INFOCOMM MEDIA DEVELOPMENT AUTHORITY | Infocomm Media Club

LEARN ROADMAP

Information Kit

2024

INFOCOMM MEDIA CLUB

The Infocomm Media Development Authority (IMDA) aims to collaborate with MOE teachers-in-charge of Infocomm Media Clubs to provide an enriching CCA experience for their student members. This includes providing members with ample opportunities to pursue their interest, deepen their learning in emerging tech and gain industry exposure.

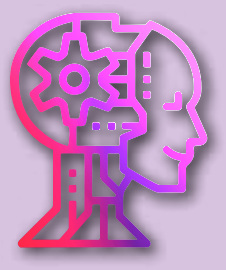
Since 2022, IMDA has been providing specially curated programmes and activities in five Pillars, to enable Infocomm Media Club members to receive a well-rounded CCA experience:

- LEARN
- DISCOVER
- SERVE
- LEAD
- EXCEL

To find out more details, visit
https://codesg.imda.gov.sg/infocomm-media-clubs

LEARN

BROAD-BASED TRAINING AND DEEP SKILLS ACQUISITION



As part of IMDA's LEARN Pillar, Infocomm Media Club members will be provided training in various Infocomm and Media domains such as Artificial Intelligence, Game Development and Mobile App Development. The intent is to spark passion for tech and media skill acquisition.

LEARN covers two training modes:

- **LEARN Roadmap**

  LEARN Roadmap caters to broad-based training held during CCA hours at the MOE school's premises. This includes industry-back courses, which consists curriculum and platforms endorsed by industry partners, to build up knowledge in their specialist domains. To cater to different interests, IMDA also offers tech and media courses in a broad spectrum of topics through our training providers.

  This Infomation Kit will cover the application process and the course offerings for the LEARN Roadmap in 2024.

- **LEARN Bootcamps & Accelerators**

  LEARN Bootcamps and Accelerators provide deep skill acquisition for Infocomm Club members. These fast-tracked learning courses are held outside of school curriculum hours, at external premises.

  Infocomm Media Clubs members will apply for Bootcamps and Accelerators on individual basis. IMDA will inform schools when Bootcamps and Accelerators are ready for application, for teachers to disseminate the information to their Club members. Clubs members can apply directly to training vendors.
  To find out more details, visit
  https://codesg.imda.gov.sg/infocomm-media-clubs

LEARN Roadmap Application Process

1. School to contact preferred training provider on their selected course* and understand details.
2. Work out a lesson schedule stating dates and times, with training provider for the selected course. The schedule needs to be signed by both parties.
3. Fill up Application Form. (by HOD or Teacher-in-Charge)

Required Information:

- Course Code
- Training Provider
- School Name and CCA Name
- Level of Students and Class Size#
- Lesson Schedule (signed)
- Contact Details of School Leader and Teacher-in-Charge

4. IMDA will review the application and send queries if any.
5. Approval. School to record attendance for training provider to submit to IMDA.

Refer to IMDA Code@SG webpage for application link:
https://codesg.imda.gov.sg/infocomm-media-clubs-cca/learn/roadmaps

POINTS TO NOTE

- IMDA supports each MOE school for up to 2 courses or classes per year. A school requiring more course/class support can write to imda_codesg@imda.gov.sg
- For selected courses, Secondary Schools/JCs can choose a complementary 12-hour add-on module to expand members' learning in additional tech domains.
- # Each class must have a minimum class size of 10 students. Schools should consider the stand-down of students from CCAs when drawing up the lesson schedule, to meet the minimum class size.
- If the students exceed 35 pax for a course, it is advisable to split the students into 2 classes for better trainer-student engagement. The school can specify so when drawing up the lesson schedule with the training provider. Note that such an application fully utilises the school's entitlement under the Roadmap.
- * The training cost will be fully funded by IMDA. Where there is hardware required for the training, schools can work with the training providers or other vendors to procure the hardware at their own expense.

LEARN Roadmap Courses 2024

Tech/Media Domain	School Level	Vendor / Course Code / Page Link
Artificial Intelligence	Primary	EP Education [AI-EP-POF]
	Primary	Stag Match [AI-SM-POF]
	Secondary/JC	Sustainable Living Lab with INTEL [INTEL-AI4YOUTH] #
	Secondary/JC	Duck Learning [AI-DL-SOF1] + Data Analytics add-on
	Secondary/JC	Duck Learning [AI-DL-SOF2] + Data Analytics add-on
	Secondary/JC	EP Education [AI-EP-SOF] + Data Analytics add-on
Data Analytics	Secondary/JC	Duck Learning [DA-DL-SOF1] + IoT add-on
	Secondary/JC	Duck Learning [DA-DL-SOF2] + IoT add-on
Digital Making	Primary	Zenitant with MICROSOFT [MICROSOFT-DIGIMAKE] #
Game Development	Primary	Zenitant with MICROSOFT [MICROSOFT-GAMEDEV] #
	Primary	Duck Learning [GD-DL-POF]
	Primary	Roboto [GD-ROB-POF]
	Secondary/JC	Roboto [GD-ROB-SOF] + Cybersecurity add-on
	Secondary/JC	Stag Match [GD-SM-SOF] + Cybersecurity add-on
Immersive Media	Primary	Make The Change with APPLE [APPLE-NEWMEDIAJR]
	Secondary/JC	Make The Change with APPLE [APPLE-NEWMEDIA] #
Internet of Things	Secondary/JC	Duck Learning [IOT-DL-SOF] + Data Analytics add-on
	Secondary/JC	EP Education [IOT-EP-SOF] + Data Analytics add-on
Mobile App Development	Primary	GSA with GOOGLE [GOOGLE-APPSHEET]
	Primary	Roboto [MD-ROB-POF]
	Secondary/JC	Tinkercademy with APPLE [APPLE-SWIFT] #
Robotics	Primary	Duck Learning [RB-DL-POF1]
	Primary	Duck Learning [RB-DL-POF2]
	Primary	Roboto [RB-ROB-POF]
	Secondary/JC	Duck Learning [RB-DL-SOF1] + IoT add-on
	Secondary/JC	Duck Learning [RB-DL-SOF2] + IoT add-on
	Secondary/JC	Stag Match [RB-SM-SOF] + IoT add-on
Social Robotics	Primary	edm8ker with UBTECH [UBTECH-SOROBOT]

 # Denotes courses with progressive levels of competency, refer to course details.
+ <domain> add-on denotes optional 12-hour module, refer to course details.

Artificial Intelligence (AI) Roadmap for Primary School

by EP Education

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** Students will gain an understanding of Machine Learning and AI concepts and work on applying these concepts through a project. Ethical and privacy issues relating to AI will also be discussed. The project work will include a simple machine learning model and computer vision.	**24 hours**	EP Education Pte Ltd **Course Code:** AI-EP-POF	**HARDWARE:** mBot / mBot2 / CyberPi / Halocode / microbit + AI camera **SOFTWARE:** • mBlock 5 (installation required) or • mBlock 5 (Web version available, no installation required) or • Makecode (Web version, no installation required)	To demonstrate their understanding of machine learning output accuracy which is measured based on confidence level by their AI system, students will apply and articulate the use of AI in a facial recognition system. They will be tasked with adding in facial profiles for machine learning, creating a database of student facial samples which lets the AI system utilise confidence level to compare against live detection.	Koh Choon Chuan cckoh@epasia.cc 9146 6015 Gwenn Tan gwenntan@epasia.cc 9800 7990

Artificial Intelligence (AI) Roadmap for Primary School

by Stag Match

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** Students will gain an understanding of Machine Learning and AI concepts and work on applying these concepts through a project. Ethical and privacy issues relating to AI will also be discussed. The project work will include a simple machine learning model and computer vision.	**24 hours**	Stag Match Private Limited **Course Code:** AI-SM-POF	HARDWARE: N.A. SOFTWARE: Pictoblox	Students will use the AI blocks in PictoBlox to learn AI and make various types of AI-based projects and prototypes to solve real-world problems. Through these projects, they will learn the following: 1. **Artificial intelligence concepts:** a) Computer Vision; b) Face Detection; c) Optical Character Recognition; and d) Speech Recognition 2. **Machine Learning:** a) Image-Based Machine Learning Models; b) Pose-Based Machine Learning Models; and c) Audio-Based Machine Learning Models	Thomas Yeo thomas.yeo@smet.edu.sg Alex stagmatch@gmail.com info@stagmatch.com.sg 6612 7165

Digital Making with MICROSOFT for Primary

by Zenitant in collaboration with MICROSOFT

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS
Primary	The Microsoft Digital Making Roadmap aims to develop students' computational thinking and problem-solving skills through hands-on making of fun prototypes/ artefacts and practical application of design thinking concepts to solve real world problems. This programme offers 2 different tracks: **Fundamental Track (16 hours):** Students will learn how to use Microsoft Makecode block-based coding platform with Micro:bit, different basic sensors/ actuators to code and create different smart gadgets/ prototypes with upcycled materials. **Intermediate Track (16 hours):** Targeted at students who have completed the Fundamental workshop previously or have experience in digital making, this course aims to coach students on using wireless communications, advanced sensors/ actuators to code and create more complex prototypes. Students will also be introduced to how they can leverage on Generative AI and Prompt Engineering to enhance their prototype.	16 hours per Track	Zenitant Pte Ltd **Course Code:** Fundamental: MICROSOFT-DIGIMAKE-FUNDA Intermediate: MICROSOFT-DIGIMAKE-INTM	HARDWARE: • BBC Micro:bit with USB Cable (capable of both power and data transfer) • Battery pack (for untethered/mobile use) • PC/Laptop with a USB port or mobile device with Bluetooth connectivity Microsoft will be sponsoring the Micro: bits, accessories and making materials necessary for the workshops, hence schools need not purchase the hardware for the course. SOFTWARE: • Microsoft MakeCode • ChatGPT

PROJECT WORK	CONTACT PERSON
Students will be creating different cardboard Micro:bit prototypes based on problem statements posed. For fundamental track, students will be creating prototypes with single input and single output such as smart lamps, smart burglar alarm systems, smart fitness trackers. For intermediate track, students will be creating prototypes with more complex sensors, multiple inputs and outputs such as smart weather automation or smart environmental automation systems with AI analytics.	Mr Philip Kong philipkong@zenitant.com.sg 9744 0711 Ms Hung Lin Lin linlin@zenitant.com.sg 9232 5024

Game Development with MICROSOFT for Primary

by Zenitant in collaboration with MICROSOFT

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS
Primary	The Microsoft Game Development Roadmap aims to coach students on game creation strategies and fundamental coding constructs using the Microsoft platforms. Students will be exposed to different genre of digital games and learn how to use both Minecraft Education and Microsoft Makecode Arcade, to code and create fun single and multiplayer digital games. This programme offers 2 different tracks: **Fundamental Track (16 hours):** Students will learn different basic game development mechanics and coding constructs on both Minecraft Education (8 hours) and MakeCode Arcade (8 hours). Students will focus on developing fun single player games on Makecode Arcade such as Space Invaders, Flappy Bird as well as single player games on Minecraft Education such as Maze Run and Zombie Defense. **Intermediate Track (16 hours):** This course targets students who have completed the Fundamental workshop previously or have experience in game creation. It aims to coach students to code and create more complex multii-level and multiplayer games. Students will learn to create Makecode Arcade games such as Galga, Paddles and collaborative 2v2 Minecraft Education multiplayer adventure games with NPCs.	16 hours per Track	Zenitant Pte Ltd **Course Code:** Fundamental: MICROSOFT-GAMEDEV-FUNDA Intermediate: MICROSOFT-GAMEDEV-INTM	**HARDWARE:** • PC/Laptop with a Windows 7 or later, Intel Core i3-3210 3.2 GHz / AMD A8-7600 APU 3.1 GHz or equivalent with 2GB RAM **SOFTWARE:** • Microsoft Minecaft Education • Microsoft MakeCode Arcade (Both software are made free by Microsoft for MOE students)

PROJECT WORK	CONTACT PERSON
With Minecraft Education: • Open-world resource collection Minecraft game to build sustainable towns/ cities • Castle/ Zombie Defense Minecraft Game • Multiplayer/ Collaborative Build or adventure game (Intermediate) With Makecode Arcade: • 2D Shooter games like Space Invaders • 2D Platformer Games like Flappy Bird • 1v1 Paddle Game (Intermediate) • Collaborative 2 Player Galga game (Intermediate)	Mr Philip Kong philipkong@zenitant.com.sg 9744 0711 Ms Hung Lin Lin linlin@zenitant.com.sg 9232 5024

Game Development Roadmap for Primary School

by Duck Learning

School Level	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** In this Game Development Roadmap, students will use Scratch 3.0, a beginner-friendly coding language. They'll grasp fundamental coding concepts like loops, variables, and debugging, learning to design characters, backgrounds, and add audio elements. The course equips students to: • Master Game Basics: Control characters, track scores, and set win/lose conditions. • Coding Skills: Students will apply logical thinking with concepts like loops, variables, conditionals, and debugging. • Apply Computational Thinking Skill: Focus on Decomposition, Abstraction, Pattern Recognition, and Algorithmic Thinking. • Develop 21st Century Learners Skills: Enhance Critical Thinking, Creative Thinking, Communication, and Collaboration. • Solve Problems with Design Thinking: Empathise, Define, Ideate, Prototype and Test.	**24 hours**	Duck Learning **Course Code:** GD-DL-POF	**HARDWARE:** PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** Scratch 3.0	Students will create design and create their own game taking into consideration game mechanics that will keep the game interesting for the player. They will: 1. Include several game levels. 2. Include score-keeping. 3. Include a game environment. 4. Include audio e.g. background music, sound effects. 5. Include at least 1 playable character and 1 non-playable character. 6. Students will document their process.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201

Game Development Roadmap for Primary School

by Roboto

School Level	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** Students will gain an understanding of concepts such as game mechanics, visual and audio elements which will be applied through a project. The project work involves working on a game environment for a concurrent multi-player mode game.	**24 hours**	Roboto LLP **Course Code:** GD-ROB-POF	HARDWARE: N.A. SOFTWARE: Scratch 3.0	Students will develop their own projects using Scratch 3.0 platform. To encourage students to exchange their thoughts of game development, and gain insights from others, the project work will include: 1. **Presentation & Pitching:** Students will present on their Scratch project with the aid of Pitch playbook. 2. **Assessment:** Students' project will be graded using defined assessment rubrics and they will figure out self-learning after the course.	Brian Lee brianlee@roboto.sg 9767 8052

New Media Junior with APPLE for Primary

by Make The Change in collaboration with APPLE

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS
Primary	The Apple New Media Junior Programme provides students with opportunities to use Apple Technologies to create versatile content that can be utilized across different platforms. The curriculum consists: 1. Videography Students will unleash their creative potential as they dive into the world of videography. Students will learn the videography process, from meticulous pre-production planning to capturing breathtaking shots during shooting, and finally, the artful post-production phase. 2. Digital Photography with iPad Students will unlock the power of photography with the iPad as their lens. Students will discover how to capture stunning digital photos using the versatile functions on their iPad, from mastering the camera settings to capturing their creative vision. 3. Augmented Reality Students will Embark on an exciting journey into the world of Augmented Reality (AR). Students will explore AR environments and gain hands-on experience in creating their own AR experience. 4. Digital Drawing Students will unleash their inner artist in the digital realm! Using iPads as their canvas, students will learn the techniques and tools to create stunning artworks. 5. Podcasting Students will embark on a captivating journey into the world of podcasting and learn how to tell compelling stories using the power of audio. From crafting engaging narratives to mastering the technical aspects, students will gain the skills and confidence to become a skilled podcaster.	24 hours	Make The Change Pte Ltd **Course Code:** APPLE-NEWMEDIAJR	**HARDWARE:** iPads with iOS (16 or newer) **SOFTWARE:** Clips, Garageband, AR Makr, WWF Forest, Mission to Mars, Camera, Keynote, Pages, Sketchbook Training provider will work with schools to ensure all necessary apps are pre-installed on the iPads prior to training.

PROJECT WORK	CONTACT PERSON
During the program, students will craft an impressive digital portfolio, culminating in a captivating digital exhibition at the program's conclusion. Beyond this, students will seize the opportunity to engage with our SERVE program, enabling them to actively contribute to the community and give back to society by teaching the new skills they learn to marginalised groups. Furthermore, students will have the privilege of participating in the Nationwide New Media Competition. Here, they will harness the skills acquired throughout the program to champion a meaningful social cause, making a real impact with their newfound expertise.	Mr Pedro Agurre pedro@makethechange.sg

Mobile App Development with GOOGLE for Primary

by GSA in collaboration with GOOGLE

School Level	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** Google AppSheet is a powerful cloud-based platform developed by Google that allows users to create and customise mobile and web applications using a no-code or low-code approach. Through a design thinking approach, students gain the necessary expertise and foundational skills to develop 1 or 2 applications aimed at addressing a specific problem statement. These applications can either be derived from GSA or tailored to suit the needs of their school.	**20 hours**	GSA Pte Ltd **Course Code:** GOOGLE-APPSHEET	HARDWARE: • Chromebook with Chrome OS 64bits. • PC/Laptop with MS Windows (Win 7 or above) • Mac with macOS (10.8 or higher) • Stable Internet access connection SOFTWARE: • Google Chrome • Google AppSheet • Google Sheets • GSA will work with schools to ensure all participants have a Google account for the programme	Students will be able to: • Define the app's purpose based on specific users' requirements. • Apply UI and UX principles to design the app. • Create data sources and integrations to ensure data is accessible. • Configure app behaviour and workflows. • Create and experiment with a prototype for further development.	Alan Wong alan.wong@gsatech.com.sg 9327 1090

Mobile App Development Roadmap for Primary School

by Roboto

School Level	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** Students will gain an understanding of concepts such as UI/UX, functional flow and the use of a database in a mobile app. The future of mobile apps and privacy issues will also be discussed. The project work requires students to build a mobile app.	**24 hours**	Roboto LLP **Course Code:** MD-ROB-POF	**HARDWARE:** PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** Thunkable Live	The theme of the project will be mainly focused on COVID-19. Students will develop their own mobile apps under this theme. Students will start the project by planning and developing the idea of the app through a storyboard, and live testing the app using an emulator on a smartphone or tablet screen.	Brian Lee brianlee@roboto.sg 9767 8052

Robotics Roadmap for Primary School

by Duck Learning

School Level	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** In this Robotics Development Roadmap, students will build various robots, learn about mechanisms and coding. Students will use the LEGO Education SPIKE Prime system and software. SPIKE Prime is beginner-friendly yet capable of complex output and functions. The objectives of this course are: • SPIKE Prime Introduction: Familiarize students with LEGO elements and how to build simple machines. • Motor Control Mastery: Manipulate motor parameters like speed and direction for precise robot movement. • Sensors Understanding: Introduce sensors (Gyro, Colour/Light, Distance, and Force) enabling the robot to respond to its environment. • Coding Skills: Apply logical thinking with concepts like loops, variables, conditionals, and debugging. • Computational Thinking Application: Vital problem-solving skills like Decomposition, Abstraction, Pattern Recognition, and Algorithmic Thinking. • 21st Century Skills Development: Enhance Critical Thinking, Creativity, Communication, and Collaboration abilities. • Solve Problems with Design Thinking: Empathise, Define, Ideate, Prototype, and Test.	**24 hours**	Duck Learning **Course Code:** RB-DL-POF1	**HARDWARE:** LEGO Education SPIKE Prime. PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better **SOFTWARE:** LEGO Education SPIKE App	Design Thinking Project Theme: Care for my Community. Students will be tasked with creating a robotic solution for a problem that the elderly faces. Students will be instructed to apply Design Thinking processes to solve the problem. Furthermore, they will design an original and innovative robotic solution, build a prototype, and test their idea.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201

Robotics Roadmap for Primary School

by Duck Learning

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** In this Robotics Development Roadmap, students will use the Strawbees kit and Micro:bit to gain an understanding of simple circuits and learn how to apply engineering principles in building intricate and stable structures while maintaining stability, balance, and structural integrity. • Introduction to Micro:bit: Students explore Micro:bit technology via MakeCode software, understanding components and functions. They utilise sensors detecting touch, acceleration, and temperature, coding Micro:bit to respond to sensor data, fostering practical coding skills. • Introduction to Strawbees: Students will experiment building structures with straws and connectors. • Coding Skills: Students will apply logical thinking with concepts like loops, variables, conditionals, and debugging. • Computational Thinking Application: Teach students vital problem-solving skills like Decomposition, Abstraction, Pattern Recognition, and Algorithmic Thinking. • 21st Century Skills Development: Enhance Critical Thinking, Creativity, Communication, and Collaboration abilities. • Solve Problems with Design Thinking: Empathise, Define, Ideate, Prototype, and Test.	**24 hours**	Duck Learning **Course Code:** RB-DL-POF2	**HARDWARE:** PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. Micro:bit. Strawbees Robotics Invention for Micro:bit. **SOFTWARE:** Makecode	Design Thinking Project Theme: Smart Home/School/Community. Students will be tasked with creating a robotic solution for a problem that the community faces. Students will be instructed to apply Design Thinking processes to solve the problem. Furthermore, they will design an innovative, fun, and easy-to-use product that is colourful and visually appealing. Students will build a prototype, and test their idea.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201

Robotics Roadmap for Primary School

by Roboto

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Primary	**OVERVIEW OF MODULE** Students will gain an understanding of simple circuits and coding concepts such as functions and event-based triggers. Commercial uses of robots will also be discussed. The project work will require students to build a robot with a microcontroller and sensors.	**24 hours**	Roboto LLP **Course Code:** RB-ROB-POF	**HARDWARE:** MakeBlock mBot (Bluetooth version) + Servo Pack Expansion Pack **SOFTWARE:** mBlock 5.3.0	Students' learning will be assessed in 2 parts: theory and practical. For theory-based, students will be tested with a MCA quiz and open-ended questions based on their knowledge of robotics, mBot and mBlock code. For practical assessment, students are required to build and customize their personal mBot to solve a course and present their solution to their classmates.	Brian Lee brianlee@roboto.sg 9767 8052

Social Robotics with UBTECH for Primary

by edm8ker in collaboration with UBTECH

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS
Primary	The Social Robotics Roadmap will expose students to artificial intelligence (AI) concepts in social robots/ humanoid robots. The course is catered for the young learners to gain insights about the use of these AI social robots such as Alpha Mini in education, healthcare and research fields and promote students' social emotional learning with social robots. The course is based on the AI humanoid robot, Alpha Mini, combined with graphical block-based programming (uCode) for development. The course aims to enable students to: i. understand what social robotics is about ii. gain insights about the use of social robots in education, healthcare, and research iii. learn about core computational thinking concepts iv. be exposed to Artificial Intelligence (AI) in social robots v. develop a keen understanding, awareness and appreciation of how social robot is designed, programmed and implemented vi. develop social-emotional competencies that increase students' capacity to learn and help them navigate current and future real-world contexts and challenges vii. develop a community outreach project and gain	20 hours	edm8ker (Makedemy Pte Ltd) **Course Code:** UBTECH-SOROBOT	**HARDWARE:** Alpha Mini robots will be provided by edm8ker during necessary sessions. Schools should prepare laptops, preferably one per student, for all course sessions. **SOFTWARE:** Web-based platform, with active internet connection

PROJECT WORK	CONTACT PERSON
Students will work in groups to craft a capstone project centred around a design challenge. They will be guided through the design thinking process to ideate and innovate an AI-enabled social impact solution employing Alpha Mini technology. This empowers the students to tackle specific social and environmental issues. During the course and project prototyping stages, students will learn to apply the functional modules of AI robot using graphical programming tools. The project work allows them to hone their confidence in their technical and communication skills. Selected projects will be given opportunities to showcase and/or compete on a global platform/ robotic competition co-hosted with UBtech.	Mr Kenneth Sim kenneth@edm8ker.com 9627 4987

Artificial Intelligence with INTEL for Secondary / JC

by Sustainable Living Lab in collaboration with INTEL

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	The Intel AI for Youth training programme exposes students to essential concepts of AI, introduce them to machine learning models and enable them to gain an appreciation of AI Ethics and Community Problem Solving. By the end of the programme, students should be able to: i. Identify leverage points in a system and assess if AI solutions could be beneficial to address societal problems; ii. Describe and discuss potential benefits and risks of using AI; iii. Use Python to perform basic data science and statistics; and iv. Understand AI Fundamentals (e.g. Data modeling, neural networks, computer vision, NLP) and explain the algorithms used.	34 hours or 56 hours	Sustainable Living Lab Pte Ltd **Course Code:** Basic (34 hours): INTEL-AI4YOUTH-BASIC Apply (56 hours): INTEL-AI4YOUTH-APPLY	**HARDWARE:** Laptops with Intel Core i5 processor, 8GB RAM or better **SOFTWARE:** Web-based software will be used. No installation of software required.	**Basic (34 hours):** Students will be challenged on an ideation sprint to innovate an AI-enabled social impact solution to address a United Nations Sustainable Development Goal. **Apply (56 hours):** Students will gain first hand experience with Intel OpenBot programme and develop additional capbilities to it. Students will challenge themselves to identify a problem area to develop a unique AI-enabled solution. They will be developing and realising their projects, honing their confidence in technical and communication skills, as well as applying AI for good. Selected projects will be given opportunities to showcase their projects and/or compete on a global platform.	Mr Niki Lee niki.lee@sustainablelivinglab.org 8622 9317

Artificial Intelligence (AI) Roadmap for Secondary / JC + Data Analytics add-on

by Duck Learning

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** In this innovative learning module, students dive into the exciting world of Artificial Intelligence (AI) and coding using the PictoBlox software. This easy-to-use software provides a hands-on experience in creating AI-powered projects, enhancing both coding and problem-solving skills. Students will also be given a holistic view of the application of AI in different industries, its limitations and misconceptions surrounding AI. Ethical and Privacy issues will also be discussed. • Introduction to AI Concepts: Give students a fundamental understanding of AI concepts such as Machine Learning (ML), Natural Language Processing (NLP), and Computer Vision (CV). • Block-Based & Python Coding: Introduce students to basic coding concepts, practice Object-Oriented Programming, and implement Python libraries. • Computational Thinking Application: Teach students vital problem-solving skills like Decomposition, Abstraction, Pattern Recognition, and Algorithmic Thinking. • 21st Century Skills Development: Enhance Critical Thinking, Creativity, Communication, and Collaboration abilities. • Design Thinking Problem Solving: Guide students through Empathise, Define, Ideate, Prototype, and Test processes in team-based problem solving. **OVERVIEW OF OPTIONAL ADD-ON MODULE IN DATA ANALYTICS** Students will gain an understanding of how to apply the 5 steps in data analytics: Setting Goals, Data Collection, Data Cleaning, Data Exploration and Data Evaluation. Students will learn how to present meaningful insights from the process.	24 hours + Optional 12 hours	Duck Learning **Course Code:** • AI-DL-SOF1 (24-hr) • AI-DL-SOF1-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** PictoBlox, PictoBlox Link, Microsoft Excel. **OPTIONAL 12-HOUR MODULE** **HARDWARE:** Databot PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** Microsoft Excel MicroBlocks ThingSpeak Arduino IDE 2.2.1 AWS IoT	In this project, students will employ CV technology to create a system capable of detecting and sorting various types of trash. They'll learn fundamental coding concepts, work with sensors and cameras, and develop algorithms using colour recognition, shape analysis, and texture differentiation. Machine Learning techniques will enhance the system's accuracy, providing hands-on experience in real-world problem-solving. Students will analyse data to explore the environmental impact of using fans versus air conditioning systems in the context of global warming. By delving into energy consumption, climate data, and eco-friendly solutions, they'll investigate the feasibility of slowing down global warming by promoting fan usage. This hands-on research endeavour encourages critical thinking and environmental awareness among students.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201

Artificial Intelligence (AI) Roadmap for Secondary / JC + Data Analytics add-on

by Duck Learning

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** In this innovative learning module, students dive into the exciting world of Artificial Intelligence (AI) and coding using the PictoBlox software. This easy-to-use software provides a hands-on experience in creating AI-powered projects, enhancing both coding and problem-solving skills. Students will also be given a holistic view of the application of AI in different industries, its limitations and misconceptions surrounding AI. Ethical and Privacy issues will also be discussed. • Introduction to AI Concepts: Give students a fundamental understanding of AI concepts such as Machine Learning (ML), Natural Language Processing (NLP), and Computer Vision (CV). • Block-Based & Python Coding: Introduce students to basic coding concepts, practice Object-Oriented Programming, and implement Python libraries. • Computational Thinking Application: Teach students vital problem-solving skills like Decomposition, Abstraction, Pattern Recognition, and Algorithmic Thinking. • 21st Century Skills Development: Enhance Critical Thinking, Creativity, Communication, and Collaboration abilities. • Design Thinking Problem Solving: Guide students through Empathise, Define, Ideate, Prototype, and Test processes in team-based problem solving. **OVERVIEW OF OPTIONAL ADD-ON MODULE IN DATA ANALYTICS** Students will gain an understanding of how to apply the 5 steps in data analytics: Setting Goals, Data Collection, Data Cleaning, Data Exploration and Data Evaluation. Students will learn how to present meaningful insights from the process.	24 hours + Optional 12 hours	Duck Learning **Course Code:** • AI-DL-SOF2 (24-hr) • AI-DL-SOF2-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** PictoBlox, PictoBlox Link, Microsoft Excel. **OPTIONAL 12-HOUR MODULE** **HARDWARE:** Micro:bit PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** Microsoft Excel MicroBlocks ThingSpeak Arduino IDE 2.2.1 AWS IoT	In this project, students will employ CV technology to create a system capable of detecting and sorting various types of trash. They'll learn fundamental coding concepts, work with sensors and cameras, and develop algorithms using colour recognition, shape analysis, and texture differentiation. Machine Learning techniques will enhance the system's accuracy, providing hands-on experience in real-world problem-solving. Students will analyse data to explore the environmental impact of using fans versus air conditioning systems in the context of global warming. By delving into energy consumption, climate data, and eco-friendly solutions, they'll investigate the feasibility of slowing down global warming by promoting fan usage. This hands-on research endeavour encourages critical thinking and environmental awareness among students.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201

Artificial Intelligence (AI) Roadmap for Secondary / JC + Data Analytics add-on

by EP Education

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** Students will gain an understanding of how Machine Learning (ML) and Natural Language Processing (NLP) works as subsets of AI. Students will also be given a holistic view of the application of AI in different industries, AI's limitations and myths surrounding AI. Ethical and Privacy issues will also be discussed. The project work involves the use of NLP and training of a simple machine learning model. **OVERVIEW OF OPTIONAL ADD-ON MODULE IN DATA ANALYTICS** Students will gain an understanding of how data is used in machine learning and learn how AI is able to analyse and automate the Data Collection, Data Cleaning and Data Classification process.	24 hours + Optional 12 hours	EP Education Pte Ltd **Course Code:** • AI-EP-SOF (24-hr) • AI-EP-SOF-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** Zumi **SOFTWARE:** Jupyter, Python 3 **OPTIONAL 12-HOUR MODULE** **HARDWARE:** N.A. **SOFTWARE:** Tableau, Python 3	**24-HOUR MODULE** The students will be able to utilise a robotics Kit with AI and Camera module. They will be teaching the system to detect directional signs, humanoid figures, obstacles to avoid and determine the confidence level. Based on the confidence level, the robot can determine its route to reach its intended destination safely. **OPTIONAL 12-HOUR MODULE** The students will be able to utilise a robotics Kit with AI and Camera module. They will be teaching the system to detect directional signs, humanoid figures, obstacles to avoid and determine the confidence level. Based on the confidence level, the robot can determine its route to reach its intended destination safely. With the Add-on activity, students will be learning how Data analytics can determine the behaviour, strategies in managing problems and coming out with solutions.	Koh Choon Chuan cckoh@epasia.cc 9146 6015 Gwenn Tan gwenntan@epasia.cc 9800 7990

Data Analytics Roadmap for Secondary / JC + IoT add-on

by Duck Learning

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** In this innovative learning module, students dive into the informative world of Data Analytics using Databot as a data collection tool. This easy-to-use software provides a hands-on experience in creating AI-powered projects, enhancing both coding and problem-solving skills. • Practical Data Analytics Skills: Students apply the five essential steps of data analytics – Setting Goals, Data Collection, Data Cleaning, Data Exploration and Data Evaluation . Using the Databot's sensors, they gain hands-on experience in collecting and interpreting real-world environmental data. This process sharpens their analytical abilities and fosters a deeper understanding of Data Analytics. • Effective Presentation of Insights: Beyond analysis, students learn to communicate their findings effectively. They develop skills in presenting complex data coherently through graphs and data plotting, enhancing their ability to convey insights to diverse audiences. This proficiency in articulating complex information is invaluable, preparing students for future professional contexts. • 21st Century Skills Development: Enhance Critical Thinking, Creativity, Communication, and Collaboration abilities. **OVERVIEW OF OPTIONAL ADD-ON MODULE IN IOT** Students will gain an understanding of how data can be collected and exported from IoT systems to generate actionable insights using data analytics software. IoT cybersecurity and considerations of using IoT collected data will also be discussed.	24 hours + Optional 12 hours	Duck Learning **Course Code:** • DA-DL-SOF1 (24-hr) • DA-DL-SOF1-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** **Databot** PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** Microsoft Excel MicroBlocks ThingSpeak Arduino IDE 2.2.1 AWS IoT Microsoft Azure IoT Google Looker Studio **OPTIONAL 12-HOUR MODULE** **HARDWARE:** Databot **SOFTWARE:** MicroBlocks ThingSpeak Arduino IDE 2.2.1 AWS IoT Microsoft Azure IoT	In response to the Covid-19 pandemic, the Ministry of Education (MOE) has shifted to online classes. Students are now tasked to study its impact. Students must research and evaluate how virtual learning influences students' grades. This project aims to gather valuable insights to aid the MOE in understanding the effectiveness of online education for the future. Every year, over 38,000 litres of water is lost due to leaks. These leaks are caused with running taps forgotten to be closed, or leaks in the pipes at home. Students are to propose a solution to detect water leaks in a standard 5-room HDB flat in Singapore. Students will develop a working prototype of their solution.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201

Data Analytics Roadmap for Secondary / JC + IoT add-on

by Duck Learning

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** In this innovative learning module, students dive into the informative world of Data Analytics using Databot as a data collection tool. This easy-to-use software provides a hands-on experience in creating AI-powered projects, enhancing both coding and problem-solving skills. • Practical Data Analytics Skills: Students apply the five essential steps of data analytics – Setting Goals, Data Collection, Data Cleaning, Data Exploration and Data Evaluation . Using the Databot's sensors, they gain hands-on experience in collecting and interpreting real-world environmental data. This process sharpens their analytical abilities and fosters a deeper understanding of Data Analytics. • Effective Presentation of Insights: Beyond analysis, students learn to communicate their findings effectively. They develop skills in presenting complex data coherently through graphs and data plotting, enhancing their ability to convey insights to diverse audiences. This proficiency in articulating complex information is invaluable, preparing students for future professional contexts. • 21st Century Skills Development: Enhance Critical Thinking, Creativity, Communication, and Collaboration abilities. **OVERVIEW OF OPTIONAL ADD-ON MODULE IN IOT** Students will gain an understanding of how data can be collected and exported from IoT systems to generate actionable insights using data analytics software. IoT cybersecurity and considerations of using IoT collected data will also be discussed.	24 hours + Optional 12 hours	Duck Learning **Course Code:** • DA-DL-SOF2 (24-hr) • DA-DL-SOF2-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** **Micro:bit** PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** Microsoft Excel MicroBlocks ThingSpeak Arduino IDE 2.2.1 AWS IoT Microsoft Azure IoT Google Looker Studio **OPTIONAL 12-HOUR MODULE** **HARDWARE:** Databot **SOFTWARE:** MicroBlocks ThingSpeak Arduino IDE 2.2.1 AWS IoT Microsoft Azure IoT	In response to the Covid-19 pandemic, the Ministry of Education (MOE) has shifted to online classes. Students are now tasked to study its impact. Students must research and evaluate how virtual learning influences students' grades. This project aims to gather valuable insights to aid the MOE in understanding the effectiveness of online education for the future. Every year, over 38,000 litres of water is lost due to leaks. These leaks are caused with running taps forgotten to be closed, or leaks in the pipes at home. Students are to propose a solution to detect water leaks in a standard 5-room HDB flat in Singapore. Students will develop a working prototype of their solution.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201

Game Development Roadmap for Secondary / JC + Cybersecurity add-on

by Roboto

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** Students will gain an understanding of concepts such as game mechanics and storytelling. Students will also learn how to create a game design document, storyboard, create game environments, customise nonplayable characters (NPCs) as well as add randomisation, music and sounds into their games. The project work requires students to design a game with progression and dynamics contents that saves players' progression to local storage. **OVERVIEW OF ADD-ON MODULE IN CYBERSECURITY** Students will gain an understanding of cybersecurity and cyberthreats in the gaming industry and how to safeguard personal data in a game from cyberattacks.	24 hours + Optional 12 hours	Roboto LLP **Course Code:** • GD-ROB-SOF (24-hr) • GD-ROB-SOF-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** Schools' laptop/ computer should have a DirectX9 (or later) compatible graphic card with at least 32MB of memory. **SOFTWARE:** Gamemaker Studio 2 **OPTIONAL 12-HOUR MODULE** **HARDWARE:** N.A. **SOFTWARE:** Web-based software.	Students will be required to develop their own 2D shooter game as the final project. They will be given freedom to customize the game based on their ideas. Students will consolidate their learning based on the knowledge gained throughout the training and visualize them by producing their digital poster on cybersecurity. Students will work in groups to create the poster design on the topic of cybersecurity in game industry. The project will be presented and discussed among the class before the end of lesson.	Brian Lee brianlee@roboto.sg 9767 8052

Game Development Roadmap for Secondary / JC + Cybersecurity add-on

by Stag Match

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** Students will gain an understanding of concepts such as game mechanics and storytelling. Students will also learn how to create a game design document, storyboard, create game environments, customise non-playable characters (NPCs) as well as add randomisation, music and sounds into their games. The project work requires students to design a game with progression and dynamics contents that saves players' progression to local storage. **OVERVIEW OF ADD-ON MODULE IN CYBERSECURITY** Students will gain an understanding of cybersecurity and cyberthreats in the gaming industry and how to safeguard personal data in a game from cyberattacks.	24 hours + Optional 12 hours	Stag Match Private Limited **Course Code:** • GD-SM-SOF (24-hr) • GD-SM-SOF-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** N.A. **SOFTWARE:** Construct 3	Students will work to design their own games, made easier through prototyping, debugging, and preview tools using Construct 3.	Thomas Yeo thomas.yeo@smet.edu.sg Alex stagmatch@gmail.com info@stagmatch.com.sg 6612 7165
				OPTIONAL 12-HOUR MODULE **HARDWARE:** N.A. **SOFTWARE:** Construct 3	Student will role-play in an online game based on an actual situation of cybercrime and hacking and work as a team to prevent the crime from happening.	

New Media with APPLE for Secondary/JC

by Make The Change in collaboration with APPLE

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE
Secondary / JC	The Apple New Media Programme provides students with opportunities to learn how to use Apple Technologies to create versatile content that can be utilized across different platforms. Students will use social media and digital marketing technologies to create awareness for projects that support social causes. Students will be learning from industry experts and will have hands-on experience developing real marketing campaigns. **The program offers 4 different tracks:** **Fundamentals** – The programme focuses on teaching students fundamental skills in using Apple Technologies to create content for various platforms. The curriculum covers a range of topics, including videography, photography, augmented reality, podcasting, and digital drawing. **Intermediate** – Upon completing the basic level, students may progress to the intermediate program. Here, they will acquire more in-depth skills to create content using Apple technologies. ***Advanced Videography** – Students will learn how to create videos using professional editing tools on their iPads. By the end of the program, students will be proficient in all aspects required to create professional-looking videos. ***Advanced Augmented Reality** – Students will learn how to use Augmented Reality on their iPads and create and manipulate virtual settings. This programme will also focus on digital drawing in detail, enabling students to use their creations and import them into Augmented Reality. ***For schools which underwent Fundamental track in 2023** **By taking part in any of the tracks, students will develop the following skills:** 1. Videography – Students will unleash their creative potential as they dive into the world of videography. Students will learn the videography process, from meticulous pre-production planning to capturing breathtaking shots during shooting, and finally, the artful post-production phase. 2. Digital Photography with iPad – Students will unlock the power of photography with the iPad as their lens. Students will discover how to capture stunning digital photos using the versatile functions on their iPad, from mastering the camera settings to capturing their creative vision. 3. Augmented Reality – Students will Embark on an exciting journey into the world of Augmented Reality (AR). Students will explore AR environments and gain hands-on experience in creating their own AR experience. 4. Digital Drawing – Students will unleash their inner artist in the digital realm! Using iPads as their canvas, students will learn the techniques and tools to create stunning artworks. 5. Podcasting – Students will embark on a captivating journey into the world of podcasting and learn how to tell compelling stories using the power of audio. From crafting engaging narratives to mastering the technical aspects, students will gain the skills and confidence to become a skilled podcaster. 6. Project Management – Students will elevate their project management skills and learn how to do project planning, execution, and control. 7. Digital Marketing – Students will unleash the full potential of digital marketing and dive into the dynamic world of online promotion, social media strategies, SEO, content marketing, and more. 8. Change Maker mindset – Students will Unlock the power of change and innovation as they discover how to develop a changemaker mindset that empowers them to drive positive change in their life and community. **Expertise levels will vary, aligning with the specific track each school chooses to pursue.**	26 hours per Track	Make The Change Pte Ltd **Course Code:** APPLE-NEWMEDIA-FUND APPLE-NEWMEDIA-INTM APPLE-NEWMEDIA-ADV-VID APPLE-NEWMEDIA-ADV-AR

HARDWARE/SOFTWARE REQUIREMENTS

HARDWARE: iPads with iOS (16 or newer)

SOFTWARE: Clips, AR Makr, Reality Composer, iMovie, Keynote, Pages, Numbers, Garageband, Sketchbook, Reality Composer
Training provider will work with schools to ensure all necessary apps are pre-installed on the iPads prior to training.

PROJECT WORK	CONTACT PERSON
During the program, students will craft an impressive digital portfolio, culminating in a captivating digital exhibition at the program's conclusion. Beyond this, students will seize the opportunity to engage with our SERVE program, enabling them to actively contribute to the community and give back to society by teaching the new skills they learn to marginalised groups. Furthermore, students will have the privilege of participating in the Nationwide New Media Competition. Here, they will harness the skills acquired throughout the program to champion a meaningful social cause, making a real impact with their newfound expertise.	Mr Pedro Agurre pedro@makethechange.sg

Internet of Things (IoT) Roadmap for Secondary / JC + Data Analytics add-on

by Duck Learning

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** Students will gain an understanding of concepts such as IoT and wireless connectivity technologies. Students will also learn about sensors and outputs of IoT systems. The importance of security for IoT systems will also be discussed. **OVERVIEW OF ADD-ON MODULE IN DATA ANALYTICS** In this innovative module, students explore Data Analytics using the five steps. Namely, Setting Goals, Data Collection, Data Cleaning, Data Exploration, and Data Evaluation. By utilising Micro: bit's sensors, they interpret real-world data, honing analytical abilities. Moreover, students learn effective data presentation techniques, including graphing. Thus, preparing them for future professional contexts and enhancing their ability to convey complex insights clearly	24 hours + Optional 12 hours	Duck Learning **Course Code:** • IOT-DL-SOF (24-hr) • IOT-DL-SOF-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** Databot PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** MicroBlocks ThingSpeak Arduino IDE 2.2.1 AWS IoT Microsoft Azure IoT	Every year, over 38,000 liters of water is lost due to leaks. These leaks are caused with running taps forgotten to be closed, or leaks in the pipes at home. Students are to propose a solution to detect water leaks in a standard 5-room HDB flat in Singapore. Students will develop a working prototype of their solution. The project work requires students to use a creative problem-solving framework to design a prototype with at least 1 sensor.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201
				OPTIONAL 12-HOUR MODULE **HARDWARE:** Micro:bit PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** Microsoft Excel Google Looker Studio MakeCode for Micro:bit	In response to the Covid-19 pandemic, the Ministry of Education (MOE) has shifted to online classes. Students are now tasked to study its impact. Students must research and evaluate how virtual learning influences students' grades. This project aims to gather valuable insights to aid the MOE in understanding the effectiveness of online education for the future.	

Internet of Things (IOT) Roadmap for Secondary / JC + Data Analytics add-on

by EP Education

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** Students will gain an understanding of concepts such as IoT and wireless connectivity technologies. Students will also learn about sensors and outputs of IoT systems. The importance of security for IoT systems will also be discussed. The project work requires students to use a creative problem-solving framework to design a prototype with at least 1 sensor to solve a pre-defined real-world problem. **OVERVIEW OF ADD-ON MODULE IN DATA ANALYTICS** Students will gain an understanding of the data analysis process and how their data collected from IoT systems can be visualized, analysed, and presented using a data analytics visual representation software.	24 hours + Optional 12 hours	EP Education Pte Ltd **Course Code:** • IOT-EP-SOF (24-hr) • IOT-EP-SOF-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** mBot / mBot2 / CyberPi / Halocode / microbit + AI camera **SOFTWARE:** mBlock 5 (Require installation to Laptop) or Makecode (web-based, no installation needed) **OPTIONAL 12-HOUR MODULE** **HARDWARE:** N.A. **SOFTWARE:** Tableau, Python 3	Students will be creating projects that are based on the context of green and sustainability. They will be storing the sensor data on the cloud. Students will then be applying the concepts and data in designing the prototype to encourage a more sustainable movement to take place in school. Students will be learning how data analytics can determine the behaviour, strategies in managing problems and coming out with solutions.	Koh Choon Chuan cckoh@epasia.cc 9146 6015 Gwenn Tan gwenntan@epasia.cc 9800 7990

Mobile App Development with APPLE for Secondary/ JC

by Tinkercademy in collaboration with APPLE

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE
Secondary / JC	The Apple Swift Programme brings an accessible introduction to mobile app development in Swift for iOS devices, by providing participants a chance to learn about introductory programming concepts in Swift. The program offers 3 different tracks: • **Track A**: App Prototyping • **Track B**: App Development Basics • **Track C**: App Development Exploration Please note that: • Track B does not require completion of Track A. • Completion of Track B is required to apply for Track C. • In a single year, schools can apply for up to 2 Tracks. **Track A: App Prototyping** is suitable for students interested in designing and prototyping mobile apps, while getting started with syntax-based coding in the Swift language. By the end of Track A, students should be able to: i. Know and implement app design concepts from Apple's Human Interface Guidelines; ii. Understand the design thinking process in relation to app development iii. Create low-fidelity and high-fidelity app prototype designs iv. Create interactive app prototypes to showcase ideas v. Read and write basic Swift code to solve coding puzzles and create simple apps. **Track B: App Development Basics** is a great choice for students interested in getting started with creating their own apps using Swift on iPad. By the end of Track B, students should be able to: i. Understand and implement basic programming concepts in the Swift language; ii. Use the Swift Playgrounds development environment to create and run apps; iii. Create mobile user interfaces with SwiftUI controls and views; iv. Utilise the SwiftUI framework to design and build a series of interactive apps. **Track C: App Development Explorations** builds on students' knowledge in Track B, allowing them to go further in SwiftUI with Augmented Reality, Machine Learning, and more. This track is available for students who have completed Track B or the Apple Swift Programme in 2022/2023. By the end of Track C, students should be able to: i. Read and apply documentation and tutorials on further concepts in Swift and SwiftUI; ii. Understand how to extend apps using online data available from application programming interfaces (APIs); iii. Utilise intermediate-to-advanced level libraries and tools such as Vision, CoreML, Reality Composer, and ARKit to create mobile apps with machine learning and augmented reality built-in.	26 hours per Track	Tinkercademy (Tinkertanker Pte Ltd) **Course Code:** APPLE-SWIFT-A APPLE-SWIFT-B APPLE-SWIFT-C

HARDWARE/SOFTWARE REQUIREMENTS

HARDWARE:

- iPad with iPadOS 16 or newer: minimum iPad 6th Gen, iPad Air 3rd Gen, iPad mini 5th Gen, iPad Pro 12" 2nd Gen, any iPad Pro 11"
- Mac devices with macOS Ventura or newer: MacBook Pro 2017 or later, MacBook Air 2018 or later, iMac 2017 or later, Mac mini 2018 or later

SOFTWARE:

Swift Playgrounds 4.3 or newer, free from App Store

PROJECT WORK	CONTACT PERSON
Students will create an app prototype or experience to take part in the Swift Explorers Challenge.	Mr Soon Yin Jie yjsoon@tinkertanker.com 8903 6700

Robotics Roadmap for Secondary/ JC + IoT add-on

by Duck Learning

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** Students explore intricate robot automation using the LEGO MINDSTORMS Education EV3 system. They construct diverse robots, master mechanisms, and coding complexities. The EV3 system immerses students in sophisticated automation processes. This journey equips them with profound knowledge in robotics, emphasizing practical applications and theoretical understanding. • LEGO MINDSTORMS Education EV3 Introduction: Familiarize students with LEGO elements and how to build simple machines. • Motor Control Mastery: Train students to manipulate motor parameters like speed and direction for precise robot movement. • Sensors Understanding: Introduce sensors (Gyro, Colour/Light, Ultrasonic, and Touch) enabling the robot to respond to its environment. • Coding Skills: Students will develop proficiency in coding concepts such as variables, loops, conditionals, and debugging, and understand the difference between single-threaded and multi-threaded coding. • Computational Thinking Application: Teach students vital problem-solving skills like Decomposition, Abstraction, Pattern Recognition, and Algorithmic Thinking. • 21st Century Skills Development: Enhance Critical Thinking, Creativity, Communication, and Collaboration abilities. • Design Thinking Problem Solving: Guide students through Empathise, Define, Ideate, Prototype, and Test processes in team-based problem solving. **OVERVIEW OF OPTIONAL ADD-ON MODULE IN IOT** Students will gain an understanding of IoT systems and learn how to integrate robotics with IoT systems. IoT cybersecurity will also be discussed.	24 hours + Optional 12 hours	Duck Learning **Course Code:** • RB-DL-SOF1 (24-hr) • RB-DL-SOF1-ADD (12-hr)	**24-HOUR MODULE** HARDWARE: • LEGO MINDSTORMS Education EV3 Core set • PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. SOFTWARE: EV3 Classroom	**Project theme: Improve my life** Students will be tasked with automating a robot that solves a mechanical problem faced in life. Students will be instructed to apply Design Thinking processes to solve the problem. Furthermore, they will design an original and innovative robotic solution, build a prototype, and test their idea. This will culminate in a group presentation at the end of the course.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201
				OPTIONAL 12-HOUR MODULE HARDWARE: • Databot • PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. SOFTWARE: • MicroBlocks • ThingSpeak • Arduino IDE 2.2.1 • AWS IoT • Microsoft Azure IoT	Every year, over 38,000 litres of water is lost due to leaks. These leaks are caused with running taps forgotten to be closed, or leaks in the pipes at home. Students are to propose a solution to detect water leaks in a standard 5-room HDB flat in Singapore. Students will develop a working prototype of their solution.	

Robotics Roadmap for Secondary/ JC + IoT add-on

by Duck Learning

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** Students explore intricate robot automation using the LEGO Education SPIKE Prime system. They construct diverse robots, master mechanisms, and coding complexities. The SPIKE Prime system immerses students in sophisticated automation processes. This academic journey equips them with profound knowledge in robotics, emphasizing practical applications and theoretical understanding. • LEGO Education SPIKE Prime Introduction: Familiarize students with LEGO elements and how to build simple machines. • Motor Control Mastery: Train students to manipulate motor parameters like speed and direction for precise robot movement. • Sensors Understanding: Introduce sensors (Gyro, Colour/Light, Ultrasonic, and Touch) enabling the robot to respond to its environment. • Coding Skills: Students will develop proficiency in coding concepts such as variables, loops, conditionals, and debugging, and understand the difference between single-threaded and multi-threaded coding. • Computational Thinking Application: Teach students vital problem-solving skills like Decomposition, Abstraction, Pattern Recognition, and Algorithmic Thinking. • 21st Century Skills Development: Enhance Critical Thinking, Creativity, Communication, and Collaboration abilities. • Design Thinking Problem Solving: Guide students through Empathise, Define, Ideate, Prototype, and Test processes in team-based problem solving. **OVERVIEW OF OPTIONAL ADD-ON MODULE IN IOT** Students will gain an understanding of IoT systems and learn how to integrate robotics with IoT systems. IoT cybersecurity will also be discussed.	24 hours + Optional 12 hours	Duck Learning **Course Code:** • RB-DL-SOF2 (24-hr) • RB-DL-SOF2-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** • LEGO Education SPIKE Prime Set • PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** LEGO Education SPIKE App **OPTIONAL 12-HOUR MODULE** **HARDWARE:** • Databot • PC/Laptop with MS Windows (Win 7 or above), Mac with macOS (10.8 or higher). Core i5-2400 with 4GB RAM or better. **SOFTWARE:** • MicroBlocks • ThingSpeak • Arduino IDE 2.2.1 • AWS IoT • Microsoft Azure IoT	**Project theme: A Game for Everyone** Students will create an inclusive and accessible game for people of all abilities and ages. They'll use LEGO elements and coding skills, promoting creativity and innovation in game design. Students will be guided to apply Design Thinking processes in this project. Furthermore, they will design an original and innovative robotic solution, build a prototype, and test their idea. This will culminate in a group presentation at the end of the course. Every year, over 38,000 litres of water is lost due to leaks. These leaks are caused with running taps forgotten to be closed, or leaks in the pipes at home. Students are to propose a solution to detect water leaks in a standard 5-room HDB flat in Singapore. Students will develop a working prototype of their solution.	Murtaza Njmudden murtaza@ducklearning.com 9752 5201

Robotics Roadmap for Secondary/ JC + IoT add-on

by Stag Match

SCHOOL LEVEL	COURSE SYNOPSIS	DURATION	TRAINING PROVIDER/ COURSE CODE	HARDWARE/SOFTWARE REQUIREMENTS	PROJECT WORK	CONTACT PERSON
Secondary / JC	**OVERVIEW OF MODULE** Students will gain an understanding of computational thinking, coding, and the different parts a robot can have. Students will also learn how to design, build a prototype, and test robotic automation solutions using microcontroller robots. The project work requires students to use a creative problem-solving framework to design a robot with at least 1 sensor and 1 moveable joint to solve a pre-defined real-world problem. **OVERVIEW OF OPTIONAL ADD-ON MODULE IN IOT** Students will gain an understanding of IoT systems and learn how to integrate robotics with IoT systems. IoT cybersecurity will also be discussed.	24 hours + Optional 12 hours	Stag Match Private Limited **Course Code:** • RB-SM-SOF (24-hr) • RB-SM-SOF-ADD (12-hr)	**24-HOUR MODULE** **HARDWARE:** OTTO Robot, Micro:bit **SOFTWARE:** Microsoft MakeCode	Student will put together what they've learnt about coding and electronics such as sensors and use of external electronics for their project.	Thomas Yeo thomas.yeo@smet.edu.sg Alex stagmatch@gmail.com info@stagmatch.com.sg 6612 7165
				OPTIONAL 12-HOUR MODULE **HARDWARE:** N.A. **SOFTWARE:** Microsoft MakeCode	Students will design a simple Smart Home solution by applying their knowledge and understanding of IoT and robotic technology. Students will propose the components, devices and sensors to use for their Smart Home Model.	

Information correct as of 16 Oct 2023.

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