GLOBAL SUMMER PROGRAMME 2027

COR-CS2232 INTERNET OF THINGS: INNOVATIONS FOR DRIVING BUSINESS GROWTH

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COURSE DESCRIPTION

The Internet. Of. Things. A world of smart objects. A world in which trillions of devices can sense, communicate, and collaborate over the Internet. A world where the physical and digital worlds are fused seamlessly into a networked matrix, where everything is interwoven and intertwined and interconnected in one colossal network.

In this course, we embark on an adventure; sometimes challenging, always exciting. We discover the essential elements of the Internet of Things. Sensors. Actuators. Embedded devices that unite the cyber and physical realms. The Internet of Things technologies that weave devices together into the global tapestry of the World Wide Web.

We unleash our creative energies, our youthful idealism, and our capacity to dream, by creating visionary technology to conquer societal challenges. This is a journey into the unknown. Yet, a still, small voice deep within us compels us: Courage! Do not be afraid! Put out into the deepest oceans and brave the stormiest seas! Let down your nets for an awesome catch!

The adventure reaches its peak at the project showcase, where we witness the work of human hands come to fruition, leaving us inspired to reflect deeply and broadly about how we, as global citizens, can harness the power of the Internet of Things as a potent force in the service of humanity.

Sounds lit? Bring some bubble tea, come and see: what's the tea with IoT? #Slayyy

LEARNING OBJECTIVES

- Explain concepts related to the Internet of Things.
- Develop basic coding skills using the Blocks visual coding language.
- Apply Design Thinking methods to design, develop, and deploy an Internet of Things prototype to conquer a societal challenge.
- Reflect deeply and broadly about the various ways in which Internet of Things innovations can create immense impact in society, especially to those in need.

PRE-REQUISITES / REQUIREMENTS / MUTUALLY EXCLUSIVE COURSE(S)

- For non-SCIS students only. Moreover, students with a tech/coding background are advised not

to take this course, due to limited opportunities for skills growth.
- Requires: a profound desire to harness the power of technology in the service of humanity.
- No prior tech knowledge necessary. Pitched at absolute beginners with zero background.
- Students are expected to purchase their own IoT devices, valued at up to S$100. Financial Aid may be provided for students who need it.

ASSESSMENT METHODS

Component	Description	Weightage (%)
Class Participation	Make creative, insightful, stimulating, novel contributions, which significantly advance the learning of the class	20
Technology Review	Create a lively vlog on an Internet of Things business innovation	20
Project Pitch	Pitch your innovative ideas for an Internet of Things business proposition	20
Project Showcase	Design, develop, deploy, and demonstrate a working prototype	20
Project Report	Create a blog article and video to narrate your experience on this adventure	20

INSTRUCTIONAL METHODS AND EXPECTATIONS

- Pre-lesson: flipped learning – readings are assigned and must be done before attending lessons.
- In-lesson: project-based learning – learn basic coding skills, and build an IoT solution in teams.
- Missing 3 or more lessons without valid reasons will result in an F grade for the course.
    - Valid reasons include: medical reasons, compassionate grounds, and circumstances where students represent Singapore in international events or competitions.
    - Invalid reasons include: internship, work commitments.

CONSULTATIONS

- By appointment.

RECOMMENDED TEXT AND READINGS

- Ethical Aspects of Cyber-Physical Systems

UNIVERSITY POLICIES

Academic Integrity

All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences.

All work (whether oral or written) submitted for purposes of assessment must be the student's own work. Penalties for violation of the policy range from zero marks for the component assessment to expulsion, depending on the nature of the offense.

When in doubt, students should consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at https://smu.sharepoint.com/sites/oasis/SitePages/DOS-WKLSWC/UCSC.aspx.

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LESSON PLAN	
LESSONS	**TOPICS**
LESSON 1	The Internet of Things ● Sensing, connecting, analyzing ● Introduction to coding, serial communications ● Design Thinking: Inspiration
LESSON 2	Business Innovations: Children & Youth ● Sensor modalities, variables, conditionals ● The Business Model Canvas, Social Good edition ● Design Thinking: Inspiration
LESSON 3	Business Innovations: Mental Wellness ● Concurrency, event handlers ● Design Thinking: Ideation
LESSON 4	Business Innovations: Disabilities & Special Needs ● Wireless communications, personal area networks ● Functions, wireless radio ● Design Thinking: Ideation
LESSON 5	Architecture ● Design principles, design patterns ● Loops, time-triggered control, actuators ● Design Thinking: Ideation
LESSON 6	Project Proposal Pitch
LESSON 7	Sensor Data Visualization ● Form, function ● Analytics Dashboards, Operations Dashboards ● Design Thinking: Implementation
LESSON 8	Artificial Intelligence of Things ● Embedded Machine Learning ● Design Thinking: Implementation
LESSON 9	Project Consultations ● Design Thinking: Implementation
LESSON 10	Impacting Humanity Positively ● Society, ethics, and the profession ● Design Thinking: Implementation
LESSON 11	Business Innovations: Selected Topics ● Selected Topics in IoT ● Design Thinking: Implementation Company Visit/Guest Speaker (TBC)
LESSON 12	Project Final Presentation