

# INFORMATION TECHNOLOGY/ COMPUTER SCIENCE (BA/MS)

The Information Technology (BA)/Computer Science (MS) program is an accelerated program giving students the opportunity to pursue admission to and begin classes for the M.S. while an undergraduate student. This program reduces the total number of courses needed and the total time needed for the combined degrees.

## CURRICULUM

Students in the BA/MS program are permitted to take up to 9 credit hours of 400-level courses that would apply toward their MS program requirements while completing their undergraduate degree. If you have general elective hours to satisfy for your undergraduate degree, your 400-level courses can be courses taken in addition to your undergraduate major courses. Additionally, there are three 400-level courses that can be applied both toward your BA and MS Information Technology program requirements:

- COMP 477 IT Project Management
- COMP 422 Software Development for Wireless and Mobile Devices
- COMP 417 Social and Ethical Issues in Computing

The following are required to complete the BA/MS dual degree program:

- Successful completion of the BA Information Technology within the School of Continuing & Professional Studies.
- 30 credit hours of 400-level graduate courses, including those counted while an undergraduate, completed with a GPA of 3.0 or higher.

Please note only 400-level courses will apply toward graduate requirements. Additionally, a student with credit for a 300-level COMP course that has an equivalent 400-level COMP course may not take the 400-level course for separate credit. Example: COMP 317 and COMP 417 are equivalent courses and credit can only be earned once.

Code	Title	Hours
<b>Information Technology Major Curriculum</b>		
COMP 170	Introduction to Object-Oriented Programming	3
COMP 251	Introduction to Database Systems	3
COMP 271	Data Structures I	3
COMP 317	Social, Legal, and Ethical Issues in Computing	3
CPST 250	Foundations of Organizations	3
CPST 291	Dynamic Programming Languages	3
CPST 310	Accounting Principles and Application	3
CPST 325	Data Processing, Analysis, and Visualization	3
CPST 342	Introduction to Web Application Development	3
CPST 343	Software Development for Mobile Devices	3
CPST 345	Introduction to IT: Networking, Cloud & Security	3
CPST 349	Project Management	3
STAT 103	Fundamentals of Statistics	3
<b>SCPS Courses</b>		
CPST 200	Introduction to Degree Completion	3
CPST 201	Civic Identity and Development	3
CPST 397	Capstone	3

### Core Requirements

The number of hours remaining toward Core requirements can vary due to transfer credit.

### Mission Specific Requirements

Mission specific requirements can vary from 0 to 15 credit hours based on your prior credit.

### General Elective Requirements

Students may have some general elective coursework to complete if their transfer credit and remaining required hours (Core, mission specific, major, etc.) do not total 120.

<b>MS Information Technology Curriculum</b>		<b>30</b>
COMP 417	Social and Ethical Issues in Computing	3
Select three courses in track		9
Select six graduate level COMP electives		18

### Scheduling Suggestion

Students in the BA/MS program are permitted to take up to 9 credit hours of 400-level courses that would apply toward their MS program requirements while completing their undergraduate degree. There are three 400-level courses that can be applied both toward your BA and MS Information Technology program requirements and these are listed below.

If you have general elective hours to satisfy for your undergraduate degree, your 400-level courses can be courses taken in addition to your undergraduate major courses and not have overlap with your major requirements.

- COMP 477 IT Project Management (satisfies CPST 349 IT major requirement)
- COMP 422 Software Development for Wireless and Mobile Devices (satisfies CPST 342 IT major requirement)
- COMP 417 Social and Ethical Issues in Computing (satisfies COMP 317 IT major requirement)

## Guidelines for Accelerated Bachelor's/ Master's Programs

### Terms

- **Accelerated Bachelor's/Master's programs:** In this type of program, students share limited credits between their undergraduate and graduate degrees to facilitate completion of both degrees.
- **Shared credits:** Graduate level credit hours taken during the undergraduate program and then applied towards graduate program requirements will be referred to as Shared credits.

### Admission Requirements

Accelerated Bachelor's/Master's programs are designed to enhance opportunities for advanced training for Loyola's undergraduates. Admission to these programs must be competitive and will depend upon a positive review of credentials by the program's admissions committee. Accordingly, the admission requirements for these programs may be higher than those required if the master's degree were pursued entirely after the receipt of a bachelor's degree. That is, programs may choose to have more stringent admissions requirements in addition to those minimal requirements below.

Requirements:

- Declared appropriate undergraduate major,
- By the time students begin taking graduate courses as an undergraduate, the student has completed approximately 90 credit hours, or the credit hours required in a program that is accredited by a specialty organization,<sup>1</sup>
- A minimum cumulative GPA for coursework at Loyola that is at or above the program-specific requirements, a minimum major GPA that is at or above the program-specific requirements, and/or appropriate designated coursework for evaluation of student readiness in their discipline.<sup>2</sup>

Students not eligible for the Accelerated Bachelor's/Master's program (e.g., students who have not declared the appropriate undergraduate major) may apply to the master's program through the regular admissions process. Students enrolled in an Accelerated Bachelor's/Master's program who choose not to continue to the master's degree program upon completion of the bachelor's degree will face no consequences.<sup>3</sup>

Ideally, a student will apply for admission (or confirm interest in proceeding towards the graduate degree in opt-out programs) as they approach 90 credit hours. Programs are encouraged to begin advising students early in their major so that they are aware of the program and, if interested, can complete their bachelor's degree requirements in a way that facilitates completion of the program. Once admitted as an undergraduate, Program Directors should ensure that students are enrolled using the plan code associated with the Accelerated Bachelor's/Master's program. Using the plan code associated with the Accelerated Bachelor's/Master's program will ensure that students may be easily identified as they move through the program. Students will not officially matriculate into the master's degree program and be labeled as a graduate student by the university, with accompanying changes to tuition and Financial Aid (see below), until the undergraduate degree has been awarded. Once admitted to the graduate program, students must meet the academic standing requirements of their graduate program as they complete the program curriculum.

- <sup>1</sup> Programs that have specialized accreditation will adhere to the admissions criteria provided by, or approved by, their specialized accreditors.
- <sup>2</sup> The program will identify appropriate indicators of student readiness for graduate coursework (e.g., high-level performance in 300 level courses). Recognizing differences between how majors are designed, we do not specify a blanket requirement.
- <sup>3</sup> If students choose not to enroll in the Accelerated Bachelor's/Master's program, they still must complete all of the standard requirements associated with the undergraduate degree (e.g., a capstone).

## Curriculum

*Level and progression of courses.* The Accelerated Bachelor's/Master's programs are designed to be competitive and attractive to our most capable students. Students admitted to Accelerated Bachelor's/Master's programs should be capable of meeting graduate level learning outcomes. Following guidance from the Higher Learning Commission, only courses taken at the 400 level or higher (including 300/400 level courses taken at the 400 level) will count toward the graduate program.<sup>1,2</sup>

Up to 50% of the total graduate level credit hours, required in the graduate program, may come from 300/400 level courses where the student is enrolled in the 400 level of the course. Further, at least 50% of the credit hours for the graduate program must come from courses that are designed for and restricted to graduate students who have been admitted to a graduate program at Loyola (e.g., enrolled in plan code that

indicates the Accelerated Bachelor's/Master's program, typically ending with the letter "D").<sup>3</sup>

In general, graduate level coursework should not be taken prior to admission into the Accelerated Bachelor's/Master's program. Exceptions may be granted for professional programs where curriculum for the Accelerated Bachelor's/Master's program is designed to begin earlier. On the recommendation of the program's Graduate Director, students may take one of their graduate level courses before they are admitted to the Accelerated Bachelors/Master's program if they have advanced abilities in their discipline and course offerings warrant such an exception.<sup>4</sup> Undergraduate degree requirements outside of the major are in no way impacted by admission to an Accelerated Bachelor's/Master's program.<sup>5</sup>

*Shared credits.* Undergraduate courses (i.e., courses offered at the 300 level or below) cannot be counted as shared credits nor count towards the master's degree. Up to 50% of the total graduate level credit hours, required in the graduate program, may be counted in meeting both the undergraduate and graduate degree requirements. Of those shared credits, students in an Accelerated Bachelor's/Master's program should begin their graduate program with the standard introductory course(s) for the program whenever possible. So that students may progress through the Accelerated Bachelor's/Master's program in a timely manner, undergraduate programs are encouraged to design their curriculum such that a student can complete some required graduate credit hours while completing the undergraduate degree. For instance, some of the graduate curriculum should also satisfy electives for the undergraduate major.

The program's Graduate Director will designate credit hours to be shared through the advising form and master's degree conferral review process. Shared credit hours will not be marked on the undergraduate record as having a special status in the undergraduate program. They will be included in the student's undergraduate earned hours and GPA. Graduate credit hours taken during the undergraduate program will not be included in the graduate GPA calculation.

- <sup>1</sup> If students wish to transfer credits from another university to Loyola University Chicago, the program's Graduate director will review the relevant syllabus(es) to determine whether it meets the criteria for a 400 level course or higher.
- <sup>2</sup> Programs with specialized accreditation requirements that allow programs to offer graduate curriculum to undergraduate students will conform to those specialized accreditation requirements.
- <sup>3</sup> In rare cases, the Graduate Director may authorize enrollment in a 400-level course for a highly qualified and highly motivated undergraduate, ensuring that the undergraduate's exceptional participation in the graduate class will not diminish in any way the experience of the graduate students regularly enrolled.
- <sup>4</sup> For example, if a particular course is only offered once every 2-3 years, and a student has demonstrated the necessary ability to be successful, the Graduate Director may allow a student to take a graduate level course to be shared prior to the student being formally admitted to the graduate program. See, also, footnote 4.
- <sup>5</sup> Students should not, for example, attempt to negotiate themselves out of a writing intensive requirement on the basis of admission to a graduate program.

## Graduation

Degrees are awarded sequentially. All details of undergraduate commencement are handled in the ordinary way as for all students in the School/College/Institute. Once in the graduate program, students abide by the graduation deadlines set forth by the graduate program. Students

in these programs must be continuously enrolled from undergraduate to graduate degree program unless given explicit permission by their program for a gap year or approved leave of absence.

## LEARNING OUTCOMES

Students in BA Information Technology program will be able to:

- Apply a structured approach to solving problems on a computer; create algorithms for solving problems and implement solutions to problems using a programming language.
- Identify elementary data structures, describe their implementation and choose an appropriate data structure to solve a given problem; evaluate algorithms to select from a range of possible options, provide justification for that selection, and implement the algorithm in a particular context.
- Design, implement, test, and debug a program that uses each of the following fundamental programming constructs: basic computation, variables, expressions, I/O, standard conditional and iterative structures (loops), the definition of functions, parameter passing, and recursion.
- Describe principles of object-orientation (abstraction, delegation, inheritance, and polymorphism) and basic design patterns; practice programming with mainstream object-oriented languages such as C++ or Java.
- Apply a variety of strategies to the testing and debugging of simple programs; construct, execute and debug programs using a modern IDE and associated debugging tools; construct and debug programs using the standard libraries available with a chosen programming language.
- Evaluate the advantages and disadvantages of dynamic languages, versus static typing. Practice programming in Python or some other dynamic language, such as Ruby or PHP.
- Organize data in ways to emphasize relationships, write simple programs to process, visualize and graphically display data, mine data for patterns, and design web interfaces to data.
- Apply the relational model to solving real world problems and implement those models using SQL on standard DBMS platforms and to use a declarative query language (SQL) to elicit information from a database.
- Analyze laws and issues in areas such as privacy, encryption, freedom of speech, copyrights and patents, computer crime, and computer/software reliability and safety; assess philosophical perspectives related to Ethics and the basics of the U.S. legal system; and identify ethical issues that arise in information technology and determine how to address them technically and ethically.
- Make informed and strategic decisions in a complex work environment; apply quantitative analysis to business problems; and impact organizational goals through project management strategies

Students in the MS Information Technology program will gain familiarity with the broad outlines of computer technology and will gain specialization in one of the track areas (Data Management, Technology Management, IT Security and Enterprise Networking).