Labs Land

Experiment for real

https://labsland.com

Pablo Orduña, PhD  pablo@labsland.com
Getting ready for the future of work

September 2017 | Commentary
50% of the companies expect that automation will lead to reduction in their full-time workforce by 2022.

30% of the activities of the majority of occupations in the US could be automated.

Future of Work: most occupations are changing

Harnessing automation for a future that works. 2017

The Future of Jobs Report. 2018
Lifelong learning + online education play key role

Automation will make Lifelong Learning a Necessary Part of Work
by Jacques Bughin, Susan Lund, and Eric Hazan, 2018

For workers of the future, then, the ability to adapt their skills to the changing needs of the workplace will be critical. Lifelong learning must become the norm—and at the moment, the reality falls far short of the necessity.

Lower barriers to training by:
- Tackling time constraints through modular training options, training delivered outside of working hours or online courses, as well as by providing workers with education and training leave.

Getting ready for the Future of Work, 2017
Re-training: who will provide it

Professional training programs

Virtual programs

Universities
**Online Courses**

The following programs offer one or more online courses:

- Clinical Medical Assistant Online
- Clinical Trials Design & Management (Biotechnology)
- Construction Professional
- Dental Assistant Online
- E-Learning Design & Development
- Education: Professional Development Courses for Teachers
- EKG Technician Online
- Event & Meeting Planning
- Human Resource Management
- Marketing
- Medical Administrative Assistant Online
- Medical Billing & Coding Online
- Multimedia, Design & Development
- Music/Recording Industry
- Paralegal Studies
- Pharmacy Technician Online
- Project Management
- Spanish/English Interpretation (Legal/Court)

<table>
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<th>Course Code</th>
<th>Course Title</th>
<th>Term</th>
<th>Section</th>
<th>Credits</th>
<th>Days</th>
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<td>8/26/19</td>
<td>12/16/19</td>
<td>6:00PM - 8:45PM</td>
</tr>
</tbody>
</table>
All Development courses

Not sure? Every course comes with a 30-day money-back guarantee

- The Web Developer Bootcamp
  - 398 lectures • 47 hours • All Levels
  - The only course you need to learn web development - HTML, CSS, JS, Node, and More! | By Colt Steele
  - $11.99

- Complete Python Bootcamp: Go from zero to hero in Python 3
  - 186 lectures • 24 hours • All Levels
  - Learn Python like a Professional! Start from the basics and go all the way to creating your own applications and games! | By Jose Portilla
  - $11.99

- Angular 8 (formerly Angular 2) - The Complete Guide
  - 503 lectures • 37 hours • All Levels
  - Master Angular (Angular 2+, incl. Angular 8) and build awesome, reactive web apps with the successor of Angular.js | By Maximilian Schwarzmüller
  - $11.99

10,000 courses
All Engineering courses

Not sure? Every course comes with a 30-day money-back guarantee

480 courses

Electricity & electronics - Robotics, learn by building

$11.99

$99.99

54 lectures • 10 hours • All Levels

Over 13,000 enrolled! Open career opportunities and have fun learning electronics focused on building robots/automation! | By Ian Juby

Mastering Data Structures & Algorithms using C and C++

$11.99

$174.99

370 lectures • 56 hours • All Levels

Learn, Analyse and Implement Data Structure using C and C++. Learn Recursion and Sorting. | By Abdul Bari
Business

- Leadership And Management
- Finance
- Marketing
- Entrepreneurship
- Business Essentials
- Business Strategy

Filter by: Skills, Job Title, Level, Language, Type, Creator

Type
- COURSE (1072)
- SPECIALIZATION (146)

Computer Science

- Software Development
- Mobile And Web Development
- Algorithms
- Computer Security And Networks
- Design And Production

Filter by: Skills, Job Title, Level, Language, Type, Creator

Type
- COURSE (788)
- SPECIALIZATION (119)
<table>
<thead>
<tr>
<th>Stable Roles</th>
<th>New Roles</th>
<th>Redundant Roles</th>
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<tbody>
<tr>
<td>Managing Directors and Chief Executives</td>
<td>Data Analysts and Scientists</td>
<td>Data Entry Clerks</td>
</tr>
<tr>
<td>General and Operations Managers*</td>
<td>AI and Machine Learning Specialists</td>
<td>Accounting, Bookkeeping and Payroll Clerks</td>
</tr>
<tr>
<td>Software and Applications Developers and Analysts*</td>
<td>General and Operations Managers*</td>
<td>Administrative and Executive Secretaries</td>
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<tr>
<td>Data Analysts and Scientists*</td>
<td>Big Data Specialists</td>
<td>Assembly and Factory Workers</td>
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<tr>
<td>Sales and Marketing Professionals*</td>
<td>Digital Transformation Specialists</td>
<td>Client Information and Customer Service Workers*</td>
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<tr>
<td>Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products</td>
<td>Sales and Marketing Professionals*</td>
<td>Business Services and Administration Managers</td>
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<td>New Technology Specialists</td>
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<tr>
<td>Financial and Investment Advisers</td>
<td>Organizational Development Specialists*</td>
<td>Material-Recording and Stock-Keeping Clerks</td>
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<tr>
<td>Database and Network Professionals</td>
<td>Software and Applications Developers and Analysts*</td>
<td>General and Operations Managers*</td>
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<td>Information Technology Services</td>
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<td>Risk Management Specialists</td>
<td>Process Automation Specialists</td>
<td>Financial Analysts</td>
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<tr>
<td>Information Security Analysts*</td>
<td>Innovation Professionals</td>
<td>Cashiers and Ticket Clerks</td>
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<td>Management and Organization Analysts</td>
<td>Information Security Analysts*</td>
<td>Mechanics and Machinery Repairers</td>
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<tr>
<td>Electrotechnology Engineers</td>
<td>Ecommerce and Social Media Specialists</td>
<td>Telemarketers</td>
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<tr>
<td>Organizational Development Specialists*</td>
<td>User Experience and Human-Machine Interaction Designers</td>
<td>Electronics and Telecommunications Installers and Repairers</td>
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<tr>
<td>Chemical Processing Plant Operators</td>
<td>Training and Development Specialists</td>
<td>Bank Tellers and Related Clerks</td>
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<td>University and Higher Education Teachers</td>
<td>Robotics Specialists and Engineers</td>
<td>Car, Van and Motorcycle Drivers</td>
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<tr>
<td>Compliance Officers</td>
<td>People and Culture Specialists</td>
<td>Sales and Purchasing Agents and Brokers</td>
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<tr>
<td>Energy and Petroleum Engineers</td>
<td>Client Information and Customer Service Workers*</td>
<td>Door-To-Door Sales Workers, News and Street Vendors, and Related Workers</td>
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<tr>
<td>Robotics Specialists and Engineers</td>
<td>Service and Solutions Designers</td>
<td>Statistical, Finance and Insurance Clerks</td>
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<tr>
<td>Petroleum and Natural Gas Refining Plant Operators</td>
<td>Digital Marketing and Strategy Specialists</td>
<td>Lawyers</td>
</tr>
</tbody>
</table>


Note: Roles marked with * appear across multiple columns. This reflects the fact that they might be seeing stable or declining demand across one industry but be in demand in another.
Philosophy courses address the big questions that make us human—morality, ethics, purpose, and rationality—in the rich historical context. Explore the field’s eastern and western traditions, including specific schools of philosophy such as existentialism.

Music and Art courses develop skills in the practice and critique of visual art, music, and creative writing. Learn to play the guitar, debate the merits of contemporary graphic novels, or explore the history of human creativity.

History courses investigate ancient and modern events and social trends. Explore themes such as war, imperialism, and globalization, and study the history of specific groups or time periods through courses on black history, women’s history, and more.

Chemistry courses explore the qualities and interactions of matter. Subtopics include organic and inorganic chemistry, industrial and research applications, and the chemistry of food, healthcare, and the environment.

Mechanical Engineering courses develop your ability to design and create mechanical systems, including those used in the automotive, aeronautics, robotics, and manufacturing industries. Subtopics include mechanics, fluid dynamics, heat transfer, and more.

Electrical Engineering courses teach the use of electronics to create, convey, and manipulate information. You’ll master the basics of circuits and signal processing, then move on to advanced subtopics such as microelectronics, telecommunications, and power.
Pick a track that fits your passion

Android Development
Build sophisticated Android apps using Java, Kotlin, C, Python and more.

Data Science
Get the intensive training needed for a career in artificial intelligence and machine learning.

Full Stack Web Development
Learn the fundamentals of frontend, backend, servers, databases, APIs, and more.

iOS Development
Create powerful iPhone and iPad apps with Swift, Objective-C, and Cocoa Touch. Learn CS with Python and C.

User Experience Design
Master the entire UX design process and learn the basics of building for web and mobile.
Why does this happen?

- Why do you think this happens?

- Does this happen in your university / company?
  - e-Technologies in Engineering Education
How can we improve this?
Experimentation requires **laboratories**

**Laboratories** require a **physical location**

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I'm a believer in online technology in education. I think we have learned enough about this to understand that *it will be transformative. It's going to change the world*, and it's going to change the way we think about education. [...]

Could you imagine a situation where students do some of their degree work remotely and then do some on campus, particularly the small, *experiential classes that don't transfer well to online*?

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-- John L. Hennessy, Past President of Stanford
CHALLENGES IN EXPERIMENTATION: IN CLASS

Inconvenience
- Lab space, safety, time constraints, liability, setup time, required supervision

Costs
- Acquisition, maintenance, security

Example

Fizz! Pop! Bang! Teachers find new science standards fun, but costly

With their emphasis on hands-on experiments, California’s new science standards have turned classrooms into noisy, messy laboratories.

“I love the new standards, I really do. But it’s so expensive, I just don’t see how it’s going to happen,” said Laura Ruiz, a science teacher at a middle school in Los Angeles Unified. “All of us teachers are spending hundreds of dollars a year of our own money to purchase supplies. Is there a cheap way to teach these standards? I’m trying to find one, but I just don’t think so.”

The new K-12 standards, called the Next Generation Science Standards, were approved by the
In both traditional and online education, educators need affordable, real experimentation.
An example: Arduino remote lab for schools

LabsLand solution: Real labs, available online

View and interact with the real equipment

Learn anywhere, anytime

The equipment is real, no simulations. LabsLand or partner institutions
EXAMPLE: ARDUINO ROBOT

LabsLand Arduino robot: students write code and see how it behaves in a real robot on real-time
EXAMPLE: ARDUINO ROBOT
LabsLand Electronics: students create complex circuits, and a real hardware with a set of relays build the circuit and take measurements shown in the web interface.
Example: FPGAs (Intel/Altera and Xilinx)
Are you familiar with Remote Labs?

How many of you have used Remote Laboratories?

How many of you use every year Remote Laboratories?

Why is this? What are the problems you see on them?
Why aren’t Remote Labs more popular?

1. Robustness and trust
2. Scalability
3. Development process
4. Critical mass of laboratories
5. Integrations in the university context
6. Sustainability
1. Robustness and trust
DEPLOYMENT OF EXISTING LABS

USA

Germany

Costa Rica

South Africa (next month)

Colombia
### Publicly available laboratories

**Summary**

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<th>#</th>
<th>Name</th>
<th>Institution</th>
<th>Status</th>
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2. Scalability
MORE EXAMPLES

**Biology:**
St. Thomas University in Houston: students see how the planarian reacts in different substances, such as caffeine.

**Physics:**
University of Queensland (Australia): students measure particles crossing across different materials through thousands.
3. Development process
LABSLAND OPEN SOURCE TECHNOLOGIES

https://github.com/weblabdeusto/weblabdeusto/
https://developers.labsland.com/weblablib/

- Remote Laboratory Management System
- Provides multiple APIs to simplify development of labs
- Covers authentication, authorization, integration...
1. Deployment of existing labs
2. LabsLand: software development / University: pedagogic and video recording
3. LabsLand: real-time software development / University: connections and hardware design
4. LabsLand: web software development / University: automation and recording
5. LabsLand: consultancy & proprietary software provider / University: all software and hardware
6. Use of LabsLand Open Source technologies
4. Critical mass
Increasing number of laboratories
5. Integrations
Learning Management Systems

- If Learning Management Systems used, no need for students to even go to LabsLand
- Teachers will still have analytics and will be able to see who used what laboratories and when
6. Sustainability
GLOBAL NETWORK OF ONLINE LABS

Lab consumers
universities, schools

Lab providers
universities

Access to laboratories

NRE projects
Lab development or deployment
“The University of Georgia has been using LabsLand’s remote labs and we now have our own lab for our students and for contributing to the LabsLand network. Students find remote labs fun, very easy to use, and very convenient: being able to do homework with real hardware at any time, anywhere.”

-- Dominik May, Assistant Professor, University of Georgia, USA

“UNED is a distance university. For us, it’s necessary to provide our students with all the possible resources online. In science and engineering, LabsLand remote labs are a key solution: engaging, with demonstrated learning outcomes, easy to use, and integrated with our digital tools.”

-- Carlos Arguedas, Universidad Estatal a Distancia (UNED), Costa Rica

“Thanks to the LabsLand robotics laboratory my 15-16-year old students have learned to program robots using real robots without leaving the classroom, and without the common inconveniences of maintaining robots or having a dedicated space. It is so convenient and students love it!”

-- Ainhoa Merino, school teacher, Badaia High School, Spain

FOCUSED IN UNIVERSITIES AND SCHOOLS

2019 Award

MIT TR35 Spain 2012

Global Impact Competition 2016 Award

Best PhD & best MSc awards by ES IEEE EdSoc
Check it out!
Paul Orduña, PhD  
Founder & CEO - San Francisco Bay Area  

- MIT TR35 Spain 2012 (top 10 innovators < 35)  
- Entrepreneurship programs GSP & Launchpad at Singularity University (5-month), 2016  
- Visiting Researcher MIT 2011  
- Past Vice-Chair Standards Committee IEEE EdSoc & Past Executive Member, IAOE

Luis Rodríguez Gil, PhD  
Founder & CTO - Bilbao, Spain  

- PhD in remote laboratories  
- IEEE award to the best MSc thesis and best academic record in 2010 and 2013  
- MSc in Computers Security, MEng in Computer Science  
- MEng in Management Engineering
Check it out (at zero cost)

If you want to explore it (for research or for testing), go to:

https://labsland.com

And then in “Pricing”. Then select the Advanced and you will create your own LabsLand space that you can test all these technologies.

Then send us an e-mail to:

support@labsland.com

With subject [ETEE2019] and the space link on it

We will increase the default 14 days demo to be ended manually (in over 2 months; and no commitment)
Questions?
Experiment for real

https://labsland.com