New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

School of Applied Engineering Technology
200 Fenster Hall
Phone: 973.596.3228
Fax: 973.624.4184
Email: appliedengineering@njit.edu

NEWARK COLLEGE OF ENGINEERING

SYLLABUS AND COURSE INFORMATION

Instructor Information:

Name: Christian Hansis
Email: christian.hansis@njit.edu
Office: Thursday 12p to 1p after class or virtual by appointment.

Course Information:

Course Name: Electronics Design for Manufacturing and Production

Course Number: ECET 230

Course Structure: 2-2-3 (lecture hr/wk – lab hr/wk – course credits)

Meeting Times:

Day	Meeting Time	Building	Room
Tuesday	10:00AM – 11:55AM	GITC	2311
Thursday	10:00AM – 11:55AM	GITC	2311

Course Description: This course teaches the fundamental skills required to design and manufacture electrical systems on printed circuit boards. The fundamental skills of electronics CAD are taught along with industry standards for schematic designations, engineering change orders, component packaging, simulation, and verification. Students are taught basic and advanced topics in PCB construction, analysis, and layout including auto-routing with a focus on through hole and surface mount technology, impedance control, heat dissipation, interconnects, panelization techniques, and production specific features and designations. Manufacturing files and outputs are studied emphasizing the necessary considerations for mass production, testing, component selection, stencil designs, solder composition, and reliability concerns.

Prerequisites: ECET 205

Corequisites: None

Required, Elective, or Selected Elective: Selected Elective

Required Materials: Electronic course materials provided by the instructor.

Course Outcomes: By the end of the course students are able to:
1. Identify the major physical and electrical concerns when designing a printed circuit board.
2. Express an electronic circuit in a standard schematic form using proper notation and designation using a modern CAD package.
3. Design a printed circuit board from a schematic.
4. Identify and specify engineering constraints for a printed circuit

New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

School of Applied Engineering Technology
200 Fenster Hall
Phone: 973.596.3228
Fax: 973.624.4184
Email: appliedengineering@njit.edu

board and mechanical layout.
5. Generate fabrication and assembly files for production and have a printed circuit board manufactured.
6. Assemble and test a printed circuit board.

Student Outcomes

The Course Outcomes support the achievement of the following ECET Student Outcomes:

Student outcome (1) - an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline
Related CO –3, 4

Student outcome (2) - an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
Related CO – 3 through 5

Student outcome (3) - an ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
Related CO – 2, 5

Student outcome (4) - an ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes;
Related CO –6

Class Topics:

Schematic Capture	PCB Layout
PCB Manufacturing	Component Packaging
Gerber Files	Pick and Place Files
Stencils	Solder Selection
Thermal Concerns	Interconnects
Testing and Inspection	

Academic Integrity:

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:
http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any

New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

School of Applied Engineering Technology
200 Fenster Hall
Phone: 973.596.3228
Fax: 973.624.4184
Email: appliedengineering@njit.edu

student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.

AI/Generative AI/LLM (AI) usage is permitted in this course only when assigned so by the instructor. The assignments which permit the usage of AI will be specifically stated, a lack of explicit permission is an explicit implication that AI usage is not permitted. Various tools and resources will be utilized to validate academic integrity.

If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Modification to Course: The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course Outline.

Prepared By: Sam Lieber

Course Coordinator: Daniel Brateris and Christian Hansis

Updated: 01 September 2025 with schedule corrected 10/14/25

GRADING POLICY

Your final grade will be determined according to the following scale:

Final Grade	Range
A	100% - 90%
B+	90% - 85%
B	85% - 80%
C+	80% - 75%
C	75% - 70%
D	69% - 60%
F	59% - 0%

New Jersey's Science & Technology University

NEWARK COLLEGE OF ENGINEERING

New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

School of Applied Engineering Technology
200 Fenster Hall
Phone: 973.596.3228
Fax: 973.624.4184
Email: appliedengineering@njit.edu

Assignments will be weighted towards your final grade by these percentages:

Attendance and Participation:	5%
Assignments, Quizzes, and Labs:	35%
Midterm Assessment:	30%
Final Assessment:	30%

EXAM AND QUIZ POLICY

No makeup examinations will be administered. If a valid, documented excuse for the missed Exam or Quiz is provided, the weight of the remaining Exam(s) or Quiz(s) will increase to compensate for the missed grade. Approval is at the discretion of the instructor.

WITHDRAW POLICY

Carefully monitor dates if you plan to exercise your option to withdraw from the course. Withdraw dates are listed in the academic calendar located at: http://www.njit.edu/registrar/calendars/

ATTENDANCE POLICY

Attendance is necessary for success in this class, and is required. Regular attendance may not be taken, however if you are absent a day in which you are randomly called for oral review or for roll call, you will get a zero for that activity – unless you have an excused absence or an extenuating circumstance. If you are absent on the day of a quiz or exam you will get a zero for that activity. Attendance will be taken at 10 minutes after class begins. Not being there at this point counts as absent.

Excused absence is one where you have the given the instructor at least 48 hours of notice (e-mail is acceptable) of your absence. You may have one – and only one – excused absence during the semester, though it can be for any reason.

Extenuating Circumstances are those that are truly beyond your control, such as sudden illness, or death of family member. Written documentation must be provided for an extenuating circumstance to be valid (such as a letter from a physician, or an obituary / funeral house notice). Undocumented cases will not be honored.

Tardiness You will be considered present if you are in class during the first 5 minutes of the class, and remain in class during the entire (remaining) duration of the class. If a quiz or oral review missed due to tardiness it will be counted towards your excused absence. Any additional absences or tardiness will result in a zero grade for the missed activity and attendance.

If you miss a class, you are responsible for any missed material.

EXAM AND QUIZ POLICY

Exams are closed book and closed notes unless specified and will be graded on correctness, support work provided, grammar, and professionalism. Partial credit will be given. Missed examinations may not be

New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

School of Applied Engineering Technology
200 Fenster Hall
Phone: 973.596.3228
Fax: 973.624.4184
Email: appliedengineering@njit.edu

retaken with the exception of extenuating circumstances. For assessments given remotely via software, students are expected to work alone and individually; software measures may be taken to ensure academic integrity.

PROJECTS

Projects may be assigned in lieu of exams or traditional assessments. Grading of projects is subject to the requirements of the projects, professionalism, and completeness. Projects are individual assignments but discussion among your peers is encouraged.

HOMEWORK

Homework will be graded on correctness and professionalism. Partial credit will be given. Homework is an individual assignment unless explicitly designated as a group assignement. Discussion among your peers is always encouraged. Homework submitted via paper is due at the start of class on the day the homework is due. Late submissions are not accepted unless there are extenuating circumstances, which will be handled on a case-by-case basis. Homework must be neat, organized, and legible. All answers must be clearly indicated. Multi-page homework's are to be stapled prior to class.

LAB REPORTS

Lab reports will be graded on correctness, content, presentation, grammar, and professionalism. Partial credit will be given. Hand submitted lab reports are due at the start of class on the due date. Lab reports are to be stapled prior to class.

LATE ASSIGNMENT POLICY

Late assignments will be penalized according to the scale:

- Homework is not accepted late – 0% credit

All other assignments:

- Less than 24 hours late –75% maximum credit
- 24 to 48 hours late – 50% maximum credit
- More than 48 hours late – 0% maximum credit

TEAMWORK POLICY

Lab work in this class may be performed as a collaborative effort within a group. All team members must contribute equally to all team exercises. The instructor will employ various mechanisms to determine the individual contributions to group lab(s). Therefore, not everyone in a given group will necessarily receive the same grade. If a group member has not contributed to a lab, their name should not appear on the lab report and the instructor should be notified of the lack of contribution to that assignment.

ACCOMMODATION FOR DISABILITY

If you have a documented physical and/or learning disability, please feel free to inform me or the NJIT Office of Accessibility Resources and Services (https://www.njit.edu/accessibility/) regarding what kind of accommodation you need to help you succeed in this class. While you are not required to disclose your

New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

School of Applied Engineering Technology
200 Fenster Hall
Phone: 973.596.3228
Fax: 973.624.4184
Email: appliedengineering@njit.edu

disability to me, you must provide appropriate documentation to receive official university assistance. All such requests will be held confidential to the fullest extent possible.

PROFESSIONALISM EXPECTATIONS AND RULES

- No eating in class. Absolutely no sandwiches, pizza, hoagies, etc… Please time yourself accordingly. In lecture classrooms only, bottled water and quiet drinks are allowed, away from any equipment.
- **Cell phones must be kept silent and out of sight during class. No exceptions**. If your cell phone rings or if you are using your cell phone during class you may be asked to leave the class. Your professionalism grade will be reduced by 50%. If you are dealing with an urgent situation please excuse yourself and handle the situation outside of class. The expectation is that cellphones do not cause any distractions to you or your fellow classmates. Cellphone must also be kept out of sight during assessments.
- **Absolutely no recording or photographing of assessment material (quizzes, exams, projects, etc. …).**
- No web surfing, instant messaging, and / or other unrelated use of computers.
- Sleeping is not allowed in class, it is expected that you are awake and alert during class.
- In-class discussions are welcome, and in fact encouraged, within the limits of mutual respect and courtesy.
- You are responsible for checking the class page **and your email** daily for announcements and assignments.
- You are **encouraged to work with other students** for all exercises, except exams and quizzes. Working together does not mean copying or plagiarizing (see Academic Integrity above).
- Suitable attire is required for class and lab. Wear attire, which is appropriate for a casual business meeting. Your overall compliance will be reflected in your professionalism grade. (Pajamas and sweatpants are business inappropriate.)
- Business suitable hygiene and grooming is required for class and lab. This includes daily showering, clean hair, face, hands, and nails, application deodorant, good oral hygiene, and clean clothing.
- For remote lectures conducted via an online meeting software or platform, it is expected that your webcam is enabled and active.

New Jersey's Science & Technology University

NEWARK COLLEGE OF ENGINEERING

New Jersey Institute of Technology
University Heights
Newark, NJ 07102-1982

School of Applied Engineering Technology
200 Fenster Hall
Phone: 973.596.3228
Fax: 973.624.4184
Email: appliedengineering@njit.edu

GENERATIVE AI

Student use of artificial intelligence (AI) is permitted in this course for certain assignments and activities. It is not permitted to be used in the assignments noted by the instructor, as doing so would undermine student learning and achievement of course learning outcomes. Additionally, if and when students use AI in this course, the AI must be cited as is shown within the NJIT Library AI citation page for AI. If you have any questions or concerns about AI technology use in this class, please reach out to your instructor prior to submitting any assignments.

COURSE SCHEDULE BY WEEK

Wk	Class	Topic
1	9/2 9/4	Course overview and Project Launch, Project tools and Communication
2	9/9 9/11	High Level Design, Module Selection
3	9/16 9/18	Prototyping, Electronic Design Tools
4	9/23 9/25	Microcontroller and IDE, Schematics
5	9/30	PCB Intro, PCB and Footprints
		NO CLASS 10/2 WELLNESS DAY
6	10/7 10/9	From Modules to Schematic
7	10/14 10/16	From Modules to Schematic, Schematic Review, Midterm Presentations
8	10/21 10/23	Midterm Written Exam, PCB Lab Visit, Placement and Routing
9	10/28 10/30	Design Rules and DRC, Component Selection
10	11/4 11/6	Routing and Zones, Layers and Silk
11	11/11 11/13	Manufacturing, File Exports, and Platforms
12	11/18 11/20	PCB Review and PCB Finish, Simulation and Firmware Strategy
13	11/25	Soldering Lab
		NO CLASS 11/27 THANKSGIVING
14	12/2 12/4	Design Specials, Board Startup, Iterations, and Testing
15	12/09	Summary and Lessons Learned
		Final Exam

This schedule is subject to change. We will attempt to include lab visits and maybe a manufacturer visit.
Printed 09/01/2025