



# Introduction to Space Payload (API011)

## **Course Overview**

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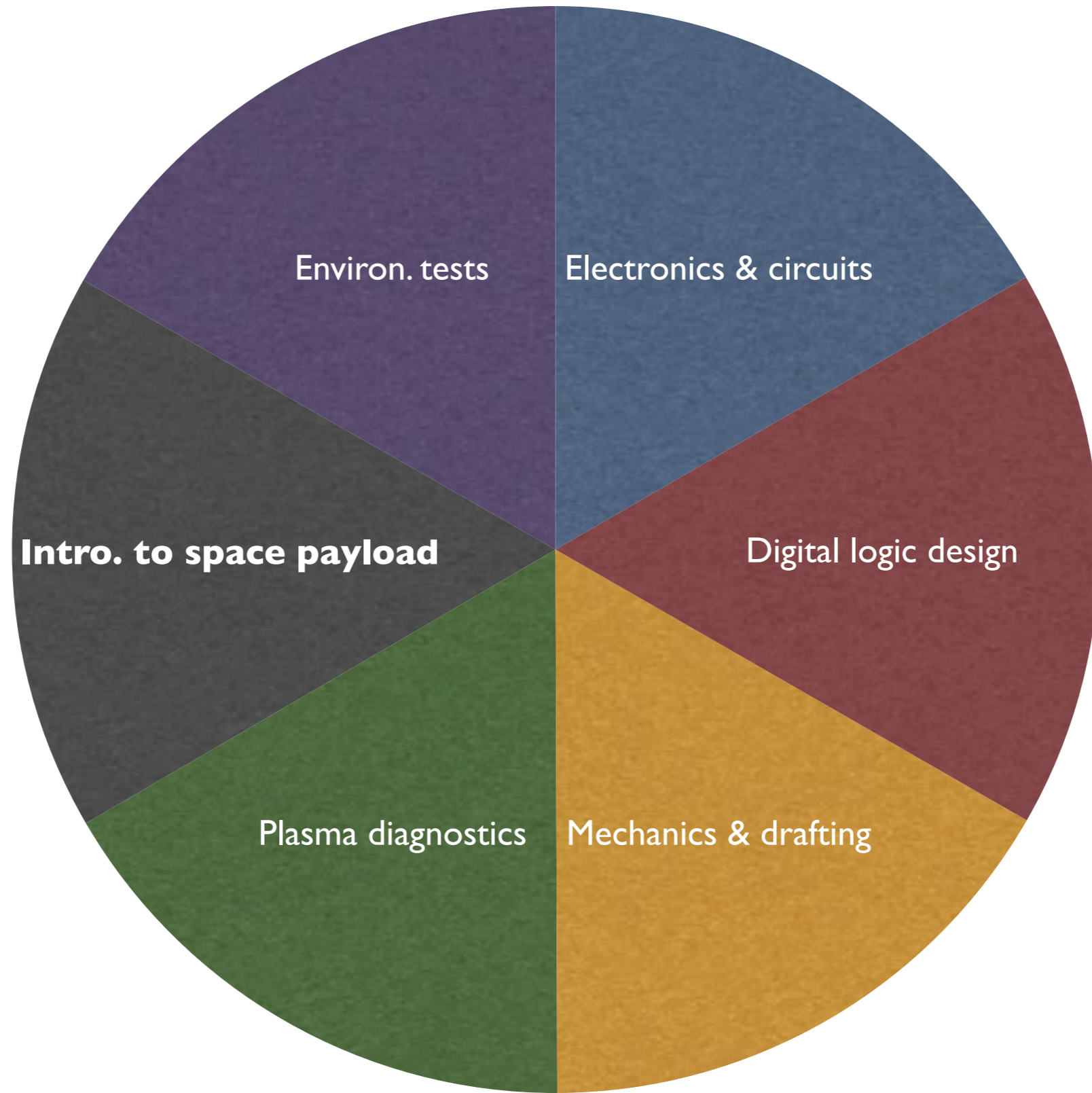
# Syllabus

- Instructor: Chi-Kuang Chao
- Assistant: Yi-Wun Chen (陳怡玟, ext 36755 or 65781, [chen.wendy@g.ncu.edu.tw](mailto:chen.wendy@g.ncu.edu.tw))
- Course type: elective course
- Classrooms: S4-811 and S4-805-1
- Lecture time: 56 hours/week for 1 week.
- Lecture hours: 8:00-11:50 & 13:00-16:50.

# Objectives

- The course is designed for undergraduate freshmen or senior high school students to introduce space payload in a hand-on style.
- One of the fundamental knowledge to design/analyze/fabricate/test space payload.

# Space payload



# Course outline

- Introduction
  - About SPL
  - Space science
  - Ionosphere
  - FS-7 IVM
  - IVM - principle of measurement
  - IVM - circuit of measurement

# Course outline (cont.)

- DAQ
  - ELVIS
  - LabVIEW SE - data acquisition
  - LabVIEW - programming
  - LabVIEW - digital data processing

# Course outline (cont.)

- Mechanics
  - SolidWorks - mechanical design
  - SolidWorks - simulation and analysis

# Course outline (cont.)

- PCB fabrication and assembly
  - MultiSim - circuit design
  - Ultiboard - circuit layout
  - LPKF - PCB fabrication
  - SMT - assembly
  - TH - soldering



# Course outline (cont.)

- Environmental tests
  - EMIC - vibration test
  - Temptronic - temperature cycling test and thermal vacuum test
  - Julabo - thermal vacuum test
  - SPSC - monitoring and plasma system
  - IVM - in-house instrument measurement

# Course outline (cont.)

- Data processing
  - MATLAB - programming
  - MATLAB - data analysis

# Course materials

- In-class lecture slides will be presented during the session and can be downloaded before the session begins
- Downloaded them from <http://athena.ss.ncu.edu.tw/>

# Grading

- Attendance (20%)
- Practices (60%)
- Final presentation and report (20%)

	8:00-9:50	10:00-11:50	13:00-14:50	15:00-16:50
7/17 (MON)	Opening 開幕式 趙吉光、811	SPL 課程與實驗室簡介 趙吉光、811	ELVIS 儀器介紹與操作 范振宇、811	LabVIEW SE 訊號擷取與實習 陳怡姘、811
7/18 (TUE)	FS-7CI 電離層與 IVM 趙吉光、811	IVM 量測電路與實習 洪晟銘、811	LabVIEW 程式設計與實習 陳怡姘、811	LabVIEW 數位擷取與實習 陳怡姘、811
7/19 (WED)	MultiSim 電路模擬與實習 林宗琪、811	Ultiboard 電路配置與實習 林宗琪、811	LPKF 電路板製作 范振宇、811/805-1	SMT 元件組裝實習 范振宇、811/805-1
7/20 (THU)	SolidWorks 機構設計與實習 曾從恩、811	Space 太空科學簡介 蘇信一、811	TH 元件組裝實習 林崇聖、811	TH 元件組裝實習 林崇聖、811
7/21 (FRI)	NSPO 太空中心簡介 陳維鈞、NSPO	NSPO 立方衛星 / 福衛七號 林信嘉 / 朱崇惠、NSPO	NSPO 衛星操控中心 NSPO	NSPO 衛星整測廠房 NSPO
7/22 (SAT)	Temp. & JULABO 溫循與熱真空測試 蔡秉翰、811/805-1	EMIC 振動測試與操作 蔡秉翰、811/805-1	SPSC 監控系統 洪晟銘、811/805-1	IVM 自製儀器量測 洪晟銘、805-1
7/23 (SUN)	MATLAB 程式設計 林崇聖、811	MATLAB 資料分析 林崇聖、811	Evaluation 心得報告 趙吉光、811	Evaluation 心得報告 趙吉光、811

# For more information

- Please visit the course web page at <http://athena.ss.ncu.edu.tw/>
- Contact me
  - By phone: 03-4227151
    - Ext.65754 at S4-804 (Office)
    - Ext.65781 at S4-805-1 (SPL - core facilities)
    - Ext.36755 at S4-820 (SPL - learning facilities)
  - By e-mail: [ckchao@jupiter.ss.ncu.edu.tw](mailto:ckchao@jupiter.ss.ncu.edu.tw)