



ARTICULATION AGREEMENT PROGRAM GUIDE

Exhibit A

| Associate in Applied Science Pre-Engineering Oakland Community College (OCC) | | Bachelor of Science Embedded Software Engineering Lawrence Technological University (LTU) | |
|---|--------------|--|-------------------------------|
| Major Requirements: | Credit Hours | Equivalent Course: | |
| CHE 1510 General Chemistry I | 4 | CHM 1213 | University Chemistry 1 |
| EGR 2010 Engineering Programming | 4 | CHM 1221 | University Chemistry 1 Lab |
| ² ENG1510 Composition I | 3 | | No Transfer Credit Awarded |
| ENG 2200 Professional Communication | 4 | COM 1103 | College Composition |
| MAT 1730 Calculus I | 4 | COM 2103 | Technical & Professional Com. |
| MAT 1740 Calculus II | 4 | MCS 1414 | Calculus 1 |
| MAT 2740 Calculus III | 4 | MCS 1424 | Calculus 2 |
| MAT 2810 Differential Equations | 4 | MCS 2414 | Calculus 3 |
| PHY 2400 Engineering Physics I | 5 | MCS 2423 | Differential Equations |
| | | PHY 2413 | University Physics 1 |
| | | PHY 2421 | University Physics 1 Lab |
| PHY 2500 Engineering Physics II | 5 | PHY 2423 | University Physics 2 |
| | | PHY 2431 | University Physics 2 Lab |
| Focus Area: | | | |
| Electrical/Computer | | | |
| EGR 2060 Engineering Digital Circuits | 4 | EEE 2214 | Digital Electronics & Lab |
| EGR 2080 Engineering Microcontrollers | 4 | EEE 3233 | Microprocessors |
| | | EEE 3231 | Microprocessors Lab |
| EGR 2700 Engineering Circuits I | 5 | EEE 2123 | Circuits & Electronics |
| Additional General Education Requirements: | | | |
| ¹ MTA Fine Arts/Humanities | 6 | LLT 1213 | World Masterpieces 1 |
| | | LLT 1223 | World Masterpieces 2 |
| ¹ MTA Social Science | 6 | SSC 2413 | Found. of the American Exp. |
| | | SSC 2423 | Develop. of the American Exp. |
| Total Credit Hours Required for Associate Degree: | 66 | | |



Additional courses that may be taken at OCC and required for the LTU, BS in Embedded Software Engineering Program:
(Deviation will result in additional LTU coursework upon transfer.)

| | | |
|-----------|------------------------------------|---|
| CIS 1500 | Introduction to Programming (Java) | 4 |
| CIS 1512 | Principles of Software Engineering | 3 |
| CIS 2151 | Object-Oriented Programming (Java) | 4 |
| <u>or</u> | | |
| CIS 2252 | Object-Oriented Programming (C++) | 4 |
| CIS 2353 | Data Structures | 4 |
| ECO 2610 | Principles of Macroeconomics | 3 |
| EGR 1100 | Introduction to Engineering | 3 |
| | | |
| MAT 1580 | Statistics | 4 |

Total additional credit hours that may be taken at OCC: **25**

Total Credit Hours Taken at OCC: **91**

| | |
|-----------|-------------------------------|
| MCS 3603 | Java (MSC/EEE Tech. Elect) |
| MCS 2513 | Software Engineering 1 |
| MCS 1514 | Computer Science 1 |
| | |
| MCS 2534 | Data Structures |
| SSC 2303 | Principles of Economics |
| EGE 1001 | Fund. of Engineering Design & |
| +EIE 1011 | Foundations of Ind Design |
| MCS 3403 | Probability & Statistics |

Total OCC Credit Hours Applied Towards the LTU B.S. in Embedded Software Engineering: **78**

**Bachelor of Science
Embedded Software Engineering
Lawrence Technological University (LTU)**

Remaining Requirements:

| | | |
|-------------|--|---|
| EEE 2123 | Circuits and Electronics | 3 |
| EEE 3011 | Introduction to ECE Projects | 1 |
| EEE 3223 | Advanced Digital Electronics | 3 |
| EEE/MSC | 4xx3 - Technical Elective | 3 |
| EEE 4241 | Embedded Systems Lab | 1 |
| EEE 4243 | Embedded Systems | 3 |
| EEE 4263 | Computer Networking | 3 |
| EEE 4273 | Real Time Systems | 3 |
| EEE 4663 | Operating Systems | 3 |
| EEE 4913 | Directed Study in EE – Adv. Embedded Systems Lab | 3 |
| EGE 3022 | Leadership & Professional Development | 2 |
| ESE 2001 | Embedded Software Engineering Lab 1 | 1 |
| ESE 3001 | Embedded Software Engineering Lab 2 | 1 |
| ESE 3011 | Embedded Software Engineering Lab 3 | 1 |
| ESE 4812 | ESE Senior Design Project 1 | 2 |
| ESE 4822 | ESE Senior Design Project 2 | 2 |
| LLT/SSC/PSY | 3xx3/4xx3 Elective | 3 |
| MCS 2514 | Computer Science 2 | 4 |
| MCS 2523 | Discrete Mathematics | 3 |
| MCS 2613 | Software Engineering 2 | 3 |
| MCS 3513 | Software Architecture | 3 |
| MCS 3543 | Database Systems | 3 |
| MCS 4513 | Software Quality & Project Management | 3 |

Total Credit Hours Taken at LTU: 57

Minimum Credit Hours Required: 132

Total Credit Hours Taken: 148

Notes:

- ¹Arts/Humanities, Social Science must be from two different disciplines. Students who complete MTA may choose from applicable courses listed in the OCC Catalog. Students who do not complete MTA can choose courses from the following:
 - Social Science: ANT 1540, 2510, 2750, GEO 2510, GLS 2510, 2520, 2904, HIS 1510, 1520, 1550, 1651, 1660, 1661, 1662, 1663, 1700, 2510, 2520, 2610, HUM 1710, PHI 1520, 1610, 1710, 2710, POL 1510, 1990, 1991, 1992, 1993, 2520, 2530, 2610, 2990, 2991, 2992, PSY 2510, 2710, 2730, 2810, SOC 2510, 2520, 2530, 2550, 2560, 2570, 2610, 2620
 - Fine Arts/Humanities: **ART** 2560, 2600, 2620, **ENG** 1610, 1710, 1720, 2300, 2510, 2520, 2530, 2540, 2550, 2560, 2750, 2760, 2770, 2780, 2800, **FSH** 1500, **HUM** 1510, 1520, 2720, 2900
- ²If a student completed ENG 1510 using the MTA then COM 1103 College Composition will be satisfied. If the student does not complete the MTA then ENG 1520 must be completed for transfer credits of COM 1103.
- The remaining degree requirements noted assume students have completed the articulation agreement as outlined- including successful completion of the specific recommended OCC electives.
- Deviation from this guide may result in none transferable and/or applicable OCC coursework, resulting in additional requirements.
- Completion of this Transfer Credit Agreement Program Guide does not guarantee admission to the Embedded Software Engineering program at the LTU. Students are encouraged to meet with an OCC Counselor prior to following this Transfer Credit Agreement Program Guide and with an LTU representative before enrolling in their final year at OCC to maximize admissions, scholarship, and transfer eligibility.
- This guide does not include any remedial courses that may be required at OCC and may not include prerequisite requirements.
- Lawrence Technological University requires that a minimum of a “C” (2.0) be earned in each course in order to be considered for transfer credit, non-germane and remedial courses may not qualify for transfer credit.
- For the full LTU Transfer Credit Policy, go to <https://www.ltu.edu/futurestudents/transfer/>.

For questions regarding the transferability of coursework not reflected on the guide, please contact Emily Phelan at Lawrence Technological University, 248-204-3169 or ephelan@edu. For questions regarding the Embedded Software Engineering program please contact Dr. Nabih Jaber, Chair of Electrical & Computer Engineering, at njaber@ltu.edu.

This Transfer Credit Agreement Program Guide is valid from **May 2022 – May 2027.**