



## Computer Science Electives and Clusters

Computer Science electives belong to one or more groupings called clusters. Undergraduate students with the proper prerequisites are permitted and *encouraged* to take graduate-level Computer Science courses. Students should note, however, that in some cases, a graduate-level course should **not** be selected if the student has completed a similar undergraduate-level course. Such details may be found in the course catalog description.

Some course numbers are **generic** and represent vehicles for faculty to introduce new courses in one or perhaps more than one cluster. At the undergraduate level there are **seminar courses** and at the graduate level there are **topics courses**. The entries for these generic course numbers, for example, CSCI 539 or CSCI 759, are identified as *generic* in the tables below and show the *potential cluster(s)* that might be associated with individual offerings of these generic course numbers. When specific seminar or topic instances are approved to be offered, we list them here and indicate the actual cluster or clusters they are associated with. Be sure to consult the notes table that follows the listings of undergraduate and graduate Computer Science Electives for important additional information and restrictions.

Guide to Computer Science Electives and Associated Clusters									
Course Number CSCI-	Undergraduate Course Names	Cluster							
		AOS	CGV	DMT	DSS	ISS	LTS	SEC	THR
351	Data Communications and Networks (name change effective as of 2145)				X			X	
352	Operating Systems	X							
420 (1)	Principles of Data Mining			X					
431	Introduction to Computer Vision					X			
452	Systems Programming	X							
453	Computer Architecture	X							
455	Principles of Computer Security							X	
462	Introduction to Cryptography				X			X	X
464	XTreme Theory								X
509	Seminar in Computer Science ( <i>generic</i> ) (no cluster associated with this course)								
509	Seminar in Computer Science: Object-Oriented Programming with an International Experience (no								

	cluster associated with this course)								
510	Introduction to Computer Graphics		X						
519	Seminar in Computer Graphics ( <i>generic</i> )		X						
529	Seminar in Data Management ( <i>generic</i> )			X	X			X	
531	Introduction to Security Measurement					X		X	
532	Introduction to Intelligent Security Systems					X		X	
539	Seminar in Intelligent Systems ( <i>generic</i> )					X		X	
539	Seminar in Intelligent Systems: Design and Programming of Inexpensive Robots					X			
539	Seminar in Intelligent Systems: Puzzles for Computing ( <b>also approved as an honors course</b> )					X			
541 <sup>(5)</sup>	Programming Skills						X		
549	Seminar in Languages and Tools ( <i>generic</i> )						X	X	
559	Seminar in Systems ( <i>generic</i> )	X			X			X	
569	Seminar in Theory ( <i>generic</i> )							X	X
571	Honors Capstone Research ( <b>also approved as an honors course</b> )								
599 <sup>(2)</sup>	Computer Science Undergraduate Independent Study								

Guide to Computer Science Electives and Associated Clusters									
Course Number CSCI-	Graduate Course Names	Cluster							
		AOS	CGV	DMT	DSS	ISS	LTS	SEC	THR
610	Foundations of Computer Graphics		X						
620 <sup>(1)</sup>	Introduction to Big Data			X					
621	Database System Implementation			X					

622	Data Security and Privacy (name change effective as of 2145)			X				X	
630 <sup>(3)</sup>	Foundations of Intelligent Systems					X			
631	Foundations of Computer Vision					X			
632	Mobile Robot Programming					X			
633	Biologically Inspired Intelligent Systems					X			
641 <sup>(5)</sup>	Advanced Programming Skills						X		
642	Secure Coding							X	
651	Foundations of Computer Networks				X			X	
652	Distributed Systems				X				
654	Foundations of Parallel Computing				X				
661	Foundations of Computer Science Theory								X
662	Foundations of Cryptography				X			X	X
664	Computational Complexity								X
665 <sup>(4)</sup>	Foundations of Algorithms								X
687	Graduate Research Seminar (no cluster associated with this course)								
709	Topics in Computer Science ( <i>generic</i> ) (no cluster associated with this course)								
711	Global Illumination		X						
712	Computer Animation: Algorithms and Techniques		X						
713	Applied Perception in Graphics and Visualization		X						
714	Scientific Visualization		X						
715	Applications in Virtual Reality		X						
716	Computational Geometry		X						X
719	Topics in Computer Graphics ( <i>generic</i> )		X						
719	Topics in Computer Graphics: Interactive Music Experience		X						
720	Big Data Analytics			X					
721	Data Cleaning and Preparation			X					
722	Data Analytics with Cognitive Computing			X					

724	Web Services and Service Oriented Computing			X	X				
729	Topics in Data Management ( <i>generic</i> )			X	X			X	
729	Topics in Data Management: Graph Databases			X					
731	Advanced Computer Vision					X			
732	Image Understanding					X			
734	Foundations of Security Measurement and Evaluation							X	
735	Foundations of Intelligent Security Systems					X		X	
736	Neural Networks and Machine Learning					X			
737	Pattern Recognition					X			
739	Topics in Intelligent Systems ( <i>generic</i> )					X		X	
739	Topics in Intelligent Systems – Introduction to Machine Learning					X		X	
739	Topics in Intelligent Systems – Multiagent Systems					X			
740	Programming Language Theory						X		X
742	Compiler Construction						X		
746	Software Development Tools						X		
749	Topics in Languages and Tools ( <i>generic</i> )						X		X
749	Topics in Languages and Tools: Scripting Languages						X		X
759	Topics in Systems ( <i>generic</i> )	X			X			X	
759	Topics in Systems: Pervasive and Mobile Systems				X				
761	Topics in Advanced Algorithms								X
762	Advanced Cryptography				X			X	X
769	Topics in Theory ( <i>generic</i> )							X	X
799 (2)	Computer Science Graduate Independent Study								

Notes Containing Additional Information or Restrictions	
Note	Information/Restrictions
1	Undergraduate students who take both CSCI 320 and CSCI 420 are <i>not permitted</i> to take CSCI 620 as a Computer Science elective or for credit toward

	a Computer Science degree. Many graduate-level Data Management courses that require CSCI 620 as a prerequisite also permit students to enroll if they have completed CSCI 320 <b>and</b> CSCI 420. Some graduate-level Data Management courses that require CSCI 620 as a prerequisite will permit students to enroll if they have completed just CSCI 320.
2	Independent study projects are proposed by a student working in conjunction with a faculty member who agrees to sponsor the project. The proposal form offers the student and faculty member a chance to propose that the project fit in no cluster or be associated with one specific cluster – the proposed cluster designation is reviewed by the coordinators when the proposal form is submitted. Approval of the independent study project includes approval of the proposed cluster designation, if one is specified.
3	Students who receive permission may substitute CSCI 630 for CSCI 331. Students who complete CSCI 331 <b>may not select</b> CSCI 630 as a Computer Science elective or for credit toward a Computer Science degree.
4	Students who receive permission may substitute CSCI 665 for CSCI 261 or CSCI 264. Students who complete CSCI 261 or CSCI 264 <b>may not select</b> CSCI 665 as a Computer Science elective or for credit toward a Computer Science degree.
5	CSCI 541 and CSCI 641 are co-listed. Students are permitted to take the course for credit more than once, provided each instance deals with a different paradigm and language. Prior to term 2175, one specific instance was titled “Advanced C++”. As of 2175, this instance is now titled “Efficient Design in Modern C++”. Students are <b>not</b> permitted to take both of these instances for credit.

Guide to Computer Science Clusters			
AOS	Architecture and Operating Systems	CGV	Computer Graphics and Visualization
DMT	Data Management	DSS	Distributed Systems
ISS	Intelligent Systems	LTS	Languages and Tools
SEC	Security	THR	Theory

Partial Guide to RIT Course Numbering Scheme	
Course Number Range	Interpretation
101-199	Introductory lower-division undergraduate courses
200-299	Lower-division undergraduate courses
300-499	Upper-division undergraduate courses
500-599	Advanced upper-division undergraduate courses
600-699	Introductory graduate courses
700-799	Advanced graduate courses