

The Students' Review

Deciding to sign up for this or that class is always a hassle. More so, for students who are only starting out at CMU Africa. As with every life experience, we thought that we could benefit immensely from hearing students who have taken certain classes share their experiences with you.

This review is unofficial and is only aimed at giving you an idea of what to expect. As it is heavily influenced by the backgrounds and capabilities of the reviewers, and does not cover all courses, please take the liberty to seek more perspectives by speaking to as many students as you can.

We wish you the best of luck in your first semester.

This is an initiative of the Academic & Research Ministry, in partnership with our Academic Adviser, Olga G. Buki.

Table Of Content

04-330 Fundamentals of Software Development and Problem Solving (PFUN)	4
04-605 (ICT Professional Development Seminar)	6
04-606 (Academic Skills for Engineers I)	7
04-608 (Advanced Academic Skills for Engineers I)	8
04-611 (Strategic Uses of Digital Information in Enterprise)	9
04-630 (Data Structures and Algorithms for Engineers)	10
04-631 (Advanced Database Systems)	11
04-632 (DevOps: Software Development and IT Operations)	12
04-638 (Programming for Data Analytics)	13
04-641 (Fundamentals of Telecommunications and Computer Networks)	14
04-645 Internet of Things (IoT)	15
04-650 (Mathematical Foundations of Machine Learning)	17
04-651 (Applications of Artificial Intelligence in Africa)	19
04-653 (Engineering AI Project Methods)	20
04-654 (Introduction to Probabilistic Graphical Models)	21
04-655 (Artificial Intelligence for Engineers)	23
04-701 (Research Methods in Engineering)	24
04-720 (Ethical Hacking)	25
04-730 (Augmented and Virtual Reality)	26
04-800-B (Recommender Systems)	Error! Bookmark not defined.
04-800-D (AI & Emerging Economies)	Error! Bookmark not defined.
04-800-E (Foundations of Entrepreneurship)	27
04-800-F (Educational Technology Design)	28
04-800-G (Humanoid Robotics and Cognition)	29
04-800-H (Quantitative Financial Analytics and Algorithmic Trading)	30
04-800-I (Introduction to Systems Software Engineering)	32
04-800-J (Cloud Infrastructure and Computing)	34
04-800-K (AIOps: Continuous and Automated IT and AI Monitoring)	35
04-801-A1 (Deep Learning Systems: Hardware, Compilers, and Algorithms)	36
04-801-N1 (Electronic Business and Technology)	Error! Bookmark not defined.

The Students' Review, Fall 2024

04-900 (MSIT Practicum)	37
04-910 (Entrepreneurship Project)	38
04-950 (Engineering Artificial Intelligence Capstone)	39
04-980 (Engineering Independent Study)	40
04-990 (Engineering Research Project)	41
11-611 (Natural Language Processing)	42
11-741 (Machine Learning with Graphs)	43
11-755 (Machine Learning for Signal Processing)	44
11-785 (Introduction to Deep Learning)	45
18-631 (Introduction to Information Security)	47
18-652 (Foundations of Software Engineering)	48
18-661 (Introduction to Machine Learning for Engineers)	49
18-681 (Power Electronics)	51
18-731 (Network Security)	52
18-751 (Applied Stochastic Processes)	53
18-785 (Data, Inference, and Applied Machine Learning)	54
18-799 (Robotics: Principles and Practice)	Error! Bookmark not defined.
18-859 (Networking Lab)	55
18-861 (Energy Project Development and Economic Studies)	56
18-862 (Control of Grid-Connected Machines & Converters)	57
18-865 (Photovoltaic Systems Engineering)	58
18-980 (M.S. Graduate Project, Course Option I or Project Option Phase I)	59
18-981 (M.S. Graduate Project, Course Option II)	60
18-989 (Introduction to Graduate Studies)	61
19-608 (Privacy, Policy, Law & Tech)	62

04-330 Fundamentals of Software Development and Problem Solving (PFUN)

Average Weekly Time Demand: 12 hours / Week.

Average Difficulty Level on a scale of 1-5: 4

Course Structure

- Weekly programming assignments
- Weekly chapter review

Recommended skills to have.

- None, this is a foundational course

Tools and Technologies Utilised in Course

- Eclipse
- Java

Reviews

- This course is for beginners, and it does not count in terms of credits on the required course list.
- The course will give you a solid understanding of Java language which will also add as an advantage in learning C/C++.
- If you want to learn the best way in this course:
 1. **NEVER use ChatGPT**, when things get tough find TAs.
 2. Follow the instructor's guidelines, [sometimes a task can be done easily with a library, if the professor says don't use them yet, follow that to learn better]
 3. The best way to learn in this course is through practice.
- Have fun!

4. 04-601 (ICT in Africa Seminar)

Average Weekly Time Demand: 9 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.25

Course Structure

- Individual and group paper summaries
- Research project.

Recommended skills to have.

- Attention to detail.
- Interpersonal Skills (Communication, Presentation etc.)

Tools and Technologies Utilised in Course

- Citation managers (Zotero, Mendeley, ...)
- Overleaf
- Presentation Software

Reviews

- There are papers to read and summarize both as an individual and in groups. Expect to use 4-5 hour for the individual summary and about 3 hours for the group discussions (both times are subjective)
- Be curious and detail-oriented in assessing publications and explore additional resources.
- Carefully read the provided research papers to be able to accurately respond to questions asked about it.
When trying to solve a problem, do not devise a solution based on what you feel like would work. First carry out EXTENSIVE research to really understand the problem and see if it is even a problem at all. Sometimes students produce a solution for a non-existent problem. Research is key.

This course goes well with ...

- 04-701 Research Methods

04-605 (ICT Professional Development Seminar)

This is a second-year course. If interested, please check out the course description [here](#).

04-606 (Academic Skills for Engineers I)

Average Weekly Time Demand: 4 hours / Week.

Average Difficulty Level on a scale of 1-5: 1

Course Structure

- Assignments

Recommended skills to have.

- None, as this is a foundational course

Reviews

- If they recommend you take the course, just take it.
- Great course.
- You can spend at maximum 3 hours working on assignment.

04-608 (Advanced Academic Skills for Engineers I)

If interested, please check out the course description [here](#).

04-611 (Strategic Uses of Digital Information in Enterprise)

Average Weekly Time Demand: 12 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- Four assignments
- Final project

Recommended skills to have.

- Critical Thinking

Tools and Technologies Utilised in Course

- IBM STT and TTS

Reviews

- It is a bit demanding but very doable.

04-630 (Data Structures and Algorithms for Engineers)

Average Weekly Time Demand: 17.5 hours / Week.

Average Difficulty Level on a scale of 1-5: 4.166

Course Structure

- Seven programming assignments (benchmarked for time and space complexity)
- Final project
- Two quizzes

Recommended skills to have.

- C/C+ basics
- Data structure basics
- Basic debugging skills
- Familiarity with problem solving.
- Familiarity with Linux environment

Tools and Technologies Utilised in Course

- g++/gdb
- CMake (and the systems it builds)
- Your IDE of choice

Reviews

- Take Intro to System software first if you are not familiar with any low-level language.
- Start assignments early, take advantage of office hours, use source control to track your work, and do independent work.
- This is not an easy course, when an assignment is released, start working on it immediately do not wait.
- Do not give your code to anyone at all costs, you will simply get caught.
- Have solid knowledge of C/C++ before approaching this course, this content is usually glossed over in a week. The assumption as the course advances would be that you have knowledge of C/C++ while approaching the subsequent course content.

04-631 (Advanced Database Systems)

Average Weekly Time Demand: 12.25 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.5

Course Structure

- Quizzes
- Midsemester and Final examinations
- Individual and group assignments

Recommended skills to have.

- Basic SQL programming
- Basic RDBMS
- Basic XML

Tools and Technologies Utilised in Course

- PostgreSQL
- XML
- SQL
- ERD Diagramming Software
- PostGIS
- MongoDB

Reviews

- Learn the database basics before joining the course.
- Some concepts may not be easily understood at first but can be understood well after revising the course materials.
- The instructor is very committed to helping students understand the concepts and offers some leniency in terms of extra classes and extra assignments if and when needed.
- This course has quizzes, exams, and both individual and group assignments starting with familiar concepts first such as normalization, triggers and SQL then building up to advanced concepts like concurrency controls, recovery, NoSQL and XML databases.

04-632 (DevOps: Software Development and IT Operations)

Average Weekly Time Demand: 11 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- Seven projects
- Random class quizzes
- Midsemester and final examinations

Recommended skills to have.

- Basic understanding of software engineering concepts
- operating systems
- Basic Git familiarity
- Basic knowledge of the Linux shell.

Tools and Technologies Utilised in Course

- Azure
- SonarCloud
- Dockers
- Kubernetes
- Java
- NodeJS
- YAML

Reviews

- You will learn so much from the seven project assignments than you can imagine. Like 60% of all your learning
- If possible, learn and explore beyond what is taught in class to get yourself ahead and improve your industry-readiness.
- This course is good for someone venturing into the field of DevOps. It is however minimal for someone who has several years of experience or has been in an SRE role before.

It introduces students to the DevOps tools and practices.

- Start projects early.

04-638 (Programming for Data Analytics)

Average Weekly Time Demand: 13.3 hours / Week.

Average Difficulty Level on a scale of 1-5: 2.5

Course Structure

- Six assignments (individual and group work)
- 2-6 hours of work per assignment
- Final project assignment (4-10 hours)

Recommended skills to have.

- Python programming
- pandas

Tools and Technologies Utilised in Course

- Python + Jupyter
- NumPy + pandas
- matplotlib
- scikit-learn
- anacondas

Reviews

- If you are not confident in your python and do not have data analysis skills, I would recommend this course. By the end, you will be very good with all the tools and skills you need for the rest of your time at CMU and at work too.
- Planning to familiarize yourself with python Programming before joining the class or in parallel.
- If you are not good at python, take this class with DIAML. The skills here will help you keep up with DIAML assignments and at some point, the two converge.
- Follow every lecture as it is important to understand the concepts and will be used in many other future courses you might take here at CMU.

This course goes well with ...

- 18-785 (Data, Inference, and Applied Machine Learning)

04-641 (Fundamentals of Telecommunications and Computer Networks)

Average Weekly Time Demand: 12 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.5

Course Structure

- Quizzes (based on assigned readings)
- Weekly labs
- Midsemester and Final examination

Recommended skills to have.

- Basic networking knowledge

Tools and Technologies Utilised in Course

- Cisco Packet Tracer

Reviews

- Pay attention during lectures so you do not have to go back and repeat them. Most of the class lectures were very detailed and once I took notes reading was not difficult. Knowledge in the area will give you an upper hand and make it easier to do well.
- If you want a good foundation in telecommunications and networking and if it forms a major part of your concentration, take networking lab alongside.
- The course has a very comprehensive structure. There are labs and other assignments. If you grasp the course content well, you will not spend too much time on the assignments and labs.
- Enjoy the course!

This course goes well with ...

- 18-731 (Network Security)
- 18-859 (Networking Lab)

04-645 Internet of Things (IoT)

Average Weekly Time Demand: 10 hours / Week.

Average Difficulty Level on a scale of 1-5: 2.5

Course Structure

- Five labs
- Five assignments
- Midsemester examination
- Final project

Recommended skills to have.

- Basic arithmetic
- LaTeX basics (for writing lab and project reports)
- Basic electronics knowledge

Tools and Technologies Utilised in Course

- NodeJS
- Raspberry Pi
- Git
- Basic Web App development

Reviews

- The first few weeks are dedicated to simple sensor and actuator mathematics, but the rest of the course is more focused on the web technologies and wireless network technologies that support IoT, with a few classes dedicated to simple IoT data fusion and analysis (especially using Kalman filtering). A series of individual and team-based lab activities and take-home homework are given, and there is only one exam (midterm exam) with the tail-end of the semester being dedicated to a project.
- The course material is quite packed. It will be great if you do not leave all lecture notes until midterm to study because you will get overwhelmed. Your TA will always be supportive for Labs so always take them seriously.

The Students' Review, Fall 2024

- All students pass the project, labs, and homework (as long as you put in the necessary effort). The exam is where many struggle, and will be the real distinguisher of who scores an A, B, C, etc.
- The course gives you a good introduction to Wireless Networks course, for those who wish to take the Wireless Networks course in Spring
By the end of the course, you will be good in web development with JavaScript-based technologies
IoT class is among the smallest in number of students, and therefore everyone is known by the Professor
The Professor is lenient and willing to extend deadlines if you provide a valid reason

04-650 (Mathematical Foundations of Machine Learning)

Average Weekly Time Demand: 15.75 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- Seven assignments (combination of mathematics and programming)
- Two-hour classes, twice a week
- Biweekly quizzes
- Midsemester and final examinations

Recommended skills to have.

- Knowledge of linear algebra
- Background in mathematics
- Python - SciPy, NumPy

Tools and Technologies Utilised in Course

- Python
- Latex (optional)
- Jupyter Notebooks

Reviews

- This is a good course to take if you plan to take any more machine learning and deep learning courses at CMU. Note that it is not a machine learning course, but a course that gives you the math behind concepts that will appear as you do machine learning and deep learning in theory and in practice.
It is easy to get an A but only if you understand everything in detail so go online and check YouTube to better understand linear algebra. The programming assignments are based on what was taught in class, and you cannot forge the code if you do not know the maths behind what you are doing.
Do not use GPT for this class. While you might be chasing good grades, it will be to your disadvantage in the more advanced ML classes as the maths there is based on what you learn here.
Assignments are linked to classwork and with a good TA, you will do well.

The Students' Review, Fall 2024

- This course has five required assignments and one optional one. You can expect to spend 10 hours or more working on each assignment.
- Read Prof. Gilbert Strang's book on Intro to Linear Algebra and watch his videos on YouTube fully. Do not miss recitations with the TA.
- It is a very nice course, and it will greatly be helpful as they prepare for other courses including Introduction to Machine Learning.
- Constantly read, especially in the beginning so that you can understand stuff in class. Read Gilbert Strang's book & watch videos recommended by TA & the Professor.
- If you are not continuing down the ML path, do not take this course. Use your units on something that will benefit you better.
- Take this course instead of ASP if you cannot take both to prepare for Intro to ML. Take Intro to ML to following semester so that the Math is still fresh!

This course goes well with ...

- Intro to Machine Learning

04-651 (Applications of Artificial Intelligence in Africa)

Average Weekly Time Demand: 8.33 hours / Week.

Average Difficulty Level on a scale of 1-5: 2.67

Course Structure

- Weekly summary paper
- Six assignments
- Final project

Recommended skills to have.

- Reading and presentation skills
- Basic research skills

Tools and Technologies Utilised in Course

- N/A

Reviews

- My advice to someone taking this course is to immediately review each assignment upon receiving it to gauge its length and difficulty, as the Research papers given in assignments can range from 6 to 30 pages. Choose your teammates carefully, and ensure you are responsible within your group by starting early, dividing tasks promptly, and meeting before any presentations. Ask questions, especially if you are new to the AI field since this course focuses on the application of AI in Africa.
- Start reading the papers early, take the summaries seriously and enjoy the course.
- Learn how to read research papers and how to write summaries of the papers.

04-653 (Engineering AI Project Methods)

This is a second-year course. If interested, please check out the course description [here](#).

04-654 (Introduction to Probabilistic Graphical Models)

Average Weekly Time Demand: 12 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.5

Course Structure

- Module based
- One quiz and assignment per module
- Five modules
- Midsemester and Final examinations

Recommended skills to have.

- Probability theory and statistics
- Graph theory (a recap would be offered, however)
- Python (Networkx will be introduced, assuming you have previous Python knowledge)

Tools and Technologies Utilised in Course

- Python (+ Numpy, Matplotlib, Networkx)

Reviews

- Make every effort to attend all the lectures, as missing even one can make it challenging to catch up. Begin the assignments early and allocate time to practice the mathematical questions in order to excel in both the assignments and quizzes.
- This course is an excellent foundational class for MSEI students who need to strengthen their mathematics skills. The instructor is highly supportive, ensuring that all students comprehend the material before progressing to the next module.
- Review the prerequisites of the course before everything. Additionally, there is currently a whole work-on course to help students gain hands-on experience with real-world applications using PGM compared to Deep Learning techniques.
- Have an open mind when going in and pay close attention since some concepts sound unfamiliar at the start. The terminologies can be confusing but ask questions. Life is too hard to not know things when you could have asked in

class. Attend office hours and inquire as much as you can where you do not understand.

This course goes well with ...

- 18-751 (Applied Stochastic Processes)
- 11-785 (Introduction to Deep Learning)

04-655 (Artificial Intelligence for Engineers)

Average Weekly Time Demand: 9 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- Biweekly assignments
- Weekly summaries
- Final Project
- Final Examination

Recommended skills to have.

- Basic python
- Basic machine learning knowledge

Tools and Technologies Utilised in Course

- Python

Reviews

- This course covers mostly theory about AI and machine learning. The student will require a little bit of programming knowledge to get the programming assignments done and Python is the programming language used.
- It is mostly Theory based, and students will be required to read a lot.
- Great for beginners who want to get theoretical knowledge.

This course goes well with ...

- 18-785 (Data, Inference, and Applied Machine Learning)

04-701 (Research Methods in Engineering)

Average Weekly Time Demand: 5.67 hours / Week.

Average Difficulty Level on a scale of 1-5: 2

Course Structure

- Research proposal (about five sub-deliverables based on the structure of the proposal.)
- Every assignment helps you build on your proposal which will be complete at the end of the course.

Recommended skills to have.

- No specific skills are required.

Tools and Technologies Utilised in Course

- Citation managers (Zotero, Mendeley, ...)
- Overleaf
- Presentation Software

Reviews

- Follow instructors' advice and recommendations to the core. Always make early submission to receive timely feedback. Instructors feedback is very important and helpful.
- Take everything little thing seriously so that you don't miss an A by 1 mark.

04-720 (Ethical Hacking)

Average Weekly Time Demand: 12.67 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- Eleven assignments
- Final group project

Recommended skills to have.

- Basic Bash knowledge
- Basics of Information Security

Tools and Technologies Utilised in Course

- Kali Linux
- OpenVPN
- OSINT
- Nmap, etc

Reviews

- Ethical hacking course focused on penetration testing and cyber defence, It provides advanced skills in identifying and exploiting vulnerabilities in systems to improve their security.
- I really recommend this course, it is remote, and the lecture is whaoooo, but make sure you take at least the Introduction to information security course before taking it.
- The course was very exciting and enjoyable, particularly the final project where we were grouped under the red and blue teams. We were given a controlled environment to conduct testing as part of the red team while the blue team was monitoring our exercises.
Overall, the project brings a lot of fun and excitement while learning new skills.

This course goes well with ...

- 18-631 (Introduction to Information Security)

04-730 (Augmented and Virtual Reality)

Average Weekly Time Demand: 15 hours / Week.

Average Difficulty Level on a scale of 1-5: 5

Course Structure

- Lab-based
- Four labs

Recommended skills to have.

- C# programming

Tools and Technologies Utilised in Course

- C#
- Unity engine

Reviews

- It would be great if you have a prior experience with C# at least otherwise you will struggle a lot

04-800-E (Foundations of Entrepreneurship)

Average Weekly Time Demand: 8.33 hours / Week.

Average Difficulty Level on a scale of 1-5: 2.33

Course Structure

- Five assignments
- Final project

Recommended skills to have.

- Presentation skills
- Communication skills
- Reading Skills
- Writing Skills

Tools and Technologies Utilised in Course

- Presentation tools (PowerPoint, SlideShare etc)
- Word processing tools (Microsoft word, Google Docs, etc)

Reviews

- This course is for people interested in entrepreneurship.
- The course content is exciting, and the instructor is amazing, but start your assignments on time. Assignments windows are usually short.
- This is a great course for students that could potentially want to start their own startups. It equips the student with great knowledge and skills about running and operating a startup. The content is very good, and the professor is even better. I liked the professor of the course so much.
- Come into the class with a mindset to contribute to the class discussions, it sharpens your mind, accelerates your learning process, and allows other students to leverage your wealth of knowledge.

This course goes well with ...

- Entrepreneurship Seminar

04-800-F (Educational Technology Design)

This is a new course. If interested, please check out the course description by searching using the course name at this [link](#).

04-800-G (Humanoid Robotics and Cognition)

Average Weekly Time Demand: 11 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.5

Course Structure

- Assignment-based
- Two projects

Recommended skills to have.

- C# & Python basics
- CAD/3D printing

Tools and Technologies Utilised in Course

- C# & Python
- Raspberry Pi
- Unity engine,
- CAD/3D printing
- Eva Robot head

Reviews

- Learn Unity and get familiar with raspberry pi. Prior AI experience will be helpful
- Prof. Conrad was busy during the semester; it will be helpful if you can be self-sufficient.
- This course requires two projects to be completed each half of the semester. The first one is about working on a humanoid robot (in our case it was building a humanoid robot head from scratch that can mimic human facial moves and show face expressions like sentiments of anger, joy, surprise...) and the second one is to solve one grand challenge related to humanoid robot but using virtual reality and AI. It also has some little assignments about understanding and implementing from scratch some machine learning algorithms and how they are related to humanoid robotics.
- It will be demanding, especially the projects, so be ready to dedicate time for it.
- The course was like a competition where the class was divided in teams and winning teams in each project present their work to an international conference.

04-800-H (Quantitative Financial Analytics and Algorithmic Trading)

Average Weekly Time Demand: 17.67 hours / Week.

Average Difficulty Level on a scale of 1-5: 4.67

Course Structure

- About ten programming assignments
- Two MCQs

Recommended skills to have.

- Financial Trading Basics
- Python (Numpy, Matplotlib)

Tools and Technologies Utilised in Course

- Python programming language
- Backtesting Libraries like Backtrader, Backtesting.py, Zipline etc.
- Data providers like YahooFinance, etc
- Visualization tools in python like Matplotlib etc
- Brokerage APIs like Interactive Brokers, Oanda, cTrader etc.
- GitHub and Git

Reviews

- Students should be familiar with python, financial markets, basic statistics and how to use software packages/libraries. Students also need to be able to query APIs and effectively read software documentation. Overall, it will be good if students are curious about what they hope to achieve in the course and motivate themselves constantly since it is self-paced.
- Do not take this course. Take a course that will have more benefit to your career, role, and time as a student here. For example, complete your cores, or take a course to prepare for deep learning or intro to ML. There is nothing to learn in this course.
- If you are considering a career as a Quant Researcher or Quant trader, then this might be a good course for you. To take the course you need to have at least an intermediate understanding of Python Programming Language and you need to be determined to succeed. Also, you need to be honest or clear about your goal

The Students' Review, Fall 2024

for taking the course early on and this should obviously not be to fulfil a credit requirement.

- It's a very challenging course. If not properly attended to, can become very time consuming. Can end up requiring enormous amounts of mental effort to complete. Expect minimal guidance. Most of the responsibility will be left to you.

04-800-I (Introduction to Systems Software Engineering)

Average Weekly Time Demand: 17 hours / Week.

Average Difficulty Level on a scale of 1-5: 4

Course Structure

- Eleven programming assignments
- Final project

Recommended skills to have.

- Git basics
- Beginner C
- Any non-functional programming language
- Basic algorithm knowledge and passion for learning

Tools and Technologies Utilised in Course

- C
- Make
- gcc/gdb
- Linux
- IDE of choice

Reviews

- The lecturer uses his industry experience to make things practical and approachable.
- The course provides a solid entry point into low level system development.
- You learn not only programming, but the how and why of testing, debugging and other useful skills.
- Great way to learn C if you plan to do things like Embedded Systems
- This course is heavily based on practical assignments, requiring the application of lecture concepts. There were eleven assignments, which give you a hands-on experience building software, and a final project with less guidance.
- The instructor was engaging, he gave me a foray into the mind of a 20+-year-old software engineer. His thought process, style of tackling problems, and writing

The Students' Review, Fall 2024

codes stuck with me long after the course.

If you are heavy on software engineering, do not miss this.

- The course will take up time and assignments will be weekly, and it gets harder in the second half, make sure not to take classes with the same frequency of assignment and difficulty level. Ask around!
- Take office hours seriously, start early, write good tests for your assignments instead of trying to 'hack it.'
- Be prepared to commit your time and be open to learning, "You are about to become a C wizard and expert on systems programming."

Also, utilize office hours when stuck and be ready to take feedback from the assignment to improve your performance as the course progresses.

04-800-J (Cloud Infrastructure and Computing)

Average Weekly Time Demand: 12 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- Single project, iteratively worked on

Recommended skills to have.

- Basic programming skills

Tools and Technologies Utilised in Course

- Docker
- Kubernetes
- MongoDB
- Neo4j
- PostgreSQL
- OpenStack
- Data Centre management
- Overlay Networks

Reviews

- Don't underestimate the assignments. They look very easy as the start, but you can be surprised with the complexity later on.
- It's a good starting point for someone interested in becoming a Cloud Engineer or related field.
- It's a good course in general and the Professors are really good and practical with the concepts.

04-800-K (AIOps: Continuous and Automated IT and AI Monitoring)

Average Weekly Time Demand: 13 hours / Week.

Average Difficulty Level on a scale of 1-5:

Course Structure

- Seven assignments
- Four research papers
-

Recommended skills to have.

- Unix basics

Tools and Technologies Utilised in Course

- Containerization
- Container Orchestrations
- Service Meshes
- Time Series Analysis

Reviews

- Follow the content well. It's a well-organized and straightforward course
- It's a very good course but not one I would recommend to first years unless they already are familiar with the concepts listed above.

04-801-A1 (Deep Learning Systems: Hardware, Compilers, and Algorithms)

Average Weekly Time Demand: 4 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- In-class paper presentations
- Final project
- Final examination

Recommended skills to have.

- Basic machine and deep learning knowledge
- Familiarity with ML topics such as CNNs, SGD, ...

Tools and Technologies Utilised in Course

- N/A

Reviews

- It is very good course that focuses not only on the theory but touches the industry applications of some concepts in deep learning.
- Be comfortable with topics such as CNN. stochastic gradient descent. The course assumes you know these and focuses on how to optimize ml models

04-900 (MSIT Practicum)

This is a second-year course. If interested, please check out the course description [here](#).

04-910 (Entrepreneurship Project)

This is a second-year course. If interested, please check out the course description [here](#).

04-950 (Engineering Artificial Intelligence Capstone)

This is a second-year course. If interested, please check out the course description [here](#).

04-980 (Engineering Independent Study)

This is a second-year course. If interested, please check out the course description [here](#).

04-990 (Engineering Research Project)

This is a second-year course. If interested, please check out the course description [here](#).

11-611 (Natural Language Processing)

Average Weekly Time Demand: 9.5 hours / Week.

Average Difficulty Level on a scale of 1-5: 4

Course Structure

- Assignment-based (four)
- Midsemester and Final examination

Recommended skills to have.

- Python
- PyTorch familiarity
- Basic understanding of Deep Learning

Tools and Technologies Utilised in Course

- Python
- PyTorch
- Transformers library

Reviews

- Try to understand the assignment and do them because that is where the actual learning happens
- This course had four assignments. The first two were solely programming tasks, while the last two combined programming with experimentation and required providing insights into your findings. Everything is well-structured, and the course provides starter codes.
- The assignments build on each other, making it crucial to understand the topics covered in each one. We were given two weeks for each assignment. If you are familiar with NLP, the first three assignments, which had full guidance, could be completed in a week or less. The last two assignments, involving experimentation and research, varied in the time needed to complete them. Additionally, the course requires students to sit for a midterm and a final exam.

11-741 (Machine Learning with Graphs)

This is a new course. If interested, please check out the course description by searching using the course name at this [link](#).

11-755 (Machine Learning for Signal Processing)

Average Weekly Time Demand: 13 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.5

Course Structure

- Weekly quizzes
- Four assignments
- Group project.

Recommended skills to have.

- Linear Algebra
- Probability and Statistics
- Python + NumPy

Tools and Technologies Utilised in Course

- Python (Numpy, Librosa and PIL)

Reviews

- Try and get familiar with the prerequisites before the course starts.
- Make plenty use of your TAs and study groups to get assignments done.
- Start the assignments early and save up your slack days as much as possible.
- The course does not teach Deep Learning based methods. The ML methods covered are non-neural.
- The course workload is moderately balanced but may get heavy during the end of the semester when projects are due. It may help to avoid having multiple projects from other courses due at the same time.
- This course is very similar to 18-661. No neural networks are taught. Teaches both audio/image signals processing. Really cool projects/assignments (audio separations/image denoising, etc.)

11-785 (Introduction to Deep Learning)

Average Weekly Time Demand: 19.167 hours / Week.

Average Difficulty Level on a scale of 1-5: 4.5

Course Structure

- Four Programming assignments: Each homework has 2 parts (Part 1 and Part 2), effectively making them distinct assignments. Part 2s tend to take longer as they involve training models.
- Final Project: Developed over the semester with 4 submissions
 - o Project proposal
 - o Midterm report
 - o Final report
 - o Video presentation).
- Five Bonus Assignments
- Weekly Quizzes

Recommended skills to have.

- Python
- PyTorch
- Linear algebra
- Basic understanding of neural networks
- Probability basics
- Calculus for Backdrop and Gradient Descent

Tools and Technologies Utilised in Course

- Python (+PyTorch, NumPy, etc)
- Kaggle
- AWS
- VS code or any other IDE
- Jupyter Notebook
- Google Collab

Reviews

- You can take this course in your first semester if you know a bit of Machine Learning and have the basics above. However, my best advice is to not go Beyond 36 Units if you are taking.
- To successfully complete this course, collaboration is your friend. **You do not copy your friend's code**, but you discuss ideas on how to tackle the problems. Remember, as a CMU student you have to take this course if you want to be a useful graduate once you graduate (it is the best course that CMU-Africa has to offer).
- It will consume your time the most compared to other courses. So, take it with less time-consuming courses.
- If you do Intro to ML before this course, it is also good. Another course before this class is Math Foundation for ML.

This course goes well with ...

- 04-650 (Mathematical Foundations of Machine Learning)
- 18-661 (Introduction to Machine Learning for Engineers)

18-631 (Introduction to Information Security)

Average Weekly Time Demand: 11 hours / Week.

Average Difficulty Level on a scale of 1-5: 2.25

Course Structure

- Ten assignments (7 take home, three in-class questions)
- Final project
- Two quizzes

Recommended skills to have.

- Bash basics
- Familiarity with Linux environment
- Basic report writing skills.

Tools and Technologies Utilised in Course

- Oracle VirtualBox
- Kali Linux
- Ubuntu
- Metasploit

Reviews

- Attend the lectures and make sure you understand the concepts.
- For the group project make sure you delegate task early so no one bears all the responsibility, and you will be fine.
- if you are curious about Cyber security, go for it.
- If you are a software enthusiast somehow familiar with basic content, consider Network Security if you have other demanding courses considered it as a core fulfilling course and have fun.
- Always read ahead.
- You do not really require an experience in programming to take this course.

18-652 (Foundations of Software Engineering)

Average Weekly Time Demand: 24 hours / Week.

Average Difficulty Level on a scale of 1-5: 4

Course Structure

- Iterative group project
- Quizzes
- Midsemester and final examinations

Recommended skills to have.

- JavaScript
- React
- NodeJs

Tools and Technologies Utilised in Course

- ExpressJS
- React

Reviews

- Take this course if you are really confident about yourself, otherwise you will be the problem for your team members.
- The course is very demanding, get ready for it.
- Be ready to work with a team.
- This course requires to be first of all a full stack web developer.

18-661 (Introduction to Machine Learning for Engineers)

Average Weekly Time Demand: 16 hours / Week.

Average Difficulty Level on a scale of 1-5: 4.67

Course Structure

- Seven assignments
- Two examinations

Recommended skills to have.

- Algebra
- Basic foundational statistics
- Python basics for Data

Tools and Technologies Utilised in Course'

- Python
- Kaggle
- Jupyter
- Google Collab

Reviews

- I strongly advise any student to take Applied Stochastic Processes if he wants to pass this course. It takes a lot of effort to complete this course.
Strong mathematic background required (Probability, Calculus, Linear Algebra_ But feel free to register for this class if you believe that you meet this requirement.
- Do not take it if your Statistics and Maths Background is not good in your first semester, except you do not take other courses that are very demanding. You could decide to try but I do not grantee that you will enjoy the course as expected as it can be overwhelming.
- Here, I can say I gained beyond my expectations. And my advice is taking the course in your second semester in any situation or experience level that you are from.

This course goes well with ...

- 04-650 (Mathematical Foundations of Machine Learning)
- 18-751 (Applied Stochastic Processes)

18-681 (Power Electronics)

Average Weekly Time Demand: 14 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.67

Course Structure

- Four programming assignments
- Four written assignments
- One project
- Final exam

Recommended skills to have.

- Basic electronic circuit analysis
- MATLAB

Tools and Technologies Utilised in Course

- MATLAB
- Presentation software
- Hardware like Thyristors, Converter, Inverter

Reviews

- Good for anyone interested in power electronic and have background in electrical or electronics.
- Try to meet with the professor several times and collaborate with other students.
- You should have adequate knowledge in power semiconductors materials, circuit analysis, MATLAB programming, python programming, power system design and analysis etc

18-731 (Network Security)

Average Weekly Time Demand: 13 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- Quizzes (three)
- Labs (two)
- Paper reading

Recommended skills to have.

- Cisco Packet Tracer knowledge

Tools and Technologies Utilised in Course

- Cisco Packet Tracer
- Linux

Reviews

- You might not understand the lectures but don't worry. Luckily assignments and test aren't heavily based on lectures. watch YouTube videos and read the slides
- Jema was my lecturer. Don't be too expectant. With the way he handles the course you can succeed on your own. It is good to take the course alongside networking lab if you plan to do networking or if you are new to networks

This course goes well with ...

- 18-859 (Networking Lab)

18-751 (Applied Stochastic Processes)

Average Weekly Time Demand: 14 hours / Week.

Average Difficulty Level on a scale of 1-5: 4.5

Course Structure

- Six assignments (Mixture of programming and calculus)
- Random in-class quizzes
- Midsemester and final examinations

Recommended skills to have.

- Python programming
- Background in mathematics, particularly probability

Tools and Technologies Utilised in Course

- Python
- NumPy
- matplotlib
- scikit-learn.

Reviews

- I recommend that anyone taking this course work with classmates to better understand the questions, as this can be the most challenging part.
- Make sure to attend office hours and recitation sessions, and do not hesitate to ask the professor questions during or after class to clarify the course content or address any issues.
- Plan your schedule to ensure you have enough time for assignments and avoid leaving them until two days before the deadline.
- In addition to the provided course materials, conduct your own research using resources like YouTube to enhance your understanding.
- The course is hard. If you have other options, then please consider them but if you are into AI, you will need to take it in other to do well in other courses.

18-785 (Data, Inference, and Applied Machine Learning)

Average Weekly Time Demand: 12.9 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.45

Course Structure

- Seven assignments
- Bonus Kaggle challenge
- Biweekly quizzes
- Midsemester and final examinations

Recommended skills to have.

- Python programming
- pandas

Tools and Technologies Utilised in Course

- Python + Jupyter
- NumPy + pandas
- matplotlib
- scikit-learn.

Reviews

- Be ready to put in a lot of work if you are a novice at Python and Data Science
- Attend office hours before attempting assignments.
- Start assignments early.
- Plan your time well.
- Try to maintain >95% in all assignments.
- Pay attention in class and go through the lecture notes to be able to get an understanding of the taught concepts, especially if you are new in the world of Data.
- The last two assignments are heavier than normal, you will not finish on time if you work on them as the norm is with the other five preceding assignments.

18-859 (Networking Lab)

Average Weekly Time Demand: 12 hours / Week.

Average Difficulty Level on a scale of 1-5: 2.5

Course Structure

- Weekly lab visits
- Weekly readings
- Midsemester examination
- Two take home projects for the final examination

Recommended skills to have.

- Basic understanding of computer networks

Tools and Technologies Utilised in Course

- Cisco Packet Tracer

Reviews

- Pay attention in class and try to grasp contents while in class.
- Take labs and assignments seriously; most of it will reflect in the midsemester exam
- Goes well with Network security and NFUN. This course can help you to prepare to take the CCNA
- Having foundational knowledge in computer networks will be great help.

This course goes well with ...

- 04-641 (Fundamentals of Telecommunications and Computer Networks)
- 18-731 (Network Security)

18-861 (Energy Project Development and Economic Studies)

Average Weekly Time Demand: 12 hours / Week.

Average Difficulty Level on a scale of 1-5: 3

Course Structure

- Two assignments
- Project report

Recommended skills to have.

- N/A

Tools and Technologies Utilised in Course

- Excel

Reviews

- It would be better taking the course while having an engineering project idea.
- It involves preparing, studying, analysing, and developing a project from initial phase to implementation phase

18-862 (Control of Grid-Connected Machines & Converters)

Average Weekly Time Demand: 12.5 hours / Week.

Average Difficulty Level on a scale of 1-5: 4

Course Structure

- Four assignments
- Course project
- Take-home exam

Recommended skills to have.

- MATLAB programming
- Power Systems knowledge

Tools and Technologies Utilised in Course

- MATLAB
- Simulink

Reviews

- Better take it during your second year.
- Having basic skills about Simulink before taking the course would be more helpful.
- You can expect to spend at least 4 hours per assignment.

18-865 (Photovoltaic Systems Engineering)

Average Weekly Time Demand: 7.5 hours / Week.

Average Difficulty Level on a scale of 1-5: 3.5

Course Structure

- Six modules
- Three assignments
- Take-home examination

Recommended skills to have.

- N/A

Tools and Technologies Utilised in Course

- PVSyst software
- MATLAB
- Excel
- Python
- HOMER software
- Course B

Reviews

- It is an important course for electrical engineers and renewable energy enthusiasts
- They should have a prior knowledge in PVSyst software, MATLAB, excel, python, HOMER software.

18-980 (M.S. Graduate Project, Course Option I or Project Option Phase I)

This is a second-year course. If interested, please check out the course description by searching using the course name at this [link](#).

18-981 (M.S. Graduate Project, Course Option II)

This is a second-year course. If interested, please check out the course description by searching using the course name at this [link](#).

18-989 (Introduction to Graduate Studies)

If interested, please check out the course description by searching using the course name at this [link](#).

19-608 (Privacy, Policy, Law & Tech)

Average Weekly Time Demand: 12 - 18 hours / Week.

Average Difficulty Level on a scale of 1-5: 4.5

Course Structure

- Pre-lecture readings (with quizzes)
- After-class discussion submissions
- Midsemester and final examinations
- Group research project

Recommended skills to have.

- N/A

Tools and Technologies Utilised in Course

- Citation managers (Zotero, Mendeley, ...)
- Overleaf
- Presentation Software

Reviews

- The course involves reading a lot of reading of research papers
- It outlines general privacy policies in US, Europe, China and some African countries like Rwanda. The focus is on the OECD guidelines, GDPR and in summary the evolution of these policies.
- You are required to read some papers before class to have prior knowledge of what will be discussed. It is assessed by taking a short quiz before class starts- the quizzes are fairly significant.