



Memo

November 17, 2017

To: Randy Smith, Vice Provost for Academic Programs
Office of Academic Affairs

From: Rosie Quinzon-Bonello, Assistant Dean for Curriculum and Assessment

RE: Computer Science and Engineering Undergraduate Program Curriculum Change

On November 15, 2017, the College of Engineering Committee for Academic Affairs (CCAA) discussed a curriculum change request submitted by the Computer Science and Engineering Undergraduate Program. The reason for such a request was the result of the program's recent ABET Accreditation visit that took place on October 15-17, 2017.

The CSE program proposed the following:

Make CSE 3341 *Principles of Programming Languages* a required course. This course along with its partner course, CSE 3321 *Automata and Formal Language* were part of a list of Computer Science Core choices. The change would make CSE 3341 a required course for all CSE undergraduates and CSE 3321, if taken, a technical elective. There would be no increase in the total number of credit hours.

A committee vote was taken – 11 approved, 0 opposed, and 0 abstentions. A properly constituted quorum was present.

CSE Proposal to Revise the BS CSE Curriculum

1. Background

There are three majors programs in the CSE Department: BS-CSE in Engineering, and BS-CIS and BA-CIS in Arts & Sciences. Over the years, we have attempted to keep the computer science of the BS-CSE and BS-CIS programs as close to identical as possible. This was a deliberate decision, intended to ensure that graduates of either program are equally attractive to potential employers.

Recently, the BS-CSE, completed an ABET accreditation visit from the CAC (Computing Accreditation Commission) and EAC (Engineering Accreditation Commission). The CAC accreditation criteria for computer science programs include the requirement that the curriculum include coverage of programming language concepts. Some of the courses currently required of all students in both the BS-CSE and BS-CIS programs, such as CSE 2221 and 2231, do indeed cover some of the topics that are normally included under the rubric of programming-language-concepts, but other topics are not included.

We do offer a course, CSE 3341, *Principles of Programming Languages*, (3 cr hrs), that is devoted to in-depth coverage of programming-language-concepts, but this course is a *Core-Choice* course; i.e., students may choose to take either CSE 3341 or an alternative course, CSE 3321, *Automata and Formal Languages*, (3 cr hrs). Students may also take both of these courses in which case, the second one counts as a technical elective in their program.

Although CSE 3321 includes some topics that are relevant to the discussion of programming language concepts, the approach is formal and focuses on theoretical results rather than practical considerations that are expected in discussions of programming language concepts.

2. Recent Developments

During the recent ABET program evaluation of the BS-CSE program, the evaluators cited us for insufficient coverage of programming language concepts in the curriculum that all students in that program must complete. The evaluators noted that while many students do indeed take CSE 3341, not all students do so, hence the shortcoming.

3. Proposed Change and Process

Following this finding, the departmental faculty had an extensive e-mail discussion about the appropriate course of action to address this finding by ABET. One proposal considered was to make CSE 3341 a *required* course rather than a *core-choice* course, with CSE 3321 becoming strictly a technical elective course.

A selection of juniors and seniors who are currently taking CSE 3341, some of whom had completed

CSE 3321 previously, were polled for their opinions on this proposal. An email message describing the proposed change was sent to all students currently in either major. Although there was some concern among faculty that this change would reduce the flexibility of the programs, there was consensus that, given ABET's finding, we had to take this action. Most students also agreed that making CSE 3341 a required course with 3321 becoming a technical elective was appropriate.

The proposal to make *CSE 3341*, Principles of Programming Languages, a required course for all future students in the BS-CIS (and BS-CSE) program(s), with *CSE 3321* becoming a technical elective, was discussed and approved unanimously at a meeting of the CSE faculty on Oct. 25, 2017.

This policy will take effect with the incoming class of Autumn 2018. All current students who have not taken CSE 3341 or 3321 will be encouraged to take CSE 3341. Current students who have taken 3321 and wish not to take CSE 3341 will not be negatively impacted by this policy. The CSE Program Coordinator will work with the Registrar's Office to make the appropriate adjustment to the Degree Audit.

4. Summary

The *only* change being proposed is that BS-CSE (and BS-CIS) majors be required to take *CSE 3341* instead of being required to take either CSE 3341 or CSE 3321. As is the case currently, students may take both courses in which case CSE 3321 will count as a technical elective. All other aspects of the program, including the total number of credit hours for the program, will remain unchanged. This change, once implemented, will ensure that the program is consistent with the curricular requirements of the accreditation criteria of the CAC.

BS CSE Requirements

General College of Engineering Requirements		Hours
Engr 1100	Introduction to Ohio State and Computer Science and Engineering	1
Engr 1181 and Engr 1182	Fundamentals of Engineering I and II	4
Math 1151 and Math 1172	Calculus I and Engineering Mathematics A	10
Physics 1250	Mechanics, Thermal Physics, Waves	5
Computer Science Core		
CSE 2221 and CSE 2231	Software I: Software Components and Software II: Software Development and Design	8
CSE 2321 and CSE 2331	Foundations I: Discrete Structures and Foundations II: Data Structures and Algorithms	6
CSE 2421 and CSE 2431	Systems I: Introduction to Low-Level Programming and Computer Organization and Systems II: Introduction to Operating Systems	7
CSE 3341	Principles of Programming Languages	3
Choose one of the following:		
CSE 2501	Social, Ethical, and Professional Issues in Computing	1
Philos 1338	Ethics in the Professions: Introduction to Computing Ethics and Effective Presentation	4
Non-Computer Science Core		
ECE 2020 and ECE 2060	Introduction to Analog Systems and Circuits and Introduction to Digital Logic	6
Math 2568 and Math 3345	Linear Algebra and Foundations of Higher Mathematics	6
Stat 3470	Introduction to Probability and Statistics for Engineers	3
Computer Science Core Choices (requirements for specialization option may dictate core choices)		
CSE 3231 or CSE 3241	Software Engineering Techniques or Introduction to Database Systems	3
CSE 3321 or CSE 3341	Automata and Formal Languages or Principles of Programming Languages	3
CSE 3421 or CSE 3461	Introduction to Computer Architecture or Computer Networking and Internet Technologies	3
CSE 3521 or CSE 3541	Survey of Artificial Intelligence I: Basic Techniques or Computer Game and Animation Techniques	3
Choose one of the following:		
CSE 3901	Project: Design, Development, and Documentation of Web Applications	4
CSE 3902	Project: Design, Development, and Documentation of Interactive Systems	4
CSE 3903	Project: Design, Development, and Documentation of System Software	4
Choose one of the following:		
CSE 5911	Capstone Design: Software Applications	4
CSE 5912	Capstone Design: Game Design and Development	4
CSE 5913	Capstone Design: Computer Animation	4
CSE 5914	Capstone Design: Knowledge-Based Systems	4
CSE 5915	Capstone Design: Information Systems	4
CSE Math and Science Electives (choose at least 8 hours)		
Math 2153	Calculus III	4
Math 2255 or Math 2415	Differential Equations and Their Applications or Ordinary and Partial Differential Equations	3
Stat 4201	Introduction to Mathematical Statistics I	4
Stat 5301	Intermediate Data Analysis I	4
Anthrop 2200	Introduction to Physical Anthropology	4
Biology 1113	Biological Sciences: Energy Transfer and Development	4
Biology 1114	Biological Sciences: Form, Function, Diversity, and Ecology	4
Chem 1210	General Chemistry I	5
Chem 1250	General Chemistry for Engineers	4
EarthSc 1121	The Dynamic Earth	4
EarthSc 1122	Earth Through Time	4
ENR 2100	Introduction to Environmental Science	3
ENR 3000 and ENR 3001	Soil Science and Soil Science Laboratory	4
FdScTe 2200	The Science of Food	3
HCS 2201	Ecology of Managed Plant Systems	4
HCS 2202	Form and Function in Cultivated Plants	4
Physics 1251	E&M, Optics, Modern Physics	5
CSE Technical Electives (choose at least 17 hours that meet the following criteria)		
Any CSE course 3000-level or above not already used to fulfill another requirement		
Requirements for specialization option may dictate technical elective choices		
At most 1 hour of CSE 4251-4255		
At most 2 hours of CSE 4193, 4193H, 4998, 4998H, 4999 or 4999H		
At most 8 hours of non-CSE courses at the 2000-level and above approved by the academic advisor		
General Education (choose at least 24 hours) For detailed GE curriculum requirements and course lists visit advising.engineering.osu.edu		

BS CSE Sample Schedule

	Autumn		Spring	
Year 1	<i>Engr 1100</i>	1	<i>CSE 2221</i>	4
	<i>Engr 1181</i>	2	<i>Engr 1182</i>	2
	<i>Math 1151</i>	5	Math 1172	5
	<i>Physics 1250</i>	5	<i>English 1110</i>	3
	CSE 1223	3	GE	3
		16		17
Year 2	CSE 2231	4	CSE 2331	3
	CSE 2321	3	CSE 2421	4
	Stat 3470	3	ECE 2060	3
	Math or Science Elective	4	Math 3345	3
	GE	3	GE	3
		17		16
Year 3	CSE 2431	3	CSE 32X1	3
	CSE 390X	4	CSE 34X1	3
	ECE 2020	3	CSE 35X1	3
	Math or Science Elective	4	CSE 2501	1
	GE	3	Math 2568	3
		17		16
Year 4	CSE 33X1 3341	3	CSE 591X	4
	Technical Elective	3	Technical Elective	3
	Technical Elective	3	Technical Elective	3
	Technical Elective	3	Technical Elective	2
	GE	3	GE	3
		15		15

Admission to the CSE major requires:

- Completion of the courses shown above in *italics* or honors versions thereof
- At least 15 hours earned at Ohio State
- Cumulative GPA of at least 3.2 and a major GPA of at least 2.0 **OR** cumulative GPA of at least 3.0 and a major GPA of at least 3.2 (must have completed through CSE 2321)

Note: Majors must select a specialization option. Requirements for the specialization options may dictate core and technical elective choices.