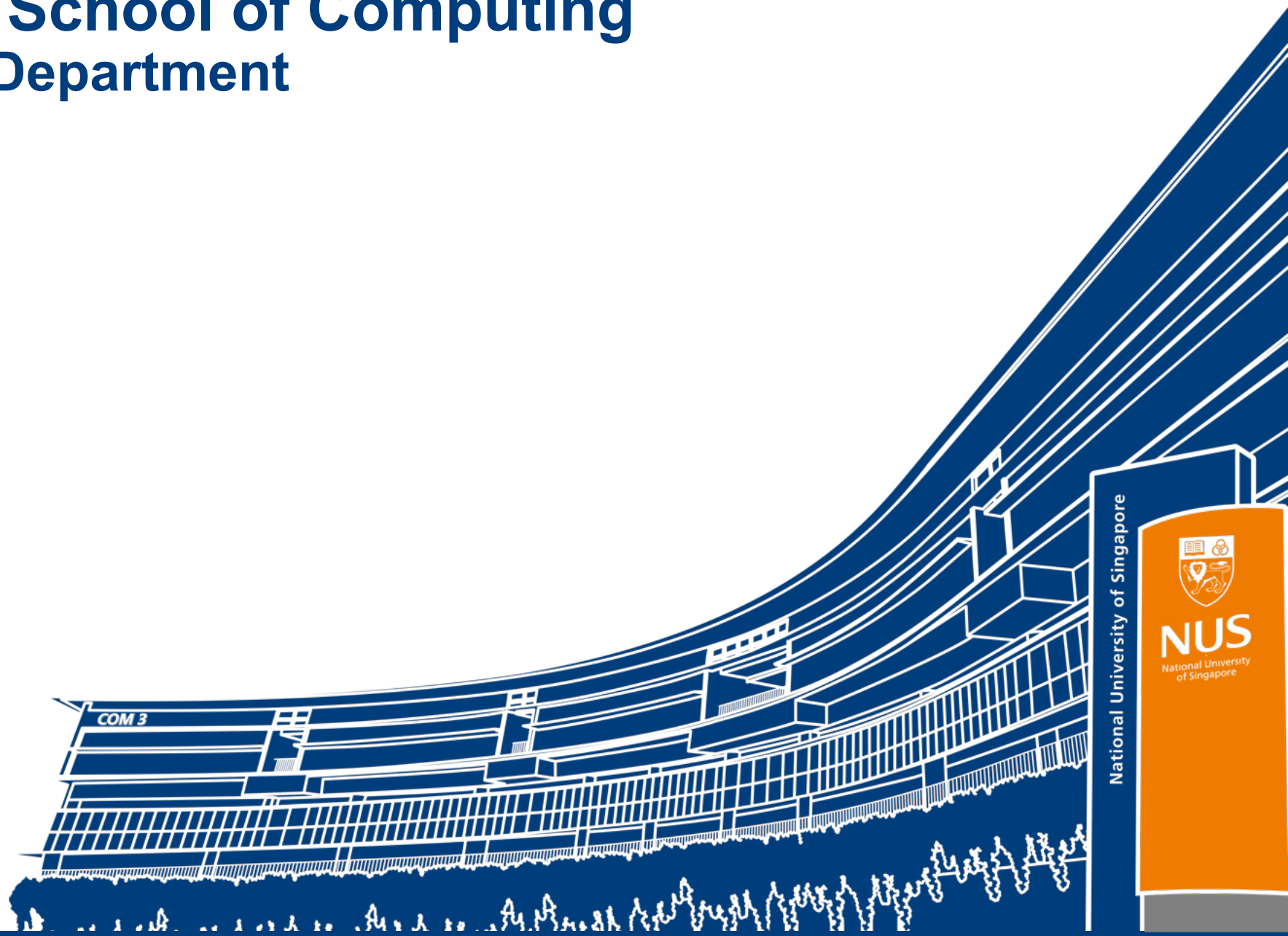
Welcome to NUS School of Computing
Computer Science Department

July 2025



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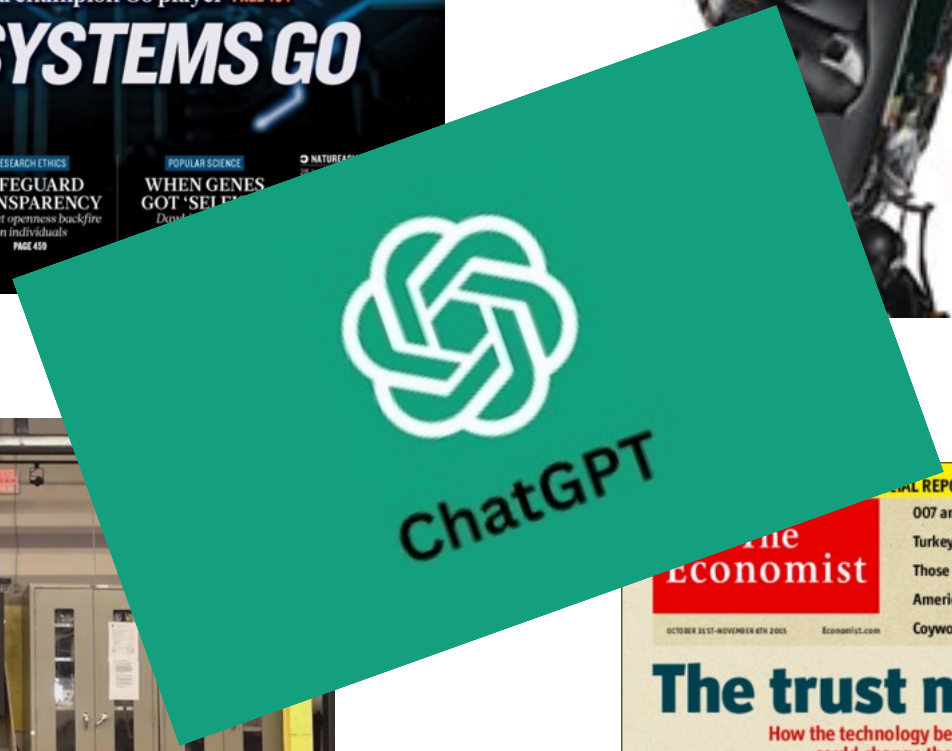
National University of Singapore


nature
QUANTUM SUPREMACY
Classical supercomputer outperformed by quantum chip for the first time


At last — a computer program that can beat a champion Go player PAGE 484
ALL SYSTEMS GO
CONSERVATION
SONGBIRDS À LA CARTE
Illegal harvest of millions of Mediterranean birds
PAGE 452
RESEARCH ETHICS
SAFEGUARD TRANSPARENCY
Don't let openness backfire on individuals
PAGE 459
POPULAR SCIENCE
WHEN GENES GOT 'SEL


THE CLEAN TECH MELTDOWN
DEBATE TEAMS GONE WILD
HOW TO CHEAT AND WIN, WIN, WIN!
WIRED
NO TRAFFIC JAMS.
NO CRASHES.
UNLIMITED TEXTING.
YOUR NEXT CAR WILL DRIVE ITSELF
A road trip to the future of robotic vehicles from Google to Mercedes.


FORTUNE
BIG DATA
MEETS BIOLOGY


ChatGPT


The Economist
007 and the spectre of Britain's past
Turkey votes to the sound of bombs
Those ever-creative accountants
America takes the fight to IS
Coywolves: the new superpredator
The trust machine
How the technology behind bitcoin could change the world

THE ZUCC | MAR. 9, 2020

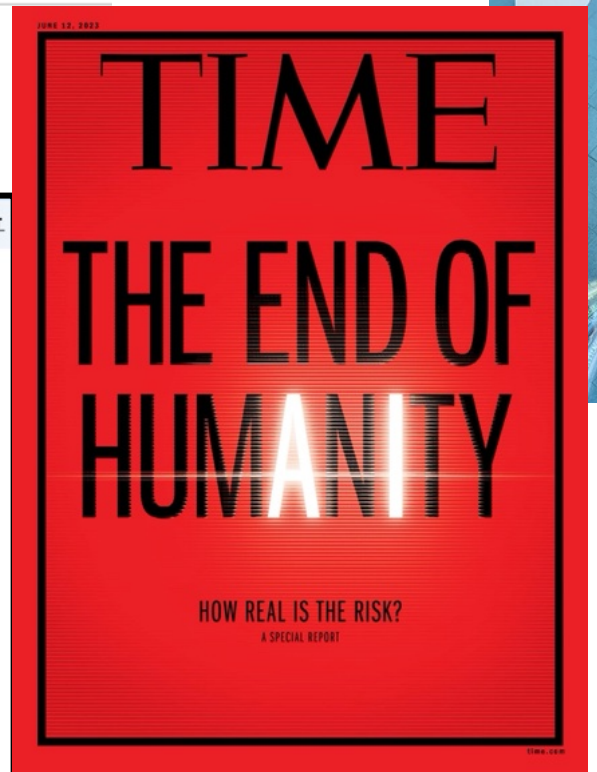
How Facebook Fact-checking Can Backfire

By Brian Feldman @bafeldman

FAKE NEWS | JUNE 10, 2019

Sorry But Your Favorite Viral Story is Probably Fake

By Madison Malone Kircher @4evrmalone



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07.06.17

The Internet's Future Is More Fragile Than Ever, Says One Of Its Inventors

Vint Cerf, the co-creator of tech that makes the internet work, worries about hacking, fake news, autonomous software, and perishable digital history.

History

1975

Department of Computer Science was established within the *Faculty of Science* at *Nanyang University*

1980

National University of Singapore was established *and the* Department of Computer Science *became a part of* NUS

1983

Department of Computer Science became the *Department of Information Systems and Computer Science* within the *NUS Faculty of Science*

1998

School of Computing was established comprising of two departments – *Computer Science* and *Information Systems*

2017

Department of Information Systems restructured to *Department of Information Systems and Analytics*

Who's Who

Dean
Tulika MILTRA

Vice Dean (Undergrad)
KAN Min Yen

Department Chair
Seth GILBERT

Vice Dean
(Student Life)
Gary TAN

Assistant Deans (Undergrad)

CHAN Chee Yong

ZHAO Jin

WANG Qiuhong

Aaron TAN

Boyd ANDERSON

Undergraduate Office

Deputy Director
TOH Mui Kiat

UG Office Contact:
https://socug.comp.nus.edu.sg/

Asst. Snr. Manager
Diana WONG

Snr. Manager
LOW Mun Bak

Snr Associate Director
Pamela LIM

University Life (?)

Classes

Socializing

Extracurriculars

University Life (?)

Classes

Socializing

Extracurriculars

“What should I do now?”

Disclaimer

Information on these slides is simplified for this presentation and should not be treated as official degree requirements.

Students should *always* refer to the official SoC Website and NUS Bulletin for complete up-to-date information.

Please check with the SoC Undergraduate Office to clarify any requirements that are unclear.

Disclaimer

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Please check with the SoC Undergraduate Office to clarify any requirements that are unclear.

Focus today: BComp(CS) and BComp(AI) degree requirements.

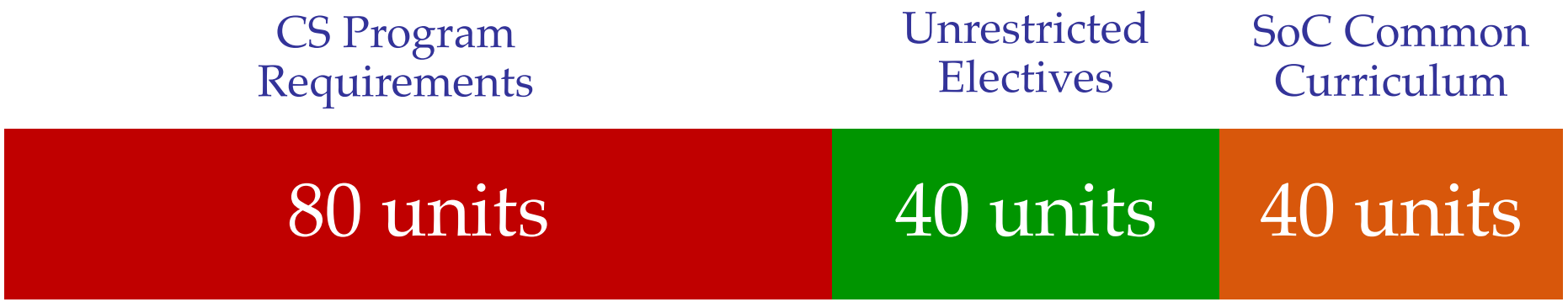
Other programs (Turing, DDP, Info Security, etc.) are similar.

Common Admission and Programme Declaration

- When students first matriculate into common admission of CS and AI, they will remain in an "indeterminate" state for their first four semesters.
- At the end of their fourth semester (or equivalent), students will declare either the AI degree programme or the Computer Science degree programme.
- Difference?
  - CS: Targeting future computer scientists with knowledge of the general computing system (integrating diverse subareas, such as AI and security).
  - AI: Targeting future AI scientists who want to dive deeper into AI and drive its advancement.

BComp(CS) Degree Requirements

*Special programmes and double degree programs are slightly different.



https://www.comp.nus.edu.sg/cug/per-cohort/cs/cs-25-26/

CS Goals

Strong technical foundations.

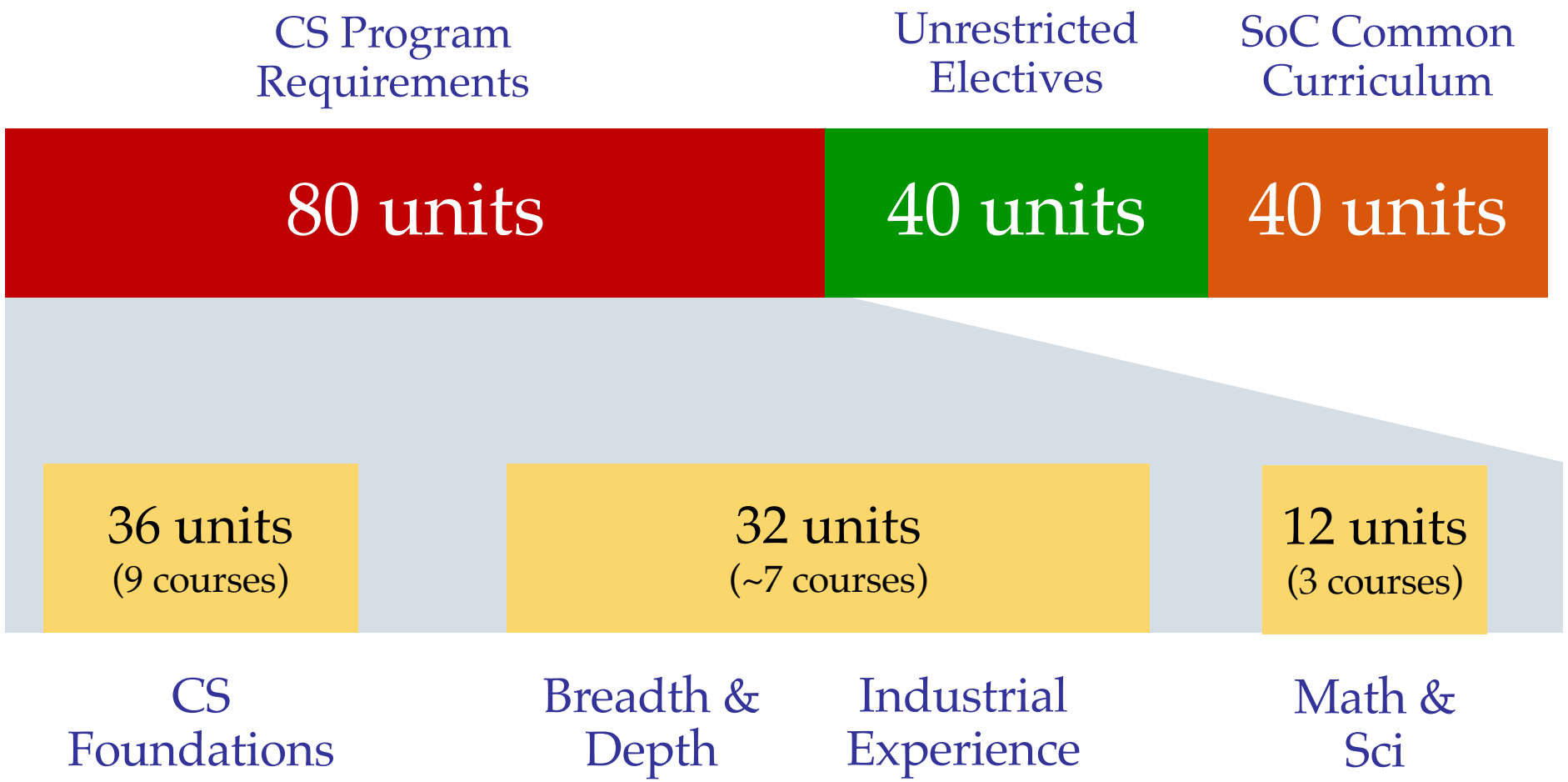
Excellent problem-solving skills.

Broad knowledge of the field.

In-depth knowledge of (at least) one specialized area.

Good communication and teamwork skills.

BComp(CS) Degree Requirements



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https://www.comp.nus.edu.sg/cug/per-cohort/cs/cs-25-26/

CS Foundations

The Beginning

Algorithms and Theory

Programming and Software Engineering

Computer Systems

AI & ML

CS Foundations

The Beginning

CS1101S
Programming
Methodology

CS1231S
Discrete
Structures

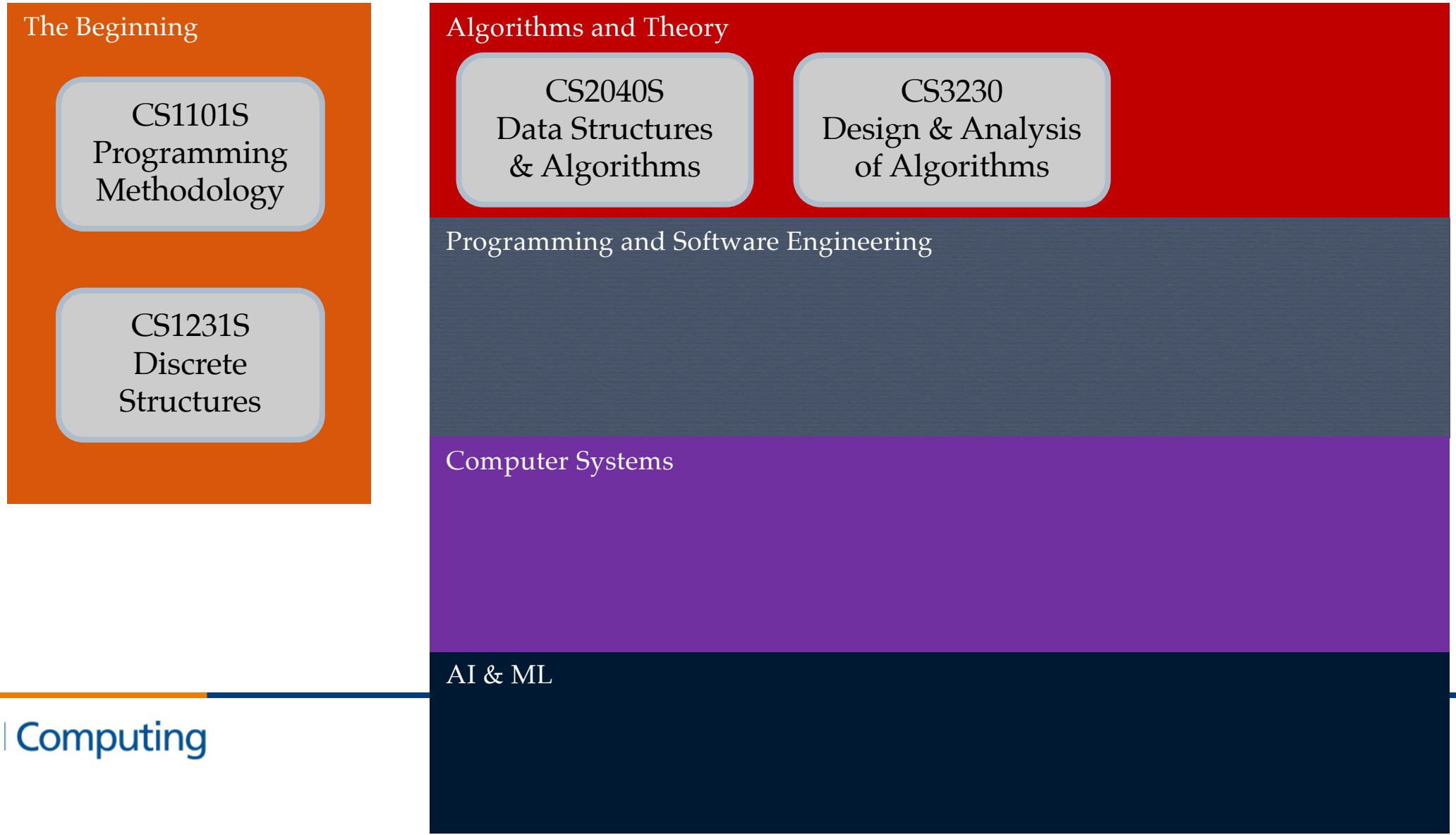
Algorithms and Theory

Programming and Software Engineering

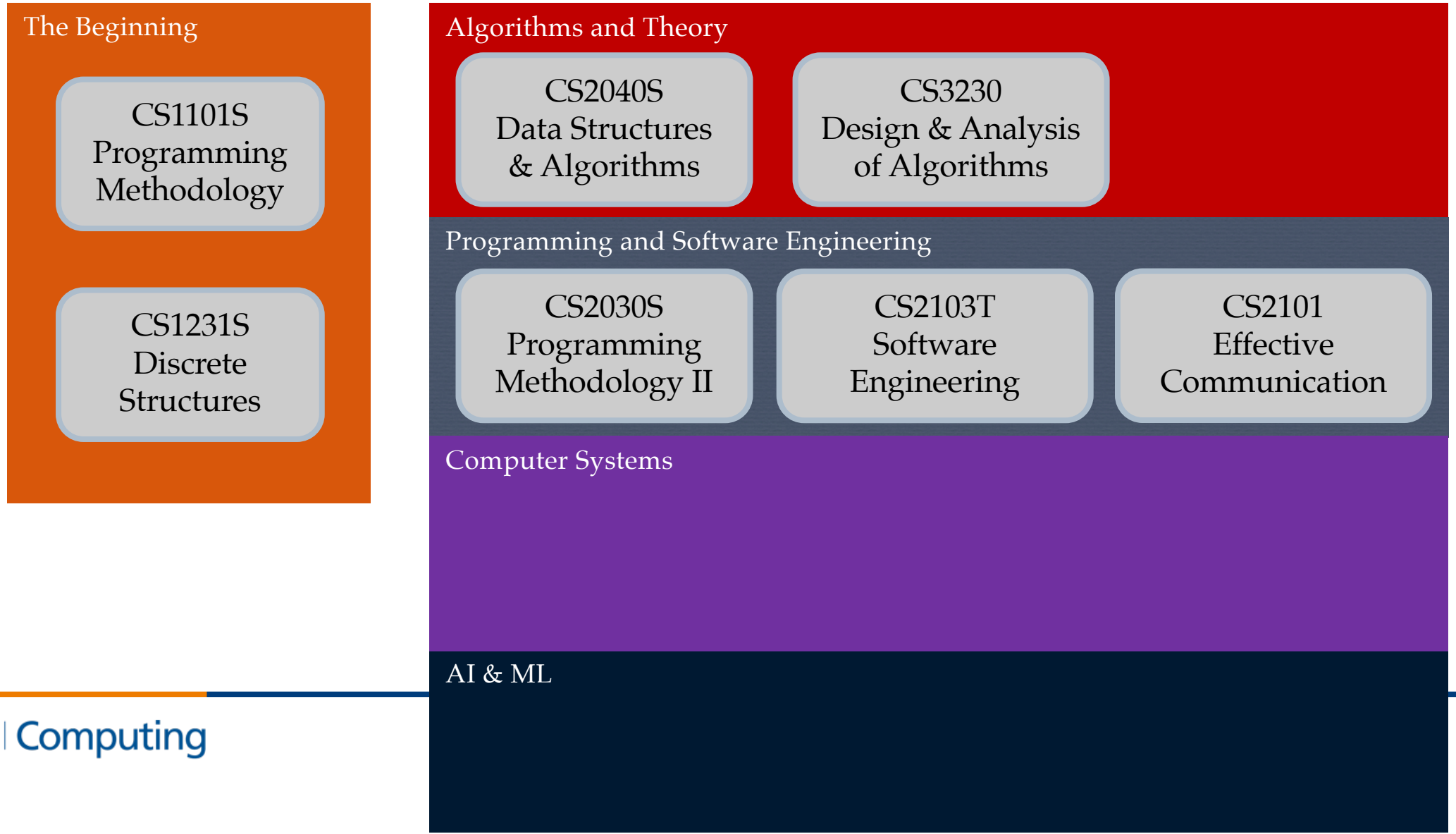
Computer Systems

AI & ML

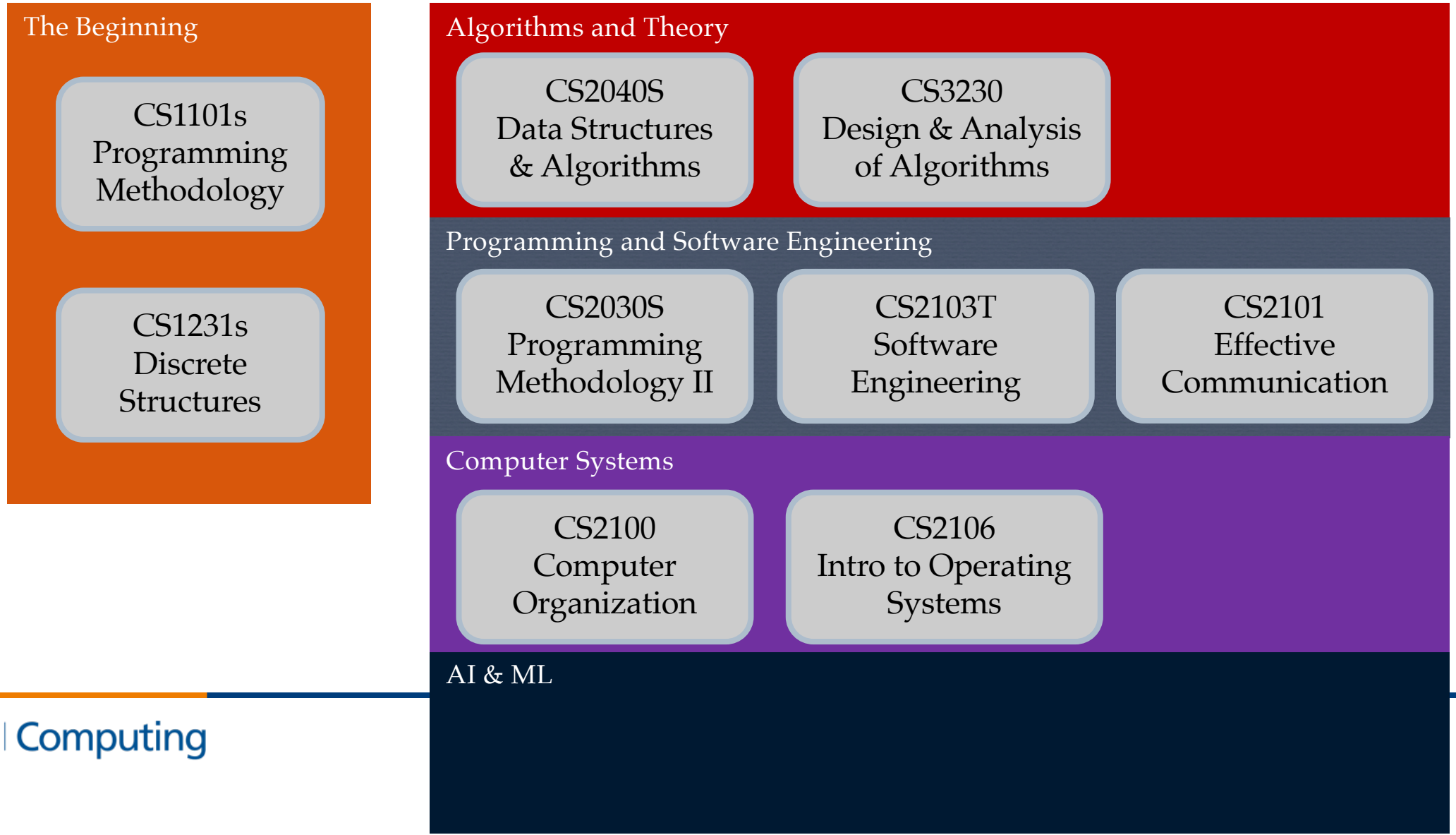
CS Foundations



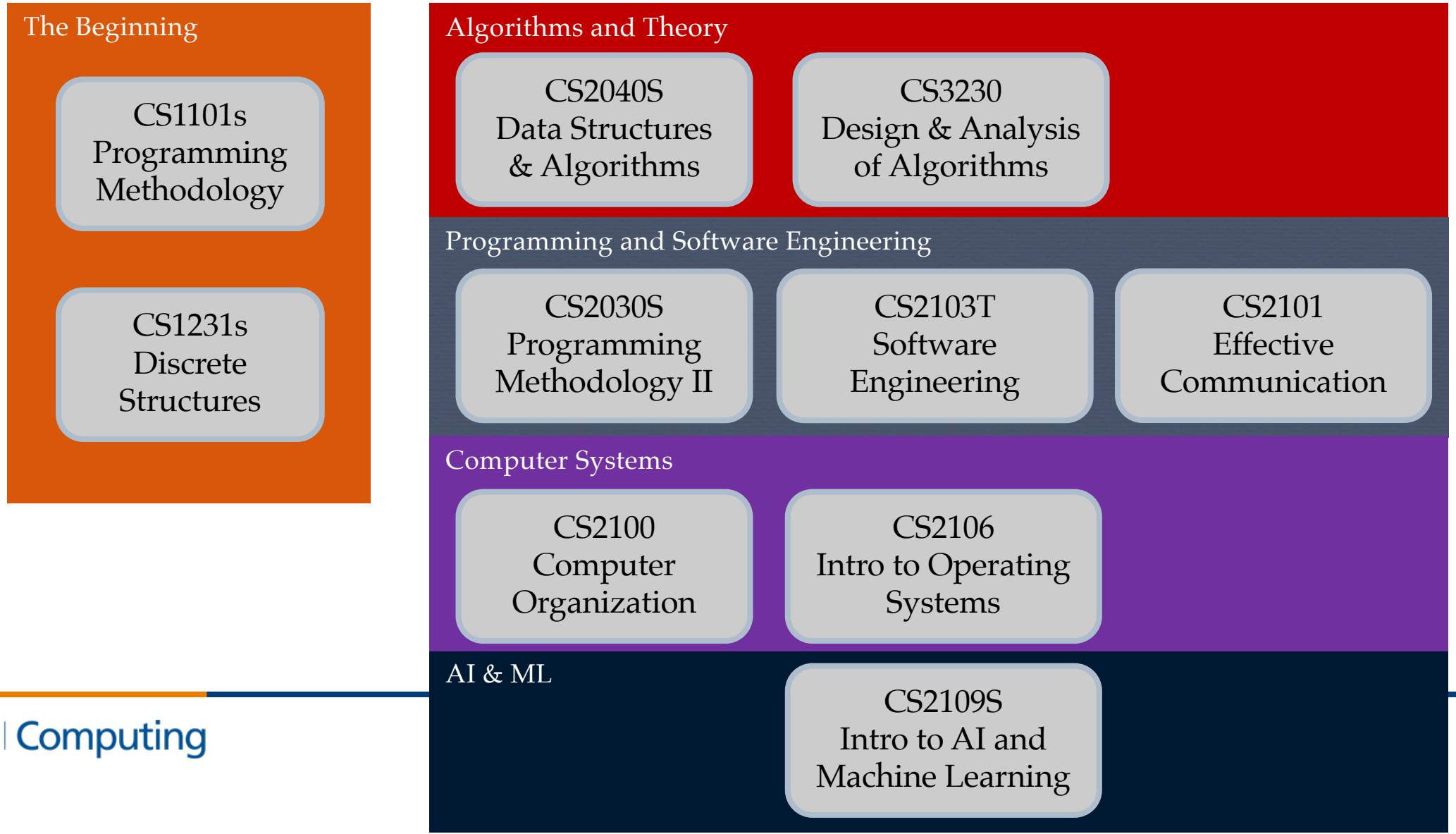
CS Foundations



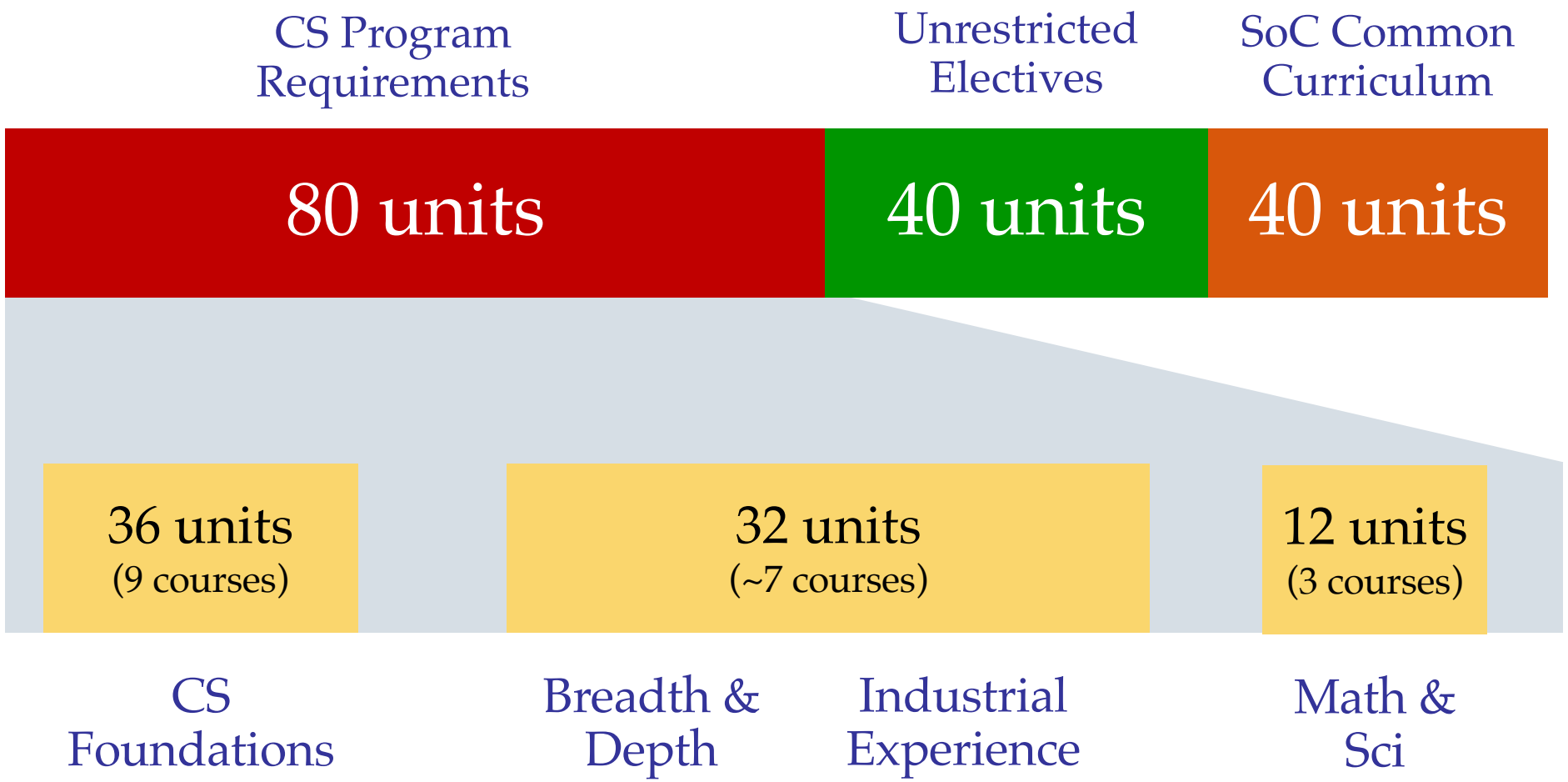
CS Foundations



CS Foundations



BComp(CS) Degree Requirements



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https://www.comp.nus.edu.sg/cug/per-cohort/cs/cs-25-26/

CS Breadth & Depth

1. Complete 12 units at level 4000 or above.

2. Satisfy a focus area:

   Complete 3 "primary" courses in an area (at least one level 4000).

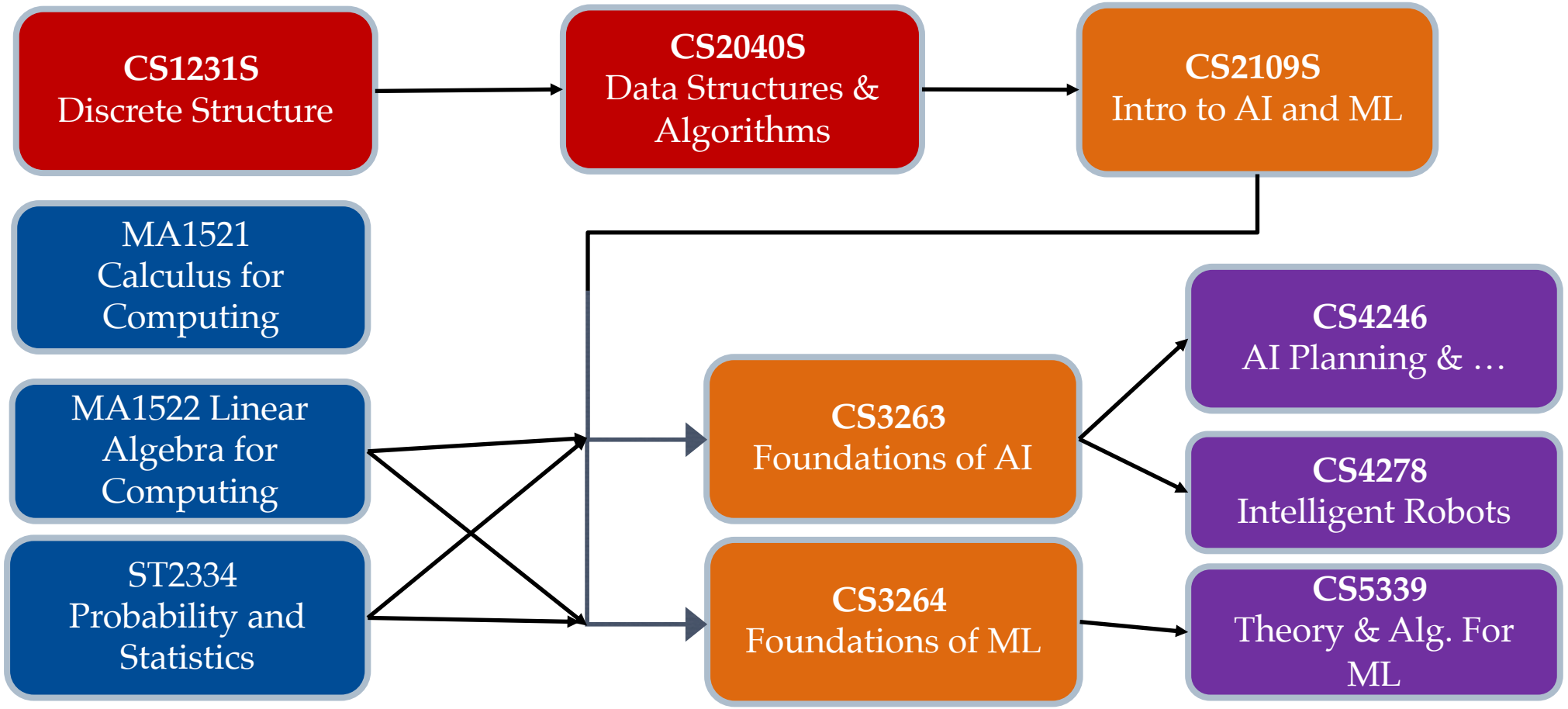
3. Get industrial experience:

   Complete 3 month (6 unit) or 6 month (12 unit) industrial experience.

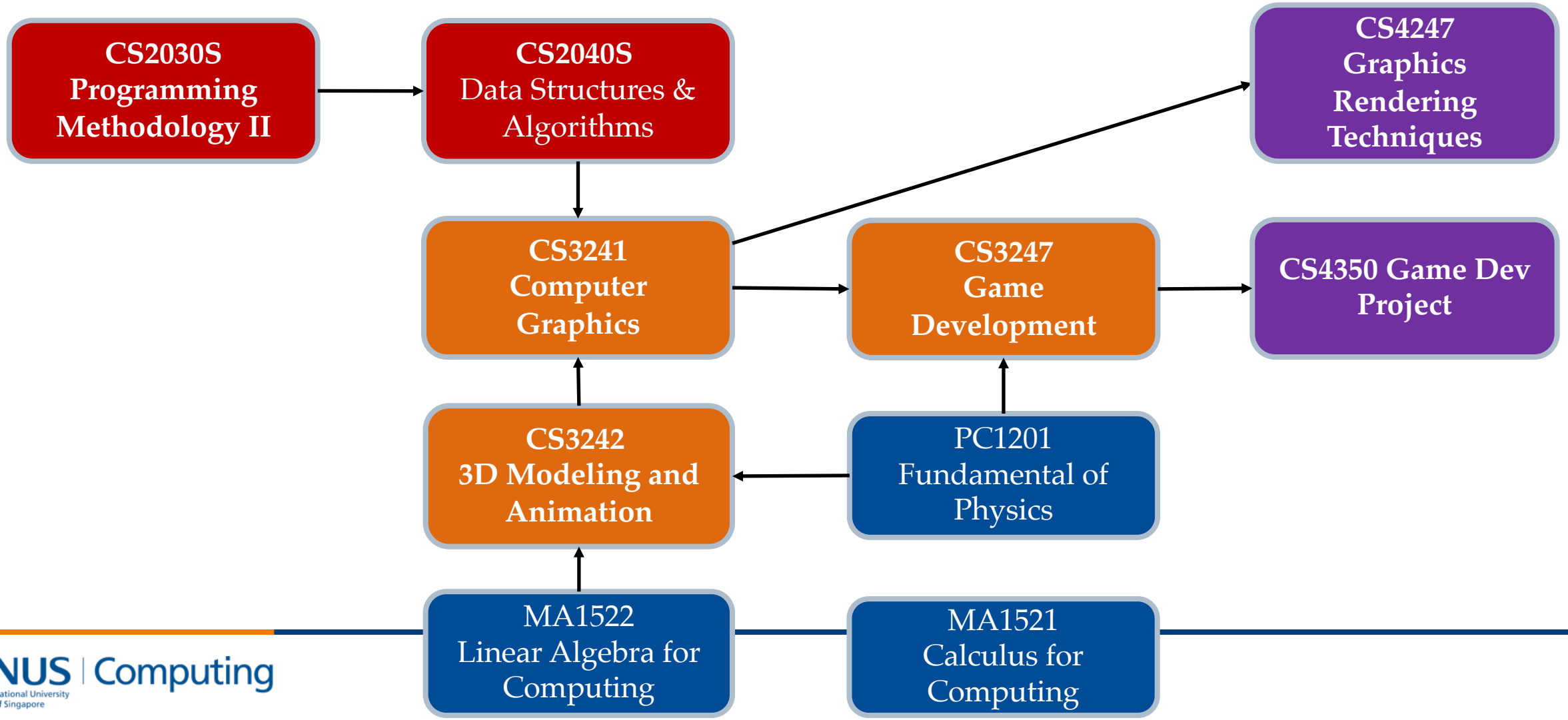
10 Focus Areas

1. Algorithms and Theory
2. Artificial Intelligence
3. Computer Graphics and Games
4. Computer Security
5. Database Systems
6. Multimedia Information Retrieval
7. Networking and Distributed Systems
8. Parallel Computing
9. Programming Languages
10. Software Engineering

Warning: Check Prerequisites (e.g., AI)



Warning: Check Prerequisites (e.g., Computer Graphics and Games)



Focus area electives

Each focus areas has a set of “electives” for students who want to learn more about the area.

Breadth & Depth

1. Complete 12 units at level 4000 or above.

2. Satisfy a focus area:

   Complete 3 "primary" courses in an area (at least one level 4000).

3. Get industrial experience:

   Complete 3 month (6 unit) or 6 month (12 unit) industrial experience.

Industrial Experience

ATAP (Advanced Technology Attachment Program)

IIP (Industry Internship Program)

SIP (Student Internship Program)

CVWO (Computing Voluntary Welfare Organization)

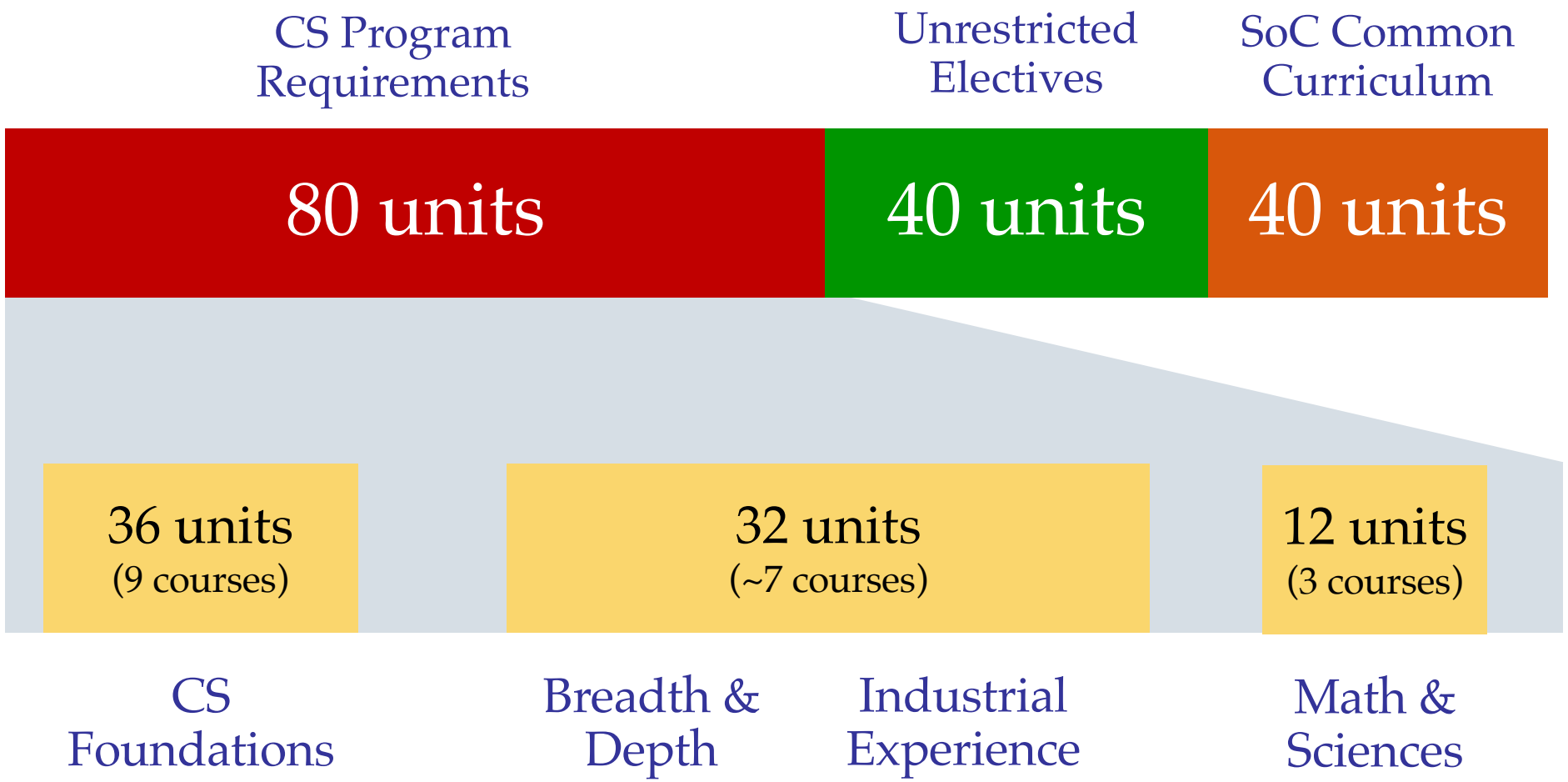
NOC (NUS Overseas College)

Other…

Students with CAP of 4.00 or higher may replace Industry Experience with a dissertation (Final Year Project: CP4101).

Students who aim for Honours (Highest Distinction) must pass the programme's dissertation course (i.e. CP4101).

BComp(CS) Degree Requirements



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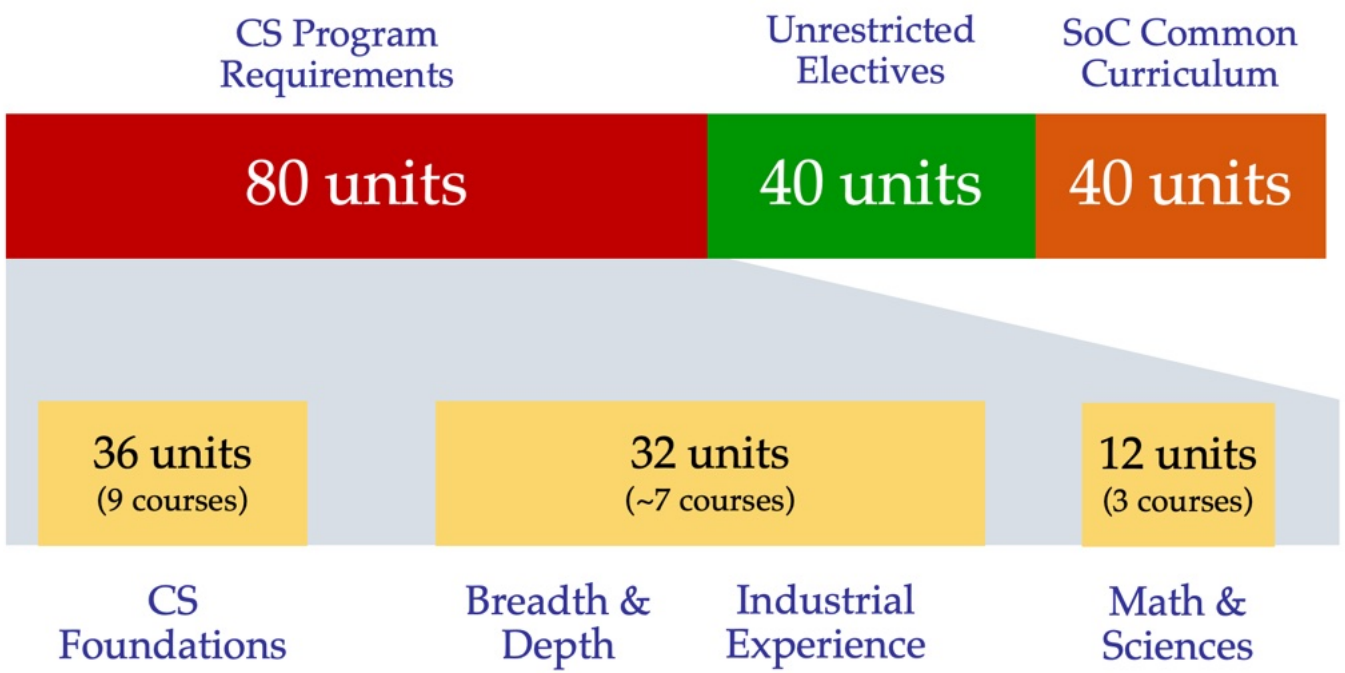
https://www.comp.nus.edu.sg/cug/per-cohort/cs/cs-25-26/

BComp(CS) Degree Requirements: Math Courses



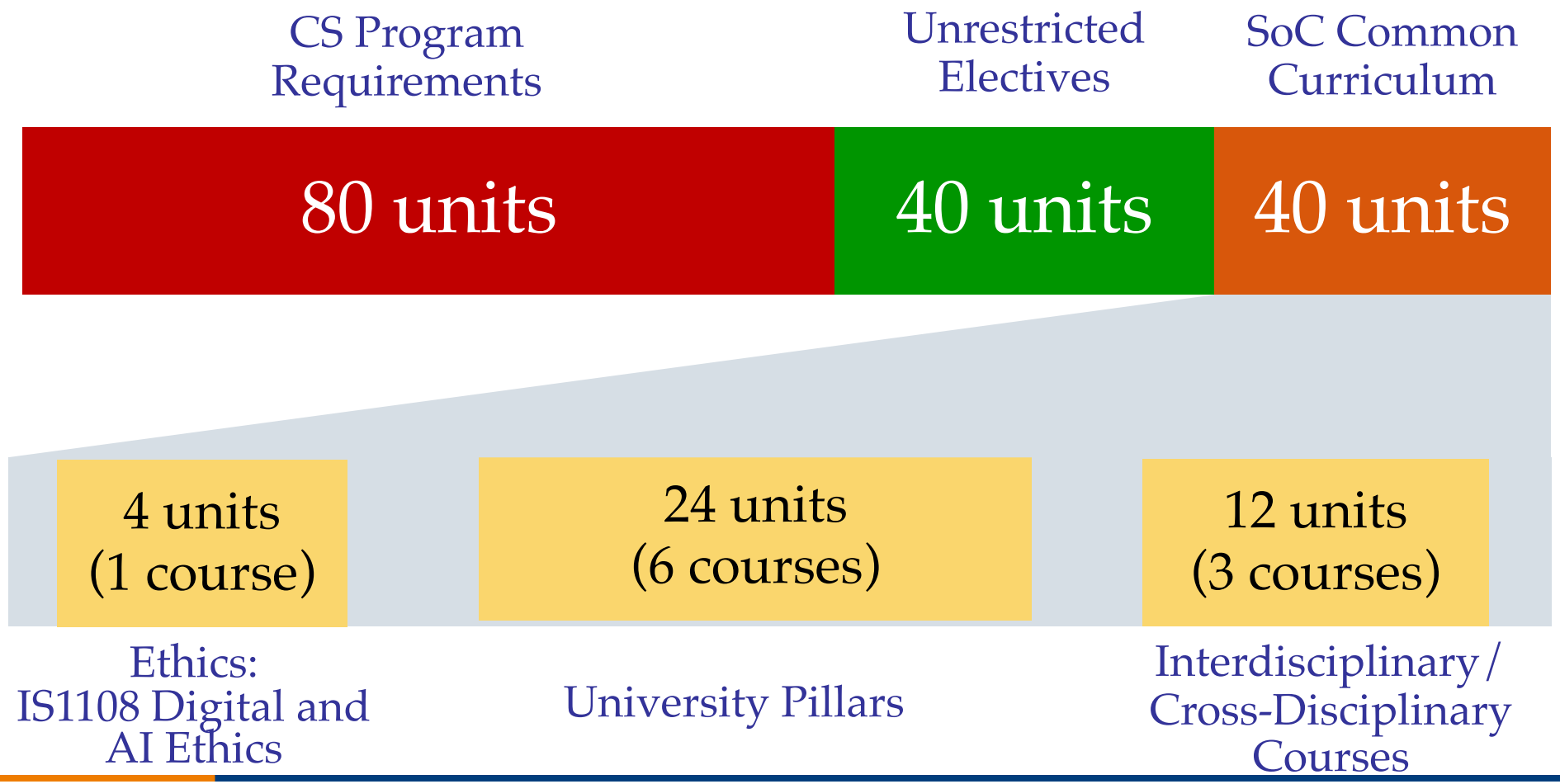
MA1521
Calculus for Computing

MA1522
Linear Algebra

ST2334
Probability & Statistics

https://www.comp.nus.edu.sg/cug/per-cohort/cs/cs-25-26/

BComp(CS) Degree Requirements



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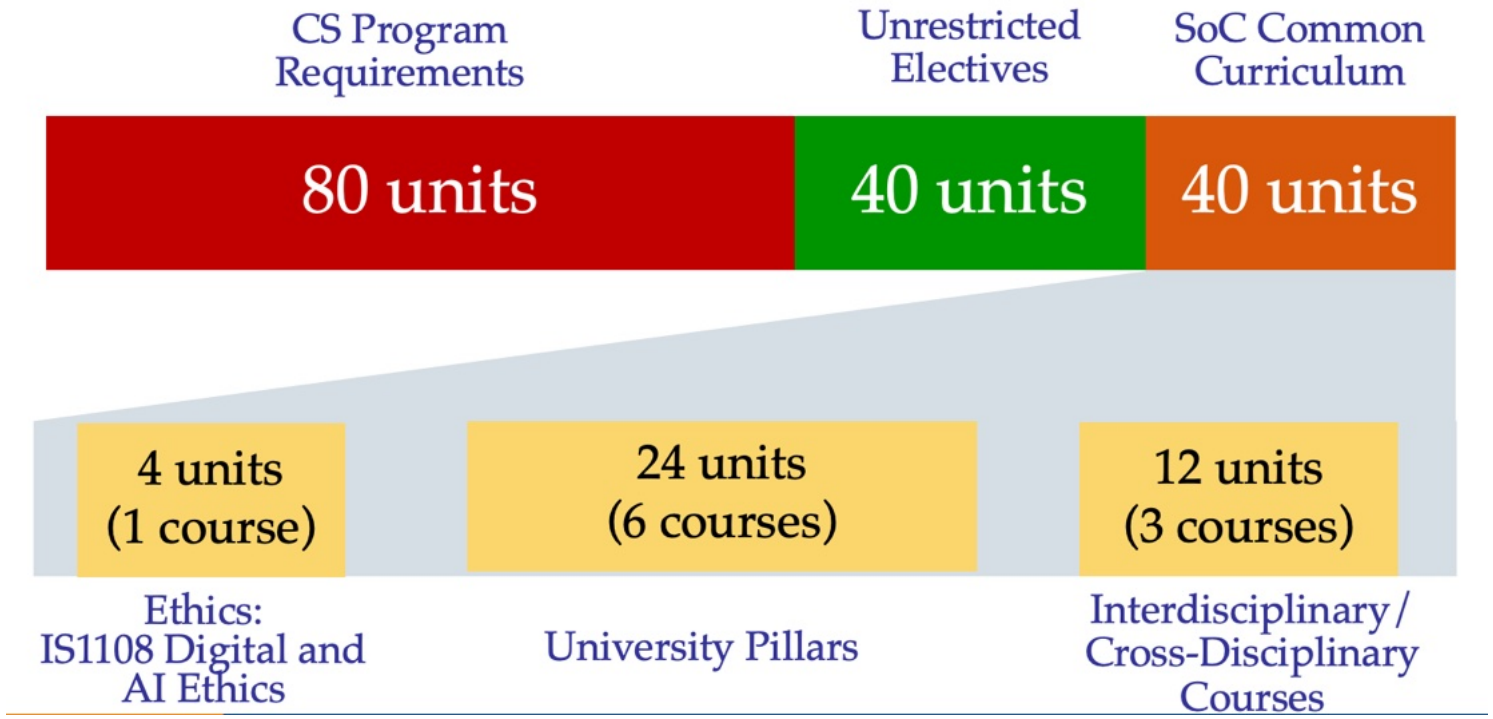
BComp(CS) Degree Requirements



University Pillars

- Data Literacy
- Critique & Expression
- Cultures & Connections
- Digital Literacy
- Singapore Studies
- Communities & Engagement

https://www.comp.nus.edu.sg/cug/per-cohort/cs/cs-25-26/

BComp(CS) Degree Requirements

University Pillars

Data Literacy:
- Preregistered: GEA1000
- Other options: DSA1101, ST1131
- Can drop GEA1000 and apply for other options

Data Literacy

Critique & Expression

ES2660 Communicating in the Information Age

Cultures & Connections

Digital Literacy

CS1101S Programming Methodology

Singapore Studies

Communities & Engagement

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https://www.comp.nus.edu.sg/cug/per-cohort/cs/cs-25-26/

Data Literacy

GEA1000: Quantitative Reasoning
- Intro to statistics
- Data analysis
- Data analysis project

Broader
Less mathematical
Less programming

ST1131: Introduction to Statistics and Statistical Computing
- Statistics
- R programming
- Data analysis

DSA1101: Introduction to Data Science
- Basic probability and statistics
- Data manipulation
- Data analysis

Targeted at DSA students
Fewer seats available
More overlap with CS courses

Data Literacy

GEA1000: Quantitative Reasoning
- Intro to statistics
- Data analysis
- Data analysis project

Computational/programming centered
Mathematically rigorous
Good preparation for CS courses in AI/ML

ST1131: Introduction to Statistics and Statistical Computing
- Statistics
- R programming
- Data analysis

DSA1101: Introduction to Data Science
- Basic probability and statistics
- Data manipulation
- Data analysis

BComp(CS) Degree Requirements

Interdisciplinary / Cross-disciplinary courses

- Choose three courses from the specified course lists.
- At least two must be interdisciplinary.

Interdisciplinary = integrates more than one discipline

Cross-disciplinary = a field different from CS that has interesting connections to CS.

BComp(CS) Degree Requirements

Examples: Interdisciplinary courses

- IS1128 IT, Management and Organisation
- IS2238 Economics of IT and AI
- HSH1000 The Human Condition
- HSI2001 Scientific Inquiry & Health: Good Science, Bad Science
- HSI2011 The World of Quantum
- DTK1234 Design Thinking
- EG2501 Liveable Cities
- IE2141 Systems Thinking and Dynamics
- PF1101A Project Management and Finance

BComp(CS) Degree Requirements

Examples: Cross-disciplinary courses

- DAO2703 Operations and Technology Management
- EL1101E The Nature of Language
- SPH2002 Public Health and Epidemiology
- NUR1113A Healthy Ageing and Well-being
- EG2201A User-Centred Collaborative Design
- EG2310 Fundamentals of Systems Design
- Any Chemistry, Physics, or Biological Sciences (PC, CM, or LSM coded)

Some options:

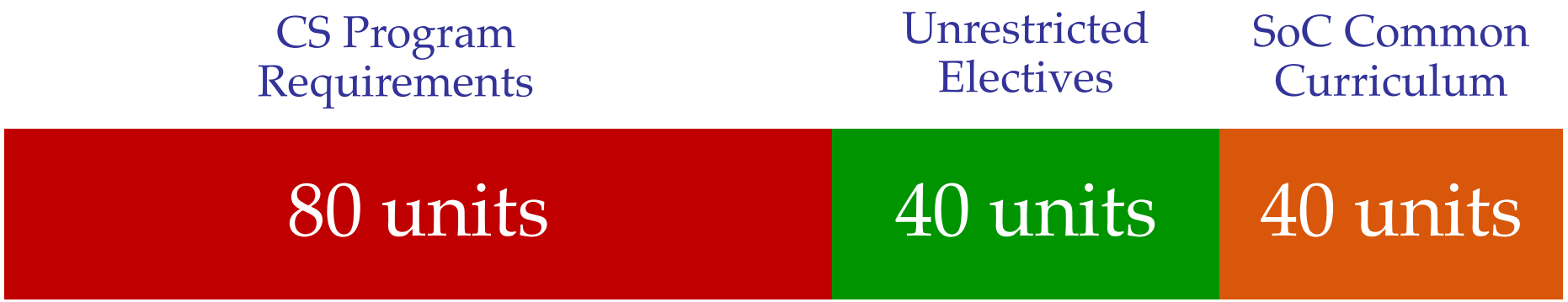
- Second major in mathematics.
- Second major in statistics.
- Minor in mathematics.
- Minor in statistics.
- Minor in financial mathematics.
- Minor in life sciences.
- Minor in geographic information systems.
- Minor in interactive media development.
- Minor in management.
- Minor in management of technology.
- Minor in entrepreneurship.

And many more…

40 units of Unrestricted Electives are useful here…

BComp(CS) Degree Requirements

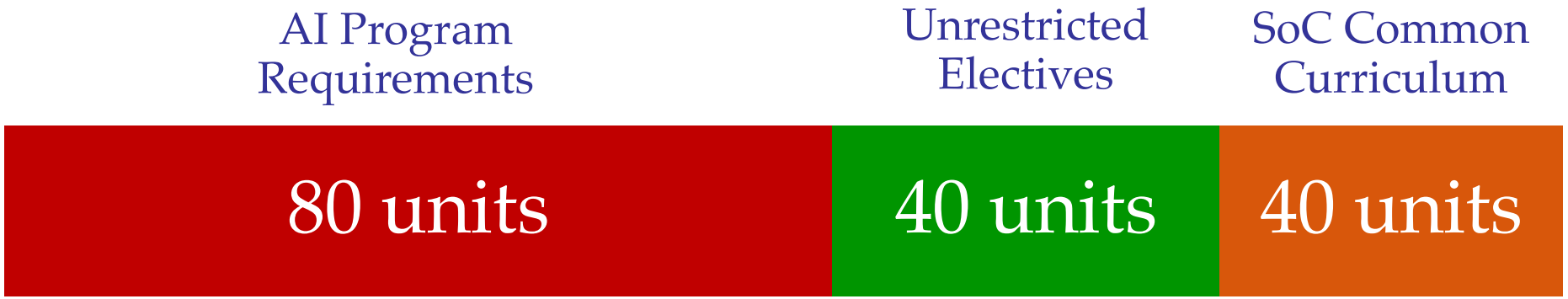
*Special programmes and double degree programs are slightly different.



https://www.comp.nus.edu.sg/cug/per-cohort/cs/cs-25-26/

BComp(AI) Degree Requirements

The Bachelor of Computing (Honours) in Artificial Intelligence or BComp (AI) programme aims to provide students with a strong foundation in AI knowledge and skills to meet today's computing needs, and to prepare them for the continuously changing computing landscape of the future.



https://www.comp.nus.edu.sg/cug/per-cohort/ai/ai-25-26/

AI Goals

Strong knowledge of computing foundations and fundamentals.

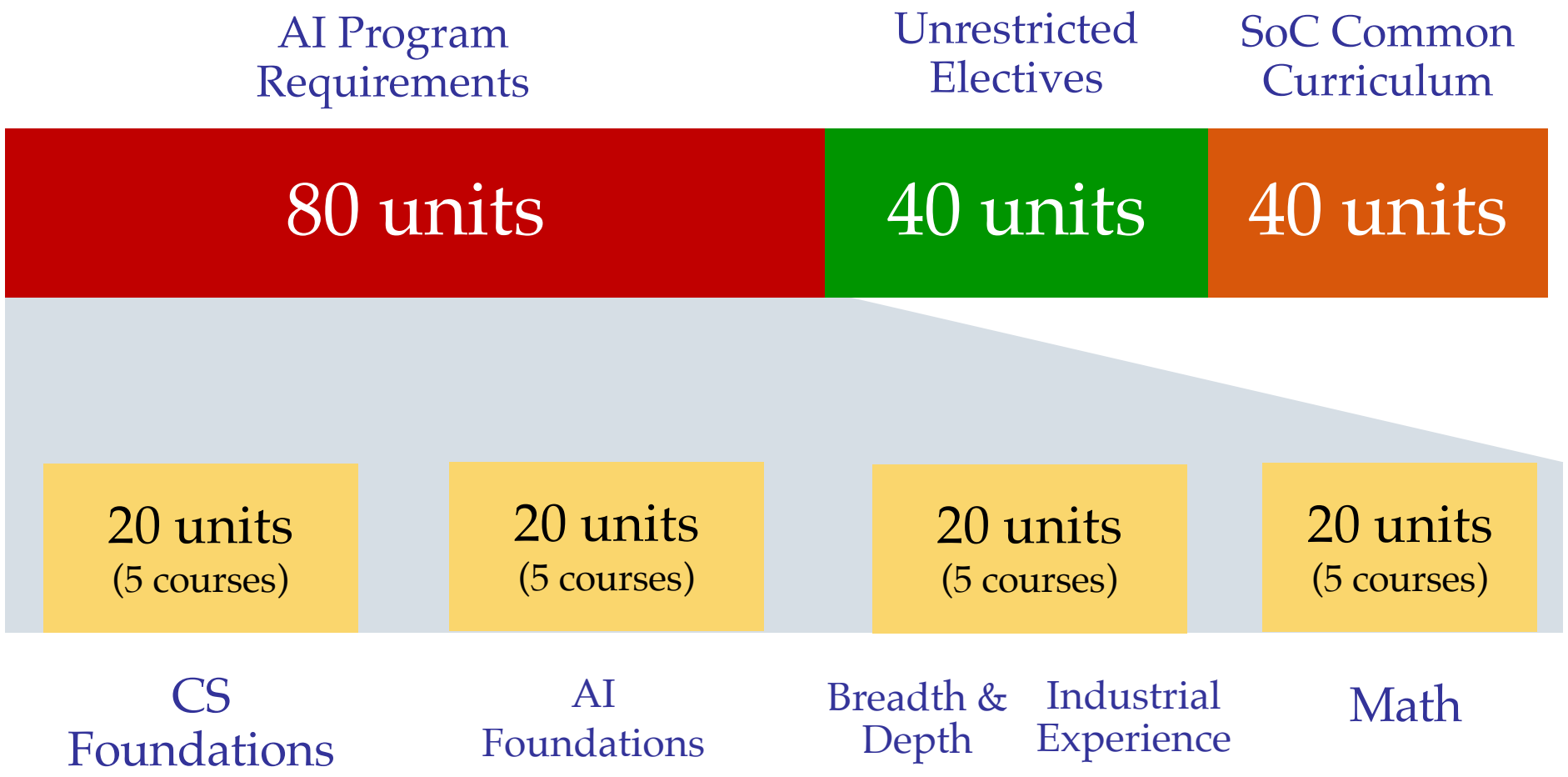
Strong knowledge of AI foundations and fundamentals,
- including broad-based knowledge across the three major areas of AI: Reasoning & Decision Making, Learning, and Perception & Language.

Ability to design, implement, and evaluate AI systems, models, and AI tools.

Understanding of the responsible use of AI.
- including issues of ethics, privacy, and AI governance.

Good communication and teamwork skills.

BComp(AI) Degree Requirements



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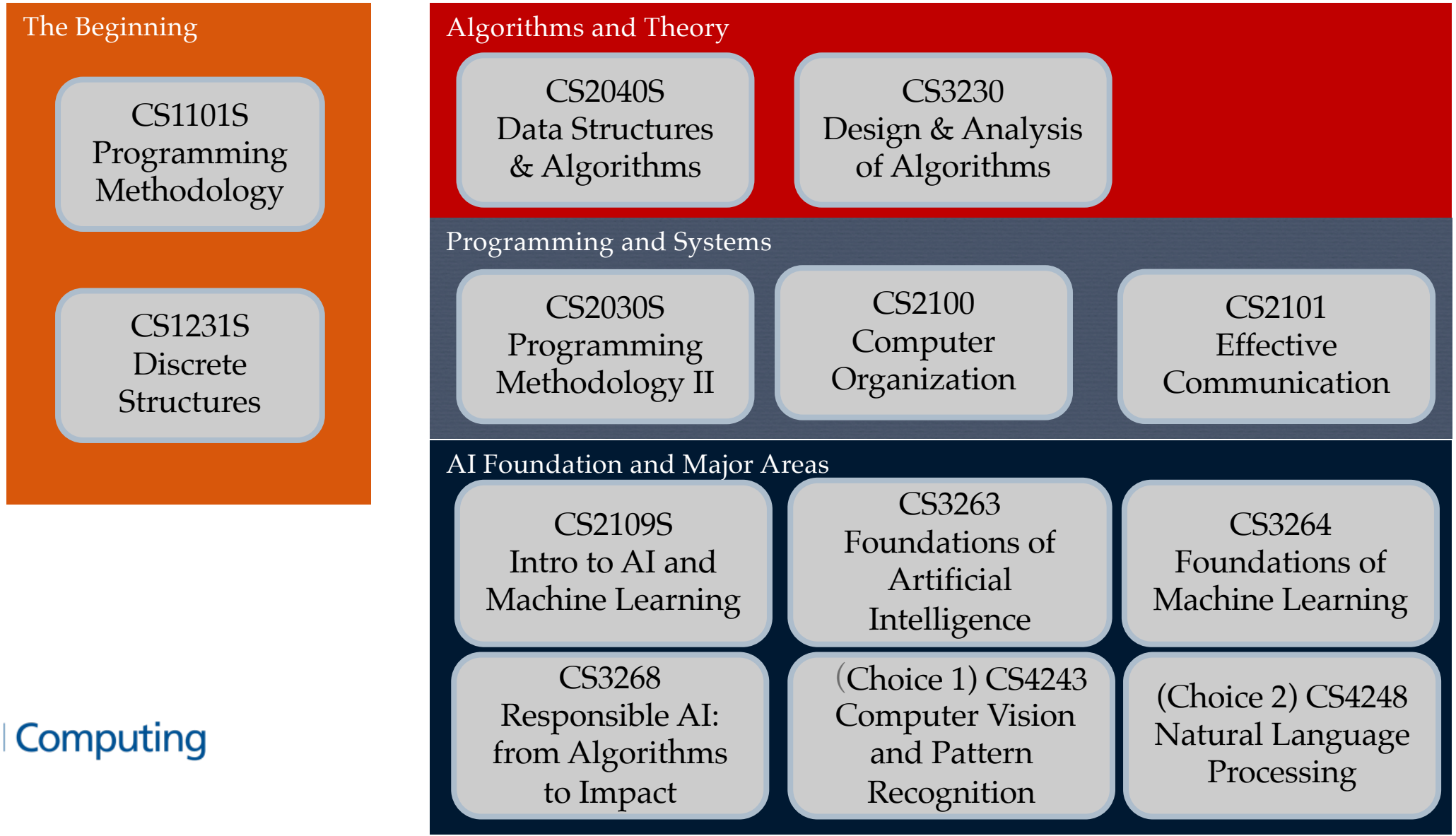
https://www.comp.nus.edu.sg/cug/per-cohort/ai/ai-25-26/

AI Foundations



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AI Breadth & Depth

1. At least 12 units at level 4000 or above.

2. At least 12 units from AI Technical Elective List.

3. Get industrial experience:

   Complete 3 month (6 unit) or 6 month (12 unit) industrial experience.

AI Technical Electives List

- CS4220 Knowledge Discovery Methods in Bioinformatics
- CS4225 Big Data Systems for Data Science
- CS4240 Interaction Design for Virtual and Augmented Reality
- CS4244 Knowledge Representation and Reasoning
- CS4246 AI Planning and Decision Making
- CS4261 Algorithmic Mechanism Design
- CS4347 Sound and Music Computing
- CS4277 3D Computer Vision
- CS4278 Intelligent Robots: Algorithms and Systems

Industrial Experience

ATAP (Advanced Technology Attachment Program)

IIP (Industry Internship Program)

SIP (Student Internship Program)

CVWO (Computing Voluntary Welfare Organization)

NOC (NUS Overseas College)

Other…

Students with CAP of 4.00 or higher may replace Industry Experience with a dissertation (Final Year Project: CP4101).

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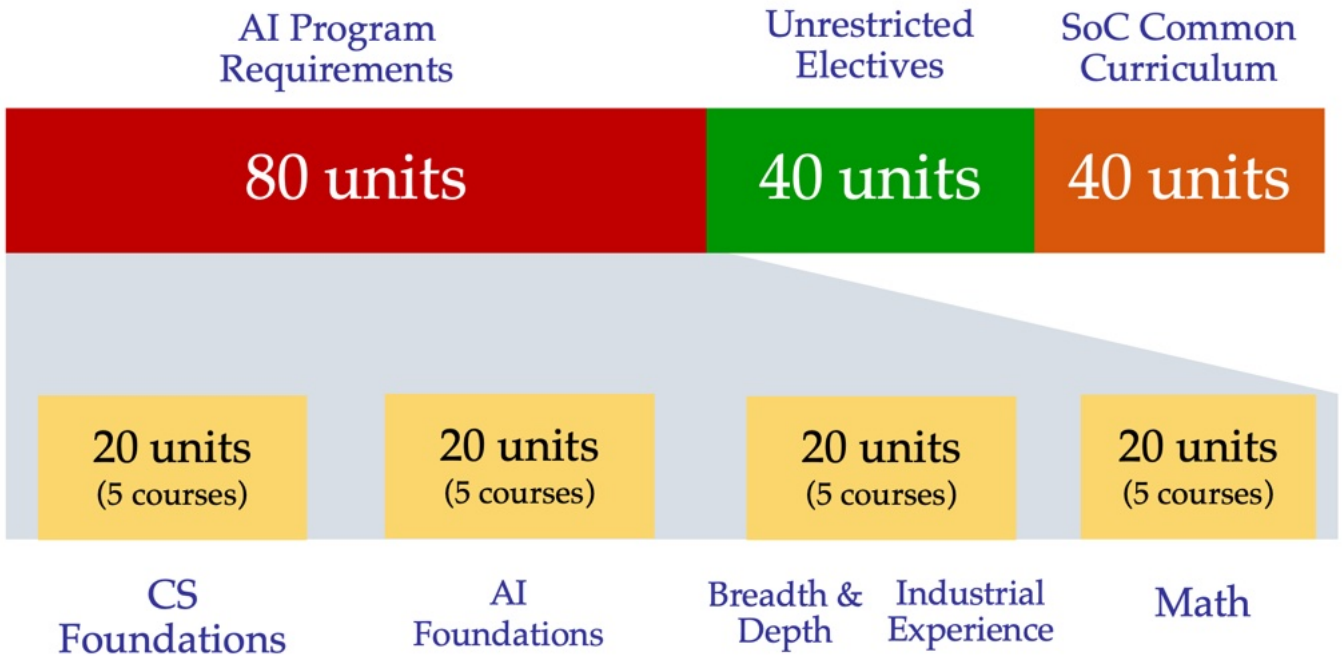
BComp(AI) Degree Requirements: Math Courses



CS1231S Discrete Structures

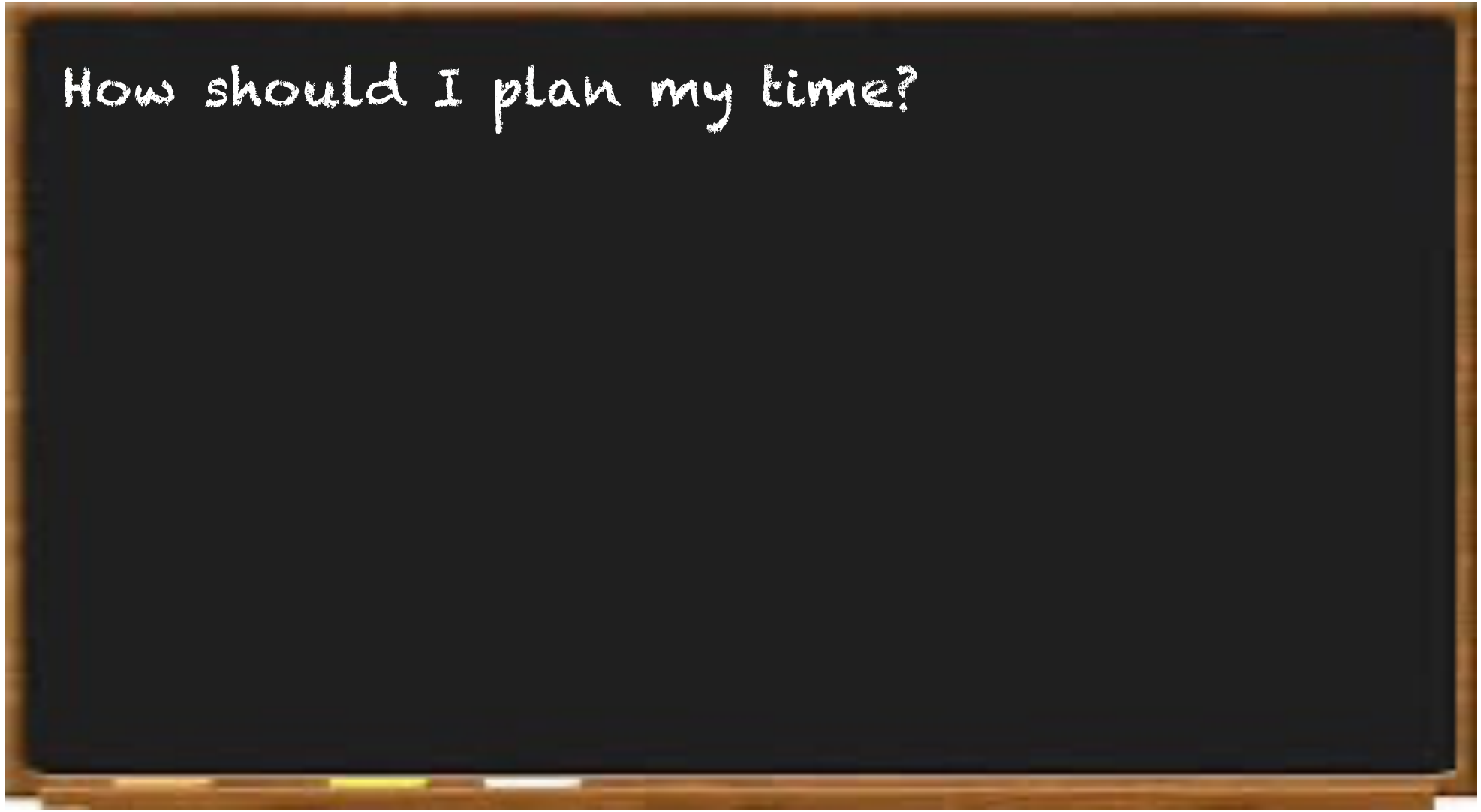
CS2251 Optimization and Regression

MA1521 Calculus for Computing

MA1522 Linear Algebra

ST2334 Probability & Statistics

https://www.comp.nus.edu.sg/cug/per-cohort/ai/ai-25-26/


How should I plan my time?

CS Year 1: The Basic Foundation

CS1101S
Programming
Methodology

CS2040S
Data Structures
& Algorithms

IS1108
Privacy / Ethics
in Computing

CS2030S
Programming
Methodology II

CS1231S
Discrete
Structures

CS2100
Computer
Organization

How to think computationally.
How to solve computational problems.
How to program.
How does a computer work.
Basic computing math.
Ethical/legal/social issues.

Data Literacy
course

Math

University Pillar
or
Interdisciplinary

Math

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CS Year 2: The CS Core

CS2103T
Software
Engineering

CS2106
Intro. to Operating
Systems

CS2101
Communication

ES2660
Communication

CS3230
Design & Analysis
of Algorithms

CS2109S
Intro to AI and
Machine Learning

How to deal with complex systems.
How to deal with complex software.
How to solve hard problems.
Advanced algorithmic techniques.
Begin to specialize.
Develop software skills.

University Pillar
or
Interdisciplinary

Math

University Pillar
or
Interdisciplinary

University Pillar
or
Interdisciplinary

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CS Year 3: The Practical Year

Sample

Focus Area Primary	Industrial Experience		
Focus Area Primary	Breadth & Depth	University Pillar or Interdisciplinary	University Pillar or Interdisciplinary
Breadth & Depth	Elective	Elective	Math

Apply knowledge to projects.
Learn practical skills on internships or NOC.
Drill deeper into focus area.

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CS Year 4:
Choose Your Own Adventure

Sample

Focus Area Primary

Breadth & Depth

Study advanced courses.
Do research.
Work on projects.
Broaden your knowledge.

Breadth & Depth

Breadth & Depth

Elective

Elective

Breadth & Depth

Elective

Elective

Elective

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AI Year 2: The AI Core

CS2109S
Intro to AI and Machine Learning

CS3263
Foundations of Artificial Intelligence

CS2101
Communication

ES2660
Communication

CS3230
Design & Analysis of Algorithms

CS3268
Responsible AI: from Algorithms to Impact

How to solve hard problems.
Advanced algorithmic techniques.
Introduction to AI and ML
Foundations of AI
Responsible AI

University Pillar or Interdisciplinary

Math

University Pillar or Interdisciplinary

Math

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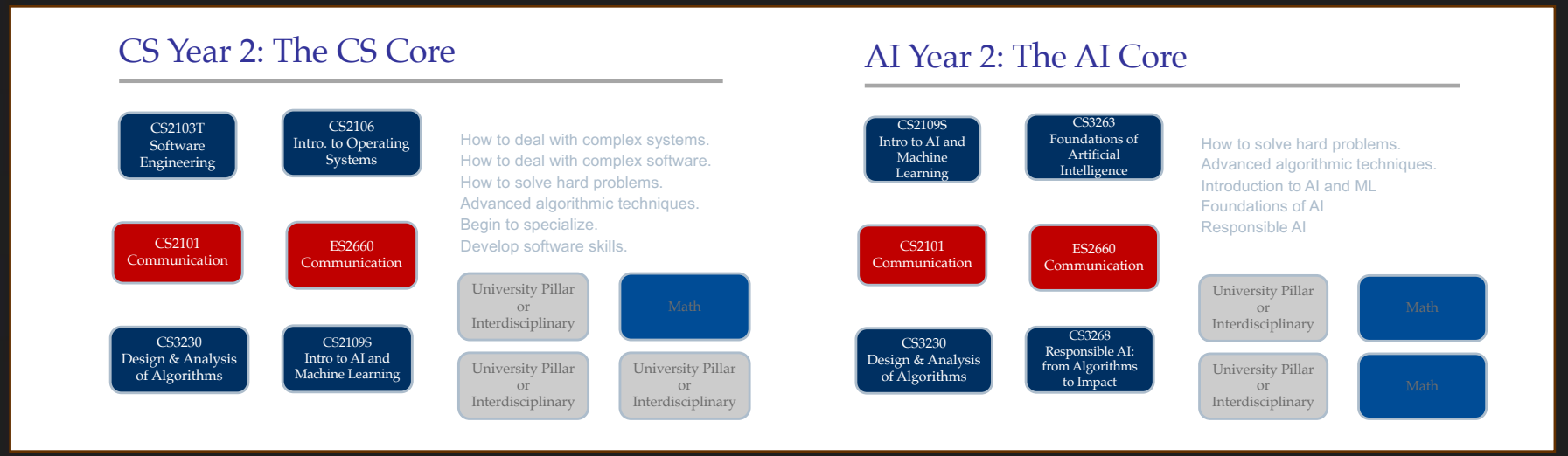
Deciding between CS and AI Programme at the end of Year 2



- CS and AI are only slightly different at the end of Year 2
- Decide which degree programme to continue

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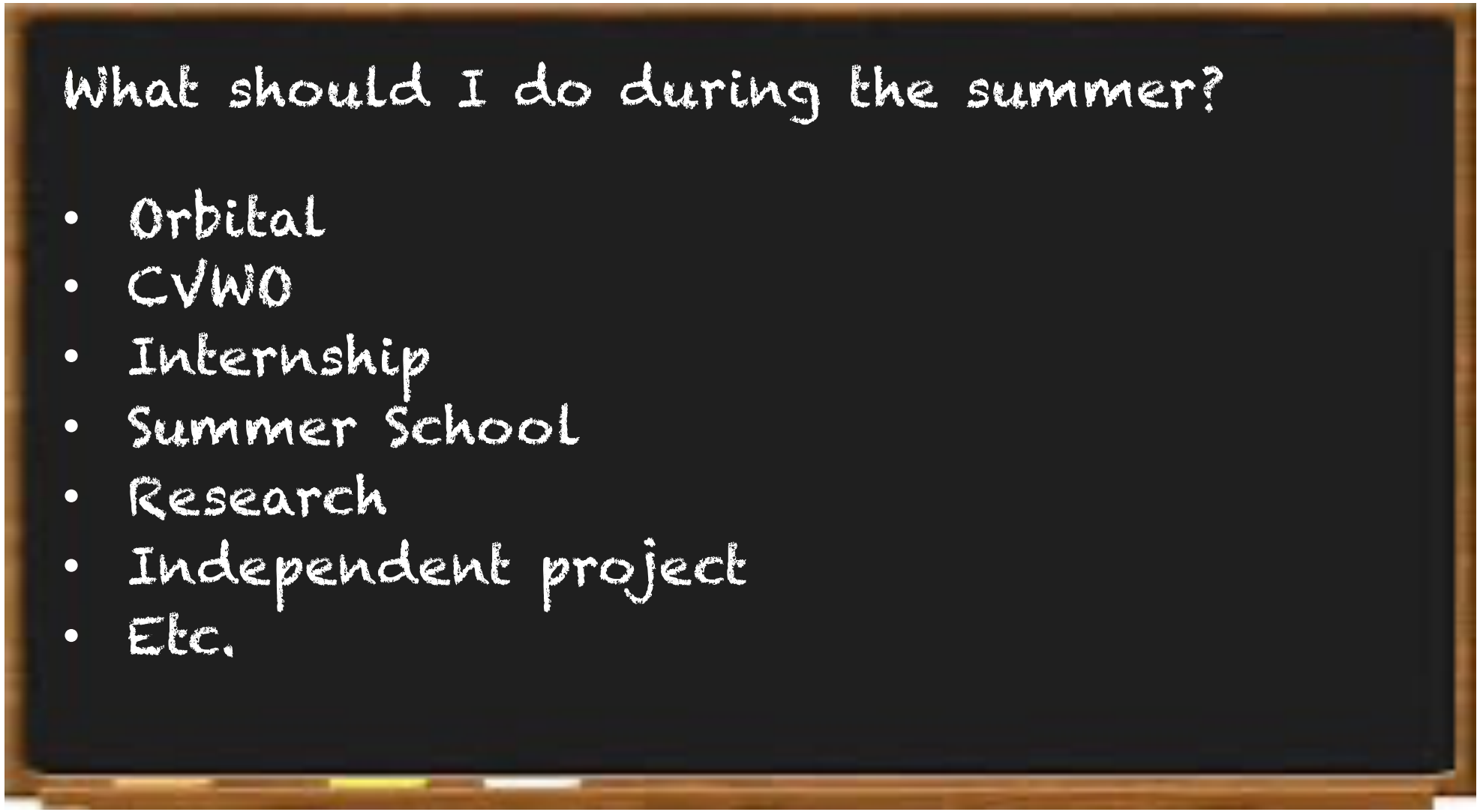
What if I can't take XXX in Year 1?

Example: Student cannot take CS1231S in Semester 1

- Semester 1: CS1101S
- Semester 2: CS1231S
- Semester 3: CS2040S
- Semester 4: CS2103T

It's okay!

As long as CS Foundations are *mostly* finished by the end of Year 2, you are on track!



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Undergraduate Research at SOC

You can be part of it…

Error Correction of Reads in DNA Fragment Assembly
By Zheng Jia

Algorithms for Peptide Sequencing via Tandem Mass Spectrometry
By Ye Nan

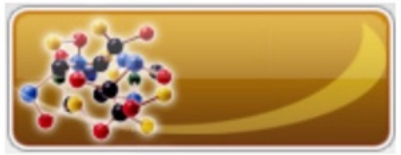
A Repetition-Based Framework for Lyric Alignment in Popular Songs
By Luong Minh Thang

Performance Analysis of Two Data Delivery Schemes for Underwater Sensor Networks
By Pius W. Q. Lee

Secure and Lightweight Acknowledgment for Peer-to-Peer Overlay Networks
By Lim Chee Liang

Modeling from Photographs
By Tan Min Rui

Directed Novelty and Redundancy in Information Retrieval
By Joseph Tan Kai Huang



Recognition of Polyadenylation Sites from Genomic Arabidopsis Sequences
By Koh Chuan Hock

Simplified Muscle Dynamics For Appealing Real-Time Skin Deformation
By Lee Keng Siang

Turing Programme

TP aims to nurture students who aspire to engage in pure research careers in Computing. It is most suitable for students who love to solve technically challenging problems and are able to handle theoretical and practical work. Students will be selected for admission to TP based on their performance in selected courses, including CS2309 and CS3230**.** Students in TP are expected to build sufficient track records by the time they graduate to gain admission into PhD programmes in top schools including SoC. Students in this programme will be assigned CS professors as their mentors to help them to build their research track records.

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https://www.comp.nus.edu.sg/cug/per-cohort/cs/tp-25-26/

Turing Programme

- Take CS2309: Research Methodology.
- Do a UROP (Undergraduate Research Opportunity Project)
- Do an FYP (Final Year Project)

Why?

- You are interested in research!
- You may want to pursue a career in research (either industrial or academic).
- "Honors" program for our most successful students.
- Networking opportunities.
- Mentor in research.

By invitation only.

Based on recommendation from CS2309 instructor or UROP advisor.

Welcome!