DATE: November 10, 2022

TO: Anne Marie Sowder, Chair of College Council Curriculum Committee

FROM: Curriculum Subcommittee
Henry Africk (Chair) and Allison Berkoy

RE: Final Report for Proposal 21–07: Program Change from an AAS in EMT to an AAS in CET

PROPOSAL OVERVIEW:

The Computer Engineering Technology Department is proposing to convert the AAS degree program in Electromechanical Engineering Technology into an AAS degree program in Computer Engineering Technology. The proposal describes the modifications needed, including three new courses to replace existing courses, changes in the prefix from EMT to CET of other existing courses, and changes in the number of credits, prerequisites, titles, and descriptions of some of the existing courses.

RATIONALE:

This proposal aims to strengthen the Computer Engineering Technology programs to better prepare graduates with the knowledge and skills currently demanded by the Computing and Tech industries. In the last decade, industries have replaced electromechanical components for control systems with interconnected computers, microcontrollers, and digital components. This proposal drops the mechanical and electromechanical content and better balances courses in hardware, electronics, computing and engineering principles. An associate's and a bachelor's degree in CET is a better 2+2 model that aligns with the ABET Accreditation requirements.

STRENGTHS:

1. The new curriculum provides a more up to date career path than the exiting one.

2. The alignment between the department’s associate's and bachelor's degree programs is better.

3. The number of 1 credit courses have been reduced, the 5 credit courses have been eliminated and the total number of contact hours has been reduced from 59 to 56 with the same number of credits.

CONCERNS:

1. Despite the reduction in contact hours and number of required courses, this remains a challenging program. Given that many of our entering students face significant challenges in reading, writing and mathematical skills, there needs to be a continuing effort to provide students with appropriate guidance and academic advisement.

2. There seems to be some overlap between courses in this program and courses offered by the Computer Systems Department and the Electrical Engineering Department. It should be made clear to students what the difference is between this program and these other programs so that students can make the proper academic choice.

SUBCOMMITTEE ACTIVITIES:

The subcommittee discussed the proposal with the proposers and the provost at several meetings this semester and last semester. As a result, the proposal has gone through several revisions as documented in the Proposal History that is included in the latest revision.

CURRICULUM MODIFICATION PROPOSAL
Title: Program Change from an AAS in EMT to an AAS in CET

By
Ohbong Kwon and Benito Mendoza

Department of Computer Engineering Technology
New York City College of Technology, CUNY
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Phone: (718) 260-5885

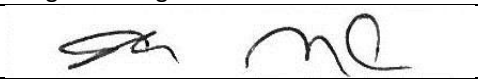
Table of Contents

CURRICULUM MODIFICATION PROPOSAL FORM 2
ALL PROPOSAL CHECK LIST 3
BRIEF DESCRIPTION OF PROPOSAL 4
RATIONALE OF PROPOSAL 6
CONSULTATIONS WITH AFFECTED DEPARTMENTS 6
Section AIII: Changes in Degree Programs 14
NEW COURSE PROPOSAL FORM: CET 1100 17
NEW COURSE PROPOSAL FORM: CET 1211 31
NEW COURSE PROPOSAL FORM: CET 2450 41
Section AV: Changes in Existing Courses 51
Section AV: Changes in Existing Courses 59
Section AV: Changes in Existing Courses 61
Section AV: Changes in Existing Courses 70
Section AV: Changes in Existing Courses 72
Section AV: Changes in Existing Courses 74
Section AV: Changes in Existing Courses 76
Section AV: Changes in Existing Courses 78
Section AV: Changes in Existing Courses 80
Section AV: Changes in Existing Courses 82
Section AV: Changes in Existing Courses 84
Section AV: Changes in Existing Courses 86
Section AVI: Courses Withdrawn 88
Departmental Curriculum Meeting Minutes 2021-09-09 89

New York City College of Technology, CUNY

CURRICULUM MODIFICATION PROPOSAL FORM

This form is used for all curriculum modification proposals. See the Proposal Classification Chart for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

Title of Proposal	Program Changes from an AAS in EMT to an AAS in CET
Date	8/29/2021
Major or Minor	Major
Proposer's Name	Ohbong Kwon, Benito Mendoza
Department	Computer Engineering Technology
Date of Departmental Meeting in which proposal was approved	9/9/2020
Department Chair Name	Sunghoon Jang
Department Chair Signature and Date	
Academic Dean Name	Gerarda Shields
Academic Dean Signature and Date	
Brief Description of Proposal (Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body.	The Computer Engineering Technology Department offers an AAS degree in Electromechanical Engineering Technology (EMT) and a BTech degree in Computer Engineering Technology (CET), following a 2+2 model. To obtain the BTech degree in CET, students must complete the EMT curriculum during the first two years and the CET curriculum during the last two years. This proposal describes the curriculum modifications needed to update the AAS in EMT program and transform it into an AAS in CET. The curricular modifications include three new course proposals (CET 1100, CET 1121, and CET 2450); changes to the course prefix from EMT to CET for all the core courses in the major; course numbers for three courses (CET 2312, CET 2350, and 2411); the number of credits for two courses (CET 1111 and CET 1150); prerequisites, titles, and descriptions for some other courses.
Brief Rationale for Proposal (Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body).	This proposal aims to strengthen the Computer Engineering Technology programs to better prepare our graduates with the knowledge and skills currently demanded by the Computing and Tech industries. In the last decade, industries have left behind electromechanical components for control systems, replacing them with interconnected computers, microcontrollers, and digital components. The curriculum proposed here drops the mechanical and electromechanical content and better balances courses in hardware, electronics, communications, and computing and engineering principles. Having an associate's and a bachelor's degree in CET is a better 2+2 model that also aligns better with the ABET Accreditation requirements.

Proposal History (Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list).	1. 10/1/2021 – New submission to CCCC 2. 02/28/2022 Modification was made according to CCCC Subcommittee's reviews. 3. 03/29/2022 Meeting with Provost's Office and Subcommittee 4. 04/12/2022 Proposal (R3) was updated and submitted to CCCC and Provost's Office. 5. 05/05/2022 Open hearing on this proposal was held. 6. 09/27/2022 Proposal (R4) was updated and submitted. 7. 11/02/2022 Meeting with Provost's Office and Subcommittee 8. 11/04/2022 Proposal (R6) was updated and submitted. 9. 11/08/2022 Proposal (R7) was updated and submitted.

Please include all appropriate documentation as indicated in the Curriculum Modification Checklist.

For each new course, please also complete the New Course Proposal and submit in this document.

Please submit this document as a single .doc or .rtf format. If some documents are unable to be converted to .doc, then please provide all documents archived into a single .zip file.

ALL PROPOSAL CHECK LIST

Completed CURRICULUM MODIFICATION FORM including:	
• Brief description of proposal	✓
• Rationale for proposal	✓
• Date of department meeting approving the modification	✓
• Chair's Signature	✓
• Dean's Signature	✓
Evidence of consultation with affected departments List of the programs that use this course as required or elective, and courses that use this as a prerequisite.	✓
Documentation of Advisory Commission views (if applicable).	N/A
Completed Chancellor's Report Form.	✓

EXISTING PROGRAM MODIFICATION PROPOSALS

Documentation indicating core curriculum requirements have been met for new programs/options or program changes.	N/A
Detailed rationale for each modification (this includes minor modifications)	✓

BRIEF DESCRIPTION OF PROPOSAL

Specifically, the proposed changes to convert the AAS in EMT to an AAS in CET include the following modifications:

1) Creates new courses
   - CET 1100 (2 credits, 1 cl hr, 2 lab hrs) in the 1st semester.
   - CET 1211 (2 credits, 1 cl hr, 2 lab hrs) in the 2nd semester.
   - CET 2450 (3 credits, 2 cl hrs, 3 lab hrs) in the 3rd semester.
2) Changes in course prefix, number, and credits
   - EMT 1111 (1 credit, 2 lab hrs) changes to CET 1111 (3 credits, 2 cl hrs, 2 lab hrs) in the 1st semester
   - EMT 1150 (5 credits, 4 cl hrs, 3 lab hrs) changes to CET 1150 (3 credits, 2 cl hrs, 3 lab hrs) in the 1st semester.
3) Changes in course prefix, number, and titles
   - EMT 1220 “Mechanisms” is renumbered and renamed as CET 2312 “Reverse Engineering/Product Design”.
   - EMT 1255 “Electronics” is renumbered as CET 2350 “Electronics”.
   - EMT 2410 “C/C++ Programing for Embedded Systems” is renumbered as CET 2411 “C/C++ Programing for Embedded Systems”.
   - EMT 2461 “Electromechanical Systems: Software Interface” is renamed as CET 2461 “Computer Systems: Software Interface”.
4) Changes in course prefix
   - All other EMT courses such as EMT 1120, EMT 1250, EMT 2370, EMT 2390L, and EMT 2455 changes course prefix from EMT to CET such as CET 1120, CET 1250, CET 2370, CET 2390, and CET 2455.
5) Withdraw courses
   - EMT 1130 (1 credit, 3 lab hrs) in the 1st semester.
   - EMT 2320 (5 credits, 4 cl hrs, 3 lab hrs) in the 3rd semester.
   - EMT 2480L (1 credit, 3 cl hrs) in the 4th semester.

From the change of the course credits and contact hours, we were able to:

- Reduce the number of 1-credit courses from 5 in the AAS in EMT program to 2 in the new AAS in CET program (CET 1120 & CET 2390)
- Reduce the number of contact hours from 59 in the AAS in EMT program to 56 in the AAS in CET with the same number of credits, with the same 36 credits for major courses.
- Eliminate 5-credit courses: there are 2 of them in the EMT program, while there will be none in the AAS in CET program.

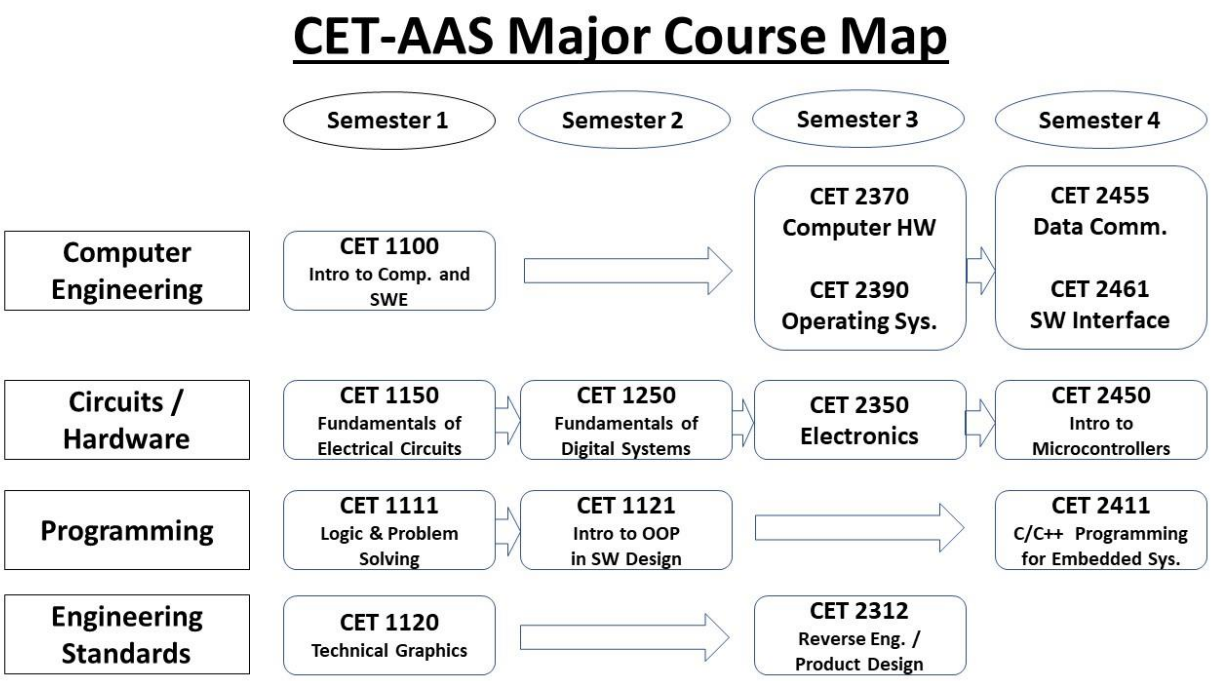


Figure 1 Courses map by main areas or disciplines for the proposed AAS in CET

A map of courses in the areas covered in the AAS in CET program are presented in Fig. 1. The arrows represent the course sequence. Table 1 includes the number of credits per semester.

Table 1 Courses and credits by semester for the proposed AAS in CET

CET-AAS Degree Map							
Semester 1		Semester 2		Semester 3		Semester 4	
CET 1100 Intro to Computer and Software Engineering	2	CET 1211 Intro to OOP in SW Design	2	CET 2312 Reverse Eng. / Product Design	4	CET 2450 Intro to Microcontrollers	3
CET 1111 Logic & Problem Solving	3	CET 1250 Fundamentals of Digital Systems	4	CET 2350 Electronics	4	CET 2455 Data Comm.	2
CET 1120 Technical Graphics	1			CET 2370 Computer HW	2	CET 2461 SW Interface	2
CET 1150 Fundamentals of Electrical Circuits	3	ENG 1121 English Comp. 2	3	CET 2390 Operating System	1	CET 2411 C/C++ for Embedded Sys.	3
MAT 1275 College Alg. & Trig.	4	MAT 1375 Pre-Calculus	4	MAT 1475 Calculus I	4		
ENG 1101 English Comp. 1	3	PHYS 1433/1441 Physics I	4-5	Flex Core 1	3	Flex Core 2	3
Subtotal CR	16	Subtotal CR	17-18	Subtotal CR	18	Subtotal CR	13

RATIONALE OF PROPOSAL

The combination of Electromechanical Engineering Technology and Computer Engineering Technology made more sense decades ago when the programs were created. However, in the last decade, thanks to the advance of computers, communications, and software, most industries have shifted from utilizing electromechanical components for control systems to utilizing interconnected digital components and computers in almost any control system. One of the main goals of computer engineering technology is to teach the knowledge and technical skills to design and create computer-controlled systems composed of different types of hardware such as sensors, actuators, electronics, networking devices, and software, following engineering principles. Perhaps, this is one of the main differences with other programs such as Computer Systems Technology and Computer Sciences, which are more focused on data and service management and software. By converting the AAS EMT major into a CET AAS, we are dropping the content focused on mechanical and electromechanical areas and providing a better balance of courses and credits in computing, hardware, electronics, communications, and engineering principles.
Additionally, the AAS in CET will align better with the ABET Accreditation criteria for programs in Computer Engineering Technology. Following the ABET indications, the AAS in CET curriculum will include instruction and develop students' skills in the following topics:

- Application of electric circuits, computer programming, associated software applications, analog and digital electronics, microcontrollers, operating systems, local area networks, and engineering standards to the building, testing, operation, and maintenance of computer systems and associated software systems; and
- Application of natural sciences (physics) and mathematics at or above the level of algebra and trigonometry to the building, testing, operation, and maintenance of computer systems and associated software systems.

CONSULTATIONS WITH AFFECTED DEPARTMENTS

The proposal was sent to the department of ETET, MECH, CST on 12/16/2021, and MATH on 1/17/2022 for consultations. Here are responses below from three departments. In addition, an open hearing was held for this proposal on 5/5/2022. The ETET department suggested that we change the title of CET 1150 "Electrical Circuits" since we reduce the range of contents. So we decided to change it to "Fundamentals of Electrical Circuits" after the departmental meeting on 8/22/2022.

- Response from the MECH department:

Masato Nakamura
Mon 2/7, 3:37 PM
Benito Mendoza; Ohbong Kwon; Sunghoon Jang

Reply all

Hi Ben,
Thank you. The new program name is very straight forward and I support this change.
Masa

--
Masato R. Nakamura, Eng.Sc.D.
Associate Professor and Chair
Department of Mechanical Engineering Technology and Industrial Design Technology
New York City College of Technology (City Tech)
The City University of New York (CUNY)
186 Jay Street, Voorhees Hall Room 532, Brooklyn, NY 11201
Cell: 202-381-6976, Email: mnakamura@citytech.cuny.edu
MECH Web: citytech.cuny.edu/mechanical

- Response from the CST department:

Ashwin Satyanarayana
Mon 2/7, 4:39 PM
Benito Mendoza; Ohbong Kwon; Sunghoon Jang

Reply all

Hello Ben,

Sorry for the late response. We don't have any comments from the CST department on this proposal. I think this is a great idea, and good luck with the rest of the curriculum process.

Best,
Ashwin

Ashwin Satyanarayana, Ph.D.
Associate Professor / Department Chair
Department of Computer Systems Technology,
New York City College of Technology
300 Jay Street - Namm 913, Brooklyn, NY 11201
Ph: (718) 260-5161

- Response from the ETET department:

Mohammad Razani
Tue 2/22, 12:31 AM
Xiaohai Li; Benito Mendoza; Ohbong Kwon; Sunghoon Jang; +4 more

Reply all

ETET Department's Com...
184 KB

Download

Action Items

Dear All,

Attached please find the ETET department's preliminary review of both SWE-BS proposal as well as the program change from AAS- EMT to AAS- CET proposal.

If there are additional comments, I will be sending them to all very soon but for now, please consider the attached itemized issues as our comments and concerns which I hope they get resolved before they are discussed on the floor of CCCC meeting.

Best Regards,

Mohammad

- CET department sent the responses to the comments on 2/25/2022. After that, ETET department sent the additional comments on 3/4/2022 and CET department responded as shown below. Please see the yellow highlighted questions from ETET department and the RTC accordingly.

March 4, 2022

21-05 BS in Software Engineering Technology (SET)

Responses to Prof. Razani's Comments:

1.1 The programs at Brooklyn College and Hunter College that have existed for a long time and are well-structured and well known with excellent reputations, cover the same and more topics.

Resp: Thanks for this comment! As listed in the proposal, the baccalaureate programs at Brooklyn College and Hunter College are not in *Software Engineering* **NOT RELEVANT** nor *Software Engineering Technology*, but BS in CS, BS in Information Systems, and BS in Computational Mathematics (at Brooklyn College); BA in Computer Science (at Hunter College).

1.2 Electrical Circuits CET 1150, Fundamentals of Digital Systems CET1250, Digital Image Processing CET 4910 and Computer Vision CET 4920, are electronic/telecommunication courses that should logically be taught by ETET faculty.

Resp:

CET4920 *Introduction to Computer Vision* and CET4910 *Digital Image Processing* are not electronic/telecommunications courses at all but CET tech elective, which were created and proposed by CET faculty (Prof. Li and Prof. Xu). It certainly should be taught by CET professors.

The comment is not about who created or proposed the course, but that the content material falls within the ETET department.

2nd Resp: CET 1150 and CET 1250 have been taught in the CET department over the years and are focused on the Compute Engineering Technology field. In addition, CET 4910 and CET 4920 are already existing courses. These courses were approved by College Council a few years ago, and there were no objections from the ETET department at that time. The CET department has offered these courses for several semesters now. The CET department has faculty with experience in these fields. If faculty from the ETET department is interested in teaching any of these courses, the CET department will be happy to invite experienced ETET faculty.

1.3 Page 22 (II. Computer Essentials): some of the courses are not even approved yet.

Resp: Thanks for this comment! They are new courses that we are proposing for this degree program, and are submitted for approval.

1.4 The proposed program is supposedly for a BS in Software Engineering Technology, however the bulk of the proposal is focused on Software Engineering.

Resp: "software engineering" is the field that this proposal and the new degree program are all about. We cannot use the word "Engineering" in the program title before it is accredited by ABET, but that does not mean we cannot propose courses in this field. We understand the difference between Engineering and Engineering Technology degree programs and emphasized hands-on experience in our proposal. Most courses proposed for this program have lab or project components.

March 4, 2022

This is a poor attempt at skirting the issue. The comment was not on the word engineering, but on the lack of the use of the word 'technology'. Furthermore, the word 'engineering' is actually used throughout the proposal to refer to the program.

2nd Resp: Thanks for the comment! Please see the updated proposal. The degree program title has been corrected as "Software Engineering Technology" and the proposed curriculum does emphasize hands-on experience as for a technology degree program. Now, regarding the course, please understand that we cannot include the word "technology" in the titles. For example, a course of "Introduction to Software Engineering" cannot use a title as "Introduction to Software Engineering Technology" nor "Introduction to Software Technology", because "software engineering" is the actual technical name of the field. Event within CUNY, some "Software Engineering" is a valid course title within a non engineering program, check the CS Program at Queens College: https://www.cs.qc.cuny.edu/index-3.html
Moreover, please see the attached your proposal of BT in ETET, which was submitted in December 2011. The word "Technology" was not used in any of the courses proposed, except for one technical elective course, which you can find in the new course titles on page 7 and in the new course descriptions on pages 14 to 17.

1.5 The letters of support are for software engineering (pages 313, 314, 317, and not Software Engineering Technology, although the word Engineering should not have been used.

Resp: Thanks for this comment! This is due to that we initially planned to propose a Software Engineering degree program and used this title in the communications when we requested the letter of support. To avoid any further hassles, we decided not to ask for another letter of support again.

This is nothing more than a 'bait-and-switch' and should not be accepted! Professional responsibilities should take precedence over 'hassles'.

2nd Resp: We are collecting new letters of support with a correct program title. Actually, we just received one from QCC, which has been included in the updated proposal. Please see Appendix A there.

1.6. The Student Outcomes are from the ABET EAC Criterion 3 and not from ABET ETAC Criterion 3 which seems to be a serious disconnect.

Resp: Thanks for this comment! It has been updated.

The point of the original comment is that the program was initially proposed as a Computer Engineering degree program and NOT as a Computer Engineering 'Technology' program! All of the Program Educational Objectives and Student Outcomes need to be reviewed for each individual course to make sure that they satisfy ABET ETAC requirements and NOT ABET EAC requirements.

March 4, 2022

2nd Resp: Thanks for reminding us about this! We are aware of this and will work on it when we pursue ABET accreditation. BTW, we were not proposing a "Computer Engineering" degree program initially.

1.7 The CET 1150 (Dc Circuits) course duplicates most of our EET 1122 course contents.

Resp: Please see below.

The response below makes no comment in explaining this objection. To reiterate, the CONTENT of CET 1150 is IDENTICAL to the content of EET 1122. The only difference is that it's one credit less. If the college council approves this course, the fact of the matter will be that any department may reintroduce a course with content identical to another department so long as the number of credits is different. (For example, the ETET department can submit a proposal to create advanced engineering technology math courses of 3-credits focused with specific applications within ETET and designed for ETET students to make sure that they satisfy the department PEOs of aspirational goals as mandated per comments from the last ABET review. This implies that students will require fewer courses within the math department, which I'm certain there should be no objection to since it will be 1-credit less than those courses offered in the Math department.)

2nd Resp: CET 1150 (former EMT 1150) which has been taught with a 5-credit course in the EMT-AAS program in the CET department over the years. It has been modified with a 3-credit course to fit in and support the CET-AAS program. Since it was reduced 2 credits, CET 1150 covers only dc circuits as the first circuit course out of four sequential circuit courses in a row in CET-AAS program. Even though the content of CET 1150 looks identical to the contents of EET 1122, it should be different in that CET 1150 focuses on more circuit analysis than EET 1122. In addition, CET 1150 doesn't require PHYS 1433 course as a pre-or corequisites, it doesn't cover the magnetism and inductance concept of magnetic forces and fields which EET 1122 does.

Regarding the courses you mentioned above, we just want to note that we are not proposing any changes on General Education Required Core courses. We are proposing and modifying courses within our program core courses (Computer Engineering Technology).

1.8 CET 1250 course (Fundamentals of Digital Systems) is similar to EET 2162 course.

Resp: CET 1250 has been taught as of EMT 1250 in EMT-AAS program. It is different from EET 2162 in that CET 1250 is a 4-credit course designed for Computer Engineering Technology program needs, especially working on the introductory level of hardware description language (HDL) with the FPGA board in the lab session.

1.9 As Provost Brown has pointed out until ABET accreditation, you cannot use the word "Engineering" in the program title (To be granted later by NY Department of Higher Education). Until then the program is Software Technology

Resp: Thanks for this comment! Provost informed us long time ago and we have been fully aware of this. It has been reflected in the proposal title and explained in the proposal.

March 4, 2022

21-07 AAS in Computer Engineering Technology

Responses to Prof. Razani's Comments:

- There is a regular use of the term "Computer Engineering" even though the program is supposed to be an *Engineering Technology* Program (Even the word Engineering, as mentioned above, is yet to be approved). This is very misleading for students that would be entering into the program.

Resp: Thanks for this comment. It has been updated in the proposal.

- EMT 2480L (Electromechanical Systems Design Laboratory) is being changed to CET 1211 Intro to Object Oriented Programming Software Design, which is a pure computer science subject and should be taught in the appropriate Computer Science Technology department. The required textbooks are based in Java and CST 1201 is entirely focused on OOP in Java.

Resp: As the subcommittee recommended, CET 1211 was proposed as a new course development instead of changing EMT 2480L. And we got support from CST department for this program change. In addition, it was also mentioned as shown below in the new course proposal.

Then the support letter from the CST department should be included in the proposal..

2nd Resp: It has been included in the updated proposal. Please find it on page 7.

There is no similar course content with 2 credits available within City Tech. Currently, CST offers CST3513 – Object-Oriented Programming with 3 credits, introducing the fundamentals of object-oriented programming. We design the course based on our computer engineering program needs, focusing more on activities to prepare students to apply OOP principles to software and embedded system designs. Starting with the fundamentals of Java programming to algorithms, continuing to mid-sized object-oriented programming and design, the course also provides samples of real-world applications, such as Image Processing, Artificial Intelligence (AI), and Internet of Things (IoT). In this course, Java will be used as the tool for helping students to learn these OOP concepts and digital technologies.

Great! Then it will be reiterated here: The ETET department can submit advanced engineering technology math courses of 3-credits focused with specific applications within ETET and designed for ETET students to make sure that they satisfy the department PEOs of aspirational goals as mandated per comments from the last ABET review. I'm certain there should be no objection to it since it will be 1-credit less than those courses offered in the Math department.

2nd Resp: We believe the CST department understands that an overlapping among our programs is natural. Computer Engineering is a discipline at the intersection of Computer Science and Electrical Engineering. As expected, there is a natural overlapping among the programs in the CET department, the CST Department, and the ETET departments at City Tech. The envisioned AAS in CET curriculum includes the CET1211, which covers some aspects of OOP, but not everything that is covered in other existing courses.

March 4, 2022

- The proposed CET 2312 Reverse Engineering/Product design has no mention in its description about reverse engineering. The course titles do not usually have a slash in them! The course should be called simple product design, if not mechanisms altogether.

This implies a credit difference, not a content difference. To reiterate, the ETET department can submit advanced engineering technology math courses of 3-credits focused with specific applications within ETET and designed for ETET students to make sure that they satisfy the department PEOs of aspirational goals as mandated per comments from the last ABET review. I'm certain there should be no objection to it since it will be 1-credit less than those courses offered in the Math department.

2nd **Resp:** CET 2312 has been modified from EMT 1220 with the new name and description reflect current content and STEM components of the course as Engineering standards. Therefore, this course has nothing to do with what you mentioned above.

Resp: Thanks for this comment. The course coordinator is working on it now. It should be updated soon in the proposal.

- The rational of the proposal contrasts the differences between the CET program and CST/CS programs, yet no mention is made of the EET nor the TCET programs, whose program and course descriptions seem to be very close to identical to the ones being proposed for the CET program, though those programs already exists and make the CET program proposal superfluous.

Resp: Thanks for this comment. But all the courses have already been taught in EMT-AAS program and are going to be changed into CET-AAS program except new course proposals. In addition, one of the new course proposals, CET 2450 "Introduction to Microcontrollers" has been taken into account with EET 3112 in the proposal as shown below.

Currently EET department offers EET 3112 Advanced Microcontroller and Embedded System Design (3 credits). However, the CET 2450 is an "introductory" level course designed for Computer Engineering Technology program needs, more focused on a wider application of 8, 16, 32-bit Microcontrollers in computer hardware-based control of electromechanical devices and Programmable Logic Controllers. Each session includes two hours of lecture and two hours of assisted lab work. Labs are assigned with each lecture by emphasizing an understanding of the principles of Microcontroller based design of electromechanical control systems. This course is designed to serve the current CET majors (AAS and BTech).

- The course below matches by more than 50% a course offered within the ETET department, as can be seen by the table below:

March 4, 2022

Original EMT Course Description/outline	NEW CET Course Description/outline	ETET Course Description/outline[1]
EMT 1150 Electrical Circuits Introduction to the basic principles of direct and alternating current circuits. Topics include linear and nonlinear passive components, transient response and phase relationships. Laboratory work is performed both in school and at home (using student-purchased kits). The use of the multi-meter, oscilloscope and frequency generator is introduced; computers are used for problem-solving.	***CET 1150 Electrical Circuits*** ***Rationale:*** "In this proposal, EMT1150 is modified to suit for freshman students. Alternating current (AC) circuit covered in EMT1150 is removed and only direct current (DC) circuit is introduced in CET1150."*** ***New course description:*** Introduction to the basic principles of direct current circuits. Topics include the basic techniques to analyze DC linear circuit network, such as series, parallel and series-parallel circuits, network theorems, equivalent circuits. Laboratory experiments include circuit simulation, breadboarding, measurement techniques and troubleshooting.	***EET 1122 Circuit Analysis*** I ***Course Description:*** Introduction to dc circuits. Topics include series, parallel, and series parallel circuits, network theorems, equivalent circuits, capacitive and inductive circuits, timing circuits and measuring instruments. Laboratory experiments include breadboarding, measurement techniques and troubleshooting. The writing of laboratory reports is taught and written reports are required.

*** No mention of the removal of AC topics is given in the table listed prior to the Rationale section.

Resp: Thanks for this comment. It has been updated in the table of the proposal. CET 1150 has been taught as EMT 1150 in EMT-AAS program with a 5-credit course. To reduce the credit and contact number, we changed it to CET 1150 with a 3-credit course balancing the needs between theory and experiments, which is different from EET 1122, a 4-credit course. Ultimately, this change is part of a redistribution of credits in the curriculum of the new AAS program in Computer Engineering Technology.

This implies a credit difference, not a content difference. To reiterate again, the ETET department may submit advanced engineering technology math courses of 3-credits focused with specific applications within ETET and designed for ETET students to make sure that they satisfy the department PEOs of aspirational goals as mandated per comments from the last ABET review. I'm certain there should be no objection to it since it will be 1-credit less than those courses offered in the Math department.

2nd Resp: This comment was reiterated 4 times above. I think we have given enough answers above.

CHANCELLOR'S REPORT FORM

Section AIII: Changes in Degree Programs

The following revisions are proposed for Associate of Applied Science (AAS) in Computer Engineering Technology
Program: Computer Engineering Technology
Program Code: CET
Effective: Fall 2023

FROM:		**TO:**	
GENERAL EDUCATION COMMON CORE	**28-30 CREDITS**	**GENERAL EDUCATION COMMON CORE**	**28-30 CREDITS**
I – REQUIRED CORE (4 COURSES, 14-15 CREDITS)		**I – REQUIRED CORE (4 COURSES, 14-15 CREDITS)**	
English Composition (2 courses, 6 credits)		**English Composition (2 courses, 6 credits)**	
ENG 1101 English Composition I	3	ENG 1101 English Composition I	3
ENG 1121 English Composition II	3	ENG 1121 English Composition II	3
Mathematical and Quantitative Reasoning (1 course, 4 credits)		**Mathematical and Quantitative Reasoning (1 course, 4 credits)**	
~~MAT 1375~~		MAT 1275	
or higher Precalculus	4	or higher College Algebra and Trigonometry	4
Life and Physical Sciences (1 course, 4-5 credits)		**Life and Physical Sciences (1 course, 4-5 credits)**	
PHYS 1433 General Physics I: Algebra Based	4	PHYS 1433 General Physics I: Algebra Based	4
or		**or**	
PHYS 1441 General Physics I: Calculus Based	5	PHYS 1441 General Physics I: Calculus Based	5
II – FLEXIBLE CORE (4 COURSES, 14-15 CREDITS)		**II – FLEXIBLE CORE (4 COURSES, 14-15 CREDITS)**	
~~Students must take courses as specified in Scientific World area and select one approved course from each of any other two areas.~~	~~6~~	Students must take 2 courses as specified in Scientific World	
~~**World Cultures and Global Issues**~~		**Scientific World**	
~~Any Approved Course~~		MAT 1375 or higher Pre-Calculus	4
~~**US Experience in its Diversity**~~		MAT 1475 or higher Calculus	4
~~Any Approved Course~~			

~~**Individual and Society**~~ ~~Any Approved Course~~ ~~**Creative Expression**~~ ~~Any Approved Course~~ ~~**Scientific World**~~ ~~MAT 1475~~ ~~or higher Calculus 4~~ ~~PHYS 1434 General Physics II: Algebra Based 4~~ ~~**or**~~ ~~PHYS 1442 General Physics II: Calculus Based 5~~	Students select one approved course from each of any two areas in the list below. 6 **World Cultures and Global Issues** Any Approved Course **US Experience in its Diversity** Any Approved Course **Individual and Society** Any Approved Course **Creative Expression** Any Approved Course
Writing Intensive Requirement Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.	**Writing Intensive Requirement** Students at New York City College of Technology must complete two courses designated WI for the associate level, one from GenEd and one from the major; and two additional courses designated WI for the baccalaureate level, one from GenEd and one from the major.
PROGRAM-SPECIFIC DEGREE REQUIREMENTS 36 CREDITS	**PROGRAM-SPECIFIC DEGREE REQUIREMENTS 36 CREDITS**
~~EMT 1111 Logic and Problem-Solving 1~~ ~~EMT 1120 Technical Graphics 1~~ ~~EMT 1130 Electromechanical Manufacturing Laboratory 1~~ ~~EMT 1150 Electrical Circuits 5~~ ~~EMT 1220 Mechanisms 4~~ ~~EMT 1250 Fundamentals of Digital Systems 4~~ ~~EMT 1255 Electronics 4~~ ~~EMT 2320 Advanced Mechanisms 5~~ ~~EMT 2370 Computer Hardware Systems 2~~ ~~EMT 2390L Operating Systems Laboratory 1~~ ~~EMT 2455 Data Communications 2~~ ~~EMT 2461 Electromechanical Systems Software Interface 2~~ ~~EMT 2480L Electromechanical Systems Laboratory 1~~	CET 1100 Intro to Computer and Software Engineering 2 CET 1111 Logic and Problem-Solving 3 CET 1120 Technical Graphics 1 CET 1150 Electrical Circuits 3 CET 1211 Intro to Object-Oriented Programming in Software Design 2 CET 1250 Fundamentals of Digital Systems 4 CET 2312 Reverse Engineering / Product Design 4 CET 2350 Electronics 4 CET 2370 Computer Hardware Systems 2 CET 2390 Operating Systems Laboratory 1 CET 2450 Intro to Microcontroller 3 CET 2455 Data Communications and Networking 2 CET 2461 Computer Systems: Software Interface 2 Technical Elective 3 CET 2411 C/C++ Programming for Embedded Systems

Technical Elective	3
~~EMT 2410 C/C++ Programming for Embedded Systems~~	
or	
CST 2403 Intro C++ Programming Language I	
~~MAT 1375~~	
or higher Precalculus	Met as GenEd
PHYS 1433 General Physics I: Algebra Based	
or	
PHYS 1441 General Physics I: Calculus Based	Met as GenEd
PHYS 1434 General Physics II: Algebra Based	
or	
PHYS 1442 General Physics II: Calculus Based	Met as GenEd
MAT 1475	
or higher Calculus	Met as GenEd
TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES	**36**
TOTAL NYSED LIBERAL ARTS AND SCIENCE CREDITS	**28-30**
TOTAL CREDITS REQUIRED FOR THE DEGREE	**64-66**

or	
CST 2403 Intro C++ Programming Language I	
MAT 1275	
or higher College Algebra and Trigonometry	Met as GenEd
PHYS 1433 General Physics I: Algebra Based	
or	
PHYS 1441 General Physics I: Calculus Based	Met as GenEd
PHYS 1434 General Physics II: Algebra Based	
or	
PHYS 1442 General Physics II: Calculus Based	Met as GenEd
MAT 1475	
or higher Calculus	Met as GenEd
TOTAL PROGRAM-SPECIFIC REQUIRED AND ELECTIVE COURSES	**36**
TOTAL NYSED LIBERAL ARTS AND SCIENCE CREDITS	**28-29**
TOTAL CREDITS REQUIRED FOR THE DEGREE	**64-65**

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM: CET 1100

This form is used for all new course proposals. Attach this to the Curriculum Modification Proposal Form and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

Course Title	**Introduction to Computer and Software Engineering**
Proposal Date	Sep 4. 2021
Proposer's Name	Chen Xu, Lili Ma, Xiaohai Li
Course Number	**CET 1100**
Course Credits, Hours	2 credits, 1 hour lecture, 2 hours lab
Course Pre / Co-Requisites	None
Catalog Course Description	Introduction to computer and software engineering, and the degree programs in the Computer Engineering Technology Department. This course introduces the hardware and software aspects of the general CET field and prepares students to achieve academic success in CET majors. Topics include history of computing and computer, basic computer organization and components, different types of computing machines and platforms, programming languages and development tools, software categories, software development life cycle, copyrights, security and ethical issues. The City Tech and CET resources are also introduced for student's academic success.
Brief Rationale Provide a concise summary of why this course is important to the department, school or college.	This course can serve as a bridge for first-year students to transition their academic study from high school to college. The course is designed to introduce students to the field of Computer Engineering in general, such as basic computer organization and components, different types of computing machines and platforms, programming languages and development tools. It can also guide students to quickly adapt to college life and learning, get familiar with City Tech and CET resources, and prepare students with a basic understanding of the upcoming CET major(s).
CUNY – Course Equivalencies Provide information about equivalent courses within CUNY, if any.	No
Intent to Submit as Common Core If this course is intended to fulfill one of the requirements in the common core, then indicate which area.	No
For Interdisciplinary Courses: - Date submitted to ID Committee for review - Date ID recommendation received - Will all sections be offered as ID? Y/N	Not applicable
Intent to Submit as a Writing Intensive Course	No

Please include all appropriate documentation as indicated in the NEW COURSE PROPOSAL Combine all information into a single document that is included in the Curriculum Modification Form.

NEW COURSE PROPOSAL CHECK LIST

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

Completed NEW COURSE PROPOSAL FORM	
• Title, Number, Credits, Hours, Catalog course description	y
• Brief Rationale	y
• CUNY – Course Equivalencies	y
Completed Library Resources and Information Literacy Form	
Course Outline Include within the outline the following.	
Hours and Credits for Lecture and Labs If hours exceed mandated Carnegie Hours, then rationale for this	y
Prerequisites/Co- requisites	y
Detailed Course Description	y
Course Specific Learning Outcome and Assessment Tables • Discipline Specific • General Education Specific Learning Outcome and Assessment Tables	y
Example Weekly Course outline	y
Grade Policy and Procedure	y
Recommended Instructional Materials (Textbooks, lab supplies, etc)	y
Library resources and bibliography	y
Course Need Assessment. Describe the need for this course. Include in your statement the following information.	
Target Students who will take this course. Which programs or departments, and how many anticipated? Documentation of student views (if applicable, e.g. non-required elective).	y
Projected headcounts (fall/spring and day/evening) for each new or modified course.	y
If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction.	y
Where does this course overlap with other courses, both within and outside of the department?	y
Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this?	y
If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need.	
Course Design Describe how this course is designed.	

Course Context (e.g. required, elective, capstone)	y
Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)?	y
Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture)	y
How does this course support Programmatic Learning Outcomes?	y
Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program.	
Additional Forms for Specific Course Categories	NA
Interdisciplinary Form (if applicable)	
Interdisciplinary Committee Recommendation (if applicable and if received)* *Recommendation must be received before consideration by full Curriculum Committee	
Common Core (Liberal Arts) Intent to Submit (if applicable)	
Writing Intensive Form if course is intended to be a WIC (under development)	
If course originated as an experimental course, then results of evaluation plan as developed with director of assessment.	
(Additional materials for Curricular Experiments)	NA
Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information).	
Established Timeline for Curricular Experiment	

Section AIV: New Courses

New courses to be offered in the School of Technology and Design

Department(s)	**School of Technology and Design**
Academic Level	**[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial**
Subject Area	Computer Engineering technology
Course Prefix	CET
Course Number	1100
Course Title	Introduction to Computer and Software Engineering
Catalog Description	Introduction to computer and software engineering, and the degree programs in the Computer Engineering Technology Department. This course introduces the hardware and software aspects of the general CET field and prepares students to achieve academic success in CET majors. Topics include history of computing and computer, basic computer organization and components, different types of computing machines and platforms, programming languages and development tools, software categories, software development life cycle, copyrights, security and ethical issues. The City Tech and CET resources are also introduced for student's academic success.
Prerequisite	None
Corequisite	None
Pre- or corequisite	None
Credits	2 credits
Contact Hours	1 hour lecture, 2 hours lab
Liberal Arts	**[ ] Yes [X] No**
Course Attribute (e.g. Writing Intensive, etc)	
Course Applicability	**[X] Major** **[ ] Gen Ed Required** **[ ] Gen Ed – Flexible** **[ ] Gen Ed - College Option** **[ ] English Composition** **[ ] World Cultures** **[ ] Speech** **[ ] Mathematics** **[ ] US Experience in its Diversity** **[ ] Interdisciplinary** **[ ] Science** **[ ] Creative Expression** **[ ] Advanced Liberal Arts** **[ ] Individual and Society** **[ ] Scientific World**
Effective Term	Fall 2023

Rationale: This course is designed as a required course for Computer Engineering Technology associate program. The course is designed to introduce students to the field of Computer Engineering in general, guide students to quickly adapt to college life and learning, get familiar with City Tech and CET resources, and prepare students with a basic understanding of the upcoming CET major(s). This course can serve as a bridge for first-year students to transition their academic study from high school to college.

LIBRARY RESOURCES & INFORMATION LITERACY: MAJOR CURRICULUM MODIFICATION

Please complete for **all** major curriculum modifications. This information will assist the library in planning for new courses/programs.

Consult with your library faculty subject specialist (http://cityte.ch/dir) **3 weeks before the proposal deadline**.

Course proposer: please complete boxes 1-4. **Library faculty subject specialist:** please complete box 5.

1	**Title of proposal** CET1100: Introduction to Computer and Software Engineering	**Department/Program** Computer Engineering Technology/ Computer Engineering Technology associate program
	Proposed by (include email & phone) Chen Xu Email: cxu@citytech.cuny.edu /718-254-8684 Lili Ma lma@citytech.cuny.edu / 718-260-8269 Xiaohai Li xhli@citytech.cuny.edu / 718-260-5880	**Expected date course(s) will be offered** Fall 2023 **# of students 20**

2	**The library cannot purchase reserve textbooks for every course at the college, nor copies for all students. Consult our website (http://cityte.ch/curriculum) for articles and ebooks for your courses, or our open educational resources (OER) guide (http://cityte.ch/oer). Have you considered using a freely-available OER or an open textbook in this course?** Yes.

3	**Beyond the required course materials, are City Tech library resources sufficient for course assignments? If additional resources are needed, please provide format details (e.g. ebook, journal, DVD, etc.), full citation (author, title, publisher, edition, date), price, and product link.** Yes.

4	**Library faculty focus on strengthening students' information literacy skills in finding, critically evaluating, and ethically using information. We collaborate on developing assignments and customized instruction and research guides. When this course is offered, how do you plan to consult with the library faculty subject specialist for your area? Please elaborate.** Once the course is offered, the faculty teaching this course may consult with the library faculty subject specialist to determine the future needs of textbook change or update, and acquisition of additional books, journals and online resources.

5	**Library Faculty Subject Specialist Junior Tidal** **Comments and Recommendations** After surveying the current collection, I feel that the library's current collection is inadequate to fully support this course. I feel that there are significant gaps in the collection, specifically in the history of computer science, the variety of books related to operating systems, platforms, and development tools, as well as contemporary works on computer security and ethical issues.

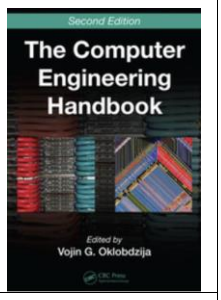
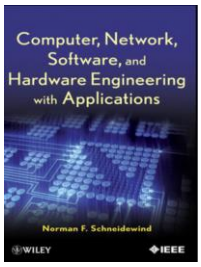
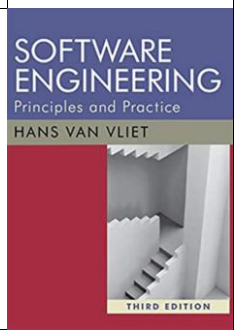
Pending course approval, I highly suggest that a large portion of the library's CET budget goes to monographs that covers these gaps, as well as supplemental resources such as videos and electronic resources. I also recommend that instructors utilize available OER textbooks to support their courses, due to the library's current restrictive budget. Several OER titles can be found here: https://open.umn.edu/opentextbooks/subjects/computer-science-information-systems.

Date 01.11.22

Computer Engineering Technology DepartmentComputer Engineering Technology Program

Sample Course Outline

Prepared by	Chen Xu, Lili Ma, Xiaohai Li	**Revision date**	9/5/2021
Course No. & Title	CET 1100 Introduction to Computer and Software Engineering		
Course Description	Introduction to computer and software engineering, and the degree programs in the Computer Engineering Technology Department. This course introduces the hardware and software aspects of the general CET field and prepares students to achieve academic success in CET majors. Topics include history of computing and computer, basic computer organization and components, different types of computing machines and platforms, programming languages and development tools, software categories, software development life cycle, copyrights, security and ethical issues. The City Tech and CET resources are also introduced for student's academic success.		
Hours / Credits	1 lecture hr, 2 lab hrs / 2 credits		
Pre-requisite	None		
Co-requisite			
Gen-Ed Objectives	1. SKILLS/Communication: Students will communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means. 2. INTEGRATION/Integrate learning: Students will resolve difficult issues creatively by employing multiple tools. 3. VALUES, ETHICS, RELATIONSHIPS / Professional/Personal Development: Students will work with teams, including those of diverse composition. Build consensus. Respect and use creativity.		
Course Objectives/ Student Learning Outcomes	Upon successful completion of this course, students shall be able to: 1. Understand the basic components of a computer system; 2. Describe the function and integration of computer hardware and software systems; 3. Understand the applications of computer engineering technology; 4. Understand the curriculum of CET program; 5. Have a career goal for themselves and plan toward it.		

Textbook:	**None**. Course materials will be provided by the instructor.	
Reference:	**A Brief Introduction to Engineering Computation with MATLAB** Author: Serhat Beyenir https://cnx.org/contents/qTr2bTqz@11.8:IZLgFOgb@3/Acknowledgements	
	The Computer Engineering Handbook Author: Vojin G. Oklobdzija Publisher: CRC Press ISBN 9780849386008	
	Computer, Network, Software, and Hardware Engineering with Applications **Author:** Norman F. Schneidewind Publisher: Wiley ISBN: 9781118181270	
	Software Engineering: Principles and Practice 3rd Edition Author: Hans van Vliet Publisher: Wiley; 3rd edition ISBN-13: 978-0470031469	

Weekly Topics

Week #	Lecture	Lab
1	Overview of the City Tech resources (admission and financial aid offices, student center, printing services, tutoring, library, computer labs); Introduction to the CET department (mission, majors, curriculum, program objectives, faculty & staff members, lab facilities, students' clubs)	Getting familiar with: • City Tech email • CUNYFirst • Blackboard OpenLab
2	CET advisement (program coordinators, advisors, DegreeWorks, roles of student and faculty, academic planner, degree maps, course selection and registration); Introduction to the Associate Degree (AAS) courses and Bachelor Degree (BTech) courses; Soft skills (communication skills, documentation, team-building, time management, good learning strategies)	Knowing how to use: • DegreeWorks • CUNYFirst • Word (Track changes, references, save as PDF, insert table, picture, header/footer, double-column) PDF (Add/delete pages, merge files, add signature, edit PDF)
3	Introduction to Computer Engineering; History of Computing and Computers; Relationship between Computer Engineering, Electrical Engineering, Computer Science, Software Engineering, and Security engineering	Introduction of some commonly-used graphic-based software, such as: • MATLAB Simulink • LabView • MultiSim SolidWorks and AutoCAD
4	Current computing machines and platforms	Introduction of some commonly-used text-based software, such as: • MATLAB • C/C++ • Java • Python
5	Introduction to Microcontrollers and Microprocessors	Programming on Microcontrollers
6	Introduction to Electrical Circuits	Simulation and Building of DC & AC Circuits
7	Number systems and logic gates	Lab exercise on logics
8	Basics of computer organization and computer components	Lab exercise on electronics
9	Survey of operating systems; Introduction to computer programming languages	Lab exercise on computer hardware components/systems
10	Basic procedural programming; Introduction to programming tools	Lab exercise on Operating System
11	Introduction to Software Engineering	Sample lab of programming under Linux/Unix
12	Software categories and architectures	Sample lab of programming in Java
13	Software development life cycle and copyrights	Sample lab of programming in Python
14	Security issues in computers and software	Sample lab of networking
15	Ethical issues in computers and software	Sample lab of security

COURSE POLICIES:

Grading:

- Quizzes: 15%
- HW and reflection: 30%
- Labs: 45%
- Attendance/Class Participation: 10%
- Total: 100%

Score %	< 60	60-69.9	70-76.9	77-79.9	80-82.9	83-86.9	87-89.9	90-92.9	93-100
Grade	F	D	C	C+	B-	B	B+	A-	A

Blackboard:

- Blackboard will be used extensively to provide course material, collect assignmentsand reports and provide detailed grading information. Students must make sure their Blackboard login works in the beginning of the course.

Hardware and Software for Lab/Project:

- Desktop/laptop or single-board computer can be used for the lab and courseproject.
- Other open-source or free software/library will be used in the labs and courseproject. Links to download the software/library will be posted on Blackboard.

Lab Reports:

- Students are expected to perform each lab activity individually.
- All lab reports must be submitted through Blackboard.
- Each lab report is due one week after the lab work is performed.
- Any late lab report will have a 30% late penalty per week; a submission will not beaccepted if it is more than three weeks late.
- Additional requirements regarding lab report's content and format will be posted onBlackboard.

Attendance:

- At the beginning of each class, the instructor will make a roll call of all the studentnames to check the attendance.
- Any lateness must be reported to the instructor by the students before the class isdismissed.
- A name without on-time attendance nor reported lateness will be considered to beabsent.
- 2 lateness will be considered equal to 1 absence.
- Any absence due to emergencies (e.g., emergency medical condition or no-fault legalcrisis) needs to be notified to the instructor by email or in-person.
- Excused absences can ONLY be considered with signed explanatory notes from aproper party with proper authority.

Classroom Conduct Policy:

- Cell phone ringing and any other distracting and disruptive behavior such as talkingloudly without permission are absolutely prohibited and may cause the student to be expelled from class.
- Any activity that threatens the college academic integrity will result in a disciplinaryaction.
- Please refer to the Student Handbook and the Catalog of New York City College ofTechnology for a full listing of Student Code of Conduct, Classroom Behavior Guidelines and Academic Integrity Rules.

Academic Integrity Policy:

- Students and all others who work with information, ideas, texts, images, music, inventions,and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantlyand appropriately to infractions of academic integrity. Accordingly, academic dishonesty isprohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

Assessment Methods:

General Education Learning Outcomes	**Assessment Methods**
SKILLS/Communication: Students will communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means.	Project and lab. Students will form a team to work on project and labs. They will write lab reports and project report, and present their project in the final presentation.
INTEGRATION/Integrate learning: Students will resolve difficult issues creatively by employing multiple tools.	Quiz, labs, reflections
VALUES, ETHICS, RELATIONSHIPS / Professional/Personal Development: Students will work with teams, including those of diverse composition. Build consensus. Respect and use creativity.	Labs and reflections

Course Specific Learning Outcomes	**Assessment Methods**
Understand the basic components of a computer system	HW, Quiz, and Lab
Describe the function and integration of computer hardware and software systems	HW, Quiz
Understand the applications of computer engineering technology	Lab and HW
Understand the curriculum of CET program	HW and Quiz
Have a career goal for themselves, and make a plan toward it	HW and reflection

Course Design

The course will be offered to the freshmen students in the AAS in Computer Engineering Technology Program in the Computer Engineering Technology Department. It is expected that a section (20 students as maximum) will take this course when it is offered in both Spring and Fall semesters every year.

The course is structured as a combination of lecture/tutorial/seminar series and hands-on lab/workshop sessions. The lecture series introduce students to City Tech and CET resources so that they will quickly adapt to college life and learning, as well as provide a brief and broad overview of the hardware and software aspects of the CET field. The hands-on sessions expose students to commonly-adopted hardware components & devices and software programming languages & tools. Adequate equipment and resources in the CET Department are available for the course's hands-on components. Many CET full-time faculty members are qualified and available to teach this course.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM: CET 1211

This form is used for all new course proposals. Attach this to the Curriculum Modification Proposal Form and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

Course Title	**Introduction to Objected-Oriented Programming in Software Design**
Proposal Date	Sep 17. 2021
Proposer's Name	Yu Wang, Lili Ma
Course Number	**CET 1211**
Course Credits, Hours	2 credits, 1 hour lecture, 2 hours lab
Course Pre / Co-Requisites	MAT 1275CO or MAT1275 or higher
Catalog Course Description	Introduction to Object-Oriented programming (OOP) in software design and applications. Topics include object-oriented design principles, classes, objects, methods, method overloading, attributes, encapsulation, data abstraction, inheritance, polymorphism, standard IO, and OOP design applications in real-world.
Brief Rationale Provide a concise summary of why this course is important to the department, school or college.	Knowledge on object-oriented programming (OOP) is intensively needed by the CET BTech major. This course, together with two other courses, implements a carefully-planned streamlined sequence of (three) programming courses in CET, starting from the AAS and leading into the BTech degree. The course serves as an intermediate-level programming course, introducing students to object-oriented programming concepts, widely-used data structures, and real-world embedded systems design applications. By building solid foundation in OOP, this course prepares students for more advanced programming and software usage in upper-level programming course(s).
CUNY – Course Equivalencies Provide information about equivalent courses within CUNY, if any.	No
Intent to Submit as Common Core If this course is intended to fulfill one of the requirements in the common core, then indicate which area.	No
For Interdisciplinary Courses: - Date submitted to ID Committee for review - Date ID recommendation received - Will all sections be offered as ID? Y/N	Not applicable
Intent to Submit as a Writing Intensive Course	No

Please include all appropriate documentation as indicated in the NEW COURSE PROPOSAL Combine all information into a single document that is included in the Curriculum Modification Form.

NEW COURSE PROPOSAL CHECK LIST

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

Completed NEW COURSE PROPOSAL FORM	
• Title, Number, Credits, Hours, Catalog course description	y
• Brief Rationale	y
• CUNY – Course Equivalencies	y
Completed Library Resources and Information Literacy Form	
Course Outline Include within the outline the following.	
Hours and Credits for Lecture and Labs If hours exceed mandated Carnegie Hours, then rationale for this	y
Prerequisites/Co- requisites	y
Detailed Course Description	y
Course Specific Learning Outcome and Assessment Tables • Discipline Specific • General Education Specific Learning Outcome and Assessment Tables	y
Example Weekly Course outline	y
Grade Policy and Procedure	y
Recommended Instructional Materials (Textbooks, lab supplies, etc)	y
Library resources and bibliography	y
Course Need Assessment. Describe the need for this course. Include in your statement the following information.	
Target Students who will take this course. Which programs or departments, and how many anticipated? Documentation of student views (if applicable, e.g. non-required elective).	y
Projected headcounts (fall/spring and day/evening) for each new or modified course.	y
If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction.	y
Where does this course overlap with other courses, both within and outside of the department?	y
Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this?	y
If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need.	
Course Design Describe how this course is designed.	

Course Context (e.g. required, elective, capstone)	y
Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)?	y
Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture)	y
How does this course support Programmatic Learning Outcomes?	y
Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program.	
Additional Forms for Specific Course Categories	NA
Interdisciplinary Form (if applicable)	
Interdisciplinary Committee Recommendation (if applicable and if received)* *Recommendation must be received before consideration by full Curriculum Committee	
Common Core (Liberal Arts) Intent to Submit (if applicable)	
Writing Intensive Form if course is intended to be a WIC (under development)	
If course originated as an experimental course, then results of evaluation plan as developed with director of assessment.	
(Additional materials for Curricular Experiments)	NA
Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information).	
Established Timeline for Curricular Experiment	

Section AIV: New Courses

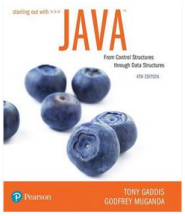
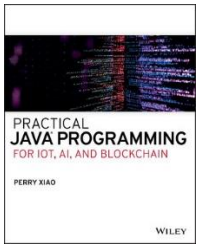
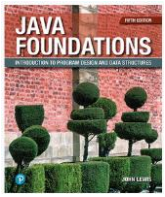
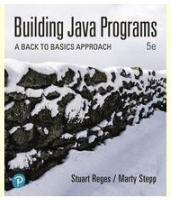
New courses to be offered in the School of Technology and Design

Department(s)	**School of Technology and Design**
Academic Level	**[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial**
Subject Area	Computer Engineering technology
Course Prefix	CET
Course Number	1211
Course Title	Introduction to Objected-Oriented Programming in Software Design
Catalog Description	Introduction to object-oriented programming (OOP) in software design and applications. Topics include object-oriented design principles, classes, objects, methods, overloading, attributes, encapsulation, data abstraction, inheritance, polymorphism, standard IO, and OOP designing applications in real-world
Prerequisite	CET 1111
Corequisite	None
Pre- or corequisite	MAT 1275CO or MAT1275 or higher
Credits	2 credits
Contact Hours	1 hour lecture, 2 hours lab
Liberal Arts	**[ ] Yes [X] No**
Course Attribute (e.g. Writing Intensive, etc)	
Course Applicability	**[X] Major** **[ ] Gen Ed Required** **[ ] Gen Ed – Flexible** **[ ] Gen Ed - College Option** **[ ] English Composition** **[ ] World Cultures** **[ ] Speech** **[ ] Mathematics** **[ ] US Experience in its Diversity** **[ ] Interdisciplinary** **[ ] Science** **[ ] Creative Expression** **[ ] Advanced Liberal Arts** **[ ] Individual and Society** **[ ] Scientific World**
Effective Term	Fall 2023

Rationale: Knowledge on object-oriented programming (OOP) is intensively needed by the CET BTech major. This course, together with two other courses, implements a carefully-planned streamlined sequence of (three) programming courses in CET, starting from the AAS and leading into the BTech degree. The course serves as an intermediate-level programming course, introducing students to object-oriented programming concepts, widely-used data structures, and real-world embedded systems design applications. By building solid foundation in OOP, this course prepares students for more advanced programming and software usage in upper-level programming course(s).

Computer Engineering Technology Department
AAS in Computer Engineering Technology
Sample Course Outline

Prepared by	Yu Wang, Lili Ma	Revision Date	9/16/2022
Course No. & Title	CET 1211 Introduction to Objected-Oriented Programming in Software Design		
Course Description	Introduction to object-oriented programming (OOP) in software design and applications. Topics include object-oriented design principles, classes, objects, methods, overloading, attributes, encapsulation, data abstraction, inheritance, polymorphism, standard IO, and OOP designing applications in real-world.		
Hours / Credits	1 class hour, 2 lab hours / 2 credits		
Pre-requisite	CET 1111		
Pre- / Co-requisite	MAT 1275CO or MAT1275 or higher		
Course Learning Outcomes	Upon successful completion of this course, the students will be able to: 1. Demonstrate knowledge of object-oriented programming principles and implementation. 2. Comprehend building blocks of OOPs language, classes, objects, methods, attributes, inheritance, package, and interfaces. 3. Given a problem specification, demonstrate capability of designing mid-sized object-oriented programs. 4. Application of OOP concepts and programming skills to real-world embedded systems design applications.		
Gen-Ed Objectives	1. SKILLS/Inquiry/Analysis: Students will employ scientific reasoning & logical thinking. 2. INTEGRATION/Integrate Learning: Students will resolve difficult issues creatively by employing multiple systems and tools. 3. KNOWLEDGE/Lifelong Learning: Acquire tools for lifelong learning—how to learn, how they learn, knowledge of resources.		

Textbooks	Textbook 1: Title: Starting Out with Java: From Control Structures through Data Structures, 4th Edition Author: Tony Gaddis, Godfrey Muganda Publisher: Pearson, 2019 ISBN-13: 978-0134787961	
	Textbook 2: Tittle: Practical Java Programming for IoT, AI, and Blockchain Author: Perry Xiao Publisher: Wiley; 1st edition (July 23, 2019) ISBN-13: 978-1119560012 ISBN-10: 1119560012	
Reference:	John Lewis, Peter DePasquale, and Joe Chase, "Java Foundations: Introduction to Program Design and Data Structures, 5th Edition", 2020 Pearson, ISBN-13: 9780135206591	
	Stuart Reges and Marty Stepp, "Building Java Programs: A Back-to-Basics Approach, 5th Edition", Pearson; 4th edition (2017), ISBN-13**: 978-0135471944**	

Weekly Lesson Plan:

Week #	Topic	Chapter
1	Course outline, classroom conduct, academic integrity, attendance, and grading policy. Intro to OOP programming in software design.	Ch 1, 2
2	Decision Structures, Class, Files class; Scanner class; String class; and Random class Lab: Writing and reading files	Ch 3, 4
3	Look at classes and objects, UML Diagram; Problem Solving with Methods Lab: Writing a Simple Class	Ch 5, 6
4	Array List Class, Array Algorithms and Operations Lab: Arrays with Search Algorithm	Ch 7
5	Focus on Object-Oriented Programming in Software Design Lab: Write a program to illustrate supper and sub classes	Ch 8
6	More about Wrapper Classes and Parse methods Lab: Write a program for text processing	Ch 9
7	Midterm exam	
8	Inheritance, Polymorphism, Abstract Classes Lab: Implement an inheritance	Ch 10
9	Encapsulation, Interface, and Polymorphism with Interfaces Lab: multiple interface implementation	Ch 10
10	Exceptions and Handling Exceptions Lab: Input/Output Streams and advanced File I/O	Ch 11
11	GUI Programming and basic Controls Lab: GUI design	Ch 12
12	Deploy of JAVA programing in real-world applications. Candidates include Image Processing, Artificial Intelligence (AI), or Internet of Things (IoT), and etc.	Ch 6,7,8 (Textbook 2)
13		
14		
15	Final Project Demonstration	

COURSE POLICIES:

Grading:

- Midterm Exam: 20 %
- Quizzes: 20 %
- Labs and Assignments: 40 %
- Final Project 20 %
- Total: 100 %

Score %	< 60	60-69.9	70-76.9	77-79.9	80-82.9	83-86.9	87-89.9	90-92.9	93-100
Grade	F	D	C	C+	B-	B	B+	A-	A

Blackboard:

- Blackboard will be used extensively to provide course material, collect assignments and reports and provide detailed grading information. Students must make sure their Blackboard login works in the beginning of the course.

Hardware and Software for Lab/Project:

- Desktop/laptop can be used for the lab and course project.
- Open-source or free software/library will be used in the labs and course project. Links to download the software/library will be posted on Blackboard.

Labs and Assignments:

- Weekly assignments will be posted. Each assignment equally contributes to the final grade.
- Labs and assignments will be done individually. See Blackboard for detailed instructions.
- All weekly assignments must be submitted through Blackboard.
- No late submission will be accepted.

Mid Term and Final Exam:

- The Mid-Term exam will cover content from weeks 1 to 7.
- The Final Exam will be cumulative.

Classroom Conduct Policy:

- Cell phone ringing and any other distracting and disruptive behavior such as talking loudly without permission are absolutely prohibited and may cause the student to be expelled from class.
- Any activity that threatens the college academic integrity will result in a disciplinary action.
- Please refer to the Student Handbook and the Catalog of New York City College of Technology for a full listing of Student Code of Conduct, Classroom Behavior Guidelines and Academic Integrity Rules.

Academic Integrity Policy:

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

Assessment Methods

Course Learning Outcomes	**Assessment Methods**
Demonstrate knowledge of object-oriented programming principles and implementation.	Quizzes, Exams, and Labs
Comprehend building blocks of OOPs language, classes, objects, methods, attributes, inheritance, package, and interfaces.	Quizzes, Exams, and Labs
Given a problem specification, demonstrate capability of designing mid-sized object-oriented programs.	Labs
Application of OOP concepts and programming skills to real-world embedded systems design applications.	Projects

General Education Learning Outcomes	**Assessment Methods**
SKILLS/Inquiry/Analysis: Students will employ scientific reasoning and logical thinking.	Students will write solutions to complex problems and demonstrate efficiency of their solutions. This will be demonstrated by the lab work, quizzes, and exams.
INTEGRATION/Integrate Learning: Students will resolve difficult issues creatively by employing multiple systems and tools.	Students will use creative, scientific, and logical thinking for selecting the building blocks of OOPs language to solve complex problems. This will be demonstrated by the lab work and project.
KNOWLEDGE/Lifelong Learning: Acquire tools for lifelong learning—how to learn, how they learn, knowledge of resources.	Students will learn and acquire new knowledge & skills demanded by the Tech industry. This will be demonstrated by the project.

Course Design

This course will be offered to freshmen students of the AAS in Computer Engineering Technology Program in the Computer Engineering Technology Department (CET). It is expected that a section (20 students as maximum) will take this course when it is offered in both Spring and Fall semesters every year.

Many modern engineering systems incorporate computational elements, while other engineering systems need to be validated through computational tools or computer-aided data collection. This course is designed to provide a foundation in objected-oriented programming, software engineering, debugging, and using existing computational codes in the context of controlling physical devices and gathering experimental data.

There is no similar course content with 2 credits available within City Tech. Currently, CST offers CST3513 – Object-Oriented Programming with 3 credits, introducing the fundamentals of object-oriented programming. We design the course based on our computer engineering program needs, focusing more on activities to prepare students to apply OOP principles to software and embedded system designs. *Starting* with the fundamentals of Java programming to algorithms, continuing to mid-sized object-oriented programming and design, the course also provides samples of real-world applications, such as Image Processing, Artificial Intelligence (AI), and Internet of Things (IoT). In this course, Java will be used as the tool for helping students to learn these OOP concepts and digital technologies.

Each session includes one hour of lecture and two hours of assisted lab work. Labs are assigned with each lecture by emphasizing understanding of the principles behind OOP and providing opportunities to practice OOP skills demanded by the software and embedded system design industry. This course is designed to serve the current CET majors (AAS and BTech) and a future software engineering curriculum.

The course is structured as a combination of lecture sessions and hands-on lab sessions. The course is designed to be taught both in-person and online, via the following three types of activities:

- Lectures
- Lab Assignments
- Tutorials/Project

No additional physical resources are required. The required software and development tools, together with the textbook, are Open Source/free. For in-person teaching, this course will take place in one of the computer labs in the CET department. Under e-learning, students will use their own computers.

Several existing faculty members in the CET department are qualified and available to teach this course. Adequate equipment and lab resources are also available for the hands-on component of the course.

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM: CET 2450

This form is used for all new course proposals. Attach this to the Curriculum Modification Proposal Form and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

Course Title	**Introduction to Microcontrollers**
Proposal Date	Jan 11, 2022
Proposer's Name	Ed Morton, Farrukh Zia
Course Number	CET 2450
Course Credits, Hours	3 credits, 2 class hours, 2 lab hours
Course Pre / Co-Requisites	Pre-req: CET 2350
Catalog Course Description	Introduction to Microcontroller architecture, programming and applications using common open source Integrated Development Environment (IDE) and programming interface. Assembly and high-level programming of 8 and 32-bit AVR and ARM microcontrollers to process signals from sensors and control Mechatronic system devices. In addition, students learn about microcontroller applications in quad copters, 3D printing, and programable logic controllers.
Brief Rationale Provide a concise summary of why this course is important to the department, school or college.	This course is one of the required courses for the proposed Computer Engineering Technology AAS program in the Department of Computer Engineering Technology. Knowledge of Microcontroller fundamentals is required by the CET BTech major. This course implements a carefully planned streamlined sequence of courses in CET, starting from the AAS and leading into the BTech degree. It serves as an introductory level course on Microcontroller hardware circuit analysis, programming concepts, widely used data structures, and pertinent applications, and prepares students for more advanced Computer Technology course(s).
CUNY – Course Equivalencies Provide information about equivalent courses within CUNY, if any.	No
Intent to Submit as Common Core If this course is intended to fulfill one of the requirements in the common core, then indicate which area.	No
For Interdisciplinary Courses: - Date submitted to ID Committee for review - Date ID recommendation received - Will all sections be offered as ID? Y/N	Not Applicable
Intent to Submit as a Writing Intensive Course	No

Please include all appropriate documentation as indicated in the NEW COURSE PROPOSAL Combine all information into a single document that is included in the Curriculum Modification Form.

NEW COURSE PROPOSAL CHECK LIST

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

Completed NEW COURSE PROPOSAL FORM	√
• Title, Number, Credits, Hours, Catalog course description	√
• Brief Rationale	√
• CUNY – Course Equivalencies	√
Completed Library Resources and Information Literacy Form	√
Course Outline Include within the outline the following.	√
Hours and Credits for Lecture and Labs If hours exceed mandated Carnegie Hours, then rationale for this	√
Prerequisites/Co- requisites	√
Detailed Course Description	√
Course Specific Learning Outcome and Assessment Tables Discipline Specific General Education Specific Learning Outcome and Assessment Tables	√
Example Weekly Course outline	√
Grade Policy and Procedure	√
Recommended Instructional Materials (Textbooks, lab supplies, etc)	√
Library resources and bibliography	√
Course Need Assessment Describe the need for this course. Include in your statement the following information.	√
Target Students who will take this course. Which programs or departments, and how many anticipated? Documentation of student views (if applicable, e.g. non-required elective).	√
Projected headcounts (fall/spring and day/evening) for each new or modified course.	√
If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction.	√
Where does this course overlap with other courses, both within and outside of the department?	√
Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this?	√
If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need.	NA
Course Design Describe how this course is designed.	√
Course Context (e.g. required, elective, capstone)	√
Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, field-trip)?	√
Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture)	√
How does this course support Programmatic Learning Outcomes?	√
Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program.	√
Additional Forms for Specific Course Categories	NA
Interdisciplinary Form (if applicable)	
Interdisciplinary Committee Recommendation (if applicable and if received)* *Recommendation must be received before consideration by full Curriculum Committee	

Common Core (Liberal Arts) Intent to Submit (if applicable)	
Writing Intensive Form if course is intended to be a WIC (under development)	
If course originated as an experimental course, then results of evaluation plan as developed with director of assessment.	
(Additional materials for Curricular Experiments)	NA
Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information).	
Established Timeline for Curricular Experiment	

Chancellor's Report Section AIV: New Courses

Department(s)	Computer Engineering Technology
Academic Level	**[X] Regular [ ] Compensatory [ ] Developmental [ ] Remedial**
Subject Area	Computer Engineering Technology
Course Prefix	CET
Course Number	2450
Course Title	Introduction to Microcontrollers
Catalog Description	Introduction to Microcontroller architecture, programming and applications using common open source Integrated Development Environment (IDE) and programming interface. Assembly and high-level programming of 8 and 32 bit AVR and ARM microcontrollers to process signals from sensors and control Mechatronic system devices. In addition, students learn about microcontroller applications in quad copters, 3D printing, and programable logic controllers.
Prerequisite	CET 2350
Corequisite	
Pre- or corequisite	
Credits	3
Contact Hours	2 Class Hours, 2 Lab Hours
Liberal Arts	**[ ] Yes [X] No**
Course Attribute (e.g. Writing Intensive, etc)	
Course Applicability	**[X] Major** **[ ] Gen Ed Required** **[ ] Gen Ed - Flexible** **[ ] Gen Ed - College Option** **[ ] English Composition** **[ ] World Cultures** **[ ] Speech** **[ ] Mathematics** **[ ] US Experience in its Diversity** **[ ] Interdisciplinary** **[ ] Science** **[ ] Creative Expression** **[ ] Advanced Liberal Arts** **[ ] Individual and Society** **[ ] Scientific World**
Effective Term	Fall 2023

Rationale: This course is one of the required courses for the proposed Computer Engineering Technology AAS program in the Department of Computer Engineering Technology. Knowledge of Microcontroller fundamentals is required by the CET BTech major. This course implements a carefully planned streamlined sequence of courses in CET, starting from the AAS and leading into the BTech degree. It serves as an introductory level course on Microcontroller hardware circuit analysis, programming concepts, widely used data structures, and pertinent applications, and prepares students for more advanced Computer Technology course(s).

LIBRARY RESOURCES & INFORMATION LITERACY:
MAJOR CURRICULUM MODIFICATION

Please complete for **all** major curriculum modifications. This information will assist the library in planning for new courses/programs.

Consult with your library faculty subject specialist (http://cityte.ch/dir) **3 weeks before the proposal deadline**.

Course proposer: please complete boxes 1-4. Library faculty subject specialist: please complete box 5.

1	**Title of proposal** CET 2450 – Introduction to Microcontrollers	**Department/Program** Computer Engineering Technology (CET) / AAS in Computer Engineering Technology
	Proposed by (include email & phone) Farrukh Zia, fzia@citytech.cuny.edu Edward Morton, emorton@citytech.cuny.edu Tel: 718-260-5885	**Expected date course(s) will be offered** Fall 2023 **# of students** 22

2	**The library cannot purchase reserve textbooks for every course at the college, nor copies for all students. Consult our website (http://cityte.ch/curriculum) for articles and ebooks for your courses, or our open educational resources (OER) guide (http://cityte.ch/oer). Have you considered using a freely-available OER or an open textbook in this course?** As to the proposer's knowledge, there is no open textbook available for this course, but there are plenty of OER and open-source technology documentation available online which may be used as supplemental material for this course.

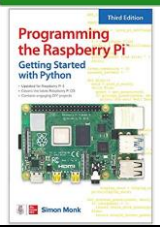
3	**Beyond the required course materials, are City Tech library resources sufficient for course assignments? If additional resources are needed, please provide format details (e.g. ebook, journal, DVD, etc.), full citation (author, title, publisher, edition, date), price, and product link.** A search of the CityTech/CUNY library catalog and database with the keyword "microcontroller hardware" or "microcontroller programming" shows sufficient print and electronic resources are available, some of which can be used as reference materials for this course.

4	**Library faculty focus on strengthening students' information literacy skills in finding, critically evaluating, and ethically using information. We collaborate on developing assignments and customized instruction and research guides. When this course is offered, how do you plan to consult with the library faculty subject specialist for your area? Please elaborate.** Once the course is offered, the department faculty teaching this course may consult with the library faculty subject specialist to determine the future needs of textbook change or update, and acquisition of additional journals and online resources.

5	**Library Faculty Subject Specialist: Junior Tidal, Comments and Recommendations**

Computer Engineering Technology Department
AAS in Computer Engineering Technology Program

Sample Course Outline

Prepared by	Ed Morton, Farrukh Zia	**Revision date**	January 2022
Course No. & Title	CET 2450 – Introduction to Microcontrollers		
Course Description	Introduction to Microcontroller architecture, programming and applications using common open source Integrated Development Environment (IDE) and programming interface. Assembly and high-level programming of 8 and 32 bit AVR and ARM microcontrollers to process signals from sensors and control Mechatronic system devices. In addition, students learn about microcontroller applications in quad copters, 3D printing, and programable logic controllers.		
Hours / Credits	2 class hrs, 2 lab hrs / 3 credits		
Pre-requisite	CET 2350		
Co-requisite			
Gen-Ed Objectives	1. SKILLS/Inquiry/Analysis: Students will employ scientific reasoning & logical thinking. 2. INTEGRATION/Integrate learning: Students will resolve difficult issues creatively by employing multiple systems and tools. 3. KNOWLEDGE/Lifelong learning. Acquire tools for lifelong learning-how to learn, knowledge of resources.		
Course Objectives/ Student Learning Outcomes	1. Demonstrate knowledge of Microcontroller hardware and programming principles and implementation. 2. Comprehend building blocks consisting of Microcontroller hardware, software, circuit interfaces and Mechatronic devices. 3. Identify circuit and device interfacing methods. 4. Perform standard tests and measurements to determine correct system operations. 5. Design and build simple Microcontroller based systems.		
Textbook **Authors** **Publisher / Year** **ISBN-13** **Lab Manual**	The AVR Microcontroller and Embedded Systems Using Assembly and C (2nd Edition) Muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi Pearson / MicroDigitalEd / 2017 978-0997925968 Laboratory exercises are included in the textbook		
Reference Book **Authors** **Publisher / Year** **ISBN-13**	Programming the Raspberry Pi (3rd Edition) Simon Monk McGraw Hill / 2021 978-1264257355		

Textbook and Reference Materials:

- https://www.amazon.com/Microcontroller-Embedded-Systems-Using-Assembly/dp/0997925965
- https://www.amazon.com/Programming-Raspberry-Pi-Third-Getting/dp/126425735X
- Additional reading and reference materials will be provided on Blackboard as needed.

Library Resources:

- Students are encouraged to use the library for supplementary resources in support of the lectures and labs.

Weekly Lesson Plan:

Week #	Textbook Chapter: Topic and Lab Exercise
1	0: Introduction to Computing 1: The AVR Microcontrollers: History and Features
2	2: AVR Architecture & Assembly Language Programming *Lab 1: Install and setup Arduino IDE 2.0 for Assembly and C program code*
3	4: AVR I/O Port Programming *Lab 2: I/O bit manipulation programming*
4	7: AVR Programming in C *Lab 3: I/O programming and logic operations in C*
5	11: AVR Serial Port Programming in Assembly and C *Lab 4: AVR serial port programming in C*
6	14: Relay, Optoisolator, and Stepper Motor Interfacing *Lab 5: Stepper motor interfacing and control* Microcontroller application in controlling 3D printer to create 3D printed objects
7	Midterm Exam #1
8	12: LCD and Keyboard Interfacing *Lab 6: LCD programming by using Arduino IDE Liquid-Crystal library*
9	13: ADC, DAC, and Sensor Interfacing *Lab 7: LM35 temperature sensor interfacing*
10	16: PWM Programming and DC Motor Control *Lab 8: DC motor control using PWM* Integration of Microcontrollers and motors, quadcopters
11	Midterm Exam #2
12	17: SPI (Serial Peripheral Interface) Protocol *Lab 9: Microcontrollers and Programmable Logic Controllers:* An Allen-Bradley SLC 100 / MicroLogix 1100 programmable Logic controller is used for projects to demonstrate automatic motor mechanism control, as well as calibrated cycling and timed delays, Ladder diagram technology and PLC programming techniques.
13	18: I2C (Inter-Integrated-circuit Communication) Protocol *Lab 9 continued: Microcontrollers and Programmable Logic Controllers:*
14	Review for Final Exam
15	Final Exam

COURSE POLICIES:

Grading:

- Midterm Exams: 50 %
- Final Exam: 25 %
- Labs and Assignments: 25 %

- Total: 100 %

Score %	< 60	60-69.9	70-76.9	77-79.9	80-82.9	83-86.9	87-89.9	90-92.9	93-100
Grade	F	D	C	C+	B-	B	B+	A-	A

Blackboard:

- Blackboard will be used extensively to provide course material, collect assignments and reports and provide detailed grading information. Students must make sure their Blackboard login works in the beginning of the course.

Hardware and Software for Lab/Project:

- Desktop/laptop can be used for the labs and course project.
- Open-source or free software/libraries will be used in the labs and course project. Links to download the software/libraries will be posted on Blackboard.

Labs and Assignments:

- Weekly assignments will be posted. Each assignment equally contributes to the final grade.
- Labs and assignments will be done individually. See Blackboard for detailed instructions.
- All weekly assignments must be submitted through Blackboard.
- No late submission will be accepted.

Midterm and Final Exams:

- The Midterm Exam #1 will cover content from weeks 1 to 7.
- The Midterm Exam #2 will cover content from weeks 8 to 11.
- The Final Exam will be cumulative.

Classroom Conduct Policy:

- Cell phone ringing and any other distracting and disruptive behavior such as talking loudly without permission are absolutely prohibited and may cause the student to be expelled from class.
- Any activity that threatens the college academic integrity will result in a disciplinary action.
- Please refer to the Student Handbook and the Catalog of New York City College of Technology for a full listing of Student Code of Conduct, Classroom Behavior Guidelines and Academic Integrity Rules.

Academic Integrity Policy:

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

Assessment Methods

Course Learning Outcomes	**Assessment Methods**
Demonstrate knowledge of Microcontroller hardware and programming principles and implementation.	Midterm and Final Exams
Comprehend building blocks consisting of Microcontroller hardware, software, circuit interfaces and Mechatronic devices.	Assignments, Labs, Exams
Identify circuit and device interfacing methods.	Assignments, Labs, Exams
Perform standard tests and measurements to determine correct system operations.	Assignments, Labs, Exams
Design and build simple Microcontroller based systems.	Assignments, Labs, Exams

General Education Learning Outcomes	**Assessment Methods**
SKILLS/Inquiry/Analysis: Students will employ scientific reasoning and logical thinking.	Students will write solutions to complex problems and demonstrate the efficiency of their solutions. This will be demonstrated by the lab work and exams.
INTEGRATION/Integrate learning: Students will resolve difficult issues creatively by employing multiple systems and tools.	Students will use creative, scientific, and logical thinking for selecting and integrating the building blocks of Microcontroller based systems. This will be demonstrated by the lab work and exams.
KNOWLEDGE/Lifelong learning. Acquire tools for lifelong learning—how to learn, how they learn, knowledge of resources.	Students will develop lifelong learning skills and acquire new technical knowledge and skills demanded by the industry. This will be demonstrated by the lab work and homework assignments.

Course Need Assessment:

This course will be offered to sophomore students of the AAS in Computer Engineering Technology Program in the Computer Engineering Technology Department. It is expected that at least one section (20 students as maximum) will take this course when it is offered in both Spring and Fall semesters every year.

Currently EET department offers EET 3112 Advanced Microcontroller and Embedded System Design (3 credits). However, the CET 2450 is an "introductory" level course designed for Computer Engineering Technology program needs, more focused on a wider application of 8, 16, 32-bit Microcontrollers in computer hardware-based control of electromechanical devices and Programmable Logic Controllers. Each session includes two hours of lecture and two hours of assisted lab work. Labs are assigned with each lecture by emphasizing an understanding of the principles of Microcontroller based design of electromechanical control systems. This course is designed to serve the current CET majors (AAS and BTech).

Course Design:

The course is structured as a combination of lecture sessions, hands-on lab sessions and exams. The course is designed to be taught both in-person and online, via the following four types of activities:

- Lectures
- Homework Assignments
- Labs/Tutorials
- Exams

No additional physical resources are required. The required hardware and software development tools, together with the reference books and material, are Open Source/free. For in-person teaching, this course will take place in one of the computer labs in the CET department. Under e-learning, students will use their own computers.

Several existing faculty members in the CET department are qualified and available to teach this course. Adequate equipment and lab resources are also available for the hands-on component of the course.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology Department

CUNYFirst Course ID	038708		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 1111~~ Logic and Problem-Solving	**Course**	CET 1111 Logic and Problem-Solving
Prerequisite	CUNY proficiency in mathematics	**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or corequisite**	
Hours	~~2 lab hrs~~	**Hours**	2 cl hrs, 2 lab hrs
Credits	~~1~~	**Credits**	3
Description	~~This course introduces the foundations of problem-solving and computer programming as it is applied to electromechanical engineering technology. It provides a basic understanding of number systems and programming techniques with practical examples implemented in a modern programming language. Concepts are developed through hands-on laboratory exercises.~~	**Description**	A practical introduction to the foundations of design thinking and problem-solving applied in computer engineering technology. Students are brought into the process of build physical computer systems that interact with the user or the environment through sensors and actuators. Students apply fundamental computational techniques, logic, creative problem solving, and iterative development through project-based learning.
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression

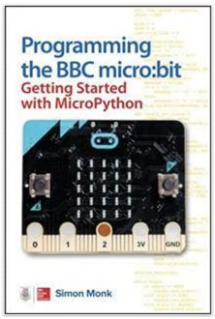
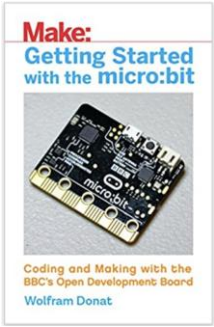
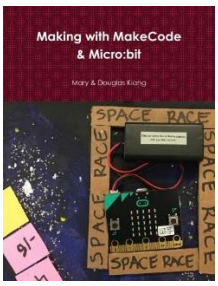
	[ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: One of the main goals of a computer engineering technology program is to teach the technical skills to design and create computer systems composed of different types of hardware such as sensors, actuators, electronics, and networking devices, and software, following engineering principles. Perhaps, this is one of the main differences with other programs such as Computer Systems Technology and Computer Sciences, which are more focused on the software part. From the beginning of their studies, computer engineering technology students must learn to create solutions to problems or user needs using hardware and software systems that work efficiently. The original EMT1111 course is one credit and only two contact hours. The proposed changes in credits and contact hours will allow the inclusion of project-based learning, design thinking, and computational thinking to teach the foundations of technical skills that our students need. And, at the same time, get them excited about the program. With three credits and four contact hours, this is feasible. Ultimately, this change is part of a redistribution of credits in the program. The two added credits will be taken from the Electrical Circuits course (EMT1150), going down from 5 to 3 credits.

Computer Engineering Technology Department
AAS in Computer Engineering Technology

Sample Course Outline

Prepared by	Benito Mendoza	**Revision date**	8/2/2021
Course No. & Title	CET 1111 Logic and Problem-Solving		
Course Description	A practical introduction to the foundations of design thinking and problem-solving applied in computer engineering technology. Students are brought into the process of build physical computer systems that interact with the user or the environment through sensors and actuators. Students apply fundamental computational techniques, logic, creative problem solving, and iterative development through project-based learning.		
Hours / Credits	2 class hr., 2 lab hr. / 3 credits		
Pre-requisite	CUNY proficiency in mathematics		
Pre- / Co-requisite	None		
Course Learning Outcomes	**Upon successful completion of this course, the students will be able to:** 1. Describe how internal and external parts of computing devices function to form a system. 2. Describe how computer hardware and software work together as a system to accomplish tasks. 3. Decompose problems into smaller, manageable subproblems to facilitate the program development process. 4. Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals, and functions. 5. Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended. 6. Recognize different schemes used to represent data. 7. Use an iterative process to plan the development of a computer system or product by including others' perspectives and considering user preferences. 8. Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of computer system development.		
Gen-Ed Objectives	**SKILLS/Inquiry/Analysis**: Employ scientific reasoning and logical thinking. **SKILLS/Inquiry/Analysis**: Use creativity to solve problems **KNOWLEDGE/Lifelong learning**: Acquire tools for lifelong learning—how to learn, how they learn, knowledge of resources. **VALUES, ETHICS, AND RELATIONSHIPS/Professional/Personal Development**: Demonstrate Intellectual honesty and personal responsibility. **VALUES, ETHICS, AND RELATIONSHIPS/Professional/Personal Development**: Work with teams, including those of diverse composition. Build consensus.		
Textbook	**None**. Material will be provided by the instructor.		

References	Programming the BBC micro:bit: Getting Started with MicroPython 1st Edition Author : Simon Monk Publisher : McGraw-Hill Education TAB; 1st edition (November 20, 2017) ISBN-10 : 1260117588 ISBN-13 : 978-1260117585	
	Getting Started with the micro:bit: Coding and Making with the BBC's Open Development Board Author : Wolfram Donat Publisher : Make Community, LLC; 1st edition (September 19, 2017) ISBN-10 : 1680453025 ISBN-13 : 978-1680453027	
	Making with MakeCode & Micro:bit Mary & Douglas Kiang Multiple formats available, some for free https://makecode.microbit.org/courses/csintro	

Class Schedule

Week	Lecture	Lab
1	**Introduction**: Introduction to the course, syllabus, objectives, how you will be assessed, academic integrity, and policies. **How computers work** • Hardware and software • The Input, Process, Output (IPO) model • Algorithms and Programs	**Lab 1: Getting started with MicroPython** Mu – what is an IDE? The IPO model with Python **When would you be 100 years old?**
2	**Computer programming I** • **Variables and Data Types**: Numbers, Strings, Booleans • **Control Flow**: sequence, conditionals, iterations	**Lab 2: Getting started with Micro:Bit** • Importing • Scroll display • Input: Buttons / how they work • Events and Event handling (interrupts) • **Vending Machine**
3	**Functions** • Functions as commands, arguments • User defined functions • Returning values • Parameters, arguments, scope	**Lab 3: Making a conductivity Tester** • micro:bit's pins as inputs • micro:bits to test the electrical conductivity of materials

4	**Computers and the technology around us** • Types of computers • What is a microcontroller? • Internet and the Cloud • Internet of Things (IoT)	**Lab 4: Sensor gadget** • Types of sensors • Temperature sensor • Light Sensor • Microphone • Making a meter
5	**The Design Thinking Process** • Empathize, Define, Ideate, Prototype, Test • Design thinking/coding by design	**Project I - A Physical Digital Pet (micro:PET)** • Requirements • Success criteria • Project Brainstorming • Ideating a solution with a micro:bit
6	**Conditionals Revisited** • Nested conditional • Chain conditionals	**micro:PET** • Designing the product • Making • Prototyping, testing, iterating
7	**Booleans** • Complex Boolean expressions • Logic Gates	**micro:PET** • Demo, Elevator speech • Evaluation
8	**Data Structures** • Lists, Tuples, Sets • Dictionaries	**Project II - Energy awareness** • Requirements • Success criteria • Project Brainstorming • Ideating a solution with a micro:bit
9	**Iterations Revisited** • Traversing Lists and Strings • While loop • Traversing Dictionaries	**Project II - Energy awareness** • Designing the product • Making • Prototyping, testing, iterating
10	**Searching algorithms** • Linear search • Binary search	**Project II - Energy Awareness Project** • Demo, Elevator speech • Evaluation
11	**Data Representation** • ASCII • Bitmaps • Sound	**Lab 5: Binary Watch** • Understand why computers use binary numbers • Converting between denary and binary
12	**Computer Networks and Communication** • Radio communication • Channels and strength	**Lab 6: Transmitting messages** • Ciphers
13	**Final Project**: IoT-Smart Cities • Requirements • Success Criteria • Teams • Project Brainstorming: Choosing a goal	**Final Project**: IoT-Smart Cities • Ideating a solution with a micro:bit • Roles and responsibilities • Working in parallel • Designing the product
14	**Final Project**: IoT-Smart Cities • Make, coding, test, iterate	**Final Project**: IoT-Smart Cities • Make, coding, preparing presentation
15	**Presentations**	**Presentations** **Wrap up and evaluation**

COURSE POLICIES:

Grading:

- Quizzes 15 %
- Lab Exercises 15 %
- Project I: 20 %
- Project II: 20 %
- Final Project 30 %
- Total: 100 %

Score %	< 60	60-69.9	70-76.9	77-79.9	80-82.9	83-86.9	87-89.9	90-92.9	93-100
Grade	F	D	C	C+	B-	B	B+	A-	A

Blackboard:

- Blackboard will be used extensively to provide course material, collect assignments and reports and provide detailed grading information. Students must make sure their Blackboard login is working in the beginning of the course.

Reading and Reference Material:

- Reading and reference material will be provided in Blackboard and OpenLab– Contents section as needed.

Software for Lab / Project:

- Free or open-source software applications will be used in the labs and course project. The main programming language is Python, Mu Editor (Both Open source). The links to download the software will be posted in Blackboard.

Lab and Project Reports:

- Lab reports must be in Word .doc file format.
- All lab reports must be submitted through Blackboard – Assignments section.
- Additional requirements on lab report's content and format will be posted on Blackboard. Please read them carefully.

Library Usage:

- Students are encouraged to use the library for supplementary resources in support of the lectures and labs.

Classroom Conduct Policy:

- Cell phone ringing and any other distracting and disruptive behavior such as talking loudly without permission are absolutely prohibited and may cause the student to be expelled from class.
- Any activity that threatens the college academic integrity will result in a disciplinary action.
- Please refer to the Student Handbook and the Catalog of New York City College of Technology for a full listing of Student Code of Conduct, Classroom Behavior Guidelines and Academic Integrity Rules.

Academic Integrity Policy:

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion.

Assessment Methods

Course Learning Outcomes/assessment methods

Course Learning Outcomes	Assessment
Students will be able to …	
Understand how internal and external parts of computing devices function to form a system.	Quiz and Labs 1 and 2
Describe how computer hardware and software work together as a system to accomplish tasks.	Lab 3 and Project 2
Decompose problems into smaller, manageable subproblems to facilitate the program development process.	Quiz and Lab 4
Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals, and functions.	Quiz, Projects 1, 2, and final project.
Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.	Quiz, Labs 5 and Lab 6.
Recognize different schemes used to represent data.	Quiz, Lab 5
Use an iterative process to plan the development of a computer system or product by including others' perspectives and considering user preferences.	Projects 1, 2, and Final Project
Take on varying roles, with teacher guidance, when collaborating with peers during the design, implementation, and review stages of computer system development.	Projects 1, 2, and Final Project

General education learning outcomes/assessment methods

Learning outcomes	Assessment
SKILLS/Inquiry/Analysis: Employ scientific reasoning and logical thinking.	Projects and Labs: Observing at the logic, and the effectiveness of the solutions presented.
SKILLS/Inquiry/Analysis: Use creativity to solve problems	Final Project: Observing the creativity used to frame a problem and design a solution. This will be an element of the grading rubric.
KNOWLEDGE/Lifelong learning: Acquire tools for lifelong learning—how to learn, how they learn, knowledge of resources.	Final Project: Observing the analysis and design documentation and the list of resources from the library and internet used to complete the project.
VALUES, ETHICS, AND RELATIONSHIPS/Professional/Personal Development: Demonstrate Intellectual honesty and personal responsibility.	Projects and Lab Exercises: Reports and presentation most following the CUNY Academic Integrity policy
VALUES, ETHICS, AND RELATIONSHIPS/Professional/Personal Development: Work with teams, including those of diverse composition. Build consensus.	Projects: Observing the distribution of activities, responsibilities, and cooperation of each member of the team. This will be an element of the grading rubric.

Course Design

The course will be offered to the freshmen students in the AAS in Computer Engineering Technology Program in the Computer Engineering Technology Department. It is expected that a section (20 students as maximum) will take this course when it is offered in both Spring and Fall semesters every year.

The course is structured as a combination of lecture sessions, hands-on lab sessions, and projects, following a Project-Based Learning approach. The hands-on sessions include lab exercises, experiments, and group projects.

Students will need a micro:bit v2 Go Bundle - with Batteries and USB Cable, caiman wires, speaker, and a servo motor, which cost around $35. No additional resources are required. Adequate equipment and resources in the CET Department are available for the hands-on components (lab experiments and projects) of this course. Several existing CET full-time faculty members are qualified and available to teach this course every semester.

References

[1] Kelly, N., & Gero, J. (2021). Design thinking and computational thinking: A dual process model for addressing design problems. Design Science, 7, E8. doi:10.1017/dsj.2021.7

[2] Dym, C.L., Agogino, A.M., Eris, O., Frey, D.D. and Leifer, L.J. (2005), Engineering Design Thinking, Teaching, and Learning. Journal of Engineering Education, 94: 103-120. https://doi.org/10.1002/j.2168-9830.2005.tb00832.x

[3] Denning, P. J. (2013). Design thinking. Communications of the ACM, 56(12),29-31.

[4] Soleimani, A. (2019). Computational Design Thinking and Thinking Design Computing. In 2019 Reynolds Symposium: Education by Design. Portland, Oregon, October 18-19, 2019

[5] Wing, J. (2008). Computational thinking and thinking about computing. Philosophical Transactions Of The Royal Society A: Mathematical, PhysicalAnd Engineering Sciences, 366(1881), 3717-3725

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology Department

CUNYFirst Course ID	038709		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 1120 Technical Graphics~~	**Course**	CET 1120 Technical Graphics
Prerequisite	None	**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or corequisite**	
Hours	3 lab hrs	**Hours**	
Credits	1	**Credits**	
Description	~~Training in basic orthographic projection and isometric drawing using sketching as a tool. Included are standard symbols and representations used in the electromechanical field, assembly drawings, charts, graphs, electrical and electronic schematics and timing charts. Extensive use of electrical, electronic, mechanical and electromechanical visual aids.~~	**Description**	This course will provide theory and training on basic 2D mechanical drawings along with electrical / electronics drawings. Student is introduced to graphic communication through the use of drafting instruments and AutoCad software.
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech

	[ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: The EMT 1120 course description has been streamlined and tailored to Computer Engineering Technology (CET 1120). It now emphasizes drawing electrical/electronic schematics and the use of AutoCAD, a widely used computer-aided design software that will help our students in producing accurate drawings of computer engineering components, system designs, and peripherals, saving time and money.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	038711		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 1150~~ Electrical Circuits	**Course**	CET 1150 Fundamentals of Electrical Circuits
Prerequisite		**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite	~~MAT 1275 or MAT 1275CO or higher, EMT 1120, EMT 1130~~	**Pre- or corequisite**	MAT 1275 or MAT 1275CO or higher
Hours	~~4 cl hrs, 3 lab hrs~~	**Hours**	2 cl hr, 3 lab hrs
Credits	~~5~~	**Credits**	3
Description	~~Introduction to the basic principles of direct and alternating current circuits. Topics include linear and nonlinear passive components, transient response and phase relationships. Laboratory work is performed both in school and at home (using student purchased kits). The use of the multimeter, oscilloscope and frequency generator is introduced; computers are used for problem-solving.~~	**Description**	Introduction to the basic principles of direct current circuits. Topics include the basic techniques to analyze DC linear circuit network, such as series, parallel and series-parallel circuits, network theorems, equivalent circuits. Laboratory experiments include circuit simulation, breadboarding, measurement techniques and troubleshooting.
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World

	[ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: EMT1150 was a 5-credit course with 4 lecture hours and 3 lab hours. It was a heavy course for freshman students and usually had only 60% to 70% passing rate. This course is one of the most important reasons for low retention rate in CET department. In this proposal, EMT1150 is modified to suit for freshman students. Alternating current (AC) circuit is removed, and only direct current (DC) circuit is introduced in CET1150. The course name is changed to Fundamentals of Electric Circuits to reflect the nature of this course, and the course description is modified to reflect the contents of this course. The credits and course hours are reduced. Two lecture hours and three lab hours can balance the needs between theory and experiments. The Pre/Co requisite updates are to allow students to take introductory course in the proper order in the program. Ultimately, this change is part of a redistribution of credits in the curriculum of the new AAS program in Computer Engineering Technology.

Sample Course outline

New York City College of Technology

Computer Engineering Technology Department

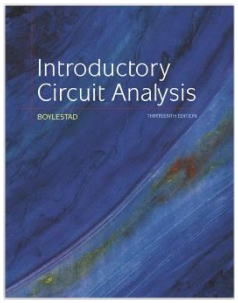
BTech Program in Computer Engineering Technology

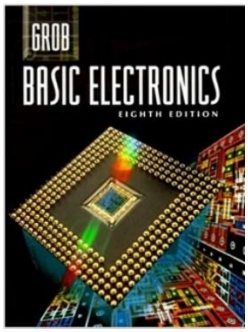
CET1150: Fundamentals of Electrical Circuits

Prepared by	Chen Xu, Ohbong Kwon, Robert Armstrong	Revision date	8/10/2022
Course No. & Title	CET 1150: Fundamentals of Electric Circuits		
Course Description	Introduction to the basic principles of direct current circuits. Topics include the basic techniques to analyze DC linear circuit network, such as series, parallel and series-parallel circuits, network theorems, equivalent circuits. Laboratory experiments include circuit simulation, breadboarding, measurement techniques and troubleshooting.		
Hours / Credits	2 lecture hours, 3 lab hours, 3 credits		
Pre-requisite			
Pre- / Co-requisite	MAT 1275 or MAT 1275CO or higher		
Gen-Ed Objectives	• SKILLS/Inquiry/Analysis: Employ scientific reasoning and logical thinking. • SKILLS/Inquiry/Analysis: Use critical thinking to solve problems • SKILLS/Communication: Students will communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means • VALUES, ETHICS, AND RELATIONSHIPS/Professional/Personal Development/Demonstrate Intellectual honesty and personal responsibility. • KNOWLEDGE/Lifelong learning/Acquire tools for lifelong learning—how to learn, how they learn, knowledge of resources		
Course Objectives/ Student Learning Outcomes	Upon successful completion of this course, students shall be able to 1. Demonstrate a basic understanding of engineering expressions and basic concepts, such as current, voltage, resistance, and power 2. Understand Ohm's law and use it to analyze basic series, parallel, and series-parallel circuits 3. Understand basic network theorems, especially using Thevenin's Theorem to find an equivalent circuit 4. Connect basic circuits on breadboard, and measure voltage, current, and resistance using Multimeter 5. Perform simple troubleshoots and fix problems in electrical circuits 6. Perform circuit computer simulations to assist problem solving. 7. Demonstrate proficiency in oral and written communication skills using appropriate technology 8. Demonstrate the ability to function effectively as a member of a team.		

Recommended Instructional Materials

Textbooks and Reference Books

Text book (required)	**Introductory Circuit Analysis, Thirteenth Edition**	
Author	Robert L. Boylestad	
Publisher	Pearson Education Inc. 2016	
ISBN	ISBN: 978-0-13-392360-5	

Reference book (optional)	**Grob's Basic Electronics**	
Author	Mitchel E Schultz	
Publisher	McGraw-Hill Education, 2015	
ISBN	ISBN:978-0-07-337387-4	

Lab material:

- Lab Manual provided by the CET Department

Reading and Reference Materials:

- Openlab course website
- DC Circuit, Chad Davis, University of Oklahoma
- Additional reading and reference materials will be provided on Blackboard as needed

Wk	Weekly Topics	
	Lecture	**Lab**
1	Course outline, classroom conduct, academic integrity, attendance, and grading policy. Introduction (Ch. 1), Systems of Units and conversion, Scientific and Engineering Notation	Math review
2	Voltage and Current (Ch. 2), Voltage, Current, Voltage Sources, Ampere Hour Rating, Battery Life Factors, Conductors and Insulators, Semiconductors	Multisim simulation
3	Resistance (Ch. 3), Resistance: Circular Wires, Wire Tables, Temperature Effects, Types of Resistor, Color Coding and Standard Resistor Values, Conductance, Ohmmeters, Metric Units.	Multimeter and resistance
4	Ohm's Law, Power and Energy (Ch. 4), Ohm's Law, Plotting Ohm's Law, Power, Energy.	Breadboard introduction and voltage current measurements with Multimeter
5	Series DC Circuits (Ch. 5), Series Resistors, Series Circuits, Kirchhoff's Voltage Law, Voltage Division in a Series Circuit.	Ohm's Law
6	Parallel DC Circuits (Ch. 6), Parallel Resistors, Parallel Circuits, Kirchhoff's Current Law, Current Divider Rule, Open and Short Circuits.	Measurement in series circuits
7	Mid-Semester Exam	Measurement in parallel circuits
8	Series-Parallel Circuits (Ch. 7), Series-Parallel Networks, Reduce and Return Approach, Block Diagram Approach, Descriptive Examples.	Measurements in series and parallel circuits
9	Series-Parallel Circuits (Ch. 7), Ladder Networks, Voltage Divider Supply (Unloaded and Loaded), Potentiometer Loading, Applications, Computer Analysis.	bridge circuit
10	Method of Analysis (Ch. 8) Current source, mesh analysis	Trouble shooting (I)
11	Network Theorem (Ch. 9), Source conversion	Trouble shooting (II)
12	Network Theorem (Ch. 9), Thevenin's Theorem.	Thevenin theorems (I)
13	Network Theorem (Ch. 9), Application of Thevenin's Theorem.	Thevenin theorems (II)
14	Review For Final Exam	Lab makeup
15	Final exam	Final exam

Course Policies

Quizzes, homework	20%
Class Midterm Exam	20%
Lab session	25%
Final Examination	25%
Attendance, Class Participation and discussion	10%

If students failed the lab session, the course is automatically failed.

Letter Grade	Numerical Grade	Ranges Quality
A	93-100	4.0
A-	90-92.9	3.7
B+	87-89.9	3.3
B	83-86.9	3.0
B-	80 -82.9	2.7
C+	77-79.9	2.3
C	70-76.9	2.0
D	60-69.9	1.0
F	59.9 and below	0.0

Blackboard

- Blackboard will be used extensively to provide course material, collect assignments and reports and provide detailed grading information. Students must make sure their blackboard login is working in the beginning of the course. Students are suggested to access the class webpage on blackboard for new materials every school day during the semester.

Library Resources

- Students are encouraged to use the library for supplementary resources in support of the lectures and labs.

Software for Lab

- Software applications will be used in the labs and course project. The links to download the software will be posted in Blackboard.

Lab Reports

- Lab reports must be submitted on time.
- Lab reports must be in Doc or PDF file format.
- All lab reports must be submitted through Blackboard – Assignments section.
- Each lab report is due one week after the lab work is performed.
- Any late-due lab report will have late penalty one week after due date.
- Additional requirements on lab report's content and format will be posted on Blackboard. Please read them carefully.

Attendance & Class Participation

- At the beginning of each class, the instructor will make a roll call of all the student names to check the attendance.
- Any lateness must be reported to the instructor by the students before the class is dismissed.

- Any absence due to emergencies (e.g., emergency medical condition or no-fault legal crisis) needs to be notified to the instructor by email or in person.

Classroom Conduct Policy

- Cell phone ringing and any other distracting and disruptive behavior such as talking loudly without permission are absolutely prohibited and may cause the student to be expelled from class.
- Any activity that threatens the college academic integrity will result in a disciplinary action.
- Please refer to the Student Handbook and the Catalog of New York City College of Technology for a full listing of Student Code of Conduct, Classroom Behavior Guidelines and Academic Integrity Rules.

Academic Integrity

- Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity.
- Academic dishonesty is prohibited in The City University of New York. Penalties for academic dishonesty include academic sanctions, such as failing or otherwise reduced grades, and/or disciplinary sanctions, including suspension, or expulsion.
- The CUNY Academic Integrity Policy is clearly published and distributed to students via the following methods: the NYCCT web site, the Instructional Staff Handbook, the Student Handbook, and via the College email system.

Disabilities Statement

- If you have special needs addressed by the Americans with Disabilities Act (ADA) and need course materials in an alternative format, please notify me immediately. Reasonable efforts will be made to accommodate your special needs.

Course Assessment Criteria

Upon successful completion of this course, students shall be able to	**Evaluation methods and criteria**
Demonstrate a basic understanding of engineering expressions and basic concepts, such as current, voltage, resistance, and power	Analysis of student performance on quiz, lab reports, homework, and exams.

Understand Ohm's law and use it to analyze basic series, parallel, and series-parallel circuits	Analysis of student performance on homework, quiz and class participation, exams.
Understand basic network theorems, especially using Thevenin's Theorem to find an equivalent circuit	Analysis of student performance in quiz, hand-on lab experiments, lab reports, and exams.
Connect basic circuits on breadboard, and measure voltage, current, and resistance using Multimeter	Analysis of student performance in hand-on lab experiments and lab reports.
Perform simple troubleshoots and fix problems in electrical circuits	Analysis of student performance in hand-on lab experiments and lab reports.
Perform circuit computer simulations to assist problem solving	Analysis of student performance in lab reports, homeworks and discussions.

General Education Outcomes and Assessment

Learning Outcomes	**Assessment Method**
SKILLS/Inquiry/Analysis: Employ scientific reasoning and logical thinking	This will be demonstrated by class discussion, homework, exams and lab reports.
KILLS/Inquiry/Analysis: Use critical thinking to solve problems	This will be demonstrated by class discussion, homework, exams and lab reports.

SKILLS/Communication: Students will communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means.	Effective reading will be demonstrated by accurate interpretation of reading/reference materials and weekly lab procedures. Effective writing will be demonstrated in lab reports.
VALUES, ETHICS, AND RELATIONSHIPS/Professional/Personal Development/Demonstrate Intellectual honesty and personal responsibility	Students will work together in groups to do lab works and complete lab report individually. They will demonstrate personal responsibility and intellectual honesty in their lab works, homework, and exams.
KNOWLEDGE/Lifelong learning/Acquire tools for lifelong learning—how to learn, how they learn, knowledge of resources	Students will learn the knowledge accumulation and development in the field. They will learn the concept of metacognition through the semester and use it in their learning process.

Course Design

The course will be offered to the freshmen students in the AAS in Computer Engineering Technology Program in the Computer Engineering Technology Department. It is expected that a section (20 students as maximum) will take this course when it is offered in both Spring and Fall semesters every year.

The course is structured as a combination of lecture sessions and hands-on lab sessions. Students need to purchase a lab kit for the lab session. The hands-on sessions include lab exercises, and experiments. Adequate equipment and resources in the CET Department are available for the hands-on components of this course. Several existing CET full-time faculty members are qualified and available to teach this course every semester.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	031160		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 1240 Introduction to Computer Engineering Technology~~	**Course**	CET 1240 Introduction to Computer Engineering Technology
Prerequisite	CST 1100	**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or corequisite**	
Hours	3 cl hrs, 3 lab hrs	**Hours**	
Credits	~~4~~	**Credits**	
Description	An introduction to basic electrical theory, semiconductor devices, digital electronics and applications. Topics cover key fundamentals of electrical quantities, digital logic and digital computer basics. Hands-on laboratory experience reinforces classroom topics and provides an opportunity to transfer theory learned in lecture to practical applications. Open only to students at Pathways to Technology Early College High School (P-TECH).	**Description**	
Requirement Designation		**Requirement Designation**	
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression

	[ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: According to the program change from an AAS in EMT to an AAS in CET, the course prefix should be changed.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	038715		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 1250 Fundamentals of Digital Systems~~	**Course**	CET 1250 Fundamentals of Digital Systems
Prerequisite	~~EMT 1111, EMT 1130, EMT 1150~~	**Prerequisite**	CET 1111, CET 1150
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or corequisite**	
Hours	3 cl hrs, 3 lab hrs	**Hours**	
Credits	~~4~~	**Credits**	
Description	An introduction to digital logic and the basic building blocks used in digital systems. Students learn Boolean algebra and switching functions, logic gates and flip-flops, combinational and sequential logic circuits, memory elements, programmable logic devices, and computer-aided design tools for digital systems design, simulation, and testing. The laboratory provides hands-on experiences through Prototyping Circuit Boards, Programmable Logic (such as FPGAs) Prototyping Boards, and Hardware Description Language (HDL).	**Description**	
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity

	[ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: According to the program change from an AAS in EMT to an AAS in CET, the course prefix and prerequisite should be changed.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	038713		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 1220 Mechanisms~~	**Course**	CET 2312 Reverse Engineering / Product Design
Prerequisite	~~EMT 1120, EMT 1130~~	**Prerequisite**	CET 1120
Corequisite		**Corequisite**	
Pre- or corequisite	~~MAT 1275 or higher, PHYS 1433 or PHYS 1441~~	**Pre- or corequisite**	PHYS 1433 or PHYS 1441
Hours	3 cl hrs, 3 lab hrs	**Hours**	
Credits	4	**Credits**	
Description	~~Levers, gears, cams, belts, chains and sprockets, intermittent motions, brakes and clutches. The application of these mechanisms as motion converters and electromechanical energy conversion systems and their displacement, velocity and acceleration. Laboratory study of physical and operational characteristics of mechanical and electromechanical components through the technique of breadboarding. Standard industrial components are used for this purpose.~~	**Description**	Reverse Engineering / Product Design of Mechanisms as integral parts of Electromechanical Systems controlled by Computer Hardware and Software. Electrical Mechanical Interfacing, Renewable Solar and Wind Energy, Robotics, Biomechanics, Instrumentation, Servo and Stepper Motors, Automatic Control System Feedback, Planetary Gears, Transmissions, Differentials, Linkages. Laboratory study of physical and operational characteristics of mechanical and electromechanical components through the technique of hands-on bread boarding using standard industrial components. Computers are used for problem solving.
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible

	[ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: According to the program change from an AAS in EMT to an AAS in CET, the new name and description reflect current content and STEM (Science, Technology, Engineering and Mathematics) components of the course as Engineering standards.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	038717		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 1255 Electronics~~	**Course**	CET 2350 Electronics
Prerequisite		**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite	~~EMT 1250, MAT 1375 or higher~~	**Pre- or corequisite**	CET 1250, MAT 1375 or higher
Hours	3 cl hrs, 3 lab hrs	**Hours**	
Credits	4	**Credits**	
Description	Non-linear behavior using semiconductor devices from diodes to CMOS IC's. A black-box analysis of amplifiers and other circuits is introduced, as well as basic optical devices. Typical circuits are breadboarded, analyzed and tested in the laboratory. Computer simulations are used for the additional reinforcement of course material.	**Description**	
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc	Writing Intensive	**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary

	[ ] Advanced Liberal Arts		[ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: According to the program change from an ASS in EMT to an AAS in CET, the course prefix, number, and pre- or corequisite should be changed.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	038721		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 2370 Computer Hardware Systems~~	**Course**	CET 2370 Computer Hardware Systems
Prerequisite	~~EMT 1250~~	**Prerequisite**	CET 1250
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or corequisite**	
Hours	1 cl hr, 2 lab hrs	**Hours**	
Credits	2	**Credits**	
Description	Computer hardware systems, along with several software concepts, are studied to understand the function and relationship of the CPU, memory and peripheral equipment. Course material is chosen for relevance to industry certification exams such as A+. The peripheral equipment includes monitors, disk drives, scanners and printers. During laboratory exercises, computer systems, with monitor and operating system, are provided for analysis by students working in teams. However, as an option, each student can build, configure, analyze and troubleshoot his or her own IBM PC (or compatible) computer.	**Description**	
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible

	[ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: According to the program change from an ASS in EMT to an AAS in CET, the course prefix and prerequisite should be changed.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	038722		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 2390L Operating Systems Laboratory~~	**Course**	CET 2390 Operating Systems Laboratory
Prerequisite		**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite	~~EMT 2370~~	**Pre- or corequisite**	CET 2370
Hours	3 lab hrs	**Hours**	
Credits	1	**Credits**	
Description	Students study the characteristics of operating systems used in IBM systems. They learn how to install the operating system and set it up to control the computer hardware. They also learn to use features of the operating system to manage the computer system.	**Description**	
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts

Effective Term			**Fall 2023**

Rationale: According to the program change from an ASS in EMT to an AAS in CET, the course prefix and pre- or corequisite should be changed.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	136230		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 2410 C/C++ Programming for Embedded Systems~~	**Course**	CET 2411 C/C++ Programming for Embedded Systems
Prerequisite		**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite	~~EMT 2370 or EET 2262 or TCET 2242 or ENT 2280 or MTEC 2280 or MECH 1240~~	**Pre- or corequisite**	CET 2370 or department approval
Hours	2 cl hrs, 2 lab hrs	**Hours**	
Credits	3	**Credits**	
Description	Introduction to the basics of C/ C++ programming language with applications to embedded systems. Fundamentals of structured and object-oriented programming in C/C++ and their applications in hardware environments. Students develop projects that highlight the application of C/C++ language in an embedded system.	**Description**	
Requirement Designation		**Requirement Designation**	
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech

	[ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: According to the program change from an AAS in EMT to an AAS in CET, the course prefix and number, and pre- or corequisite should be changed.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	038723		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 2455 Data Communications~~	**Course**	CET 2455 Data Communications
Prerequisite	~~EMT 1250, EMT 2370~~	**Prerequisite**	CET 2370
Corequisite		**Corequisite**	
Pre- or corequisite		**Pre- or corequisite**	
Hours	1 cl hr, 2 lab hrs	**Hours**	
Credits	2	**Credits**	
Description	Fundamentals of data communications and computer networks protocols and standards. It provides a basic understanding of data communication systems with practical examples of communication networks as applied in engineering technology. Study of OSI and TCP/IP models, data transmissions, transmission media, network topologies, network cabling system, IP addressing, TCP/IP suite, local area networks (LANs), wide area networks (WANs), wireless network, and network security. Students carry out experiments using modern hardware and software networking tools.	**Description**	
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible

	[ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts		[ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: According to the program change from an AAS in EMT to an AAS in CET, the course prefix and prerequisite should be changed.

Section AV: Changes in Existing Courses

Changes to be offered in the Computer Engineering Technology department

CUNYFirst Course ID	038724		
FROM:		**TO:**	
Department(s)	Computer Engineering Technology	**Department(s)**	Computer Engineering Technology
Course	~~EMT 2461 Electromechanical Systems: Software Interface~~	**Course**	CET 2461 Computer Systems: Software Interface
Prerequisite	~~EMT 1111, EMT 2370~~	**Prerequisite**	
Corequisite		**Corequisite**	
Pre- or corequisite	~~EMT 2455, EMT 2480L, MAT 1475 or higher~~	**Pre- or corequisite**	CET 2455, MAT 1475 or higher
Hours	3 lab hrs	**Hours**	
Credits	2	**Credits**	
Description	How computer hardware and electromechanical systems control external devices, both electrically and mechanically. Students build a project to learn the interface of software and hardware for use as a control element.	**Description**	
Requirement Designation	Required	**Requirement Designation**	Required
Liberal Arts	[ ] Yes [X] No	**Liberal Arts**	[ ] Yes [X] No
Course Attribute (e.g. Writing Intensive, Honors, etc		**Course Attribute (e.g. Writing Intensive, Honors, etc**	
Course Applicability	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts	**Course Applicability**	[X] Major [ ] Gen Ed Required [ ] English Composition [ ] Mathematics [ ] Science [ ] Gen Ed - Flexible [ ] World Cultures [ ] US Experience in its Diversity [ ] Creative Expression [ ] Individual and Society [ ] Scientific World [ ] Gen Ed - College Option [ ] Speech [ ] Interdisciplinary [ ] Advanced Liberal Arts
Effective Term			**Fall 2023**

Rationale: According to the program change from an AAS in EMT to an AAS in CET, the course prefix, title, and pre- or corequisite should be changed.

Section AVI: Courses Withdrawn

Computer Engineering Technology department

EMT 1130 Electromechanical Manufacturing Lab
Rationale: According to the program change from EMT-AAS to CET-AAS, all mechanical courses were withdrawn on order to focus on the field of Computer Engineering Technology.

EMT 2320 Advanced Mechanism
Rationale: According to the program change from EMT-AAS to CET-AAS, all mechanical courses were withdrawn on order to focus on the field of Computer Engineering Technology.

EMT 2480L Electromechanical Systems Laboratory
Rationale: According to the program change from EMT-AAS to CET-AAS, all mechanical courses were withdrawn on order to focus on the field of Computer Engineering Technology.

Departmental Curriculum Meeting Minutes 2021-09-09

2021-09-09 CET Curriculum Meeting Minutes

Attendance (excused are in bold): Sunghoon Jang, Robert Armstrong, Seymour Blank, Aparicio Carranza, Ohbong Kwon, Xiaohai Li, Lili Ma, Benito Mendoza, Edward Morton, John Razukas, José M. Reyes Álamo, Yu Wang, Chen Xu, Farrukh Zia.

Started at 12:30PM (Meeting held virtually over Zoom)

1- Updates about the status of classrooms for teaching hybrid courses.
2- Sharing the news of the ranking of out CET program as #3 in the Nation Best Affordable College to earn your Computer Engineering Degree by University HQ.
3- About enrollment, some Colleges are down by 20-30% or more, City Tech about 11%, after a 10% drop the previous year. Our Department's preliminary numbers seem to be holding steady with previous years, no major drops so far. Still waiting for the official numbers.
4- BS Software Engineering
    a. Proposal draft was sent to related Departments for their feedback
    b. Proposal was shown in detail to the Department
        i. Emphasis was put on the missing pieces and correction of titles and typos
        ii. Program flowchart and degree map was shared with faculty and discussed.
        iii. Discussion about the pre/co requisites. Especially for first year courses the co-requisites were revised, and the math requirements were preserved. Other co-requisites such as other CET courses were relaxed to give students more flexibility.
        iv. Discussion about admission criteria especially the math level. Department agreed that MAT 1275 as for the CET program is a reasonable starting point. Question about whether MAT 1275CO is acceptable. Question about adding Dept. Approval clause.
        v. Discussion about the core courses and their titles that include "Software Engineering" and removing it. Prof. Zia suggested adding it to the course description instead of the title.
    c. Deadline for proposal submission is on September 13th
    d. Proposal draft approved unanimously by the Department with modifications.
5- CET Associate Degree
    a. Final version of the course changes was shown.
    b. Degree map and proposed name changes was displayed.
    c. A summary of the changes such as contact hours and credits per course was presented.
    d. Update of the course codes to better match CUNY standards and the courses sequences, such as ending the programming courses with "11" (e.g., CET 1211)
    e. Discussion about the overlapping courses in CET and SWE and how to properly assign codes. Prof. Ma raised the concern for ABET accreditation if there is a conflict. Possible solution is to keep the codes as proposed and if there is any concern in the future, codes might be changed. Faculty agree codes should remain the same for both programs.
    f. Proposed course name changes for consistency.
    g. Proposal draft approved unanimously by the Department with modifications.

Meeting adjourned at 2:38 PM
Scribe: José M. Reyes Álamo