

# 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





# How NYIT Has Approached Remote Instruction

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# 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

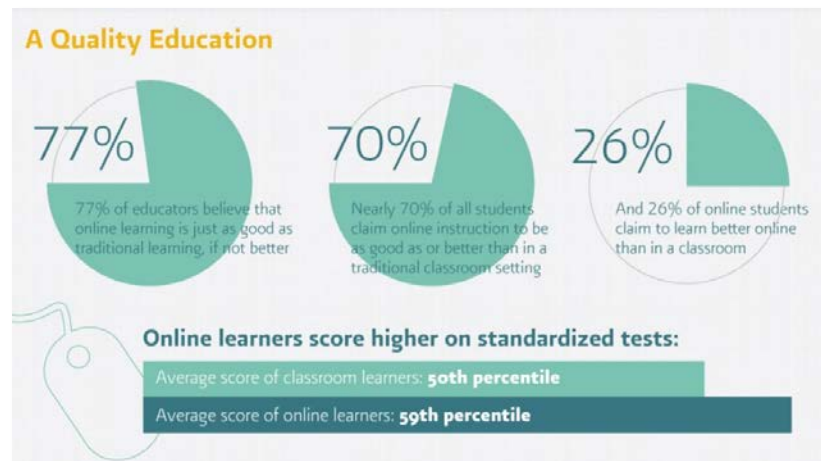
## Hybrid Course

- ▶ 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
<b>Pedagogical*</b>	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
<b>Operational</b>	Held in the same geographic location at the same time—regularly scheduled sessions	Class is in session 24/7
<b>Students</b>	Often live in close proximity to campus, schedule allows for classroom sessions	Often working professionals, can be globally dispersed, personal availability can vary widely
<b>Role of Instructor</b>	Lecturer, sage on the stage that transfers knowledge to students	Facilitator, helps the students construct knowledge by guiding discussions

The screenshot shows the Johns Hopkins University Engineering for Professionals website. The main navigation bar includes links for Prospective Students, Current Students, Employers, Faculty, Alumni, and various program and course links. A sidebar on the left lists a 'Learning Roadmap for New Online Instructors' with items like 'Getting Started', 'Preparing to Teach', and 'Comparing Face to Face and Online Teaching'. The main content area features a video player with a play button and the title 'EP Instructors—How is Teaching Online Different Than in a Face to Face Setting?'. Below the video, the text 'Comparing Face-to-Face and Online Teaching' is visible.

**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

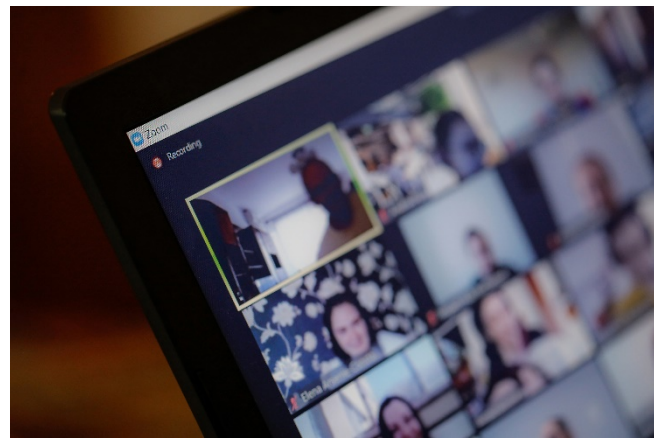
- ***If you use a lot of video***, use [Kaltura's](#) quizzing feature. This will stop the video at prescribed points and show your students questions you've created.

### 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

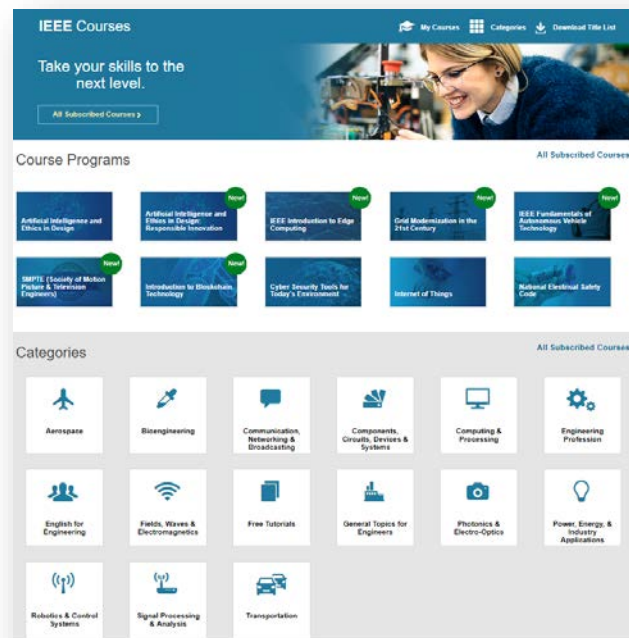
- ▶ **Connect students with one another.** You may need to initially force this, as they are not in the same physical space, and the isolation can be overwhelming.
- ▶ Don't lecture! **eLearning and video content from publishers**, your recorded videos and other content **should be provided as on-demand 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



# 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





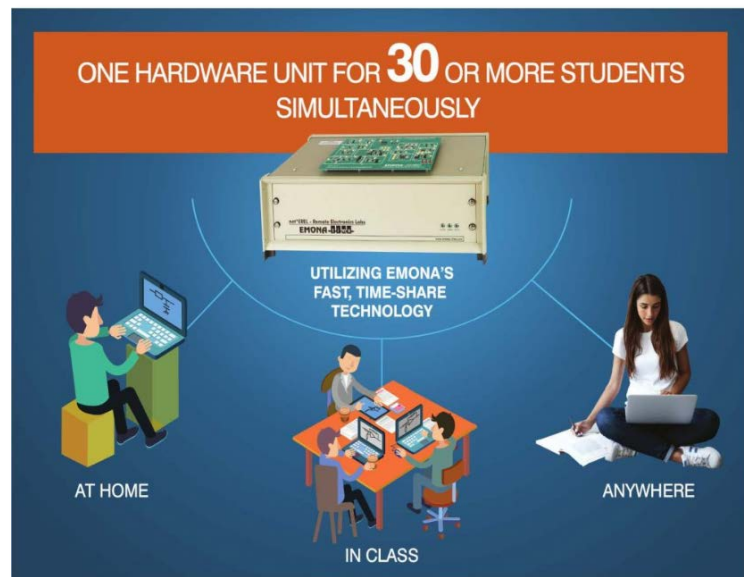
# Instructor Resources

- ▶ **IEEE eLearning Library**  
(<https://ieeexplore.ieee.org/courses/home>)
- ▶ **Merlot Multimedia Resources**  
(<https://www.merlot.org/merlot/index.htm>)
- ▶ **“within” Virtual Reality App** (<https://www.with.in/>)
- ▶ **Examples of Available Lectures**
  - Electronic and Electrical Engineering Lectures:  
<https://www.youtube.com/channel/UCjALws4XTgfLyNnvXnKPj-g/playlists>
  - 200 on-line lectures covering all subjects of Digital Electronics on YouTube at:  
<http://youtube.com/user/billkleitz>
  - VHDL Basics and FPGA Impementation (Intel, Altera and Xilinx):  
<https://www.youtube.com/playlist?list=PLBOhtamYB1hj8CJiOhz2F9kCQwcY6t5af>
  - Introduction to Cryptography by Christof Paar:  
<https://www.youtube.com/channel/UC1usFRN4LCMcfIV7UjHNuQg/videos>



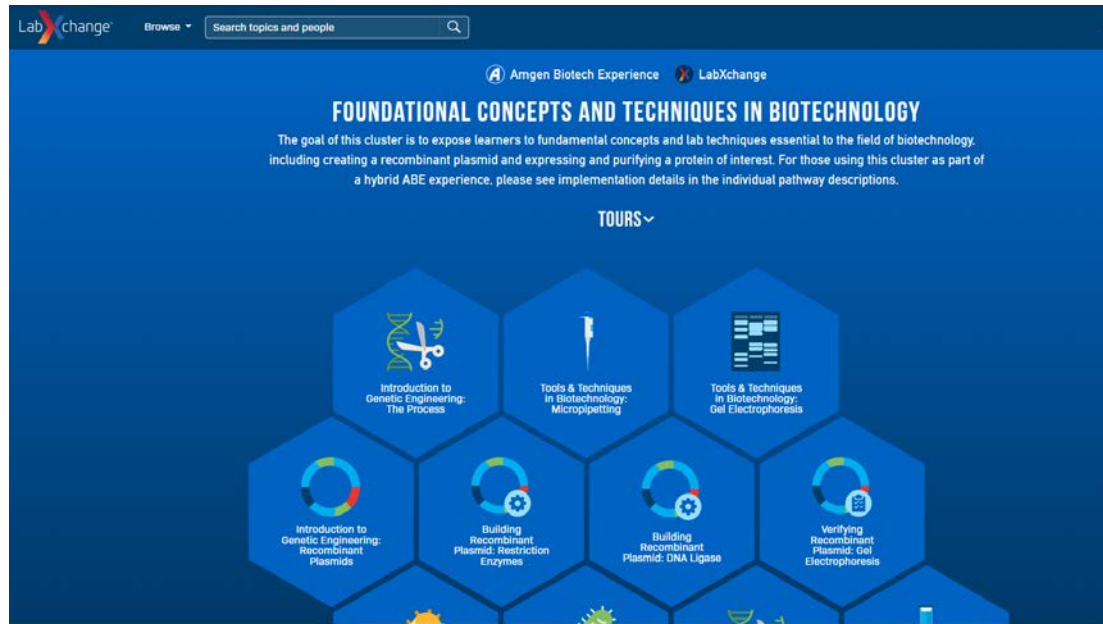
## Online Labs

- ▶ 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**



# Faculty Need Vetted Online Content

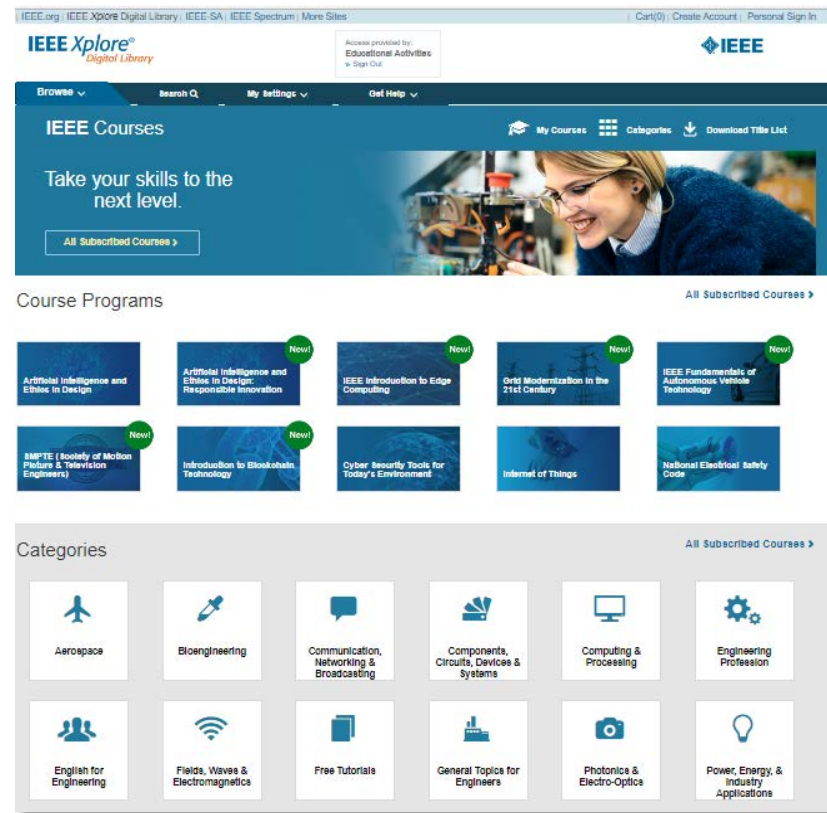
*Publishers are the ideal source for peer-reviewed content that every student can access online*

- ▶ 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



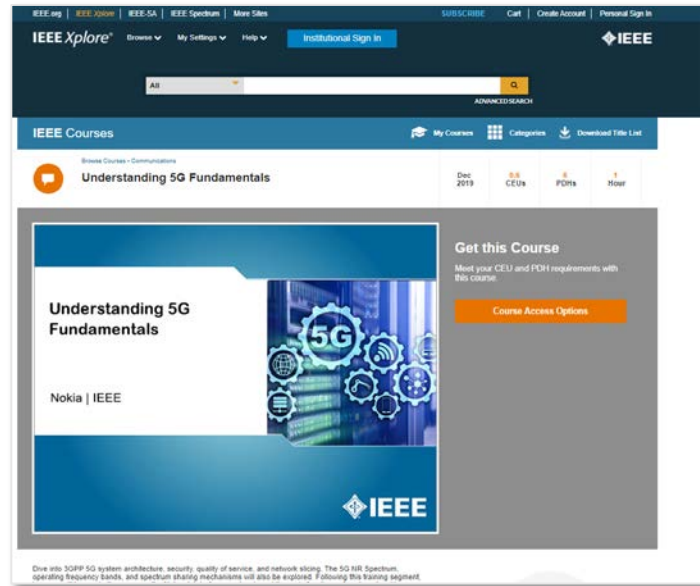


# Essential eLearning Topics for Engineering Education

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 screenshot displays the IEEE Xplore eLearning portal interface. On the left, a sidebar titled "Course Programs" shows four new courses: "5G Networks", "Enterprise Blockchain for Healthcare, IoT, Energy, and Supply Chain", "Finite Element Method", and "IEEE Guide to Autonomous Vehicle Technology". Below this, a "Categories" section lists various engineering fields: Aerospace, Bioengineering, Computing, Emerging Technologies, Photonics & Electro-Optics, Power & Energy, and Transportation.

The main content area features the IEEE Xplore logo and navigation links: "Browse", "My Settings", "Help", and "Institution". The "Browse" dropdown menu is open, highlighting "Courses". Other options in the menu include Books, Conferences, Journals & Magazines, Standards, Recently Published, and Popular.

On the right, a list of courses is displayed, each with a thumbnail image, title, description, CEUs, PDHs, and duration. The courses listed are:

- From Growth to Great**: Introductory. 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.
- Human Emotion in Devices and Technology**: Introductory. 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.
- Legal and Implementation Issues of Enterprise Artificial Intelligence**: Introductory. 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.
- The Basis for No Bias**: Introductory. 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 created and the data sets they utilize, businesses can... [View More](#). CEUs: 0.3, PDHs: 3, 1 Hour.
- Transparency and Accountability for Robots and Artificial Intelligence Systems**: Introductory. 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. The top navigation bar is dark blue with a hamburger menu icon, the IEEE logo, and the text 'English for Technical Professionals'. A full-screen icon is in the top right. The main content area is split: the left side has a white background with the IEEE logo, the course title 'ENGLISH for Technical Professionals™', and the word 'READING' in orange. The right side features a vibrant illustration of an open book with various icons (like a lightbulb, musical notes, a soccer ball, and a gear) floating above it. Below this, 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 contains the sentence 'that form the baseline understanding for those technical components.' A 'NEXT' button is on the right. The bottom of the player includes a progress bar, play/pause, previous, and next buttons, along with volume, closed captions (CC), and a transcript (TOC) icon. The IEEE logo is in the bottom right corner of the slide.

IEEE English for Technical Professionals

IEEE  
ENGLISH for  
Technical Professionals™

READING

LESSON 12.3 Decipher how to read a standard versus a white paper;  
Constructions of objectivity.

that form the baseline understanding for those technical components.

NEXT



# 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!**