# PROGRAM PROPOSAL FORM

☒ **Preliminary Approval** – Check here when using this form for preliminary approval of a program proposal, and respond to the items in general terms.

☐ **Final Approval** – Check here when completing this form after the Vice President for Instruction has given preliminary approval to a program proposal. For final approval, complete information must be provided for each item.

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| **Program Name:** | C# Programming for Modern Computing Environments |
| **Division and Department:** | Business and Computer Technologies Division – Computer Instruction Department |
| **Type of Award:** | ☐ AA ☐ AS ☐ AAS<br>☒ Cert. ☐ Adv. Cert. ☐ Post-Assoc. Cert. ☐ Cert. of Comp. |
| **Effective Term/Year:** | Fall 2015 |
| **Initiator:** | Khaled Mansour |

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| **Program Features**<br>Program's purpose and its goals.<br>Criteria for entry into the program, along with projected enrollment figures.<br>Connection to other WCC programs, as well as accrediting agencies or professional organizations.<br>Special features of the program. | Desktop applications, mobile applications and embedded applications are developed with a variety of software tools and in a variety of programming languages. The C# Programming language developed by Microsoft is a modern and important general purpose programming language that can be used to develop applications in all three environments. Due to recent enhancements in C#, and to the availability of universal development environments such as Xamarin, the cross platform capabilities of C# and appeal to developers has increased dramatically. It is now one of the most important development platforms available to developers. This academic program is designed to capitalize on the current popularity of C# and structure course offerings into a traditional computer science CS-1, CS-2, Capstone Project sequence that will accommodate novice and experienced programming students alike. Additionally, capstone projects will focus on embedded systems programming, the Internet of Things, and the Connected Vehicle, all important drivers of technology for the next decade or more. |
| **Need**<br>Need for the program with evidence to support the stated need. | Indeed.com job postings as of January 11, 2015 revealed a total of 377 postings for developers having skills in C# and the .Net platform on which it is based. This compares very favorably to 566 postings for Java Developers as of the same date. In November of 2014, Microsoft began the process of open sourcing components of C# and the .Net development platforms to developers. This is expected to drive down the costs associated with development in C# and drive up the number of requests for development of applications on the platform. No longer novel or boutique, C# has become an important tool for software developers, and the sequence of courses proposed in this certificate more thoroughly prepares students to develop with C# and for a variety of computing platforms. |

| **Program Outcomes/Assessment**<br>State the knowledge to be gained, skills to be learned, and attitudes to be developed by students in the program.<br>Include assessment methods that will be used to determine the effectiveness of the program. | Outcomes | Assessment method |
|---|---|---|
| | 1. **Conduct a requirements analysis and produce software requirements specifications for a moderately complex application project.**<br>2. **Apply software design principles to determine activities required to conceptualize, frame and implement the application.**<br>3. **Implement the software design in C# .Net.**<br>4. **Test the implementation according to sound software testing principles.** | **1-5. Software project.** |

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| | 5. **Successfully deploy the application.** | |

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| **Curriculum**<br><br>List the courses in the program as they should appear in the catalog. List minimum credits required. Include any notes that should appear below the course list. | **CPS 120: Introduction to Computer Science (3 credits)**<br>**CPS 191: Introduction to C# .Net (4 credits)**<br>**CPS 291: Intermediate and Advanced C# .Net (4 credits)**<br>**CIS 282: Relational Database Concepts and Application (3 credits)**<br>**CPS 296: Embedded Systems Software Project (4 credits)** |

**Budget**

Specify program costs in the following areas, per academic year:

| | START-UP COSTS | ONGOING COSTS |
|---|---|---|
| **Faculty** | $ . | $ . |
| **Training/Travel** | 1200.00 | . |
| **Materials/Resources** | 5000.00 | . |
| **Facilities/Equipment** | . | . |
| **Other** | . | . |
| **TOTALS:** | $ 6200.00 | $ . |

**Program Description for Catalog and Web site**

**C# Programming for Modern Computing Environments**
Certificate

*Description*

This program focuses on one of today's most in-demand programming platforms: C# .Net. Students progress through a series of courses starting with basic computing logic and algorithm development, database theory, object-oriented programming techniques and the program culminates in a hands-on capstone project targeting the creation of an application for modern embedded computing environments. The skills learned in this program will be adaptable to the development of mobile apps, embedded apps, connected vehicle applications and intelligent transportation systems, infotainment applications, desktop applications and applications for Internet devices.

Prior knowledge of the Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), Networking fundamentals, client/server architecture, and basic electricity/electronics is recommended. Suggested courses include:

-ELE 111: Electrical Fundamentals
-ELE 211: Basic Electronics
-CST 225: PC Networking
-WEB 110: Web Development I

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| **Program Information** | **Accreditation/Licensure -**<br><br>**Advisors** – Michael Galea, Clarence Hasselbach, Philip Geyer, William Reichert, Khaled Mansour<br><br>**Advisory Committee -**<br><br>**Admission requirements -**<br><br>**Articulation agreements -**<br><br>**Continuing eligibility requirements** – B- Grade Point average in program requirements. |

**Assessment plan:**

| Program outcomes to be assessed | Assessment tool | When assessment will take place | Courses/other populations | Number students to be assessed |
|---|---|---|---|---|
| 1. Conduct a requirements analysis and produce software requirements specifications for a moderately complex application project. | Software project. | Winter 2017 | CPS 296: Embedded Systems Software Project- All sections. | All students. |
| 2. Apply software design principles to determine activities required to conceptualize, frame and implement the application. | Software project. | Winter 2017 | CPS 296: Embedded Systems Software Project- All sections. | All students. |
| 3.Implement the software design in C# .Net. | Software project. | Winter 2017 | CPS 296: Embedded Systems Software Project- All sections. | All students. |
| 4.Test the implementation according to sound software testing principles. | Software project. | Winter 2017 | CPS 296: Embedded Systems Software Project- All sections. | All students. |
| 5.Successfully deploy the application. | Software project. | Winter 2017 | CPS 296: Embedded Systems Software Project- All sections. | All students. |

**Scoring and analysis plan:**

1. Indicate how the above assessment(s) will be scored and evaluated (e.g. departmentally-developed rubric, external evaluation, other). Attach the rubric. **Departmentally-developed rubric.**

2. Indicate the standard of success to be used for this assessment. **The standard of success will be that 70% of the students will score 70% or higher on the assessment tool.**

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3. Indicate who will score and analyze the data. **Departmental Faculty.**

4. Explain how and when the assessment results will be used for program improvement. The results of the program assessment should be available at the conclusion of the Winter 2017 semester. With the assessment results, the department will evaluate the program's impact on student success, relevancy of course and program content, and consistency in delivery of course content. The results will be shared with a panel of individuals, including advisory committee members from Industry, for comment and recommendations.

| REVIEWER | PRINT NAME | SIGNATURE | DATE |
|---|---|---|---|
| Department Chair/Area Director | John Trame | John Trame | 1/11/2015 |
| Dean | Kimberly Hovens | | 1/13/15 |
| Vice President for Instruction<br>☐ Approved for Development<br>☐ Final Approval | William Abernethy | | 01/25/15 |
| President | Rose Bellanca | RB Bellanca | 2/25/15 |
| Board Approval | | | 3/2/15 |