College of Information Technology and Computing
Department of Information Technology

SYLLABUS
Course Title: **IT Elective 1 – IoT Fundamentals**
Course Code: **IT315**
Credits: **3 units (2 hours Lecture, 3 hrs Laboratory)**

USTP Vision

A nationally-recognized Science and Technology (S&T) university providing the vital link between education and the economy

USTP Mission

- Bring the world of work (industry) into the actual higher education and training of the students;
- Offer entrepreneurs of the opportunity to maximize their business potentials through a gamut of services from product conceptualization to commercialization;
- Contribute significantly to the national development goals of food security and energy sufficiency through technology solutions.

Semester/Year: **1st Semester SY 2025-2026**

Class Schedule:
IT3R1 T 1:00 PM - 4:00 PM Th 1:00 PM - 3:00 PM
IT3R2 F 10:00 AM - 1:00 PM W 8:00 AM - 10:00 AM
IT3R3 F 1:00 PM - 4:00 PM M 10:00 AM - 12:00 PM
IT3R4 F 7:00 AM - 10:00 AM W 1:00 PM - 3:00 PM
IT3R5 S 10:00 AM - 1:00 PM T 6:00 PM - 8:00 PM
IT3R6 F 10:00 AM - 1:00 PM M 8:00 AM - 10:00 AM
IT3R7 S 1:00 PM - 4:00 PM W 6:00 PM - 8:00 PM
IT3R8 ThF 4:00 PM - 5:30 PM T 7:00 PM - 9:00 PM

Bldg./Rm. No. **ICT Building 9**

Prerequisite(s): **IT221, IT222, IT223**
Co-requisite(s):

Instructors:
Jay Noel N. Rojo
Dario Miñoza
Niel Angel Pagupat

Email: **jaynoel.rojo@ustp.edu.ph**
Mobile No.: Available upon request.

Consultation Schedule: MWF 4-6 PM **Bldg 09 IT Faculty Office**

Office Phone No./Local: **(088) 856 1739 local 1153**

I. Course Description:

The IoT Fundamentals provides students with a comprehensive understanding of the Internet of Things (IoT). It develops foundational skills using hands-on lab activities that stimulate the students in applying creative problem-solving and rapid prototyping in the interdisciplinary domain of electronics, networking, security, data analytics, and business. The student-

USTP Core Values:

A. **Unselfish Dedication** – Selfless commitment and complete fidelity towards a course of action or goal.
B. **Social Responsiveness** – Ethical/moral responsibility leading to corrective action on social issues and contributions for the betterment of the environment and the community's quality of life.
C. **Transformational Leadership** – Leading through inspiration and by example to foster positive change with the end goal of developing followers into leaders.
D. **Prudence –** Self-governance leading to circumspection and good judgment in the management of affairs and use of resources.

Program Educational Objectives:

PEO1: Graduates are proficient in the IT field and able to engage constantly in technological and professional advancement by pursuing a higher academic level and practicing quality improvement in their career and personal lives.

PEO2: Graduates are competent in generating new ideas and innovations in Information

centric approach translates into the student being able to ideate, design, prototype and present an IoT solution for an identified business or society need.

II. Course Outcomes:

Course Outcomes (CO)	Program Outcomes (PO)														
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
CO1: Create circuits and microcontroller programs with the Arduino and a variety of components.	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
CO2: Create Python programs on the Raspberry Pi to provide IoT functionality.	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
CO3: Use appropriate tools to model Python-based IoT systems.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
CO4: Diagram a business model using the Business Model Canvas.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
CO5: Explain how the IoT can be used to provide solutions in healthcare, energy, smart-city, and manufacturing.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
CO6: Explain the importance of designing IoT solutions that secure and protect devices, software, and data.	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D

III. Course Outline:

Allotted Time	Course Outcomes (CO)	Intended Learning Outcomes (ILO)	Topic/s	Suggested Readings	Teaching-Learning Activities	Assessment Tasks/Tools	Grading Criteria	Remarks
Week 1 August 7-8, 2025 5 hrs			Course Orientation (Class Policies & requirements) Orientation on the Laboratory policies.	Student Handbook Course Syllabus	1. Orientation 2. Walk-through on the Curriculum 3. Student online registration to Academy.	1. Online Registration 2. Online student enrolment		

Technology with more emphasis on technopreneurship, management, IT solutions and the likes through research collaborations.

PEO3: Graduates are practicing professionals in the field of Information Technology who can contribute significantly to human development, socio-economic transformation, and patriotic initiatives.

Program Outcomes:

a: Apply knowledge of computing, science, and mathematics in solving computing/IT-related problems through critical and creative thinking;

b: Use current best practices and standards in solving complex computing/IT-related problems and requirements;

c: Analyze complex computing/IT-related problems by applying analytical and quantitative reasoning; and define the computing requirements appropriate to its solution.

d: Identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer based-systems.

			Creation of online student account.			3. Access to curriculum		
Week 2-3 August 11-22, 2025 10 hrs	**CO1**	- Analyze the things that make up the IoT. -Explain how things connect to other things and to the IoT.	**-Chapter 1:** Things and Connection	Online curriculum Chapter 1 Lecture Slides	- Lecture/seminar - Videos - Interactive Activities - Packet Tracer Activities - Jigsaw learning -- group activities - module quizzes -device Configuration	- online self-assessment test - online chapter Exam - hands-on/ practical assessment -Activity 1	70% passing	
Week 4-5 August 25-Sept 5 , 2025 10 hrs	**CO1, CO2**	- Explain how components and devices are used to build and measure values in electronic circuits. - Create circuits and microcontroller programs with the Arduino and a variety of components. -Explain how Packet Tracer models IoT systems.	**- Chapter 2:** Sensors, Actuators and Microcontrollers - Power supply (1.5vdc, 3vdc, 5vdc, 12vdc) - Relay - Actuator (solenoid) - Temperature sensor - Moisture sensor - Light sensor - Pressure Sensor - Humidity sensor	Online curriculum Chapter 2 Lecture Slides	- Lecture/seminar - Interactive Activities - Packet Tracer Activities - Virtual box/VMware - group activities - module quizzes	- online self-assessment test - online chapter Exam - hands-on/ practical assessment	70% passing	

e: Design creatively, implement and evaluate different computer-based systems, processes, components, or programs to meet desired needs and requirements under various constraints

f: Integrate effectively the IT-based solutions into the user environment with appropriate consideration for public health and safety, cultural, societal, and environmental concerns;

g: Select, adapt and apply appropriate techniques, resources, skills, and modern computing tools to complex computing activities, with an understanding of the limitations.

h: Function effectively as individual, or work collaboratively and respectfully as a member or leader in diverse development teams and in multidisciplinary and/or multicultural settings.

i: Assist in the creation of an effective IT project plan;

j: Communicate effectively in both oral and in written form by being able to deliver and comprehend instructions clearly; and present persuasively to diverse audience the

Week 6 Sept 8-12 , 2025 5 hrs	**CO2, CO3**	- Explain the value of computer programs.	- **Chapter 3:** Software is Everywhere - GPS module - SMS module - Bluetooth connection - Websocket protocol	Online curriculum Chapter 3 Lecture Slides	- Lecture/seminar - Interactive Activities - Packet Tracer Activities - module quizzes	- online self-assessment test - online chapter Exam - hands-on/ practical assessment	70% passing	
Week 7-8 Sept 15-26 , 2025 10hr		- Use the SBC (Raspberry Pi, Orange Pi) for simple applications. - Use a modeling tool (Packet Tracer, UML) to model IoT systems.						
Week 9 Sept 29-Oct 3, 2025	**MIDTERM EXAMINATION**						70% passing	

complex computing / IT-related ideas and perspectives; **k:** Assess local and global impact of computing information technology on individuals, organizations, and society; **l:** Act in recognition of professional, ethical, legal, security and social responsibilities in the utilization of information technology; **m:** Recognize the need to engage in independent learning and be at pace with the latest developments in a specialized field in IT, with emphasis on Database Management and Information System; Network Design and Administration; and Computer Vision and Image processing for continual development as a computing professional; **n:** Participate in generation of new knowledge; or in research and development projects aligned to local and national development agenda or goals with the end view of contributing to the local and national economy; and **o:** Preserve and Promote	Week 10-11 Oct. 13-24, 2025 10 hrs	**CO2, CO3**	- Explain how the network supports the IoT. - Explain why fog and cloud computing are used in IoT systems.	**- Chapter 4:** Fog Networks and Cloud Services	Online curriculum Chapter 4 Lecture Slides	- Lecture/seminar - Interactive Activities - Packet Tracer Activities - module quizzes - device configuration - troubleshooting device connectivity	- online self-assessment test - online chapter Exam - hands-on/ practical assessment	70% passing	
	Week 12 Oct. 27-31, 2025 5 hrs	**CO3,CO5**	-Explain how Networking (Cisco, MikroTik, etc) equipment, software, and services enable IoT systems. -Explain the value of Industrial IoT Applications. -Explain how IoT systems solve real world problems.	**Chapter 5:** Industrial IoT Appliances -IIoT connectivity - MQTT Protocol - Websocket protocol	Online curriculum Chapter 5 Lecture Slides	- Lecture/seminar - Interactive Activities - Packet Tracer Activities - module quizzes - device configuration - troubleshooting device connectivity	- onlin self-assessment test - online chapter Exam - hands-on/ practical assessment	70% passing	

"Filipino historical and cultural heritage".	Week 13-14 Nov. 3-7, 2025 10 hrs	**CO2,CO3, CO4,CO5, CO6**	- Investigate real-world social or environmental problems. - Design an IoT solution that addresses a real-world social or environmental problem.	**- Chapter 6:** Create an IoT Solution	Online curriculum Chapter 6 Lecture Slides	- Project Consultation -Progress Reporting	- online self-assessment test - online chapter Exam - hands-on/ practical assessment	70% passing	
	Week 15-16 Nov. 10-21, 2025 10 hrs		- Create an IoT system. - Design a plan to market an IoT solution.						
	Week 17 Nov. 24-28, 2025 5hrs		- Explain how to continue your learning about the IoT.						
	Week 18 Dec 5-	**FINAL EXAMINATION**						70% passing	

13, 2025			

- **Course Requirements:**

- Class standing (attendance, participation, etc.) policy:

(a) Expected classroom behavior (may want to develop this with the students, e.g., What guidelines m are appropriate for behavior and participation in a large class

- Students must come to class on time.
- Strict observance of deadlines.
- Class participation is encouraged.
- Observe proper courtesy.

(b) Ground Rules for participation in discussions or activities.

- Only one student may talk at a time.
- Must follow instructions for every activity given.
- For group activity, each member must participate accordingly.

2. Course Readings/Materials:

(a) Titles, authors, and editions of textbooks and other materials, required and recommended

1. Starter Kit Manual by Mike Roberts
2. Designing the Internet of Things Adrian McEwen et al
3. Internet of Things (IoT) in 5 days, Antonio Colina et al
4. Cisco Curriculum (www.netacad.com)

(b) Supplies needed (Arduino Uno Starter Kit, Electronic components, Desktop PCs/Laptop, Internet Connection

- Packet Tracer

(c) URLs for online resources

- https://www.raspberrypi.org/
- www.tutorialspoint.com

3. Assignments, Assessment, and Evaluation

(a) Policy concerning homework (grading, posting, late policy, etc.)
Students may share ideas as they work on their assignments but the submitted assignments must be their own work.

(b) Policy concerning make-up exams
No special examination is given unless a student has valid reasons stipulated in the Student Handbook Article 3: Excused Absences.

(c) Policy concerning late assignments/requirements

- Assignments: no assignment for a particular date, will have a grade of zero (0).
- Projects: late submission of projects will have a corresponding consequence. There will be a deduction of points for every day that the project submission will be late.

(d) Preliminary information on term papers or projects, with due dates

- Projects for midterm and finals are given ahead of time along with its corresponding due dates, rubrics, and other requirements for the completion of the projects.
- Non-submission of projects does not mean you

(e) List of assignments that will impact the final grade and % weight given each

- Portfolio: grade will be part of the PIT.

(f) Description in detail of grading processes and criteria (how many quizzes, tests, papers; weighting of each; amount of homework, etc.) or the GRADING POLICY

Grading System

Lecture Grade (67%)	
Performance Item/Criteria	**%**
Class Performance Item	10%
Quizzes (All quizzes, prelim and pre-final exams)	40%
Major Exams (i.e, Midterm and Final Exams)	30%
Performance Innovative Task / Project	20%
TOTAL	**100%**
Laboratory Grade (33%)	
Performance Item/Criteria	**%**

Laboratory Exercises/Reports	30%
Laboratory Major Exam	40%
Hands on Exercises	30%
TOTAL	**100%**

Term/Periodic Grade = 67% Lecture Grade + 33% Laboratory Grade

Options:

FINAL GRADE (FG) = 1/3 Midterm Grade (MTG)+ 2/3 Final Term Grade (FTG)

FINAL GRADE (FG) = 1/2 Midterm Grade (MTG)+ 1/2 Final Term Grade (FTG)

(Passing Percentage is 70%)
Ex. In a 10-item quiz, obtaining 7 points would be equivalent to a passing score.

Disclaimer:
Every attempt is made to provide a complete syllabus that provides an accurate overview of the subject. However, circumstances and events make it necessary for the instructor to modify the syllabus during the semester. This may depend, in part, on the progress, needs, and experiences of the student.

Rubrics

Rubrics fore Research Assignments

Criteria	Content	Authenticity	Originality	Total
	The content aligns with the given topic.	The work is original and not produced by any AI generation tool.	The content is original and not plagiarized.	
Percentage(%)	20%	30%	50%	100%

Rubric for Exercises

Criteria	Functionality	Creativity	Originality	Total
	The app is 100% working based on specifications with no errors and bugs found	The interface is well designed and the colors are pleasing to the eye.	The code base in written with originality and not generated or aided by any AI apps, copied from. Source code is not a duplicate from other students answers.	

				Validation process will be conducted thru oral questions.	
	Percentage (%)	50%	20%	30%	100%

Rubrics for Projects

	Criteria	Functionality	Creativity	Collaboration	Total
		The app is fully functional according to the specifications, with no errors or bugs detected.	The interface is well-designed, with colors that are visually appealing.	The team collaborates effectively using Git, ensuring regular merges, commits, and pushes.	
	Percentage (%)	40%	20%	40%	100%

Prepared by:

ENGR. JAY NOEL N. ROJO, MSIT
Instructor

Recommending Approval:

DR. LOVE JHOYE M. RABOY
Chairperson, Dept. of Information Technology

Approved by:

DR JUNAR A LANDICHO
Dean, CITC

Commented [1]: For your approval, Dean @junarlandicho@ustp.edu.ph _Assigned to junarlandicho@ustp.edu.ph_