# University of Peradeniya E18 Field Introduction

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# Disclaimer

This presentation is made by <u>Gihan</u>, <u>Suren</u> and <u>Chandima</u> 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 01<sup>st</sup> 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 GPA Field Selection



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

# Cutoff GPAs

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

# Difficulty / workload

E14 CO had 62 students.

The google sheet had information of \_\_\_\_\_ students. [Data courtesy of Amila Indika]

•	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



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# Accreditation, standards (1/2)





https://iesl.lk/images/pdf/accreditation/List\_of\_Accredited\_Engineering\_Degre e\_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		2019	
Degree Program Specialty : Computer Engineering	2009		
Bachelor of the Science of Engineering	3	6	
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 Found	ed 1906 2016	
Bachelor of the Science of Engineering Degree Program Specialty : Manufacturing & Industrial Engineering	2017	2019	



#### 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)<sup>4</sup>









# Internships (1/2)

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



# 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.
  - <u>http://projects.ce.pdn.ac.lk/</u>
  - We have data from E15 final year and E16 unified projects.
- Why do we have a lot of projects?
  - [Next slides. Based on Dr. <u>Asitha Bandaranayake</u>'s explanation]

You come to the department with some basic knowledge.

First year knowledge



First year knowledge



First year knowledge









Subject 1	First year
	 knowledge



























# Subfields

#### • <u>Core : (around 9 credits per topic)</u>

 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.





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



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# Bio medical engineering

**Treatment** 

#### **Diagnostics**

#### Genetics

Sensors, developing equipment

Signal processing

Machine learning (to detect conditions)







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

#### **Diagnostics / sensing** (Many depts)

#### An Ensemble Learning Approach for Electrocardiogram Sensor Based Human Emotion Recognition

by 🔃 Theekshana Dissanayake 🐂 💿 🔃 Yasitha Rajapaksha 🛛 , 🕐 Roshan Ragel 🛛 and 🕐 Isuru Nawinne

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



Figure 1. SpikerShield Heart and Brain sensor.

# **Genetics = DNA sequencing**

(Computer department only)

# *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. 48

# 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
  - $\circ$  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

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

Academic stuff: <u>https://suren3141.github.io/ https://gihan.me/contact/</u> Industry stuff: <u>chandima.s@eng.pdn.ac.lk</u> (+94719692398)

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



a. First job

2. About the industry

- b. Job opportunities in software and hardware.
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- f. Where we stand in comparison to other computer degrees? (CS, CSE, IT, CE)



# Links

Home <a href="http://www.ce.pdn.ac.lk/">http://www.ce.pdn.ac.lk/</a>

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

Courses <a href="http://www.ce.pdn.ac.lk/undergraduate-courses">http://www.ce.pdn.ac.lk/undergraduate-courses</a>

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-2019/0669634001576069380?short

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