

Using eLearning to Support Remote Instruction

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Our New Reality

Some of the Challenges of Remote Instruction

- ▶ Reimagining lectures
- ▶ Student engagement
- ▶ Finding effective teaching resources/content
- ▶ Hands-on labs
- ▶ Effective and reliable assessment
- ▶ Data privacy
- ▶ Multiple time zones
- ▶ Language barriers
- ▶ Internet connectivity
- ▶ Synchronous vs asynchronous instruction



New York Tech's Approach to Remote Instruction

Blended Course

- ▶ Face-to-face class sessions accompanied by online materials and activities
- ▶ Online materials are not intended to “replace” face-to-face class time but instead supplement and build upon the content discussed in the classroom

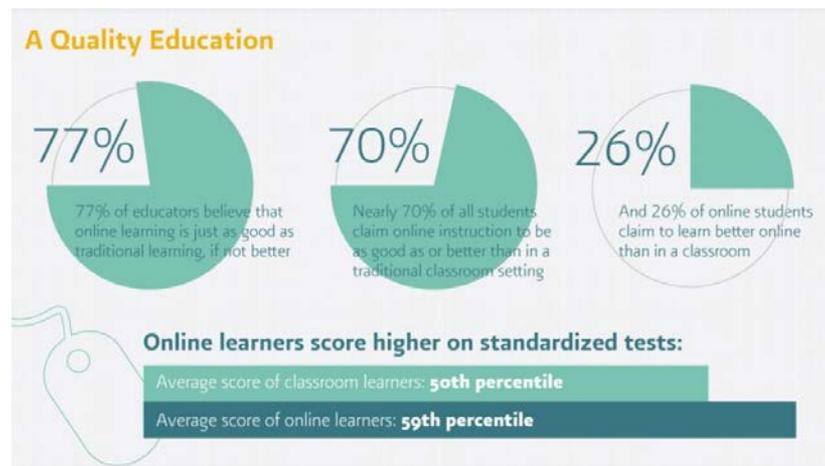
Hybrid Course

- ▶ Online components replace a portion of face-to-face class time
- ▶ Online interactions can be synchronous (i.e. Zoom) or asynchronous (i.e. online discussion forums, VoiceThread)

- ▶ College of Engineering went 20% in-person, 80% of classes hybrid (Hybrid Remote Instruction – HRI)
- ▶ Labs and first-year classes held in-person – but with HRI options available.
- ▶ Extensive investment in technology

Online Education CAN be Very Effective...

- ▶ **Online education**, including online teaching and learning, **has been studied for decades**. Numerous research studies, theories, models, standards, and evaluation criteria focus on quality online learning, online teaching, and online course design.
- ▶ What we know from research is that **effective online learning results from careful instructional design and planning**, using a systematic model for design and development.
- ▶ Typical planning, preparation, and development time for a fully online university course is **several months before the course is delivered**. Faculty are usually more comfortable teaching online by the second or third iteration of their online courses.



Teaching Face-to-Face vs. Online

Types of Differences	Teaching Face-to-Face	Teaching Online
Pedagogical*	Mostly synchronous interaction, content presented as lectures, hands-on, pencil-and-paper assessments, content can be planned session-by-session	Mostly asynchronous interaction, discussion forums, various means of content presentation, alternative assessments (e.g., collaborative/research projects, presentations), content must be planned out in advance of development
Operational	Held in the same geographic location at the same time—regularly scheduled sessions	Class is in session 24/7
Students	Often live in close proximity to campus, schedule allows for classroom sessions	Often working professionals, can be globally dispersed, personal availability can vary widely
Role of Instructor	Lecturer, sage on the stage that transfers knowledge to students	Facilitator, helps the students construct knowledge by guiding discussions



Prospective Students | Current Students | Employers | Faculty | Alumni

JOHNS HOPKINS
WHITTING SCHOOL
OF ENGINEERING

Engineering
for Professionals

CONTINUING EDUCATION | PROGRAMS & COURSES | ADMISSIONS & AID | STUDENT

► FACULTY RESOURCES ► LEARNING ROADMAP FOR NEW ONLINE INSTRUCTORS ► **COMPARING FACE TO FACE AND ONLINE TEACHING**

Comparing Face to Face and Online Teaching

- Getting Started
- Preparing to Teach
- Learning Roadmap for New Online Instructors
- Assessing Student Learning Online
- **Comparing Face to Face and Online Teaching**
- Completing your Final Course Setup
- Content Types and Best Practices
- Course Design Fundamentals
- Designing for Difficult Discussions
- Establishing an Online Presence
- Instructional Design
- Online Course Facilitation and Time Management
- Online Course Structure and Schedule

EP Instructors—"How is Teaching Online Different Than in a Face to Face Setting?"

Comparing Face-to-Face and Online Teaching

Watch this video:
<https://ep.jhu.edu/faculty/learning-roadmap-for-new-online-instructors/comparing-face-to-face-and-online-teaching>



General Hints for an Online Engineering Course (1)

Set Clear
Expectations
and Rubrics

Segment Your
Content

Curate Content

Communication
is Critical

General Hints for an Online Engineering Course (2)

Assignments

- ***If you would normally have a single assignment with five questions***, break it up into five small assignments that are dispersed in between relevant content.

Video

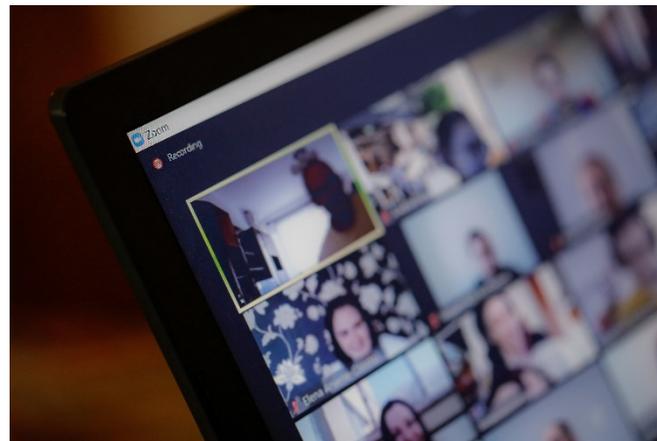
- ***If you use a lot of video***, use [Kaltura's](#) quizzing feature. This will stop the video at prescribed points and show your students questions you've created.

Quizzes

- ***If you normally give a quiz at the end of the week***, break it up into two or three small ones and position them after related content

Engagement

- ▶ **Connect students with one another.** You may need to initially force this, as they are not in the same physical space, and the isolation can be overwhelming.
- ▶ Don't lecture! **eLearning and video content from publishers**, your recorded videos and other content **should be provided as on-demand basis.**
- ▶ **Live (synchronous) sessions should be flipped:** students do groupwork projects, have discussions, and Q&A.
- ▶ **Choreograph your module lesson plan sequence:** (1) eLearning module, followed by (2) polling, followed by (3) quiz, followed by (4) video, etc.



“The one who does the work, does the learning.”

Use eLearning to Differentiate Instruction

- ▶ In place of lectures
- ▶ Create homework not from the textbook
- ▶ Tutoring and supplemental instruction
- ▶ Advising
- ▶ Research
- ▶ Projects

The screenshot displays the IEEE Courses website. At the top, there is a navigation bar with the text 'IEEE Courses' and links for 'My Courses', 'Categories', and 'Download Title List'. Below this is a banner with the text 'Take your skills to the next level.' and a button for 'All Subscribed Courses'. The main content area is divided into two sections: 'Course Programs' and 'Categories'. The 'Course Programs' section features a grid of course cards, each with a title and a 'New!' badge. The 'Categories' section features a grid of category cards, each with an icon and a title.

IEEE Courses

Take your skills to the next level.

All Subscribed Courses

Course Programs

All Subscribed Courses

- Artificial Intelligence and Ethics in Design
- Artificial Intelligence and Ethics in Design
- IEEE Introduction to Edge Computing
- Grid Modernization in the 21st Century
- IEEE Fundamentals of Submersible Vehicle Technology
- IEEE Fundamentals of Submersible Vehicle Technology
- SEPTIE (Society of Motion Picture & Television Engineers)
- Introduction to Blockchain Technology
- Cyber Security Tools for Today's Environment
- Internet of Things
- Network Electrical Safety Code

Categories

All Subscribed Courses

- Aerospace
- Biomechanics
- Communication, Networking & Broadcasting
- Components, Growth, Drivers & Systems
- Computing & Processing
- Engineering Profession
- English for Engineering
- Fields, Waves & Electromagnetics
- Free Tutorials
- General Topics for Engineers
- Photonics & Electro-Optics
- Power, Energy & Industry Applications
- Robotics & Control Systems
- Signal Processing & Analysis
- Transportation



Group Work

- ▶ Select online groups of **four to six people**, no larger groups
- ▶ If possible don't let groups to be randomized - **allow self-selection**
- ▶ **Create a structure** for each group:
 - Set **time schedule to submit plans**
 - Require **basic team roles** to be determined and **submitted**
 - Require **scheduled internal team meetings** as well as **meetings with you**
 - Set **rubrics for team members' contribution**



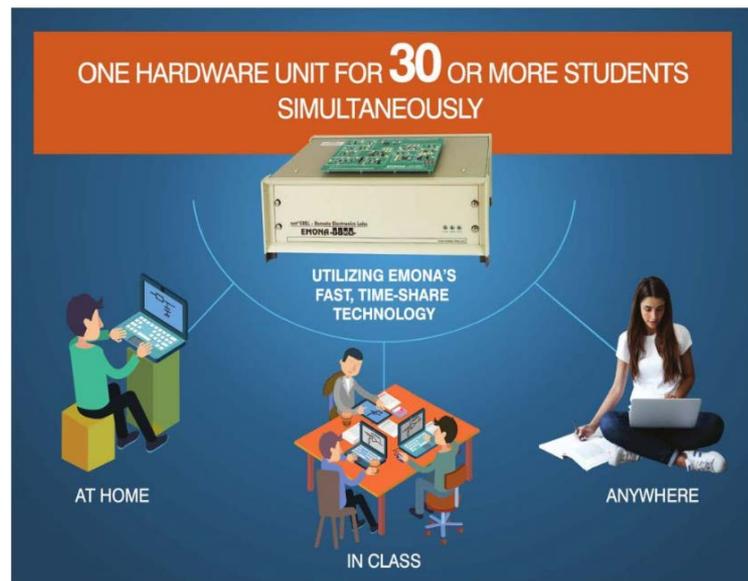
Assignments

- ▶ Use a rubric
- ▶ Document your feedback
- ▶ Add feedback responses for quiz questions
- ▶ Continuously improve your course
- ▶ Hold live sessions



Online Labs

- ▶ Example Vendor - **Emona Multi-User, Remotely Controlled Experiments in Electronics and Telecoms**
- ▶ Emona offers a range of hardware experiments (NOT SIMULATIONS) which classes of students use a single equipment to carry out experiments in real time.
 - Easy student access: From anywhere on web browser, log on with USERNAME/PASSWORD
 - Many students can run independent experiments simultaneously due to very fast time-share technology



Online Labs

- ▶ Example Vendor - **Harvard's LabXchange** has just released a suite of lab simulations with assessments that focus on basic molecular biology techniques

The screenshot displays the LabXchange website interface. At the top, there is a search bar with the text "Search topics and people" and a magnifying glass icon. Below the search bar, the text "Amgen Biotech Experience" and "LabXchange" is visible. The main heading is "FOUNDATIONAL CONCEPTS AND TECHNIQUES IN BIOTECHNOLOGY". Below this heading, a paragraph states: "The goal of this cluster is to expose learners to fundamental concepts and lab techniques essential to the field of biotechnology, including creating a recombinant plasmid and expressing and purifying a protein of interest. For those using this cluster as part of a hybrid ABE experience, please see implementation details in the individual pathway descriptions." Below the paragraph is a "TOURS" dropdown menu. The main content area features a grid of seven hexagonal tiles, each representing a different lab simulation or concept. The tiles are arranged in two rows: the top row has three tiles and the bottom row has four tiles. Each tile contains an icon and a title. The tiles are: 1. "Introduction to Genetic Engineering: The Process" (DNA double helix and scissors icon), 2. "Tools & Techniques in Biotechnology: Micropipetting" (pipette icon), 3. "Tools & Techniques in Biotechnology: Gel Electrophoresis" (gel electrophoresis image icon), 4. "Introduction to Genetic Engineering: Recombinant Plasmids" (circular plasmid map icon), 5. "Building Recombinant Plasmid: Restriction Enzymes" (restriction enzyme icon), 6. "Building Recombinant Plasmid: DNA Ligase" (DNA ligase icon), 7. "Verifying Recombinant Plasmid: Gel Electrophoresis" (gel electrophoresis image icon).



Faculty Need Vetted Online Content

Publishers are the ideal source for peer-reviewed content that every student can access online

- ▶ Faculty say they're working up to 60% more
- ▶ Finding and vetting content that all students can access takes a lot of time
- ▶ Engineering libraries can help by providing vetted resources
- ▶ Online instructional resources that are peer-reviewed and globally relevant allow instructors to focus on student support while still meeting accreditation criteria



IEEE eLearning Library: Peer-Reviewed Online Library Resource

- ▶ Hundreds of engaging, multimedia courses developed by leading experts from around the world
- ▶ Entire library of online courses are peer reviewed
- ▶ Online courses are available 24/7 and can be accessed from anywhere in the world on the IEEE *Xplore* Digital Library
- ▶ Content supports a variety of engineering curriculum areas as well as Career Preparation topics

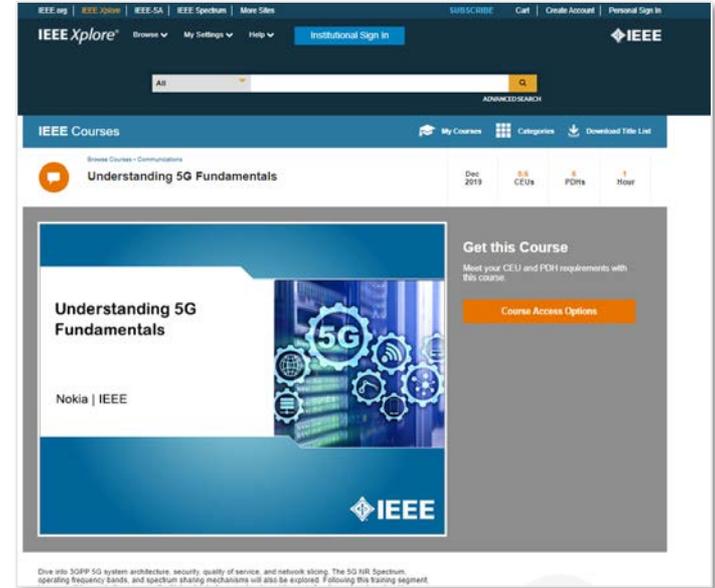
The screenshot displays the IEEE Xplore Digital Library homepage. At the top, there is a navigation bar with links for IEEE.org, IEEE Xplore Digital Library, IEEE-SA, IEEE Spectrum, and More Sites. A user account section shows 'Cart(0)', 'Create Account', and 'Personal Sign In'. The main header features the IEEE Xplore logo and a search bar. Below the header, a large banner reads 'IEEE Courses' with the tagline 'Take your skills to the next level.' and a button for 'All Subscribed Courses'. The 'Course Programs' section lists several courses, each with a 'New!' badge: 'Artificial Intelligence and Ethics in Design', 'Artificial Intelligence and Ethics in Design: Responsible Innovation', 'IEEE Introduction to Edge Computing', 'Grid Modernization in the 21st Century', 'IEEE Fundamentals of Autonomous Vehicle Technology', 'EMTCE (Society of Motion Picture & Television Engineers)', 'Introduction to Blockchain Technology', 'Cyber Security Tools for Today's Environment', 'Internet of Things', and 'National Electrical Safety Code'. The 'Categories' section shows a grid of 12 icons representing different engineering fields: Aerospace, Bioengineering, Communication, Networking & Broadcasting, Components, Circuits, Devices & Systems, Computing & Processing, Engineering Profession, English for Engineering, Fields, Waves & Electromagnetics, Free Tutorials, General Topics for Engineers, Photonics & Electro-Optics, and Power, Energy, & Industry Applications.

Essential eLearning Topics for Engineering Education

Aerospace	Bioengineering	Career Development	Communications
Components, Circuits, Devices & Systems	Computing	Emerging Technologies	Fields, Waves, & Electromagnetics
IEEE Standards	Photonics & Electro-Optics	Power & Energy	Robotics
Signal Processing & Analysis	Telecommunications	Transportation	

New York Tech's Experience with IEEE eLearning Courses

- ▶ Graduate level ECE course “Silicon IC Fabrication”
 - Selected two eLearning courses:
 - Interconnect Technology for 32 NM and Beyond
 - Dealing with Issues in VLSI Interconnect Scaling
 - Students are given about 3 weeks to complete the course
 - 25 students in the course
- ▶ Graduate level ECE course “Digital Communication”
 - Selected two eLearning courses:
 - Understanding 5G Fundamentals
 - Green Radio Techniques for Improved Wireless Basestation Design



IEEE eLearning Content Can Supplement Many Engineering Classes

The image displays the IEEE Xplore eLearning platform interface. On the left, there is a 'Course Programs' section with four featured courses, each marked 'New!': '5G Networks', 'Enterprise Blockchain for Healthcare, IoT, Energy, and Supply Chain', 'Finite Element Method', and 'IEEE Guide to Autonomous Vehicle Technology'. Below this is a 'Categories' section with icons for Aerospace, Bioengineering, Computing, Emerging Technologies, Photonics & Electro-Optics, Power & Energy, and Transportation. The main content area shows the IEEE Xplore website header with navigation links for 'Browse', 'My Settings', and 'Help'. The 'Browse' dropdown menu is open, listing 'Books', 'Conferences', 'Courses', 'Journals & Magazines', 'Standards', 'Recently Published', and 'Popular'. The 'Courses' option is highlighted with a red circle. To the right, several course cards are visible, including 'From Growth to Great', 'Human Emotion in Devices and Technology', 'Legal and Implementation Issues of Enterprise Artificial Intelligence', 'The Basis for No Bias', and 'Transparency and Accountability for Robots and Artificial Intelligence Systems'. Each course card displays its CEUs, PDHs, and duration.

Course Programs

All Courses >

New! 5G Networks

New! Enterprise Blockchain for Healthcare, IoT, Energy, and Supply Chain

New! Finite Element Method

New! IEEE Guide to Autonomous Vehicle Technology

Categories

Aerospace

Bioengineering

Computing

Emerging Technologies

Photonics & Electro-Optics

Power & Energy

Transportation

IEEE.org | IEEE Xplore | IEEE-SA | IEEE Spectrum | More Sites

IEEE Xplore

Browse ▾ My Settings ▾ Help ▾

Books

Conferences

Courses

Journals & Magazines

Standards

Recently Published

Popular

During this time, there may be intermittent impact on the availability of the content.

ADVANCED SEARCH

SEARCH 5,

Introductory

From Growth to Great

In this course we will examine how the growth of Artificial Intelligence is aligned with responsible business practice, and will understand the need for, and principles of, Agile Governance. Next we will review how ethical considerations tie into the... [View More](#)

CEUs: 0.3 PDHs: 3 1 Hour

Introductory

Human Emotion in Devices and Technology

The field of Affective Computing that encompasses the nature of how human emotions respond to devices and technology is a seminal issue to study in regards to the ethical implications of AI/AS. Here users may not understand that robots/AI are infus... [View More](#)

CEUs: 0.3 PDHs: 3 1 Hour

Introductory

Legal and Implementation Issues of Enterprise Artificial Intelligence

Self-driving cars, drones, and companion robots are already introduced into society. With this in mind, what are the most pressing legal issues for companies to be thinking about today and in the far future? This course will outline the top issues... [View More](#)

CEUs: 0.3 PDHs: 3 1 Hour

Introductory

The Basis for No Bias

Algorithmic Bias is unavoidable when recognizing that humans create the initial code upon which these AI tools are built. By identifying and assessing the key considerations in how algorithms are related and the data sets they utilize, businesses can... [View More](#)

CEUs: 0.3 PDHs: 3 1 Hour

Introductory

Transparency and Accountability for Robots and Artificial Intelligence Systems

As Autonomous and Intelligent Systems are spreading across several industry and service

Technical English Challenges Complicate Remote Instruction

- ▶ English is the international language of engineering, and a job requirement for graduating students
- ▶ It is hard for international students who struggle with technical English to learn these subjects remotely
- ▶ eLearning programs like IEEE English for Technical Professionals help students master technical English before attending graduate engineering classes



How NYIT Uses English for Technical Professionals

The screenshot shows a video player interface for an IEEE course. At the top, there is a navigation bar with the IEEE logo and the text "English for Technical Professionals". Below this, the main content area is split into two sections. The left section features the IEEE logo, the text "ENGLISH for Technical Professionals™", and the word "READING" in yellow. The right section is a vibrant, abstract illustration of an open book with various icons (like a musical note, a soccer ball, a leaf, and a gear) floating above it. Below the main content, a dark blue banner displays "LESSON 12.3" and the lesson title: "Decipher how to read a standard versus a white paper; Constructions of objectivity." A white text box below the banner contains the text "that form the baseline understanding for those technical components." To the right of this box is a "NEXT" button. At the bottom of the player, there is a control bar with icons for play/pause, previous, next, volume, closed captions (CC), and table of contents (TOC).



Supporting University Continuing Education Programs

- ▶ Alumni and other working professionals are experiencing career displacement due to the pandemic
- ▶ eLearning courses can be offered through the university:
 - Workforce retraining
 - Alumni services
 - Career services



Questions?

Thank you!

