# PROGRAM REVIEW – CURRICULUM PACKET
## 2018-2019

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# COMPUTER SCIENCE

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This report includes course student learning outcome (cSLO) assessment summaries from 2015-16 to 2017-18.

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**COURSE OFFERINGS**

Table 1. Course offerings per academic year from 2015-16 to 2018-19

| Course Name | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 |
|---|---|---|---|---|
| CS G101 | x | x | x | x |
| CS G102 | x | x | x | x |
| CS G121 | x | x | x | x |
| CS G127 |   | x | x | x |
| CS G130 | x | x | x | x |
| CS G131 |   |   | x | x |
| CS G147 | x | x | x | x |
| CS G148 |   | x | x | x |
| CS G149 |   | x | x | x |
| CS G150 | x | x | x | x |
| CS G153 | x | x | x | x |
| CS G154 | x | x | x | x |
| CS G167 | x |   |   |   |
| CS G175 | x | x | x | x |
| CS G178 | x | x | x | x |
| CS G185 |   | x | x | x |
| CS G189 | x | x | x | x |
| CS G196 |   | x | x | x |
| CS G242 | x | x | x | x |
| CS G262 | x | x | x | x |

**COURSE ASSESSMENT STATUS**

| Fully Assessed | Partially Assessed | No Assessment |
|---|---|---|
| ↑ | ↔ | ↓ |

Table 2. Course Assessment Status between 2015-16 and 2017-18
*No enrollment data between 2013-14 and 2018-19

| Course Name | Total cSLOs | No. cSLOs Assessed | Assessment Status | | Last Term Offered |
|---|---|---|---|---|---|
| CS G101 | 4 | 0 out of 4 | No Assessment | ↓ | Spring 2019 |
| CS G102 | 5 | 1 out of 5 | Partially Assessed | ↔ | Spring 2019 |
| CS G121 | 7 | 0 out of 7 | No Assessment | ↓ | Fall 2018 |
| CS G127 | 7 | 1 out of 7 | Partially Assessed | ↔ | Spring 2017 |
| CS G130 | 6 | 2 out of 6 | Partially Assessed | ↔ | Spring 2019 |
| CS G131 | 4 | 0 out of 4 | No Assessment | ↓ | Fall 2018 |
| CS G135 | 7 | 0 out of 7 | No Assessment | ↓ | * |
| CS G147 | 7 | 0 out of 7 | No Assessment | ↓ | Spring 2018 |
| CS G148 | 3 | 1 out of 3 | Partially Assessed | ↔ | Fall 2017 |

| Course Name | Total cSLOs | No. cSLOs Assessed | Assessment Status | | Last Term Offered |
|---|---|---|---|---|---|
| CS G149 | 3 | 0 out of 3 | No Assessment | ↓ | Spring 2017 |
| CS G150 | 3 | 0 out of 3 | No Assessment | ↓ | Spring 2018 |
| CS G153 | 8 | 0 out of 8 | No Assessment | ↓ | Spring 2019 |
| CS G154 | 5 | 2 out of 5 | Partially Assessed | ↔ | * |
| CS G167 | 4 | 0 out of 4 | No Assessment | ↓ | Spring 2014 |
| CS G175 | 8 | 3 out of 8 | Partially Assessed | ↔ | Spring 2019 |
| CS G178 | 2 | 0 out of 2 | No Assessment | ↓ | Fall 2018 |
| CS G189 | 5 | 1 out of 5 | Partially Assessed | ↔ | Spring 2019 |
| CS G196 | 3 | 0 out of 3 | No Assessment | ↓ | Fall 2018 |
| CS G242 | 4 | 0 out of 4 | No Assessment | ↓ | Fall 2018 |
| CS G262 | 5 | 2 out of 5 | Partially Assessed | ↔ | Spring 2019 |

Table 3. cSLOs that were not assessed between 2015-16 and 2017-18

| Course Name | cSLO Name | cSLO to Assessed |
|---|---|---|
| CS G101 | cSLO 1 | Assess pros/cons of Communication Software in Business |
| CS G101 | cSLO 2 | Evaluate pros and cons of Communication Software |
| CS G101 | cSLO 3 | Compare and contrast various types of computer input devices. |
| CS G101 | cSLO 4 | Explain the usage of the various components of the system unit. |
| CS G102 | cSLO 1 | Describe the basic building blocks of operating systems. |
| CS G102 | cSLO 2 | Compare and contrast common software development methodology. |
| CS G102 | cSLO 3 | Describe the differences between the common programming languages. |
| CS G102 | cSLO 5 | Describe the fundamentals of computer networking. |
| CS G121 | cSLO 1 | Develop 3D polygon objects. |
| CS G121 | cSLO 2 | Demonstrate understanding of 3D game engines. |
| CS G121 | cSLO 3 | Create and apply object textures. |
| CS G121 | cSLO 4 | Demonstrate knowledge of texture and alpha mapping. |
| CS G121 | cSLO 5 | Apply transparencies and shading. |
| CS G121 | cSLO 6 | Apply material to objects and create specialized material effects. |
| CS G121 | cSLO 7 | Integrate 3D artwork with game engines. |
| CS G127 | cSLO 1 | Given a set of requirements for a small business or scientific problem, prepare the software development specification. |
| CS G127 | cSLO 2 | Design the software components and database structures for code sections. |
| CS G127 | cSLO 3 | Create a project with the correct file and database structure. |
| CS G127 | cSLO 4 | Partition the programs into appropriate functions and Web pages. |
| CS G127 | cSLO 5 | Design a simple We based user interface to satisfy the user interactions. |
| CS G127 | cSLO 7 | Add the appropriate error handling routines |
| CS G130 | cSLO 2 | Demonstrate the fundamentals of computer-based operating systems and utility programs. |
| CS G130 | cSLO 4 | Compare and contrast communication and networking concepts including local area networks (LAN), metropolitan area networks (MAN), wide area networks (WAN), topologies, wired and wireless media approaches, network connectivity issues and methods, general and firewall security. |
| CS G130 | cSLO 5 | Describe the information systems development approach, including system development life cycle, analysis, design, implementation and support. |
| CS G130 | cSLO 6 | Identify and discuss computer ethics, crime, privacy and other social implications. |
| CS G131 | cSLO 1 | Create programs partitioned into appropriate functions and modules. |
| CS G131 | cSLO 2 | Develop programming solutions using all the necessary expressions, branches, loops, functions, classes. |
| CS G131 | cSLO 3 | Implement the appropriate error handling routines. |
| CS G131 | cSLO 4 | Design a simple graphical user interface to satisfy the user interactions. |
| CS G135 | cSLO 1 | Understand the concepts and terminologies of the UNIX/Linux operating System. |

| Course Name | cSLO Name | cSLO to Assessed |
| --- | --- | --- |
| CS G135 | cSLO 2 | Install and configure the UNIX/Linux operating system. |
| CS G135 | cSLO 3 | Utilize administrative commands to maintain a local working system. |
| CS G135 | cSLO 4 | Manage files and directories. |
| CS G135 | cSLO 5 | Manage permissions and security. |
| CS G135 | cSLO 6 | Write simple shell scripts to enable automation. |
| CS G135 | cSLO 7 | Manage tasks and services. |
| CS G147 | cSLO 1 | Understand and describe the world of 3D interactive game programming. |
| CS G147 | cSLO 2 | Compare and contrast the functionality in the existing gaming engines. |
| CS G147 | cSLO 3 | Demonstrate knowledge of current and popular gaming engines for the Windows platform. |
| CS G147 | cSLO 4 | Distinguish and apply the theory and principle of the mathematical algorithms utilized in 3D games. |
| CS G147 | cSLO 5 | Apply theoretical knowledge with hands-on lab assignments for drawing primitive objects and applying lighting, textures blending, stenciling, shadowing, and transparency techniques. |
| CS G147 | cSLO 6 | Integrate sound and video into the fabric of a computer game design games that interact with user I/O devices such as joysticks. |
| CS G147 | cSLO 7 | Use the internet and library resources to research topics and communicate via e-mail. |
| CS G148 | cSLO 1 | Compare and contrast existing game engines. |
| CS G148 | cSLO 2 | Describe the internal components of a game engine and their interactions. |
| CS G149 | cSLO 1 | Understand the basic principles of computer networking. |
| CS G149 | cSLO 2 | Describe the components of a Multiplayer Online Game and the distribution and interaction of these components on the network. |
| CS G149 | cSLO 3 | Explain the tools used by teams of developers to create Massively Multiplayer online Games (MMOGs). |
| CS G150 | cSLO 1 | Describe the current state of the mobile game environment. |
| CS G150 | cSLO 2 | Explain the component internals of mobile games and the interactions of these components. |
| CS G150 | cSLO 3 | Compare and contrast the current design tools, development environments, debuggingfacilities and deployment packages. |
| CS G153 | cSLO 1 | Given a set of requirements for a small business or scientific problem, prepare the software development specification. |
| CS G153 | cSLO 2 | Design the software components and draw flow-charts for the complex code sections. |
| CS G153 | cSLO 3 | Design, implement, test, and debug a program that uses each of the following fundamental programming constructs: basic computation, simple I/O, standard conditional and iterative structures, and the definition of functions. |
| CS G153 | cSLO 4 | Apply the techniques of structured (functional) decomposition to break a program into smaller pieces. |
| CS G153 | cSLO 5 | Describe and utilize the mechanics of parameter passing. |
| CS G153 | cSLO 6 | Design a simple user interface to satisfy the user interactions. |
| CS G153 | cSLO 7 | Code all the necessary expressions, branches, loops, functions, classes. |
| CS G153 | cSLO 8 | Add the appropriate error handling routines. |
| CS G154 | cSLO 2 | Describe object-oriented class hierarchy and inheritance. |
| CS G154 | cSLO 3 | Implement, test, and debug simple recursive functions and procedures. |
| CS G154 | cSLO 4 | Explain software development methodologies and debugging techniques. |
| CS G167 | cSLO 1 | Utilize Objective-C language to create basic object oriented applications. |
| CS G167 | cSLO 2 | Demonstrate the theory and application of the Model-View-Controller (MVC) methodology for designing applications. |
| CS G167 | cSLO 3 | Utilize the Apple iPhone development environment including Cocoa Touch, Xcode, and Interface Builder. |
| CS G167 | cSLO 4 | Develop applications incorporating iPhone technologies using (but not limited to) Core Audio, Animation, Data, Location, GPS (Global Position Syst.), Audio/Video, Multitasking, and Web Services. |

| Course Name | cSLO Name | cSLO to Assessed |
|---|---|---|
| CS G175 | cSLO 1 | Given a set of requirements for a small business or scientific problem, prepare the software development specification. |
| CS G175 | cSLO 2 | Design the software components and draw flow-charts for the complex code sections. |
| CS G175 | cSLO 5 | Describe and utilize the mechanics of parameter passing. |
| CS G175 | cSLO 6 | Design a simple user interface to satisfy the user interactions. |
| CS G175 | cSLO 7 | Code all the necessary expressions, branches, loops, functions, classes. |
| CS G178 | cSLO 1 | Understand the basic principles of the event-driven and graphical programming model. |
| CS G178 | cSLO 2 | Explain the mechanisms for proper class hierarchy and component design in .Net. |
| CS G189 | cSLO 2 | Describe object-oriented class hierarchy and inheritance. |
| CS G189 | cSLO 3 | Implement, test, and debug simple recursive functions and procedures. |
| CS G189 | cSLO 4 | Explain software development methodologies and debugging techniques. |
| CS G189 | cSLO 5 | Write programs that use abstract data structures. |
| CS G196 | cSLO 1 | Understand the basic principles of a multi-tiered application running on the World Wide Web. |
| CS G196 | cSLO 2 | Explain the mechanisms for proper class hierarchy and component design in ASP.net. |
| CS G196 | cSLO 3 | Describe the software development tools and methodologies for creating distributed multi-tiered application. |
| CS G242 | cSLO 1 | Diagram the relationship between machine-level architecture & organization and high-level abstractions such as programming languages. |
| CS G242 | cSLO 2 | Identify the fundamental components, both hardware and software, in the architectural and organizational design of a computer system. |
| CS G242 | cSLO 3 | Solve problems involving operations of computer arithmetic and identify errors arising from binary representation. |
| CS G242 | cSLO 4 | Create assembly language segments with the correct data structure. |
| CS G262 | cSLO 1 | Describe how formal tools of symbolic logic are used to model real-life situations, including those arising in computing contexts such as program correctness, database queries, and algorithms. |
| CS G262 | cSLO 4 | Demonstrate different traversal methods for trees and graphs. |
| CS G262 | cSLO 5 | Apply the binomial theorem to independent events and Bayes' theorem to dependent events. |

**DATA EVALUATION**

Table 4. cSLOs assessed and corresponding Data Evaluation.
*Denotes historical cSLOs.

| Course Name | cSLO | Semester Assessed | cSLO Data Evaluation |
|---|---|---|---|
| CS G102 | cSLO 4 | Fall 2016 | While the number of students who passed the quiz was high, the number who took the quiz was fewer than 50% of the initial enrollment numbers. |
| CS G127 | cSLO 6 | Spring 2017 | The quiz was worth 30 points. Out of the 11 submissions, 8 were in the 90's, 1 in the 80's, and 2 in the 70's. Students in the top demonstrated an excellent understanding for Web programming concepts and their application. The percentage for this submission is at 90% which is very close to the course average. |
| CS G130 | cSLO 1 | Spring 2016 | Prior to the tests each section was given instruction on how to review Chapter content to improve retention. The lectures were connected to the real world and related to the chapter content in the textbook. Review of the individual test results per individual indicated higher scores measuring retention and understanding than previous lecture/textbook Approaches. |
| CS G130 | cSLO 1 | Spring 2016 | Prior to the tests each section was given instruction on how to reviewChapter content to improve retention. The lectures were connected to the real world and related to the chapter content in the textbook. Review of the individual test results |

| Course Name | cSLO | Semester Assessed | cSLO Data Evaluation |
|---|---|---|---|
| | | | per individual indicated higher scores measuring retention and understanding than previous lecture/textbook Approaches. |
| CS G130 | cSLO 1 | Spring 2016 | 85% of students met the assessment. |
| CS G130 | cSLO 1 | Spring 2017 | This an online section of Computer Science 130. Students were able to learn the terminologyand usage of computer components and how to functionally use application software for everyday needs. The students achieving/demonstrating the skills of the SLO listed in Step #1 were at an acceptable level or higher.These students studied the text books, took the chapter tests, and completed the lab assignmentswhich made them successful.Students who failed to implement the above actions received an F or possibly a very low D. The factor influencing student results starts with class involvement via the internet at the outset of the class.If the student fails to accomplish this interaction (and read the text), all other aspects of instructional delivery, then, are not able to generate acceptable results. Online students need motivation and supplemental information available online.The students in this class had that additional material.It then is my conclusion that the unsuccessful student did so due to their lack of motivation or some other unknown factor |
| CS G130 | cSLO 3 | Spring 2017 | Majority of students showed competency in knowing about computer components and application software. • Overall the system is working well. • I used final survey for student experience. 88% participated. Overall class experience and learning was above average. |
| CS G148 | cSLO 3 | Fall 2016 | The class format of a once-weekly six hour class made it easy to ensure that all students were able to work along with what was being discussed in class.The only student who had problems was the one who regularly skipped class. |
| CS G154 | cSLO 1 | Spring 2018 | The project was worth 100 points. Out of the 30 submissions, 23 were in the 90's, 3 in the 80's, and 4 below 70. Those students in the top percentile submitted code that was logically correct and showed very good understanding data storage and manipulation using hash table operations. The skill demonstrated by the students was at the excellent level. The percentage for this submission is at 90.2% which is below the course average of 92.9%. |
| CS G154 | cSLO 5 | Spring 2017 | The project was worth 100 points. Out of the 25 submissions, 21 were in the 90's, 2 in the 80's, and 2 below 60. Those students in the top percentile submitted code that was logically correct and showed very good understanding stacks and queues operations. The skill demonstrated by the students was at the excellent level. The percentage for this submission is at 92% which is above the course average. |
| CS G175 | cSLO 3 | Fall 2016 | Each separate topic had its own week of focus and own program to write.Variables, I/O, branches, loops, and functions all had high success rates.The unsatisfactory results are almost all due to students who stopped coming to class but didn't officially drop.Only one showed up but never did homework. |
| CS G175 | cSLO 4 | Spring 2017 | Each project was worth 100 points. Out of the 36 submissions, 21 were in the 90's, 7 in the 80's, 3 in the 70's, and 5 below 60. Those students in the top percentile submitted code that was logically correct and showed very good understanding for breaking down complex code into single task modules. The skill demonstrated by the students was at the excellent level. The percentage for this submission is at 84% which is very close to the course average. |
| CS G175 | cSLO 8 | Spring 2018 | Each question was worth 2 points and the class average was 89.5% for the exam. Out of the approximate 20 questions related to "Exception Handling", on the average 2 questions were missed which is a very good result. Most of the topics covered in this exam were not able to be included in a coding assignment because of the end of semester. Thus, the result of missing only 2 questions out of 20 looks pretty impressive. |

| Course Name | cSLO | Semester Assessed | cSLO Data Evaluation |
|---|---|---|---|
| CS G189 | cSLO 1 | Fall 2016 | Each individual data storage type was given its own week and program.The book questions were meant to encourage thought about the uses of the structures in real life programs.The end result was very polarized.Mostly A's with a few F's from people who just didn't do the homework. |
| CS G262 | cSLO 2 | Spring 2018 | The project was worth 100 points. Out of the 31 submissions, 23 were in the 90's, 4 in the 80's, and 4 in the 70's and below. Those students in the top percentile submitted solutions that were logically correct and showed very good understanding of proof by induction and its applicability. The skill demonstrated by the students was at the excellent level. The percentage for this submission is at 90.7% which is just below the course average, 90.9%. |
| CS G262 | cSLO 3 | Spring 2017 | The project was worth 100 points. Out of the 17 submissions, 13 were in the 90's, 3 in the 80's, and 1 in the 70's. Those students in the top percentile submitted solutions that were logically correct and showed very good understanding recurrence equations and their applicability. The skill demonstrated by the students was at the excellent level. The percentage for this submission is at 95% which is above the course average. |

**DATA PLANNING**

Table 5. cSLOs assessed and corresponding Data Planning.
*Denotes historical cSLOs.

| Course Name | cSLO | Semester Assessed | cSLO Data Planning |
|---|---|---|---|
| CS G102 | cSLO 4 | Fall 2016 | The student learning process was good, but efforts will increase to improve retention through the end of the semester. |
| CS G127 | cSLO 6 | Spring 2017 | The level of understanding and implementation for this SLO is very good. Student who were identified as deficient, were contacted and advise on future assignments. Most of the difficulties were related to students poor planning for study. Students were advised weekly with regards to time to set aside for course work. |
| CS G130 | cSLO 1 | Spring 2016 | The new lecture approach, along with the textbook review results indicate higher test scores.  Subject immersion in both lecture and textbook seems to generate higher measurement scores.  Further enhancement to this method will also be applied to the laboratory component of this course (such as focused product explanations and hands--on tutorials).  The combined aspects of the class will further improve overall student learning. |
| CS G130 | cSLO 1 | Spring 2016 | The new lecture approach, along with the textbook review results indicate higher test scores.  Subject immersion in both lecture and textbook seems to generate higher measurement scores.  Further enhancement to this method will also be applied to the laboratory component of this course (such as focused product explanations and hands--on tutorials).  The combined aspects of the class will further improve overall student learning. |
| CS G130 | cSLO 1 | Spring 2016 | no action plans provided |
| CS G130 | cSLO 1 | Spring 2017 | An attempt will be made to provide more online activities that will(we hope) increase interest. Greater student measuring emphasis will be implemented to make obvious to the student.The software component now has small tutorials in techniques to attempt the delivery of more detailed approach to the information.We will expaqnd on those software tutorials. |
| CS G130 | cSLO 3 | Spring 2017 | I will keep using weekly reminders, emails etc. to connect to all students, especially ones at risk. |
| CS G148 | cSLO 3 | Fall 2016 | I thought this project turned out to be too easy based on the success rate.  I am currently changing the assignment to cover more, but in smaller pieces.  The individual parts should have the same success rate since they are the same size, but we will be able to cover more. |

| Course Name | cSLO | Semester Assessed | cSLO Data Planning |
|---|---|---|---|
| CS G154 | cSLO 1 | Spring 2018 | The level of understanding and implementation for this SLO is very good. Student who were identified as deficient, were contacted and advise on future assignments. Most of the difficulties were related to students poor planning for study and work on assignments. Students were advised weekly with regards to time to set aside for course work. |
| CS G154 | cSLO 5 | Spring 2017 | The level of understanding and implementation for this SLO is very good. Student who were identified as deficient, were contacted and advise on future assignments. Most of the difficulties were related to students poor planning for study and work on assignments. Students were advised weekly with regards to time to set aside for course work. |
| CS G175 | cSLO 3 | Fall 2016 | In a previous SLO report I found a spot in the semester that saw a large number of drops. I rewrote that part of the class to get to this point. Now there is a dip in success rates immediately after this SLO. This covers the first half of the semester, and objects are the second half. I need to find a smoother transition between the two halves to raise the overall success rate. Next semester I plan on slowing down there and perhaps dropping something from the end of the class. |
| CS G175 | cSLO 4 | Spring 2017 | The level of understanding and implementation for this SLO is very good. Student who were identified as deficient, were contacted and advise on future assignments. Most of the difficulties were related to students poor planning for study and work on assignments. Students were advised weekly with regards to time to set aside for course work. |
| CS G175 | cSLO 8 | Spring 2018 | The level of understanding and exam testing for this SLO is very good. Student who were identified as deficient, were contacted and advise on future study. Most of the difficulties were related to students' poor planning for study and lack of opportunity to implement the topic in a coding assignment. Students were advised weekly with regards to time to set aside for course work. |
| CS G189 | cSLO 1 | Fall 2016 | I am completely changing the projects that I assign for this class. As is, each project is 80% overhead and 20% core ideas. That is, data structures in general take a lot of code to get started, but then the unique parts are very localized. My hope is that by giving them a structure to begin with it will decrease the intimidation factor that keeps students from doing the homework and they will better learn the core concepts. |
| CS G262 | cSLO 2 | Spring 2018 | The level of understanding and implementation for this SLO is very good. Student who were identified as deficient, were contacted and advise on future assignments. Most of the difficulties were related to students poor planning for study and work on assignments. Students were advised weekly with regards to time to set aside for course work. |
| CS G262 | cSLO 3 | Spring 2017 | The level of understanding and implementation for this SLO is very good. Student who were identified as deficient, were contacted and advise on future assignments. Most of the difficulties were related to students poor planning for study and work on assignments. Students were advised weekly with regards to time to set aside for course work. |