completing the accelerated BS in Computer Science/MS in Computing Security dual degree program in one additional year beyond the BS degree.

Table 1a: Undergraduate Program Schedule (BS degree in Computer Science) and Graduate Program Schedule (MS in Computing Security)

Term: Fall 1		Check course classification (s)				Term: Spring 1		(Check course classification (s)			
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)	**Course Number & Title**	CR	LAS	Maj	New	Prerequisite(s)
CSCI 141 Computer Science I	4		X		None	CSCI 142 Computer Science II	4		X		CSCI 141 with grade of "C-" or better
MATH 181 Project-Based Calculus I (counts as General Education Perspectives course) **P-7A**	4	X			Math Placement Exam score	MATH 182 Project-Based Calculus II (counts as General Education Perspectives course) **P-7B**	4	X			C- or better in (MATH 181 or MATH 173 or 1016 282) or (MATH 171 and MATH 180) or equivalent courses
General Education Elective (required part of General Education Framework Foundation) (see Note 1) **F-1**	3	X				MATH 190 Discrete Mathematics for Computing (counts as General Education Electives course) **E-1**	3	X			None (co-requisites MATH 182 or MATH 182A or MATH 172 or equivalent courses)
General Education Framework Perspectives Course **P-2**	3	X				First-Year Writing **(students choose one of several approved Writing Intensive course**s) (required part of General Education Framework Foundation) (see Note 1) **F-2**	3	X			
General Education Framework Perspectives Course **P-3**	3	X				General Education Framework Perspectives Course **P-4**	3	X			
ACSC 010 Year One	0				New institute first year requirement launched with start of semesters	Wellness Activity	0				Institute requirement
Term credit total:	17	13	4			Term credit total:	17	13	4		
Term: Fall 2		Check course classification (s)				**Term: Spring 2**		(Check course classification (s)			
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)	**Course Number & Title**	CR	LAS	Maj	New	Prerequisite(s)
CSCI 243 The Mechanics of Programming	3		X		CSCI 142 with grade of "C-" or better or CSCI 140 with grade of "C-" or better or CSCI 242 with grade of "C-" or better	CSCI 250 Concepts of Computer Systems	3		X		CSCI 243 and MATH 190
CSCI 262 Introduction to Computer Science Theory or CSCI 263 Honors Introduction to Computer Science Theory	3		X		CSCI 141 and MATH 190	SWEN 261 Introduction to Software Engineering	3		X		CSCI 142 or CSCI 242 or CSCI 140 or 4003 243
MATH 251 Probability and Statistics I (counts as General Education Electives course) **E-2**	3	X			MATH 182 or MATH 172 or MATH 182A or 1016 282 or equivalent courses	MATH 241 Linear Algebra (counts as General Education Electives course) **E-3**	3	X			MATH 190 or MATH 200 or MATH 219 or MATH 220 or MATH 221 or MATH 221H or

												equivalent courses
Lab Science I (see Note 2) (counts as General Education Perspectives course) **P-5**	4	X				Lab Science 2 (see Note 2) (counts as General Education Electives course) **E-4**	4	X			
General Education Framework Perspectives Course (chosen from Ethical category) **P-1**	3	X				General Education Perspectives Course **P-6**	3	X			
Wellness Activity	0				Institute requirement						
Term credit total:	16	10	6			Term credit total:	16	10	6		

Term: Summer 2	Check course classification (s)				
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)
Co-op (see Note 3)	0		X		
Term credit total:	0	-	-	Student registers for co-op and is considered full time	

Term: Fall 3	Check course classification (s)				
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)
CSCI 251 Concepts of Parallel and Distributed Systems	3		X		CSCI 243 or SWEN 262
CSCI 320 Principles of Data Management	3		X		CSCI 142 and MATH 190
CS Elective Course 1	3		X		
Science Elective Course 1 (see Note 2) (counts as General Education Electives course) **E-5**	3	X			
General Education Framework **Writing Intensive course**) (see Note 4) (counts as General Education Immersion course) **I-1**	3	X			
Term credit total:	15	6	9		

Term: Spring 3	Check course classification (s)				
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)
Co-op	0		X		

Term: Fall 4	(Check course classification (s)				
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)
CSCI 261 Analysis of Algorithms or CSCI 264 Honors Analysis of Algorithms	3		X		(CSCI 243 or SWEN 262) and MATH 190
CS Elective Course 2	3		X		
CSCI 344 Programming	3		X		(CSCI 243 or SWEN 250 or IGME 309) and MATH

Term credit total:	0	-	-	Student registers for co-op and is considered full time	

Term: Spring 4				Check course classification (s)	
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)
CSCI 331 Introduction to Intelligent Systems	3		X		CSCI 261 or CSCI 264 and (MATH 251 or STAT 205)
CS Elective Course 3 (from one cluster)	3		X		
Science Elective Course 2 (see Note 2) (counts as General Education Electives course) **E-6**	3	X			
Free Elective Course 2 **CSEC-731 Web Server and Application Security Audits** (see Note 6)	3				Knowledge of system security
General Education Framework (counts as General Education Immersion course) **I-2**	3	X			
Term credit total:	15	6	6	Student also takes 3 credits of free electives	

Language Concepts					190
Free Elective Course 1	3				
CSCI 471 Professional Communications (**approved Writing Intensive course in program**)	3		X		4th or 5th year standing in CS
Term credit total:	15	0	12	Student also takes 3 credits of free electives	

Term: Fall 5				(Check course classification (s)	
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)
Co-op	0		X		
Term credit total:	0	-	-	Student registers for co-op and is considered full time	

Term: Spring 5					Check course classification (s)
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)
CS Elective Course 4 (from the same cluster as CS Elective Course 3)	3		X		
General Education Framework (counts as General Education Immersion course) **I-3**	3	X			
General Education Framework Electives course **E-7**	3	X			
Free Elective Course 3 **CSEC-733 Information Security Risk**	3				

Term:					Check course classification (s)
Course Number & Title	CR	LAS	Maj	New	Prerequisite(s)

Management					
Free Elective Course 4 **CSEC-742 Computer System Security** (see Note 7)	3				Knowledge of networking, systems, and security technologies
Term credit total:	15	6	3	Student also takes 6 credits of free electives	

Term credit total:					

Term: Fall 6th Year Graduate		Check course classification (s)			
Course Number & Title	CR	LA S	Maj	New	Prerequisite(s)
CSEC-601 Research Methods and Proposal Development	3		X		
CSEC-603 Enterprise Security	3		X		
CSEC-604 Cryptography and Authentication	3		X		
CSEC Graduate Elective One	3		X		
Term credit total	12		12		

Term: Spring 6th Year Graduate		Check course classification (s)			
Course Number & Title	CR	LA S	Maj	New	Prerequisite(s)
CSEC Graduate Elective Two	3		X		
CSEC Thesis	6		X		
Term credit total	9		9		

Program Totals:	**Total Credits: 156 (includes 9 hours of double counting graduate level courses)**	**Liberal Arts & Sciences: 64**	**CS Major: 50 CSEC Major: 30**	**Elective & Other: 12**

Cr: credits **LAS:** liberal arts & sciences **Maj:** major requirement **New:** new course
Prerequisite(s): list prerequisite(s) for the noted courses

NOTES:

(1) The General Education Framework includes a General Education Elective (effective with the 2015-2016 academic year) (3 semester credits) and a First-Year Writing Intensive course (currently students choose from URWT 150 or ENGL 150 or ISTE 110) (3 semester credits).

(2) Students must complete one of the following lab science sequences: (a) PHYS 211 and 212 (University Physics I and II), (b) CHMG 141/145 and 142/146 (General & Analytical Chemistry I/General & Analytical Chemistry I Lab and General & Analytical Chemistry II/General & Analytical Chemistry II Lab), or (c) BIOL 101/103 and 102/104 (General Biology I/General Biology I Lab and General Biology II/General Biology II Lab). Students are free to choose from approved science electives that either extend or complement their lab science selection.

(3) A student must complete a minimum of two semesters and one summer of co-op. The schedule presented in table 1a represents only one of several equally valid potential schedules. Students have the flexibility to arrange their co-op's to be completed using a different pattern. In support of this, it should be noted that all required Computer Science

courses shown above as taken in fall 3, fall 4, spring 4, and spring 5 are scheduled to be offered during fall and spring semesters as well as the summer session.

(4) The General Education Framework requires students to select eight courses that cover the seven Perspectives categories known as: Ethical, Artistic, Global, Social, Natural Science Inquiry, Scientific Principles, and Mathematical (two courses are selected from this last category). Programs may require specific courses in up to three Perspectives categories. Computer Science will have required choices for students in three Perspectives categories: one of several possible ethics courses in the Ethical Perspective (currently students choose from PHIL 306 or PHIL 102 or PHIL 202); their first lab science course (see note (2) in the Natural Science Inquiry Perspective (but this course can also be counted under the Scientific Principles Perspective); the two calculus courses in the Mathematical Perspective.

Programs may require specific courses for use as General Education Electives. Computer Science requires six of the possible seven General Education Electives to consist of: MATH 190, 251, and 241 (all part of the Mathematical Perspective); Lab Science Course 2 and Science Elective Courses 1 and 2 (once again we opt to count these courses as part of the Scientific Principles Perspective). This leaves one General Education Elective for students to choose for themselves. Students also have the option to count one of their Science Elective courses toward their Scientific Principles Perspective, thus giving themselves one more General Education Elective to choose for themselves.

Which General Education courses carry the Writing Intensive (WI) designation is constantly evolving. We designated course I-1 from General Education as an example only to confirm that we would complete the requirement by year 3.

(5) Courses designated as General Education are identified with a letter indicating the category (F for Foundation; P for Perspectives; I for Immersion; E for Electives) followed by a number (to distinguish courses within a category).

(6) CSEC-731 Web Server and Application Security Audits has a pre-requisite of knowledge of system security. Undergraduate Computer Science students who have completed CSCI 243 The Mechanics of Programming, CSCI 250 Concepts of Computer Systems, and CSCI 455 Principles of Computer Security have permission to take CSEC-731.

(7) CSEC-742 Computer System Security has a pre-requisite requirement of knowledge of networking, systems, and security technologies. Undergraduate Computer Science Students who have completed CSCI-250 Concepts of Computer Systems, CSCI-351 Data Communications and Networks, and CSCI-455 Principles of Computer Security have permission to take CSEC-742. Alternatively, the successful completion of CSEC-731 may also satisfy the pre-requisites.