# Software Engineering Technology Major (SET)

## Computer Programming and Database Management - Software Engineering Technology Major (SET)

The Computer Programming and Database Management - Software Engineering Technology Major (SET) focuses on the design, development, implementation, and maintenance of software used in a variety of industries.

Students gain knowledge of computer operating systems and software development using several programming languages. Students also gain knowledge of core math and science concepts and skills.

Graduates earn an Associate of Applied Science degree and are prepared to enter the workforce as skilled computer programmers and systems integrators. Graduates may continue their education in a bachelor's degree program in engineering, engineering technology, mathematics, or computer science.

Although some required courses are available through evening and/or online classes, most of the required courses for the Software Engineering Technology Major are scheduled on Monday through Friday between 8 a.m. and 5 p.m.

For more information, please contact the Center for Innovative Technologies at (513) 569-1743.

To apply for this program at Cincinnati State, visit the Admissions (http://www.cincinnatistate.edu/academics/admission) section of the College website.

## Software Engineering Technology Major (SET)

| **Semester 1** | | **Lec** | **Lab** | **Credits** |
|---|---|---|---|---|
| FYE 1XX First Year Experience Elective (**B**) | | 1 | 0 | 1 |
| ENG 101 | English Composition 1 ( **G**) | 3 | 0 | 3 |
| MAT XXX Mathematics Elective (**G**) | | 3 | 0 | 3 |
| IT 100 | Computer Programming Foundations ( **B**) | 2 | 3 | 3 |
| XXX-XXX Arts/ Humanities Elective (**G**) | | 3 | 0 | 3 |
| **Semester 2** | | | | |
| IT 101 | Programming 1 ( **B**) | 2 | 3 | 3 |
| IT 111 | Database Design and SQL 1 ( **B**) | 2 | 3 | 3 |
| XXX-XXX Software Engineering Technology Elective 1 (**B**) | | 3 | 3 | 4 |
| CPDM 210 | System Analysis and Design ( **T**) | 2 | 3 | 3 |
| **Semester 3** | | | | |
| IT 102 | Programming 2 ( **T**) | 2 | 3 | 3 |
| XXX-XXX Software Engineering Technology Elective 2 (**B**) | | 3 | 3 | 4 |
| XXX-XXX Technical Concentration Elective 1 (**T**) | | 2 | 3 | 3 |
| XXX-XXX Technical Track Elective 1 (**T**) | | 2 | 3 | 3 |
| **Semester 4** | | | | |
| XXX-XXX Experiential Learning Elective 1 (**T**) | | 1 | 40 | 2 |
| XXX-XXX Technical Concentration Elective 2 (**T**) | | 2 | 3 | 3 |
| **Semester 5** | | | | |
| XXX-XXX Software Engineering Technology Elective 3 (**B**) | | 3 | 3 | 4 |
| XXX-XXX Technical Concentration Elective 3 (**T**) | | 2 | 3 | 3 |
| XXX-XXX Technical Track Elective 2 (**T**) | | 2 | 3 | 3 |
| XXX-XXX Economics Elective (**G**) | | 3 | 0 | 3 |
| ENG-10X English Composition Elective (**G**) | | 3 | 0 | 3 |
| **Semester 6** | | | | |
| XXX-XXX Experiential Learning Elective 2 (**T**) | | 1 | 40 | 2 |

| | | | | |
|---|---|---|---|---|
| CPDM 290 | Computer Programming and Database Management Capstone ( **T**) | 2 | 3 | 3 |
| Total Credits: | | 49 | 122 | 65 |

## Electives

| | | |
|---|---|---|
| **First Year Experience Elective** | | |
| FYE 100 | College Survival Skills | 1 |
| FYE 105 | College Success Strategies | 2 |
| FYE 110 | Community College Experience | 3 |
| **Mathematics Elective** | | |
| MAT 121 | Technical Algebra and Geometry with Statistics | 3 |
| MAT 125 | Algebra and Trigonometry | 4 |
| MAT 131 | Statistics 1 | 3 |
| MAT 151 | College Algebra | 4 |
| **English Composition Elective** | | |
| ENG 102 | English Composition 2: Contemporary Issues | 3 |
| ENG 103 | English Composition 2: Writing about Literature | 3 |
| ENG 104 | English Composition 2: Technical Communication | 3 |
| ENG 105 | English Composition 2: Business Communication | 3 |
| **Arts/Humanities Elective** | | |
| Any Transfer Module course from ART, LIT, MUS, PHI, REL, THE, or COMM 130 | | |
| **Economics Elective** | | |
| ECO 105 | Principles of Microeconomics | 3 |
| ECO 110 | Principles of Macroeconomics | 3 |
| **Experiential Learning Electives (Choose courses from 1 experiential learning group)** | | |
| **Cooperative Education Experiential Learning** | | |
| CPDM 190 | Cooperative Education Preparation: Computer Programming and Database Management | 1 |
| CPDM 291 | Full-Time Cooperative Education 1: Computer Programming and Database Management | 2 |
| CPDM 292 | Full-Time Cooperative Education 2: Computer Programming and Database Management | 2 |
| **Project-Based Experiential Learning** | | |
| CPDM 296 | Project-Based Learning 1 | 2 |
| CPDM 297 | Project-Based Learning 2 | 2 |
| **Software Engineering Technology Electives (Choose 3 courses)** | | |
| BIO 131 | Biology 1 | 5 |
| CHE 110 | Fundamentals of Chemistry | 4 |
| CHE 111 | Bio-Organic Chemistry | 4 |
| MAT 126 | Functions and Calculus | 4 |
| MAT 251 | Calculus 1 | 5 |
| MAT 252 | Calculus 2 | 5 |
| PHY 151 | Physics 1: Algebra and Trigonometry-Based | 4 |
| PHY 152 | Physics 2: Algebra and Trigonometry-Based | 4 |
| **Technical Concentration Electives (Choose 1 concentration)** | | |
| **C Programmer Concentration** | | |
| SET 151 | C Programming 1 (**T**) | 3 |
| SET 252 | C Programming 2 (**T**) | 3 |
| SET 253 | C Programming 3 (**T**) | 3 |
| **Java Programmer Concentration** | | |
| IT 161 | Java Programming 1 (**T**) | 3 |
| IT 162 | Java Programming 2 (**T**) | 3 |
| IT 262 | Java Programming 3 (**T**) | 3 |
| **Web Programmer Concentration** | | |
| IT 117 | Web Application Development 1 (**T**) | 3 |
| IT 118 | Web Application Development 2 (**T**) | 3 |
| IT 218 | Web Application Development 3 (**T**) | 3 |
| **Technical Track Electives (Choose courses from 1 track)** | | |
| **Java Programming Track** | | |
| IT 161 | Java Programming 1 (**T**) | 3 |
| IT 162 | Java Programming 2 (**T**) | 3 |
| **C Programming Track 1** | | |
| SET 151 | C Programming 1 (**T**) | 3 |
| SET 252 | C Programming 2 (**T**) | 3 |
| **C Programming Track 2** | | |
| SET 252 | C Programming 2 (**T**) | 3 |
| SET 253 | C Programming 3 (**T**) | 3 |
| **IBMi Powersystem Track** | | |
| CPDM 211 | Business Application Development 1: RPGLE/DB2 (**T**) | 4 |
| CPDM 212 | Business Application Development 2: RPGLE/DB2 (**T**) | 4 |
| **Mobile Application Track** | | |
| CPDM 230 | Mobile Application Development (**T**) | 4 |
| CPDM 240 | Emerging Technologies: Web and Mobile Applications (**T**) | 4 |
| **Computer Networking Track** | | |
| NETC 121 | Network Communications 1 (**T**) | 3 |
| NETC 122 | Network Communications 2 (**T**) | 3 |
| **Web Programming Track** | | |
| IT 117 | Web Application Development 1 (**T**) | 3 |
| IT 118 | Web Application Development 2 (**T**) | 3 |
| **Database Analytics Track** | | |
| IT 112 | Database Design and Management (**T**) | 3 |
| IT 212 | Business Intelligence, Data Warehousing, and Reporting (**T**) | 3 |

## Computer Programming and Database Management (CIS, CSD, SET)

- Ability to collect, disseminate, analyze, and apply the requirements for a specific software development project.
- Ability to write, test, and maintain software applications utilizing current and relevant programming languages.
- Ability to design and implement a normalized relational database(s) to meet the needs of the software development project.
- Ability to effectively utilize databases and database management systems to organize, store, and retrieve data for use in application software.
- Ability to create application software that is intuitive for a wide range of users.

- Ability to effectively articulate ideas, recommendations, and solutions.
- Ability to lead and/or participate effectively in teams.
- Ability to utilize appropriate resources to broaden individual knowledge and to apply the industry's latest development tools, techniques, and standards.

# Faculty

## Program Chair/Advisor

Professor Robert Nields, MBA
robert.nields@cincinnatistate.edu

## Co-op Coordinator

Professor Noelle Grome, ME, MA
noelle.grome@cincinnatistate.edu

# IT Courses

**IT 100 Computer Programming Foundations**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on fundamental concepts related to computer programming. Topics include: problem solving and developmental tools, design techniques such as flow charting and pseudo coding, and testing techniques used in programming.
Prerequisites: AFL 085 and AFM 092, or appropriate placement test scores

**IT 101 Programming 1**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
An introduction to concepts of object-oriented software development. Topics include: application design methods, stages of software development, structures of programming, and modular programming concepts using procedures and functions.
Prerequisites: AFL 085 and AFM 092, or appropriate placement test scores

**IT 102 Programming 2**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of IT 101. Topics include: object-oriented design and implementation, developing class modules, and accessing and writing to external data storage and databases-embedded SQL and stored procedures.
Prerequisites: IT 101 and IT 111

**IT 103 .NET Programming 3**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of IT 102. Topics include: creating, debugging, and maintaining web-based database applications using the .NET framework.
Prerequisites: IT 102 and IT 111

**IT 105 Information Technology Concepts**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on information technology fundamentals. Topics include: the internet, software, hardware, input/output (I/O) and storage, operating systems, communications and networks, database management, security, system development, programming, enterprise computing, and numbering systems. The course is delivered through online instruction only.
Prerequisites: AFL 085 and AFM 092, or appropriate placement test scores

**IT 110 HTML with CSS and JavaScript**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on internet programming using HTML, CSS, and JavaScript. Topics include: HTML commands, cascading style sheets, JavaScript commands, web applications (apps), and dynamic web pages.
Prerequisites: None

**IT 111 Database Design & SQL 1**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on fundamentals of relational database design and implementation using Microsoft SQL Server. Topics include: SQL Enterprise Manager, fundamentals of database design and normalization, data import and export, Structured Query Language (SQL), indexes and keys, views, and stored procedures.
Prerequisites: AFL 085 and AFM 092, or appropriate placement test scores

**IT 112 Database Design and SQL 2**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of IT 111. Topics include: advanced stored procedures using transact SQL, user defined functions, triggers, user defined data types, full text searching, replication, database maintenance plans, and designing data models from abstract requirements.
Prerequisites: IT 111 (minimum grade C)

**IT 115 Operating Systems Administration 1**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on the Windows operating system used on PCs. Topics include Windows utilization and management, utilities, managing disks, disaster recovery, troubleshooting, user management, productivity tools, and performance issues. This course prepares students for a Microsoft Certification exam.
Prerequisites: AFL 085 or appropriate placement test score

**IT 116 Operating Systems Administration 2**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of IT 115. Topics include: managing software problems; managing virtualization; and client configuration, development, deployment, and security. This course prepares students for a Microsoft Certification exam.
Prerequisites: IT 115 (minimum grade C)

**IT 117 Web Application Development 1**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on fundamentals of web-based application development. Topics include: current front-end and back end technologies used to develop business-related applications, and understanding infrastructure to support application development.
Prerequisites: IT 101 and IT 111

**IT 118 Web Application Development 2**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of IT-117. Topics include: using current front-end and back-end technologies to develop business-related applications.
Prerequisites: IT 117

**IT 140 PHP and MySQL**
**4 Credits. 3 Lecture Hours. 3 Lab Hours.**
A course in PHP web programming with a MySQL database. Topics include: PHP language, syntax, variables, and forms; MySQL database design; connecting to a MySQL database using PHP; inserting, editing, and deleting MySQL data using PHP; and building dynamic web pages using PHP and MySQL.
Prerequisites: IT 101 and IT 110

**IT 150 Logistics and Distribution Technology**
**3 Credits. 2 Lecture Hours. 2 Lab Hours.**
A course on technologies and software used in supply chain management for freight, air, and maritime logistics operations. Topics include: barcodes, RFID, Wi-Fi tags, logistics and inventory software, high frequency tracking, and passive/active tracking.
Prerequisites: SCM 105

**IT 161 Java Programming 1**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on fundamentals of the Java programming language. Topics include: data types, variables, basic command line input/output, decisions, loops, procedures, string manipulation, arrays, object-oriented development, event programming, and database programming.
Prerequisites: IT 101

**IT 162 Java Programming 2**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of IT 161. Topics include: Java Server Pages (JSP) and complex database applications using Java and JSP.
Prerequisites: IT 161

**IT 212 Business Intelligence, Data Warehousing, and Reporting**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on concepts, technologies, and techniques used to effectively consolidate, arrange, and analyze large amounts of data. Topics include: decision support systems, data mining, and how to derive business value from large amounts of data.
Prerequisites: IT 112

**IT 215 Scripting**
**3 Credits. 2 Lecture Hours. 2 Lab Hours.**
A course on task automation and configuration management using Microsoft PowerShell programming language. Topics include: modifying existing PowerShell scripts, and creating new scripts to automate common tasks.
Prerequisites: NETB 155

**IT 218 Web Application Development 3**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of IT 118. Topics include: using current front-end and back-end technologies to develop complex business-related applications.
Prerequisites: IT 118

**IT 220 Emerging Topics in Computer Software Development**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on current topics related to Computer Software Development such as data reporting, XML, and other new concerns.
Prerequisites: IT 101, IT 110, IT 111

**IT 262 Java Programming 3**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of IT 162. Topics include: completing complex projects using Java and associated technologies.
Prerequisites: IT 162

## SET Courses

**SET 110 HTML for Programmers**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on client-side web development from a programmer's perspective. Topics include: HTML, JavaScript, cascading style sheets (CSS), the document object model (DOM), dynamic HTML (DHTML), and regular expressions.
Prerequisites: None

**SET 151 C Programming 1**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A course on fundamentals of the C computer programming language. Topics include: decision statements, loops, functions, arrays, strings, structures, pointers, and dynamic memory allocation.
Prerequisites: IT 101

**SET 191 Part-Time Cooperative Education 1: Software Engineering Technology**
**1 Credit. 1 Lecture Hour. 20 Lab Hours.**
Students seeking an associate's degree participate in their first part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: None

**SET 192 Part-Time Cooperative Education 2: Software Engineering Technology**
**1 Credit. 1 Lecture Hour. 20 Lab Hours.**
Students seeking an associate's degree participate in their second part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: SET 191

**SET 193 Part-Time Cooperative Education 3: Software Engineering Technology**
**1 Credit. 1 Lecture Hour. 20 Lab Hours.**
Students seeking an associate's degree participate in their third part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: SET 192

**SET 194 Part-Time Cooperative Education 4: Software Engineering Technology**
**1 Credit. 1 Lecture Hour. 20 Lab Hours.**
Students seeking an associate's degree participate in their fourth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: SET 193

**SET 195 Part-Time Cooperative Education 5: Software Engineering Technology**
**1 Credit. 1 Lecture Hour. 20 Lab Hours.**
Students seeking an associate's degree participate in their fifth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: SET 194

**SET 196 Part-Time Cooperative Education 6: Software Engineering Technology**
**1 Credit. 1 Lecture Hour. 20 Lab Hours.**
Students seeking an associate's degree participate in their sixth part-time field learning experience related to their degree. Students are expected to register for academic courses during the same semester. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: SET 195

**SET 198 First Year Special Topics in Software Engineering Technology**
**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**
A course on selected topics related to Software Engineering Technology, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.
Prerequisites: Instructor Approval

**SET 199 First Year Independent Project in Software Engineering Technology**
**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**
A project related to Software Engineering Technology that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Software Engineering Technology faculty. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: Instructor Approval

**SET 252 C Programming 2**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of SET 151, using the C++ computer programming language. Topics include: classes, object-oriented programming techniques, polymorphism, inheritance, encapsulation, pointers, memory management, overloading, templates, and advanced data structures.
Prerequisites: SET 151

**SET 253 C Programming 3**
**3 Credits. 2 Lecture Hours. 3 Lab Hours.**
A continuation of SET 252, using the C# computer programming language. Topics include: program design, database programming techniques using stored procedures, and views with SQL Server.
Prerequisites: IT 111 and SET 252

**SET 290 Software Engineering Technology Capstone**
**3 Credits. 1 Lecture Hour. 4 Lab Hours.**
Students apply their programming and database skills to complete a software application.
Prerequisites: IT 103 and IT 111 and SET 252

**SET 291 Full-Time Cooperative Education 1: Software Engineering Technology**
**2 Credits. 1 Lecture Hour. 40 Lab Hours.**
Students seeking an associate's degree participate in their first full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: None

**SET 292 Full-Time Cooperative Education 2: Software Engineering Technology**
**2 Credits. 1 Lecture Hour. 40 Lab Hours.**
Students seeking an associate's degree participate in their second full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: SET 291

**SET 293 Full-Time Cooperative Education 3: Software Engineering Technology**
**2 Credits. 1 Lecture Hour. 40 Lab Hours.**
Students seeking an associate's degree participate in their third full-time field learning experience related to their degree. Students must follow cooperative education policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: SET 292

**SET 294 Internship 1: Software Engineering Technology**
**2 Credits. 1 Lecture Hour. 40 Lab Hours.**
Students seeking an associate's degree participate in their first unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: CIT 190

**SET 295 Internship 2: Software Engineering Technology**
**2 Credits. 1 Lecture Hour. 40 Lab Hours.**
Students seeking an associate's degree participate in their second unpaid field learning experience related to their degree. Students must follow applicable policies and procedures to earn credit. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: SET 294

**SET 298 Second Year Special Topics in Software Engineering Technology**
**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**
A course on selected topics related to Software Engineering Technology, which gives students opportunities to study information not currently covered in other courses. Grades issued are A, B, C, D, or F.
Prerequisites: Instructor Approval

**SET 299 Second Year Independent Project in Software Engineering Technology**
**1-9 Credits. 0 Lecture Hour. 0 Lab Hour.**
A project related to Software Engineering Technology that is completed by one or more students to meet specific educational goals. Projects must have prior approval and supervision by Software Engineering Technology faculty. Grades issued are Satisfactory or Unsatisfactory.
Prerequisites: Instructor Approval