University of Peradeniya
E18 Field Introduction

Computer Engineering

If you have **questions**, please drop an email or contact on WA

Academic stuff: https://gihan.me/contact/

Industry stuff: chandima.s@eng.pdn.ac.lk (+94719692398 | +6593474936)

2021 May 1

Disclaimer

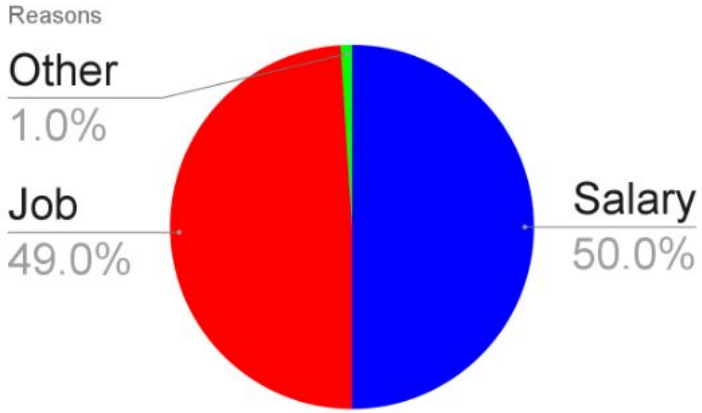
This presentation is made by Gihan, Suren and Chandima to share their **personal opinions** about the Department of Computer Engineering, University of Peradeniya with the E18s considering the department during field selection.

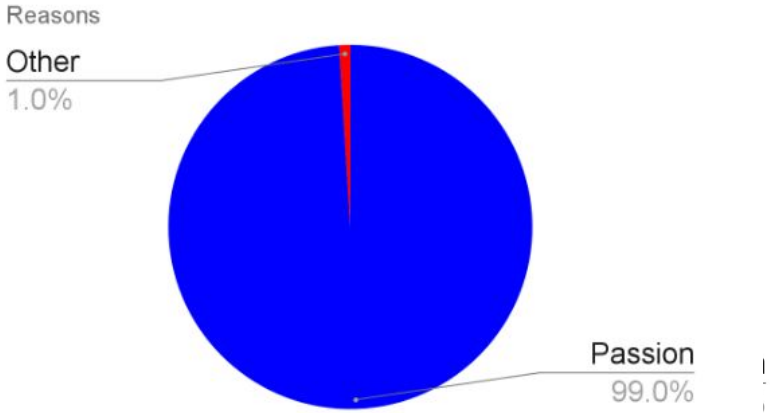
Gihan and Suren created the first part (academic programme) and Chandima created the second part (industrial aspects) and presented on 01st May 2021.

However, these opinions are not reflective of the stances held by their employees, affiliated organizations or the Department of Computer Engineering, University of Peradeniya.

Picking a field (1/2) :

You don’t have to attend this session if your reasons are:



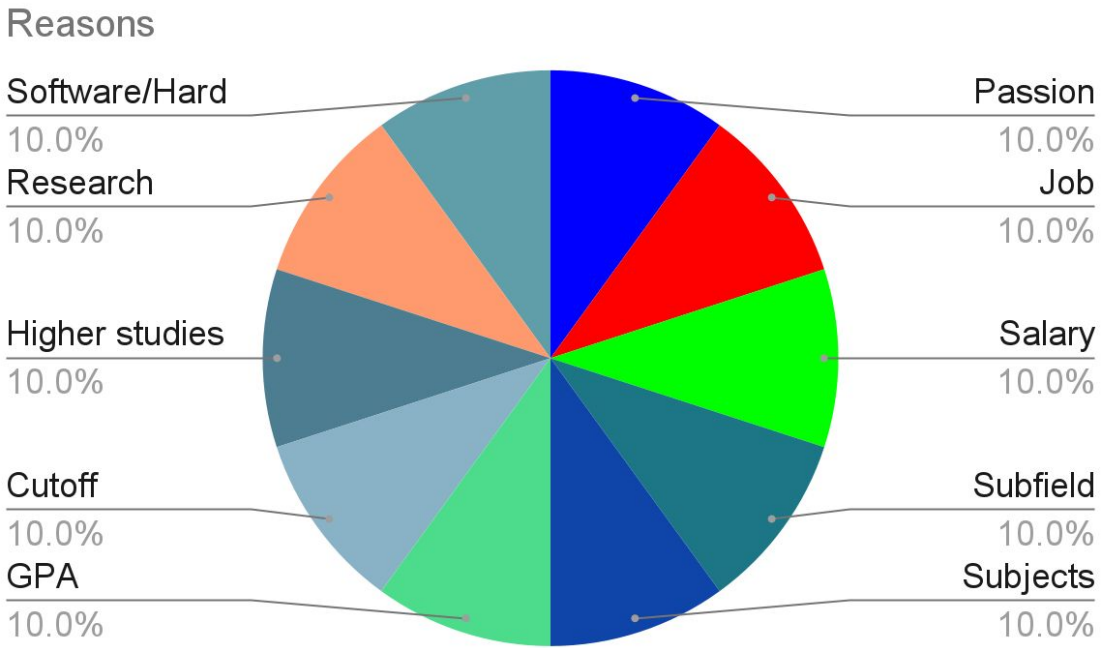


Computer Engineering

Do what you are passionate about

Picking a field (2/2)

If your decision is based on everything, let us continue >>



Subtopics (1/2)

1. About the degree
    a. Prior knowledge
    b. Field selection
    c. Workload / results
    d. Accreditation
    e. Programming languages used?
    f. Internships
    g. Projects
    h. Subfields / courses
    i. Bio-medical engineering
    j. Collaborations
    k. Misconceptions
2. About the industry

Subtopics (2/2)

1. About the degree
2. About the industry
    a. First job
    b. Job opportunities in software and hardware.
    c. Salaries
    d. Stress
    e. Retirement
    f. Where we stand in comparison to other computer degrees? (CS, CSE, IT, CE)

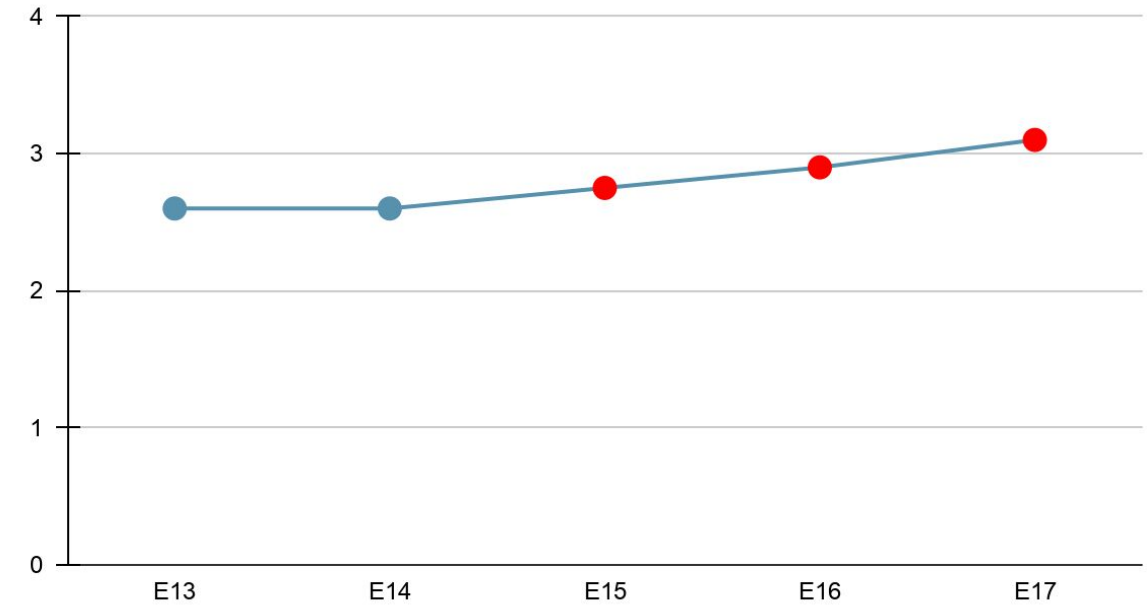
Prior knowledge

Requirement: None

However,

1. Self-studying is always good for ANY field.
2. Programming languages are one of the few things you can self study almost completely.

Field Selection



- Top choice field.
- Second choice field.

- Computer has been the **top choice** in field selection for **3 years**. (earlier it was 2nd).
- E17 cutoff was **3.10**. (E18s, maintain at least 3.3)

Cutoff GPAs

- This slide was added later
- You can access all cutoffs from https://cepdnaclk.github.io/fieldselection/
- E18 cutoff was actually 3.3.

Difficulty / workload

E14 CO had 62 students.

The google sheet had information of __ students.

● First Class	>=3.70	13
● Second Class (Upper)	3.30<= and >3.70	21
● Second Class (Lower)	3.00<= and >3.30	10
● Third Class	<=3.00	12

FAQ : What programming languages will be used?

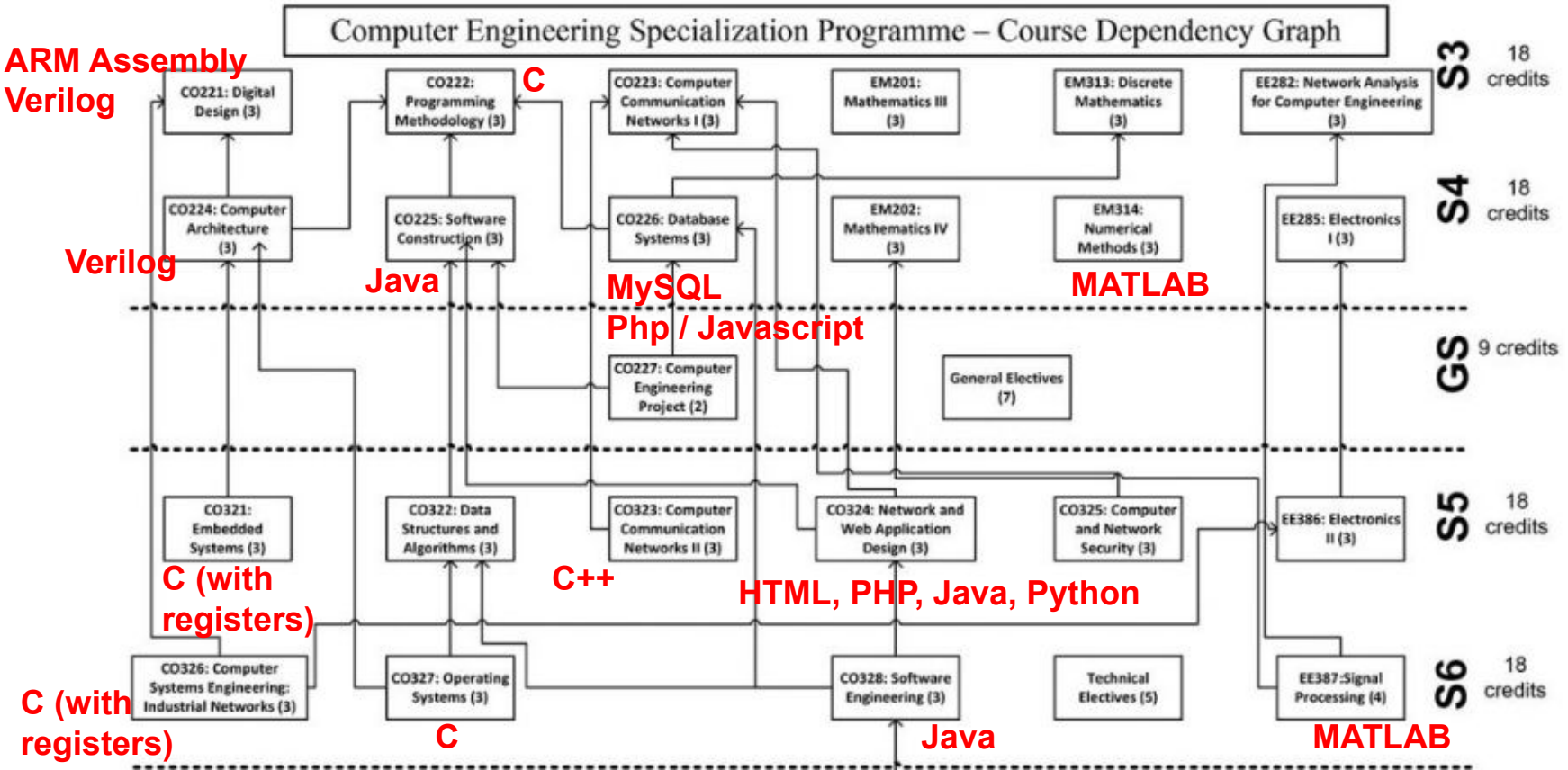
Short answer

Don’t worry about “knowing” programming languages. Different tasks will require different languages and you will be using them when time comes.

Ex: You don’t have to learn how to use a Bunsen burner to start with AL Chemistry. You will be using the burner for some lab practicals and you will learn it then.

FAQ : What programming languages will be used?

Long answer http://www.ce.pdn.ac.lk/undergraduate-courses



Accreditation, standards (1/2)

Content

Quality

The Institution of Engineers Sri Lanka
Apex body for Professional Engineers in Sri Lanka
IESL
Founded 1906

acm Association for Computing Machinery

https://iesl.lk/images/pdf/accreditation/List_of_Accredited_Engineering_Degree_Programmes_revised_as_at_July_14_2020_new.pdf

https://www.acm.org/education/curricula-recommendations

UNIVERSITY OF PERADENIYA

Degree Programme	Period of validity of the accreditation	
	From (Intake Year)	To (Intake Year)
Bachelor of the Science of Engineering Degree Program Specialty : Civil Engineering	2007	2020
Bachelor of the Science of Engineering Degree Program Specialty : Chemical and Process Engineering	2011	2020
Bachelor of the Science of Engineering Degree Program Specialty : Computer Engineering	2009	2019
Bachelor of the Science of Engineering Degree Program Specialty : Electrical and Electronic Engineering	2008	2022
Bachelor of the Science of Engineering Degree Program Specialty : Mechanical Engineering	2009	2019
Bachelor of the Science of Engineering Degree Program Specialty : Production Engineering	2009	2016
Bachelor of the Science of Engineering Degree Program Specialty : Manufacturing & Industrial Engineering	2017	2019

I E S L
Founded 1906

acm Association for Computing Machinery

Table 3.1: CE2016

CE-CAE	Circuits and Electronics
CE-CAL	Computing Algorithms
CE-CAO	Computer Architecture and Organization
CE-DIG	Digital Design
CE-ESY	Embedded Systems
CE-NWK	Computer Networks

Knowledge Areas

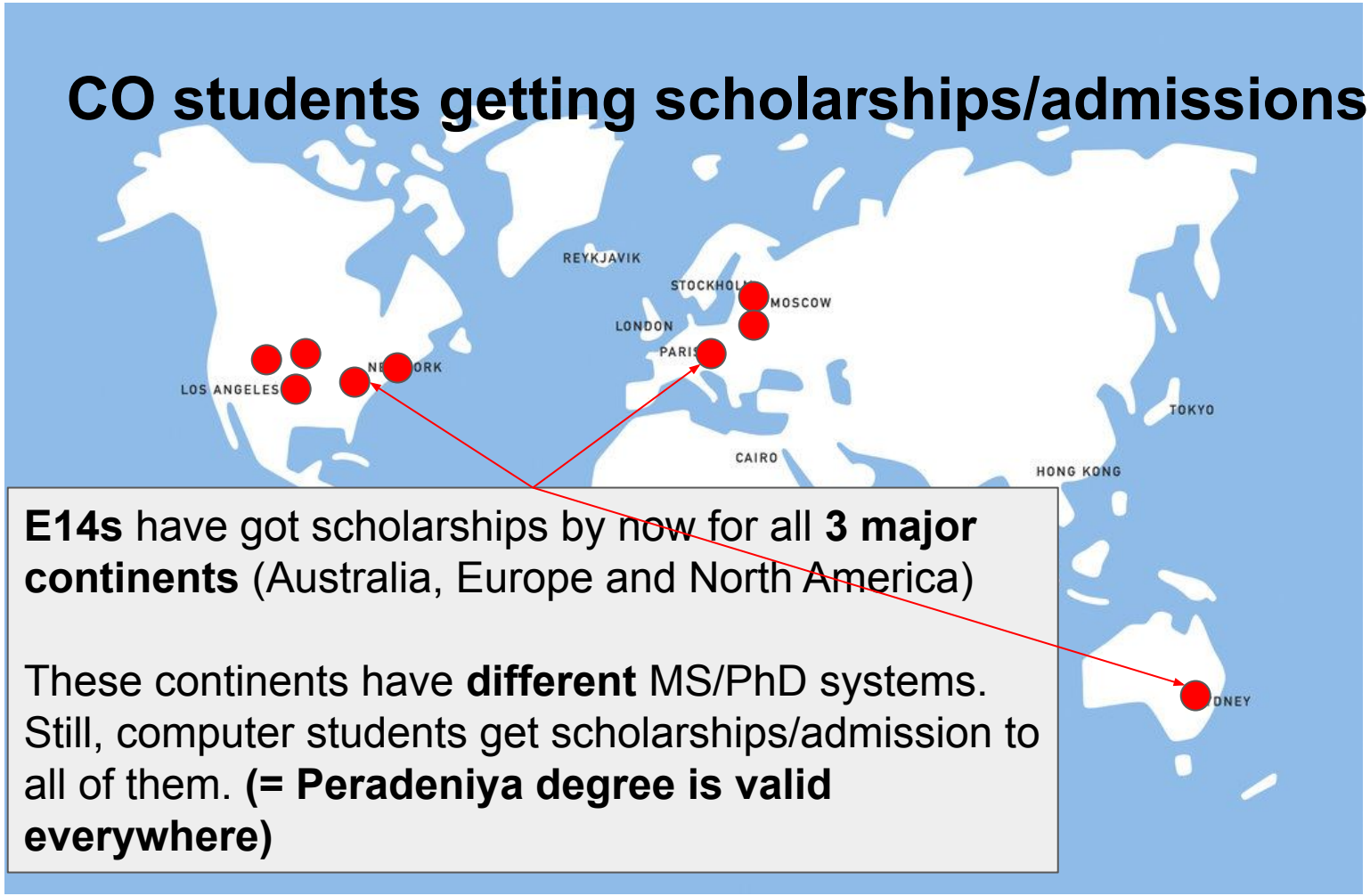
CE-PPP	Preparation for Professional Practice
CE-SEC	Information Security
CE-SGP	Signal Processing
CE-SPE	Systems and Project Engineering
CE-SRM	Systems Resource Management
CE-SWD	Software Design

Accreditation, standards (2/2)

CO students getting scholarships/admissions

- E14 (up to 2022 Apr)
- E13
- E12

CO students getting scholarships/admissions



E14s have got scholarships by now for all **3 major continents** (Australia, Europe and North America)

These continents have **different** MS/PhD systems. Still, computer students get scholarships/admission to all of them. **(= Peradeniya degree is valid everywhere)**

- E14 (up to 2022 Sept)
- E13
- E12

CO students getting scholarships/admissions

- E14 (up to 2022 Sept)
- E13

CO students getting scholarships/admissions

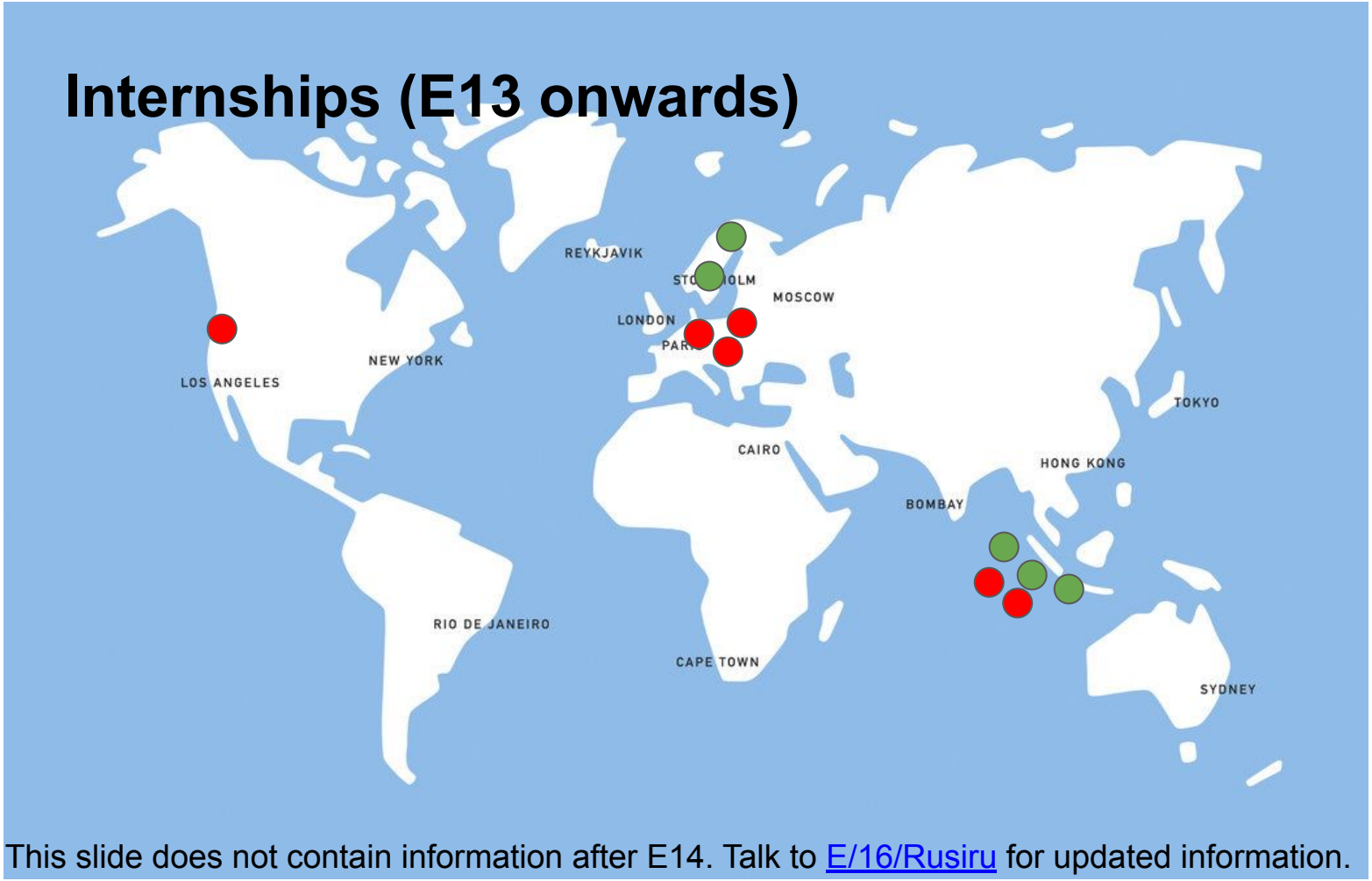
- E14 (up to 2022 Sept)
- E13
- E12

Internships (1/2)

- Computer internship = **20 weeks** (usually, after the 6th sem)
- Other internships = 10 weeks (usually, after the 4th sem and 6th sem)

- All computer engineering students get **paid** during the internships.
  - Why work for free for “experience”?
- More computer engineering students go for **international** internships.
  - New experiences, connections, exposure.
- More computer engineering students go for **research** internships.
  - This far, only the computer students have created actual research publications from the internships.

Internships (E13 onwards)



This slide does not contain information after E14. Talk to E/16/Rusiru for updated information.

Projects

“Computer curriculum has so many projects” -- TRUE!

- What are the projects done by Computer department?
  - **Course projects, unified projects and final year research project.**
  - http://projects.ce.pdn.ac.lk/
  - We have data from E15 final year and E16 unified projects.
- Why do we have a lot of projects?
  - [Next slides. Based on Dr. Asitha Bandaranayake’s explanation]

You come to the department with some basic knowledge.

Management jobs

Management job requirement

The knowledge needed to get a management job is minimal.

First year knowledge

Technical engineering jobs

Industry requirement

Management jobs

Management job requirement

But you need a higher set of skills to do technical engineering jobs properly.

First year knowledge

Technical engineering jobs

MSc, PhD

Industry requirement

Research career requirement

Management jobs

Management job requirement

And to do research as a MS/PhD student.

First year knowledge

Technical engineering jobs

MSc, PhD

Industry requirement

Research career requirement

Management jobs

Management job requirement

You do courses for four years

Subject 1

First year knowledge

Technical engineering jobs

MSc, PhD

Industry requirement

Research career requirement

Management jobs

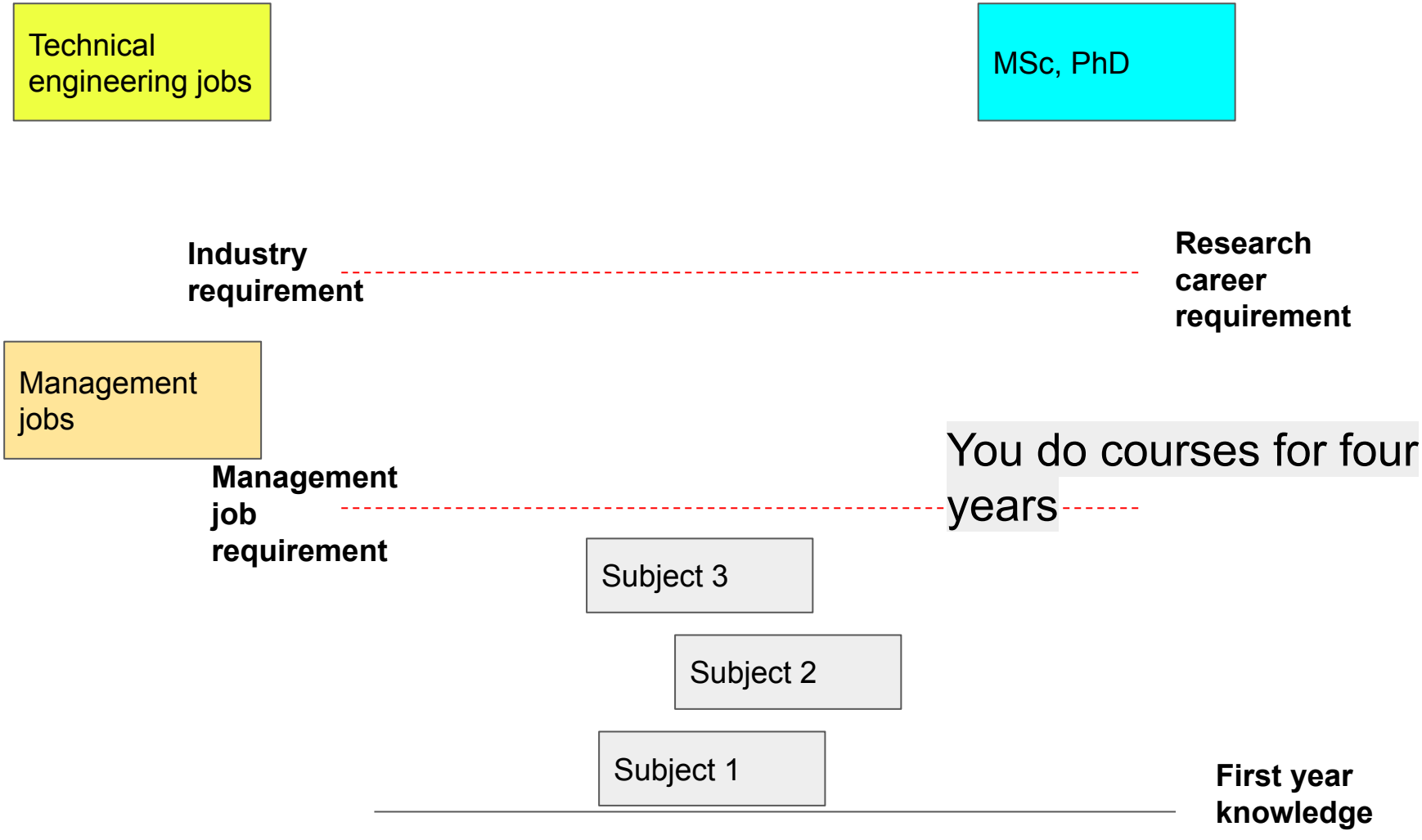
Management job requirement

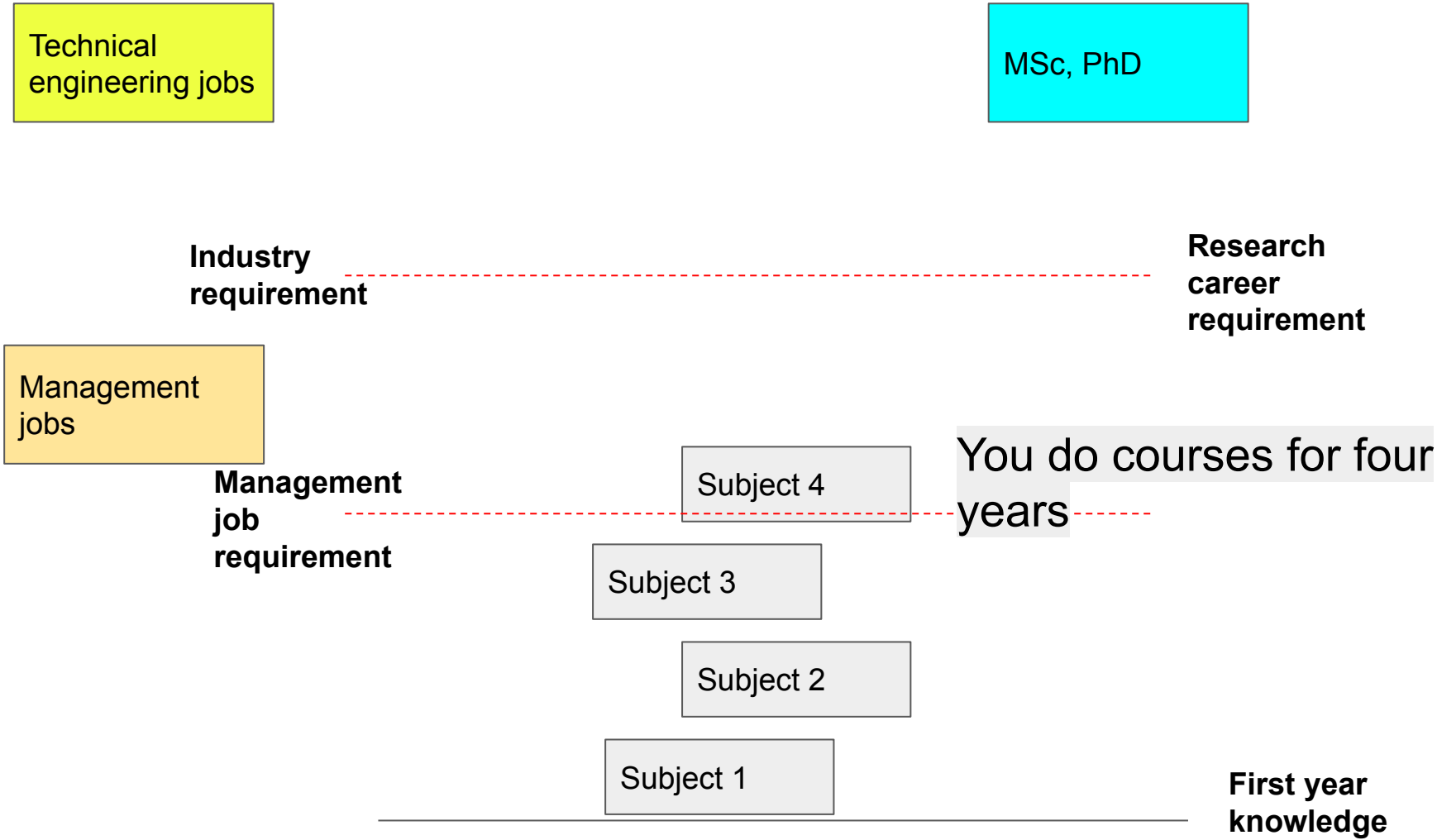
You do courses for four years

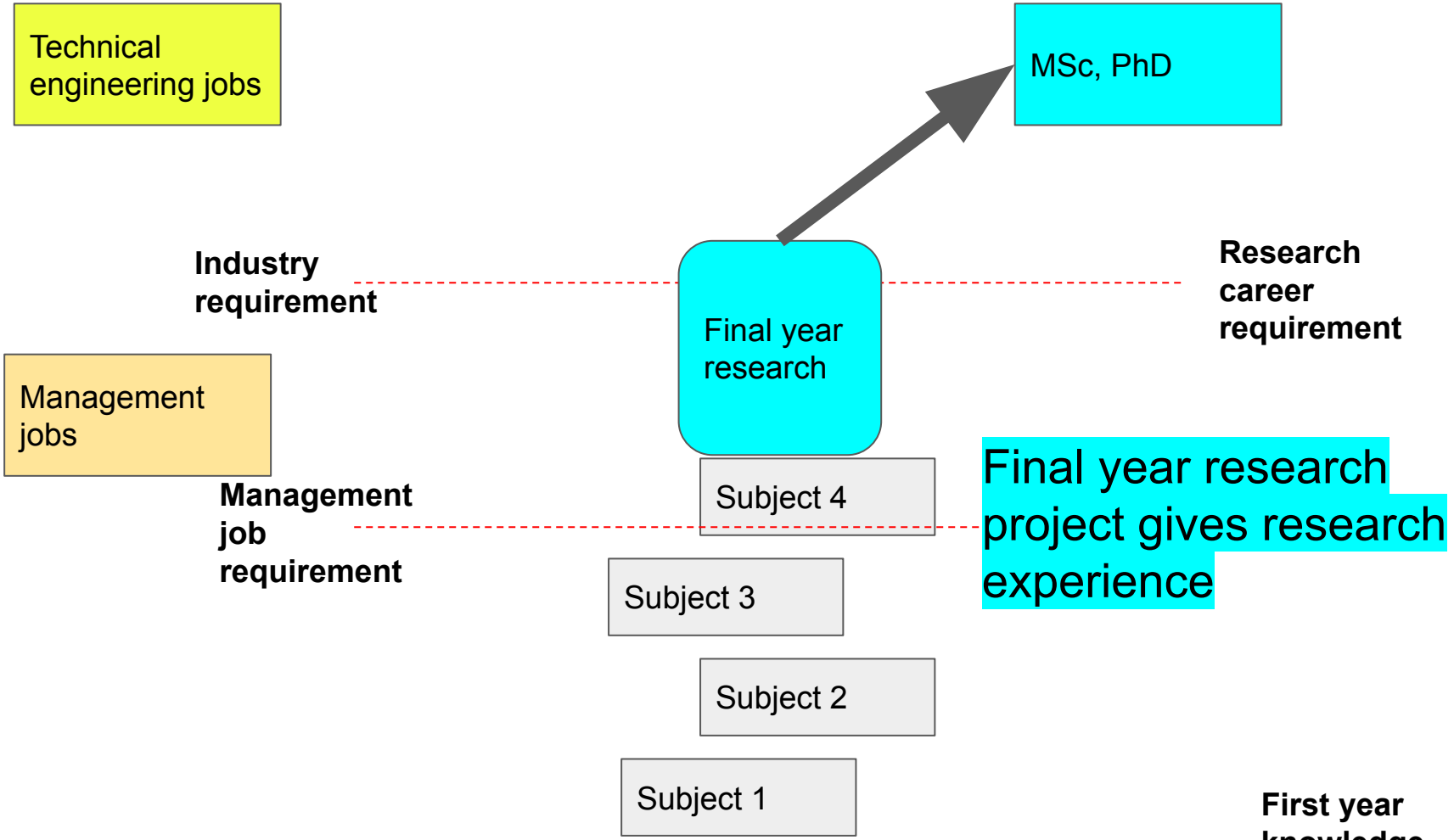
Subject 2

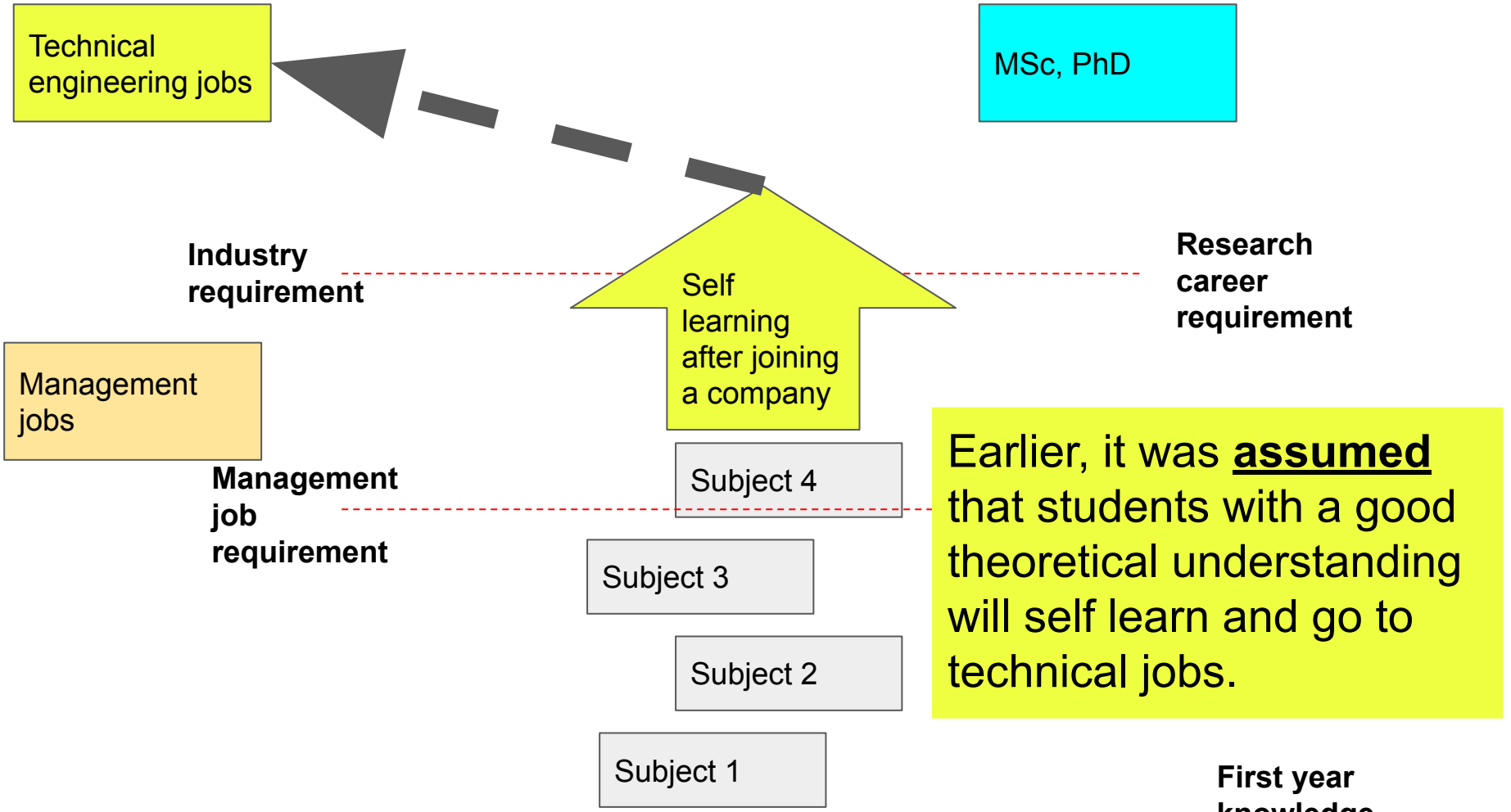
Subject 1

First year knowledge


Technical engineering jobs
MSc, PhD
Industry requirement
Research career requirement
Management jobs
You do courses for four years
Management job requirement
Subject 3
Subject 2
Subject 1
First year knowledge

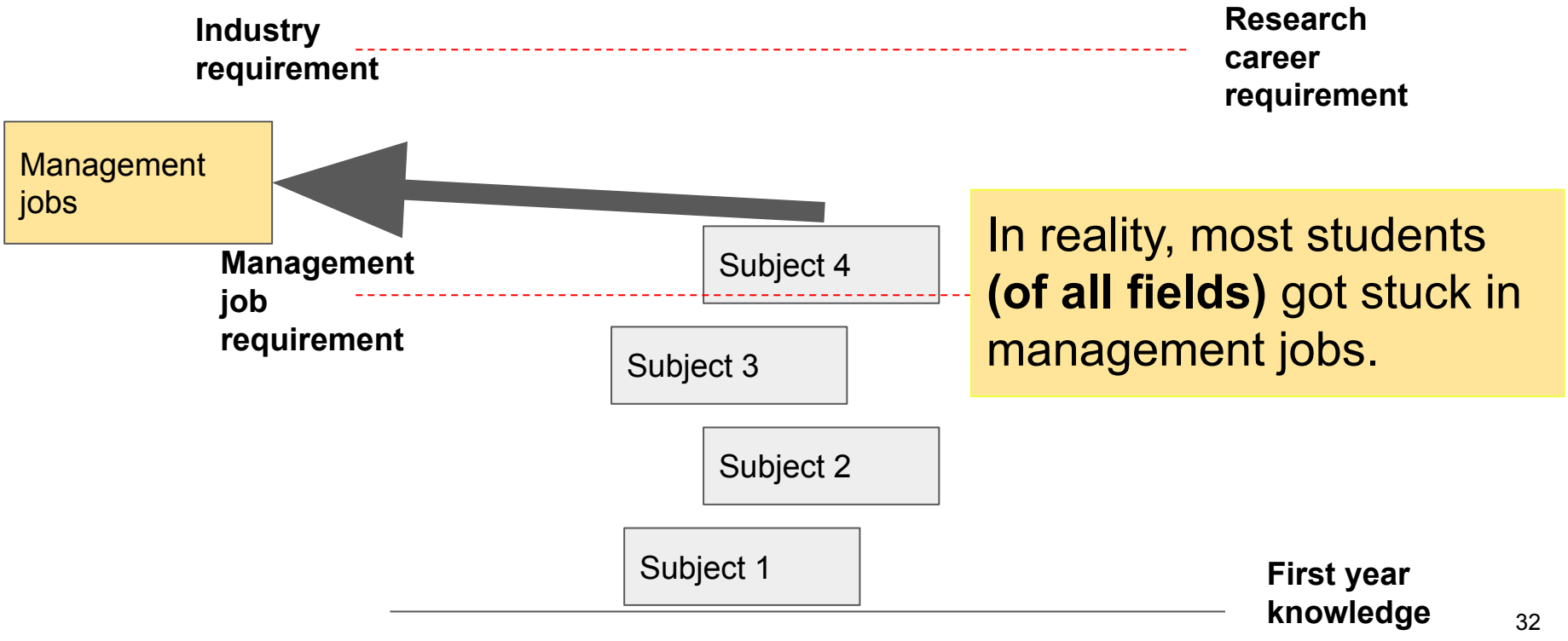

Technical engineering jobs
MSc, PhD
Industry requirement
Research career requirement
Management jobs
Management job requirement
Subject 4
You do courses for four years
Subject 3
Subject 2
Subject 1
First year knowledge


Technical engineering jobs
MSc, PhD
Industry requirement
Research career requirement
Final year research
Management jobs
Management job requirement
Subject 4
Final year research project gives research experience
Subject 3
Subject 2
Subject 1
First year knowledge

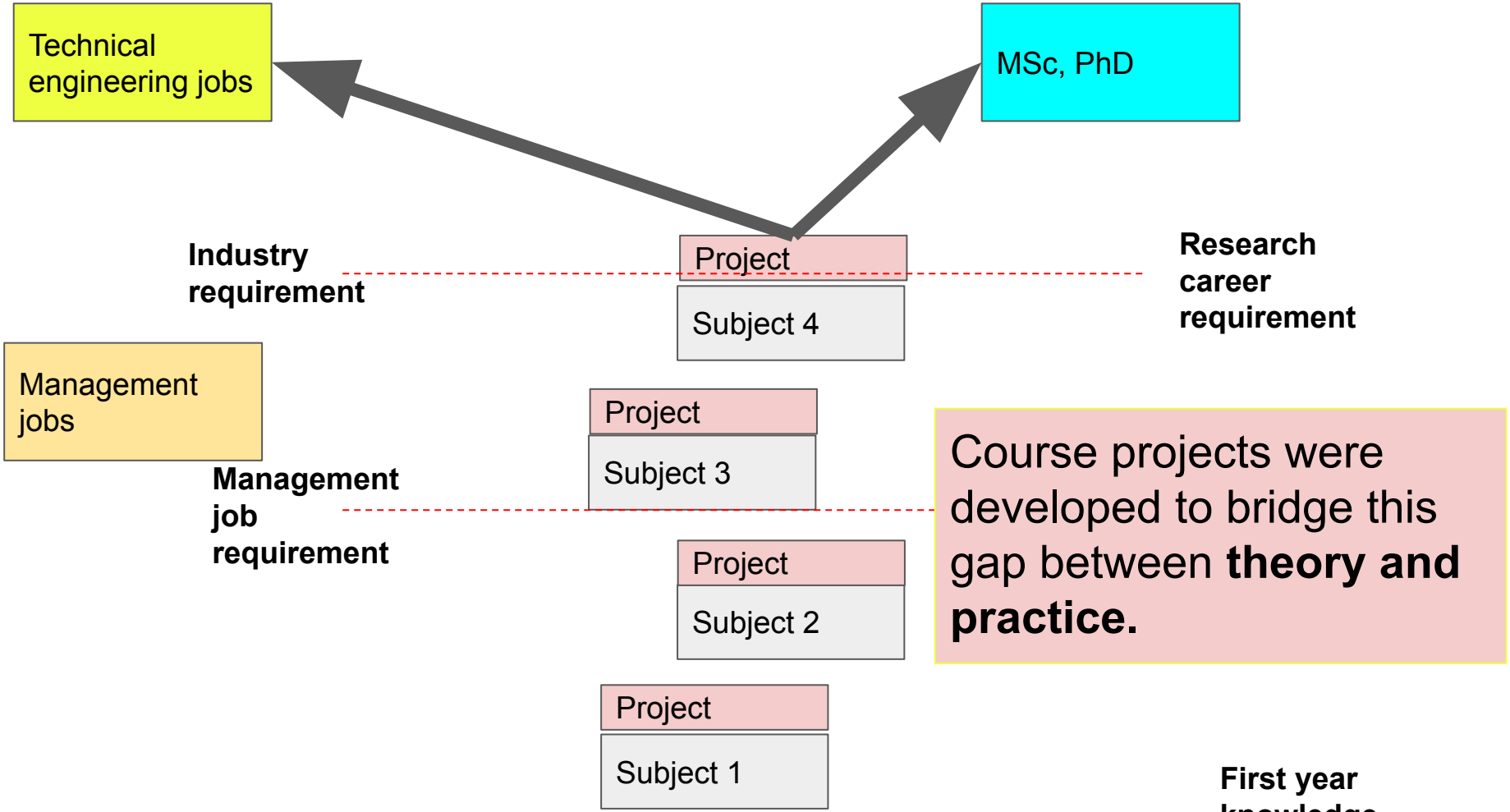

Technical engineering jobs
MSc, PhD
Industry requirement
Research career requirement
Self learning after joining a company
Management jobs
Management job requirement
Subject 4
Subject 3
Subject 2
Subject 1
First year knowledge
Earlier, it was assumed that students with a good theoretical understanding will self learn and go to technical jobs.

Technical engineering jobs

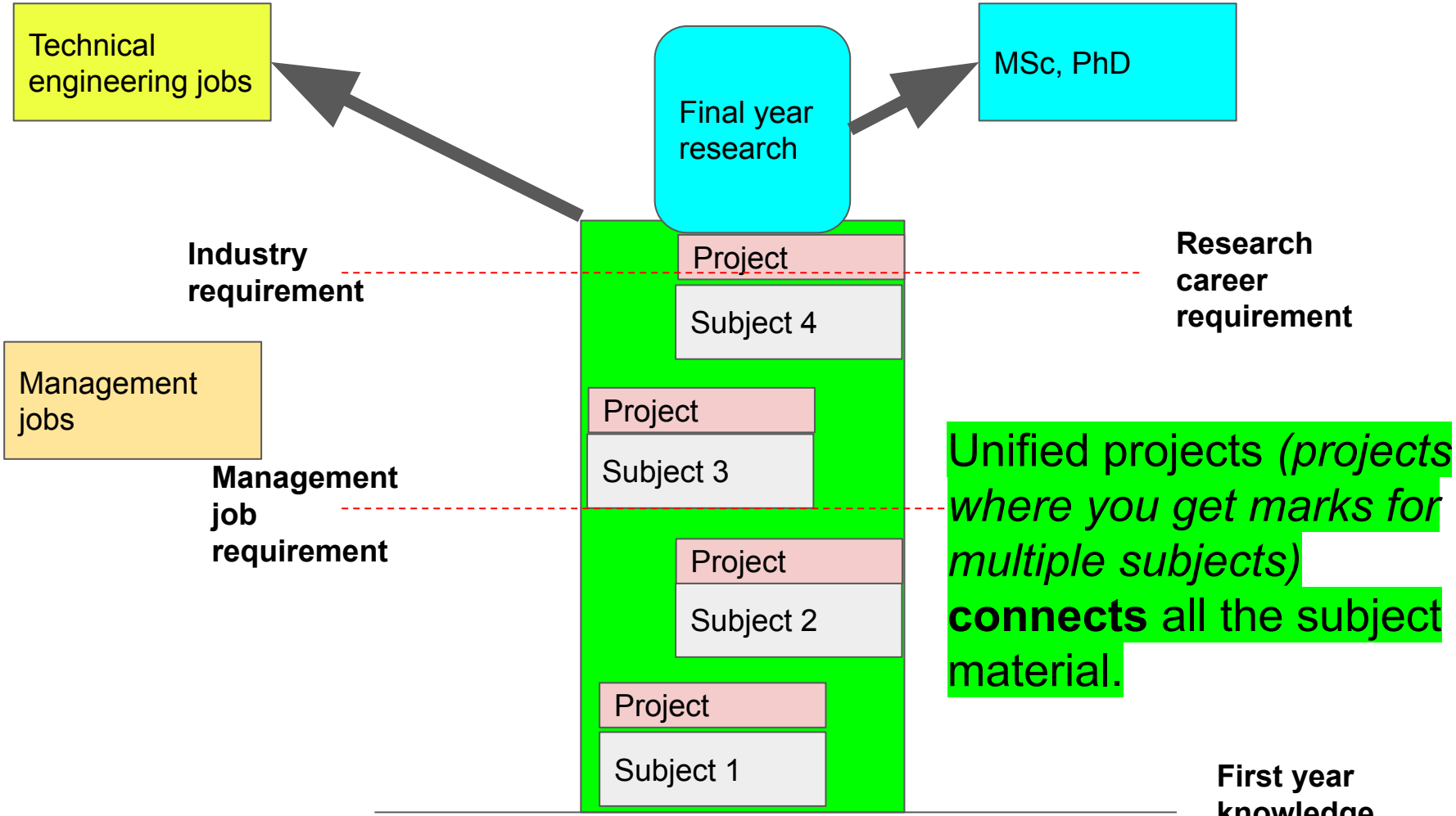
MSc, PhD

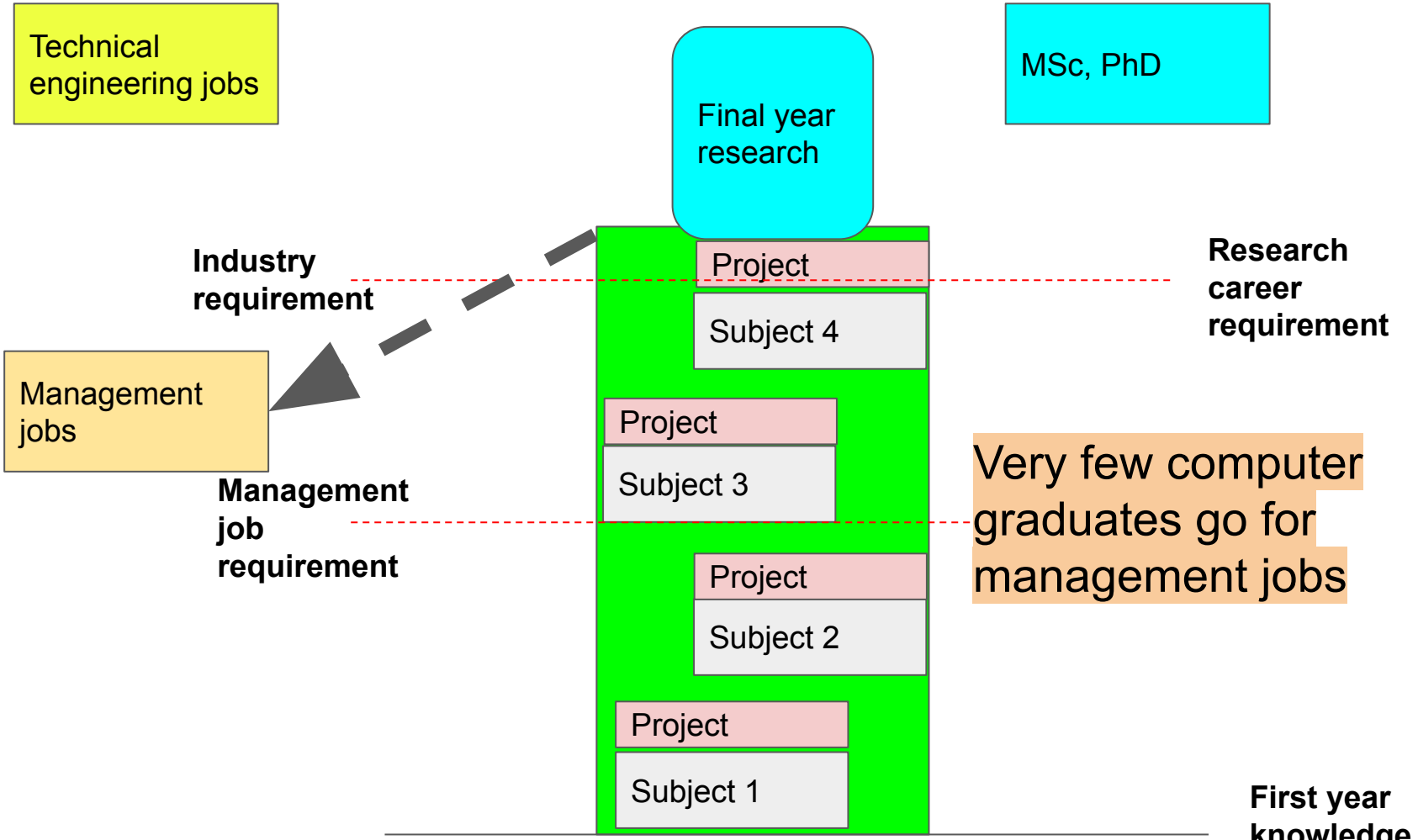


In reality, most students **(of all fields)** got stuck in management jobs.



Course projects were developed to bridge this gap between **theory and practice.**


Technical engineering jobs
Final year research
MSc, PhD
Industry requirement
Research career requirement
Management jobs
Management job requirement
Project
Subject 4
Project
Subject 3
Project
Subject 2
Project
Subject 1
Unified projects *(projects where you get marks for multiple subjects)* **connects** all the subject material.
First year knowledge


Technical engineering jobs
Final year research
MSc, PhD
Industry requirement
Research career requirement
Management jobs
Project
Subject 4
Project
Subject 3
Management job requirement
Very few computer graduates go for management jobs
Project
Subject 2
Project
Subject 1
First year knowledge

Subfields

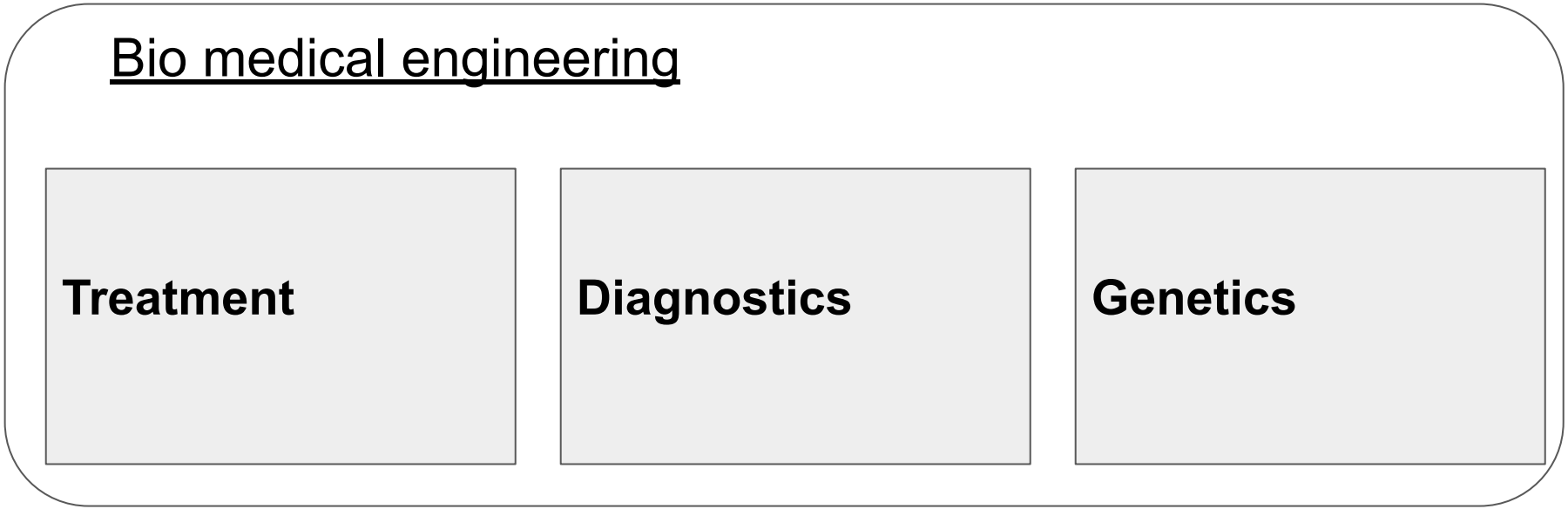
- **Core : (around 9 credits per topic)**
  - Programming, networking, electronics, computer architecture (processor design), mathematics

- **Specialization with technical electives**
  - Artificial intelligence / Machine learning
  - Mathematics (+ pure CS)
  - Software engineering
  - Hardware engineering (processor design or embedded systems)
  - Networking (communication)

These are just words. Pick the **subjects** and **projects** you want to do.

Where does bio-medical engineering (BME) fit in?

This is a popular question because unlike in Moratuwa, there is no specific bio-medical department in Peradeniya.



Bio medical engineering

Treatment

Solutions that can help medical procedures.

Diagnostics

Genetics

Usually, treatments are not designed by undergraduate institutions in Sr Lanka.
It is difficult to find such research groups here.

Bio medical engineering

~~Treatment~~	**Diagnostics**	**Genetics**

Usually, treatments are not designed by undergraduate institutions in Sr Lanka.
It is difficult to find such research groups here..

Bio medical engineering

~~**Treatment**~~

Diagnostics

- Sensors, developing equipment
- Signal processing
- Machine learning (to detect conditions)

Genetics

Bio medical engineering

~~**Treatment**~~

Diagnostics

- Sensors, developing equipment
- Signal processing
- Machine learning (to detect conditions)

Genetics

These techniques are taught in multiple courses even though there is no bio-medical specialization

Bio medical engineering

~~**Treatment**~~

Diagnostics

- Sensors, developing equipment
- Signal processing
- Machine learning (to detect conditions)

Genetics

Many departments conduct such courses and research

Bio medical engineering

~~**Treatment**~~

Diagnostics
(Many depts)

Genetics = DNA sequencing

This research area is active **only in the computer engineering department.**

Bio medical engineering projects in the computer department (two examples)

Diagnostics / sensing
(Many depts)

Genetics = DNA sequencing
(Computer department only)

An Ensemble Learning Approach for Electrocardiogram Sensor Based Human Emotion Recognition

by Theekshana Dissanayake *, Yasitha Rajapaksha, Roshan Ragel and Isuru Nawinne

Department of Computer Engineering, University of Peradeniya, Peradeniya 20400, Sri Lanka

* Author to whom correspondence should be addressed.

Sensors **2019**, *19*(20), 4495; https://doi.org/10.3390/s19204495

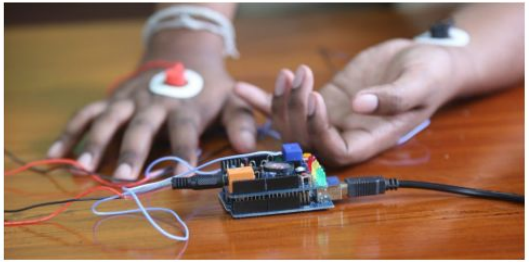


Figure 1. SpikerShield Heart and Brain sensor.

Genopo: a nanopore sequencing analysis toolkit for portable Android devices

Hiruna Samarakoon, Sanoj Punchihewa, Anjana Senanayake, Jillian M. Hammond, Igor Stevanovski, James M. Ferguson, Roshan Ragel, Hasindu Gamaarachchi & Ira W. Deveson

Communications Biology **3**, Article number: 538 (2020) | Cite this article

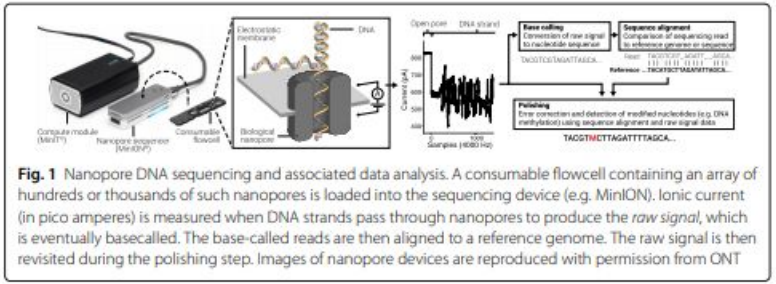
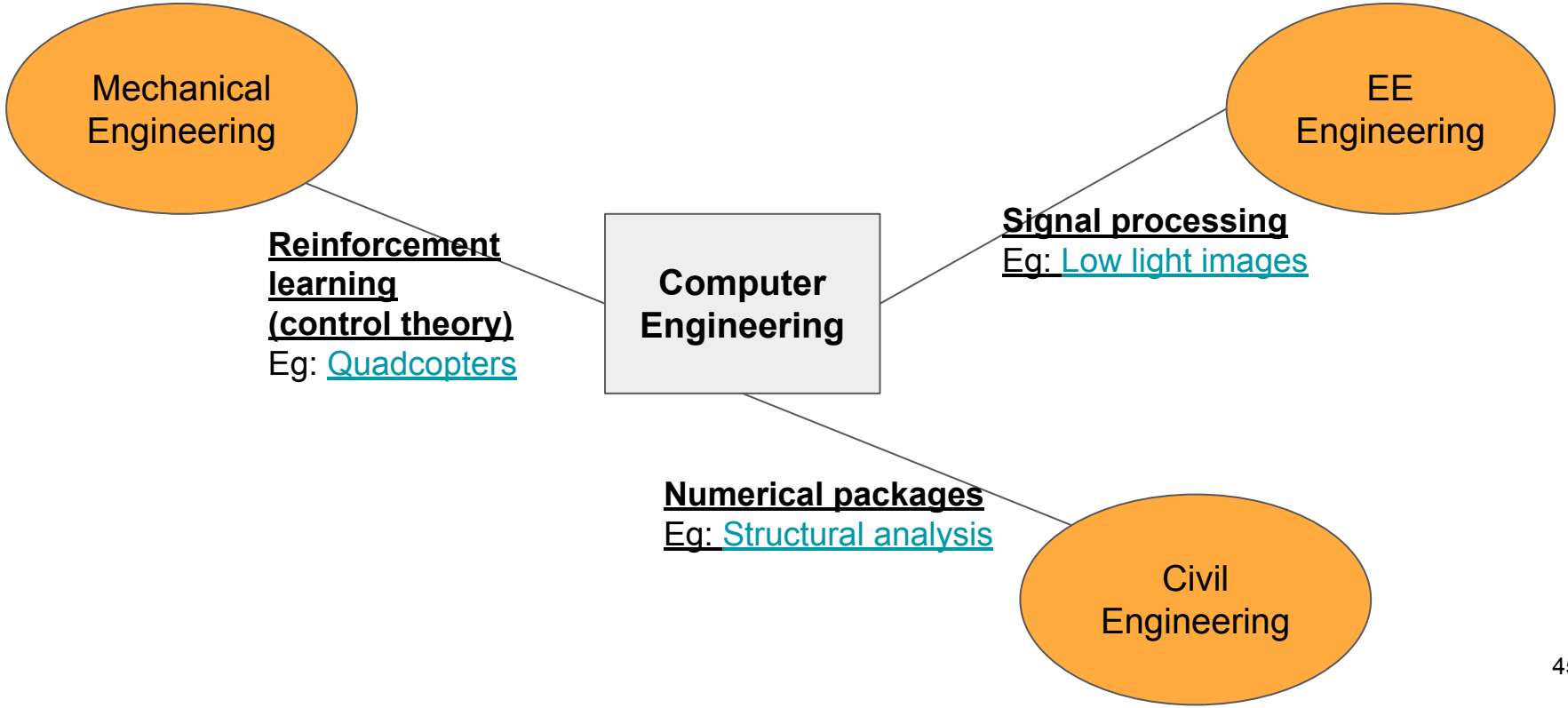


Fig. 1 Nanopore DNA sequencing and associated data analysis. A consumable flowcell containing an array of hundreds or thousands of such nanopores is loaded into the sequencing device (e.g. MinION). Ionic current (in pico amperes) is measured when DNA strands pass through nanopores to produce the *raw signal*, which is eventually basecalled. The base-called reads are then aligned to a reference genome. The raw signal is then revisited during the polishing step. Images of nanopore devices are reproduced with permission from ONT

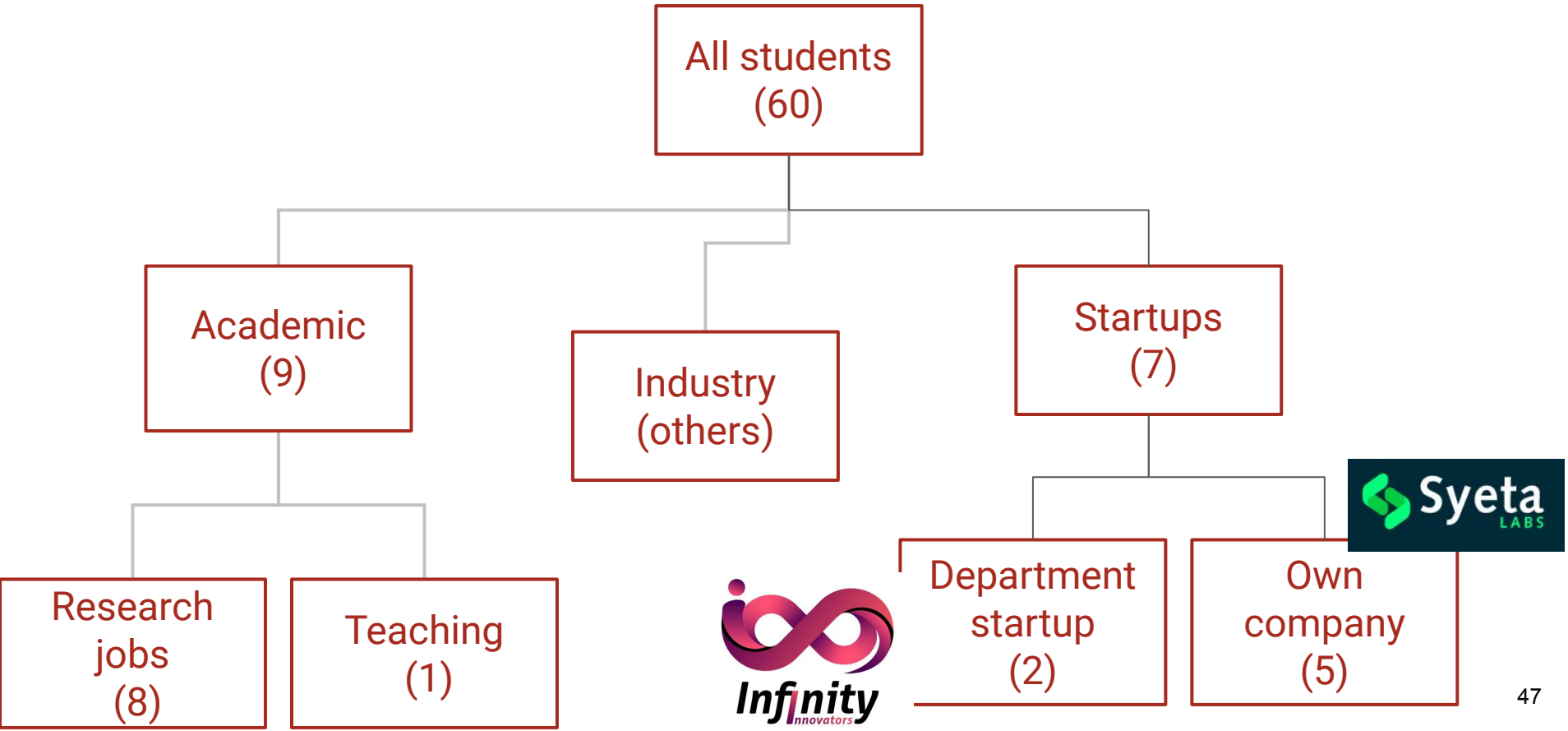
Collaborations with other departments



Computer engineering graduates in the industry

By Chandima Samarasinghe [2021 May 1]

First job types (E14 as of 01/05/2021)



Job availability and starting salaries

- Computer has been the only field with **100% job guarantee** for many years.
  - *We know for sure about E12, E13 and E14.*
- The **highest, average and minimum salaries** of computer students have been higher than everything else for many years.
  - *We know for sure about E12, E14 and E14.*
  - **Highest 200,000+, average 160,000, minimum 130,000.**

    This is not after analyzing everyone's salaries.
- Keep your LinkedIn profile updated. Do diverse projects, follow online courses and get certified. You will be constantly receiving attractive job offers without even applying.

The salary numbers are from 2021. Reach out to to me if you want to talk about the current situation in the industry.

Software - Hardware split (in SL jobs) + Networking

1. FPGA / High Performance Computing - Paraqum, LSEG
2. Networking - SLT, Mobitel, Banks, LEARN
3. IoT - Codegen, Dialog
4. HDL / Digital Design - Synopsys
5. Firmware Development - Zebra Technologies
6. Cloud Infrastructure (AWS/Azure) - Almost all the software companies

FAQ : How stressful is software engineering?

- In some jobs, the engineering team has to deal with the questions raised by the clients. If your company is a multinational company, you may have to solve/answer them adhering to the guidelines quickly. (this is highly depend on the company, team you are working)
- Anyway, most of the software companies use agile scrum process. So, all you have to do is complete the tasks you are assigned within the time frame. So, you can take days off if you want as long as the task will be completed by the deadline.
- They organize multiple programs/events to relieve stress. Some companies even pay allowances in this WFH situation to participate in programs to improve your both mental and physical health.
- Finally all of them boils down to one thing! Handling stress is common for anything you do. If you love what you are doing and/or you get a proper compensation that’s what all matters. You have many options if you do computer engineering, so you can always pick a job which gives you more freedom. But you will have to always make a trade off between freedom and money!

FAQ : Why do many software engineers retire early?

- With the experience, you will get promoted, you will have to deal with the people management responsibilities. So you will not be doing just coding for the rest of the career.
- What we see is, with the experience, senior software engineers (Tech Leads) see more opportunities to grow themselves rather working for a company. So they usually start their own businesses or startups. Some of the biggest companies are born in that fashion in Sri Lanka.
- With enough experience, you have the option to be a full time freelancer, individual contractor or a consultant.

Comparison to other degrees (CE, CSE, IT)

“CS vs CE? Which is better?”

- Just check their course curriculums. Some degrees only focus on the **latest technologies** rather than the fundamentals.

Industry preparation at computer department

- 100% of the students go to internships by submitting CVs and facing interviews.
  - Rest of the faculty get assigned to internships by the ITCGU
- CV writing workshops.
- Mock interviews.
- Soft-skills workshops.
- Events to meet the industry
  - Hackathon
  - Coders
  - Career fair **(Computer department has two career fairs = faculty fair and department fair)**

Thank you for your time!

We hope you will

- do great in your first year exams,
- get enough GPA to do any field and
- do what matches you the best.

Summary

1. About the degree
    a. Prior knowledge
    b. Field selection
    c. Workload / results
    d. Accreditation
    e. Programming languages used?
    f. Internships
    g. Projects
    h. Subfields / courses
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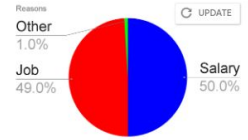
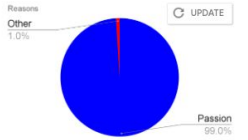
2. About the industry
    a. First job
    b. Job opportunities in software and hardware.
    c. Salaries
    d. Stress
    e. Retirement
    f. Where we stand in comparison to other computer degrees? (CS, CSE, IT, CE)

You don't have to attend this session if your reasons are:



Computer Engineering



Do what you are passionate about which might or might not be computer

If you have **questions**, please drop an email or contact on WA
Academic stuff: https://gihan.me/contact/
Industry stuff: chandima.s@eng.pdn.ac.lk (071 969 239 8)

Links

Home http://www.ce.pdn.ac.lk/

Projects http://projects.ce.pdn.ac.lk/

Courses http://www.ce.pdn.ac.lk/undergraduate-courses

A few labs

- http://vision.ce.pdn.ac.lk/
- https://cepdnaclk.github.io/sites/labs/escal/

Newsletter: https://view.joomag.com/aces-outline-the-newsletter-2019/06696340015760693 80?short

Other content about field selection: https://gihan.me/resources/field-selection/