

PET328: Computer Applications in Petroleum Engineering

(Python Programming with Petroleum Engineering Applications)



Dr. Olatunde Mosobalaje
with Ms Gift Aghaulor & Mr. Peter Ojegbile
Covenant University, Nigeria

FIRST-DAY PACKAGE

1

2

3

4

5

APPETIZER

LEARNERS EXPERIENCE DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

- The Change
- The Motivation/Relevance
- The Vision and the Mission
- 2021-2024: Success Stories
- 2025: AL Edition

- Learning Outcomes
- Assessment
- Learning Activities
- Blended Learning Opportunities

- Course Contents
- Time Table
- Course Calendar
- Grading

- Python 3
- Jupyter Notebook
- GitHub

- Certifications
- Qualification for PDA_SIG
- Profile Enhancement
- Resources

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

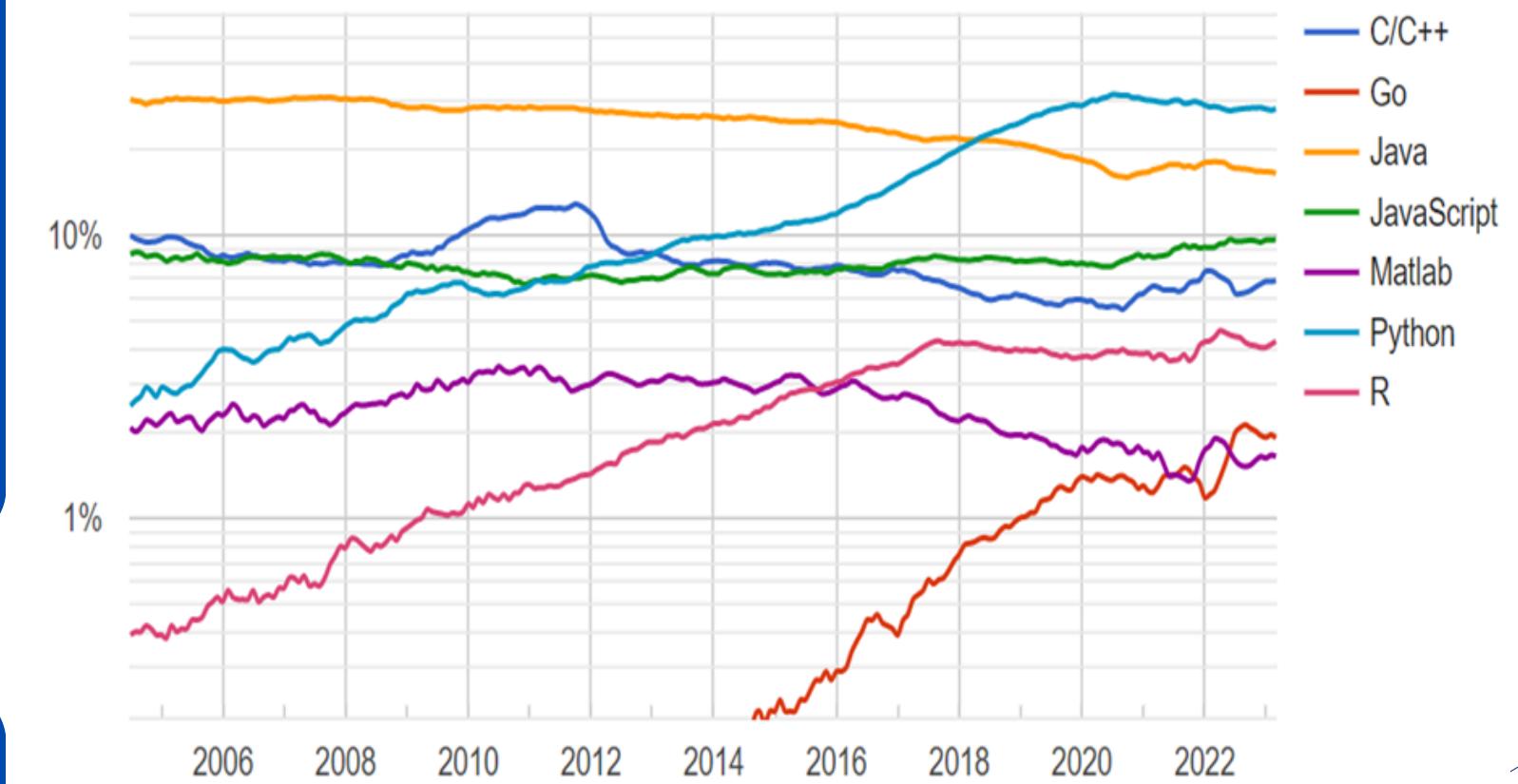
The Change

From PET415 & PET512 to PET328

- From 400L & 500L to 300L - early exposure
- From FORTRAN/MATLAB/Excel to Python
- More varied applications in PET328 than in PET415
- Introduced blended learning opportunities (Cousera & DataCamp)
- Use of GitHub for collaboration

Why Python?!

- Popularity - tops PYPL chart
- Open-source license
- Extensive functionalities - modules/libraries
- Ease of learning
- Vast users' community support



APPETIZER

LEARners' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

The Motivation/Relevance

Oilfield Emerging Trends

- **Oilfield Digitalization**
 - Smart fields; intelligent wells; digital twin; cloud computing; Internet of Things (IoT)
- **Post-COVID**
 - Remote work; labour automation
- **Data Proliferation**
 - Petroleum Data Analytics (PDA); Machine Learning (ML); Artificial Intelligence
- **SPE Competency Matrix**
 - Analytics programming language
- **Advocacy for PE graduates with both domain and digital knowledge**
- **Integration with industry softwares**
 - Petrel, Techlog etc have Python extensions



Human competence in computer programming is crucial in driving these innovations

APPETIZER

LEARners' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

The Vision & the Mission

The Vision

Petroleum engineering graduates possessing a balanced blend of PE domain knowledge and digital skills



The Mission

To provide opportunities to acquire competence in computer programming, as a pre-cursor to develop digital skills relevant to emerging oil/gas opportunities

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

2021-2024: Success Stories - Learners-side

200+

190

70.5%

20+

Online Courses
completed by
PET328
students

Free DataCamp
licenses to over
400 data
science courses
- worth over
20,000 USD

Pass rate

PET328
students joined
the PDA Special
Interest Group

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

2021-2024: Success Stories - Instructor's side

Teaching experience
published in SPE NAICE
2023

The screenshot shows the OnePetro website interface. At the top, there is a navigation bar with the OnePetro logo, a search icon, a shopping cart icon, and a user profile icon. Below the navigation bar, the text 'SPE Nigeria Annual International Conference and Exhibition' is displayed next to the SPE International logo. A sidebar on the left contains a 'ARTICLE NAVIGATION' button. The main content area features a title 'Introducing Python Coding to Petroleum Engineering Undergraduates: Excerpts from a Teaching Experience' with a small dollar sign icon, followed by the authors' names 'O.O. Mosobalaje; O.D. Orodu'. Below the title, a brief description states: 'Paper presented at the SPE Nigeria Annual International Conference and Exhibition, Lagos, Nigeria, July 2023. Paper Number: SPE-217148-MS <https://doi.org/10.2118/217148-MS>'. At the bottom of the page, it says 'Published: July 30 2023'.

Publication got a
bronze medal



Launched a Community of
Practice for Educators

The image is a promotional graphic for a community of practice. It features a circular inset showing several people's hands joined together in a circle. To the right of the inset is the Python logo, which consists of two interlocking snakes, one blue and one yellow. The text 'Python for PetEng Educators' is written in large, bold, blue and red letters, with '... upskilling, collaboration & research' in smaller text below it. The background of the main image has a subtle grid pattern.

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

2021-2024: Success Stories

- Instructor's side

Collaborations via PET328

With Professional Bodies:

- Society of Petroleum Engineers (SPE)
DSEATS Africa Region
- Triple Helix Nigeria (THN)



With Industry:

- CypherCrescent Limited

With Government Agency:

- Nigerian Content
Development & Management
Board (NCDMB)

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE DESIGN

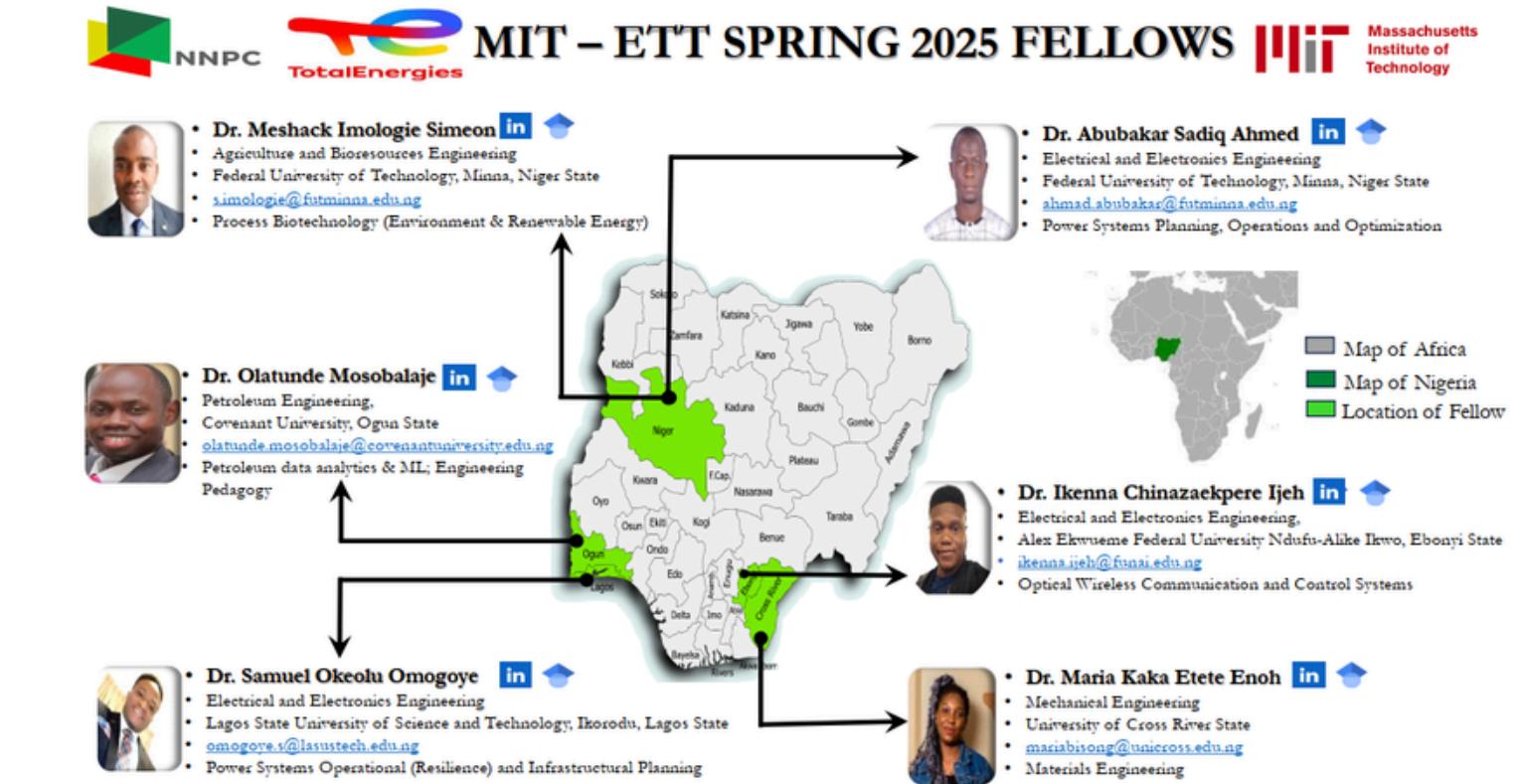
LESSON PLAN

TOOLBOX

DELIVERABLES

2021-2024: Success Stories - Instructor's side

**PET328 - selling point for selection
into the MIT-ETT Fellowship:
<https://ett.mit.edu/current-fellows/>**



APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

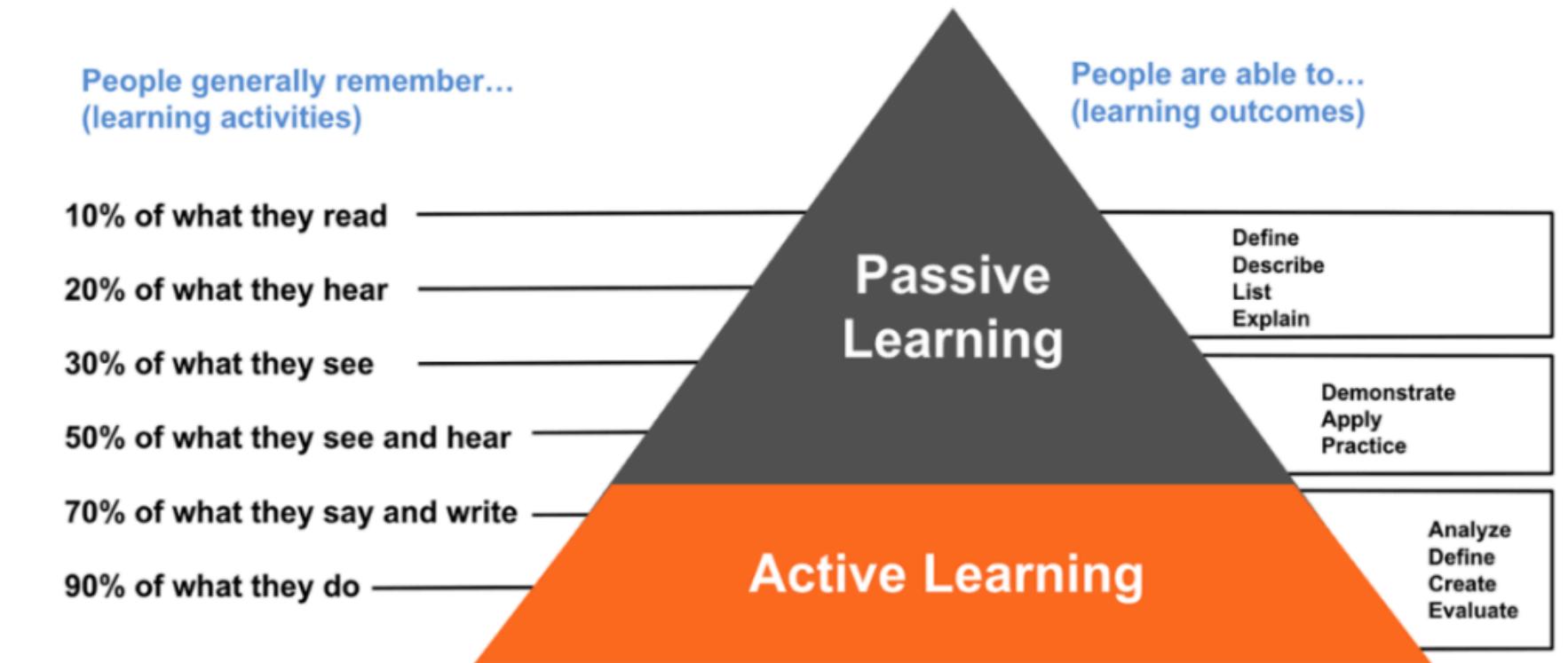
TOOLBOX

DELIVERABLES

2025 - the Active Learning Edition

Springing from my ongoing participation in the MIT-ETT fellowship, the 2024/2025 edition of PET328 is designed around the Active Learning Pedagogy:

- **Class time will be for participatory (higher-order) learning activities such as:**
 - **discussions**
 - **problem solving**
 - **exploring concepts**
 - **analyzing**
 - **evaluating etc**



APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

2025 - the Active Learning Edition

How would it happen?!

- Flipped classroom:
 - Pre-class assignments:
 - videos - self-sufficient
 - readings
 - DataCamp contents - mapped to PET328
 - Kaggle contents - mapped to PET328
 - Off-class discussion forum - Telegram group (voluntary)
- Class starts with quiz:
 - Not to be graded
 - To assess learners understanding of pre-class assignments
- Real-time Feedback using:
 - Google form
 - Slido.com
- Compulsory to bring PC or device to class



PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Learning Outcomes - Acquire skills

Students
acquire
skills to:

Analyze features in Python codes such as input/output, execution flow, control structures

Create & assign values to variables; convert values/variables between types; use math and string operators

Develop Python scripts to implement conditional execution (*if...else*) and repetitive (*for* and *while*) loops.

Create & call functions for common PE computations; set or skip values for arguments of functions

Create and (re-)assign multi-valued data: *lists*, *tuples* and *dictionaries*; access element(s) and loop through the values/indices

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Learning Outcomes - Professional Competencies

Students are able to:

Automate common Petroleum Engineering computational tasks with Python scripting

Develop algorithms and Python scripts to execute Petroleum Engineering workflows

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Assessments

	Learning Outcome	Assessment
	<p>LO1: Students should be able to analyze the workings of fundamental patterns in Python programs such as input/output statements, execution flow, control structures etc</p>	<p>Acceptable evidence of mastery of this LO will be:</p> <ul style="list-style-type: none">• Ability to construct Python statements to request input parameters from program users<ul style="list-style-type: none">◦ Example: porosity for use in a volumetric program• Ability to construct Python statements to report the output of a computation/simulation.<ul style="list-style-type: none">◦ Example: cumulative oil produced, material balance simulator program.• Ability to formulate a while loop<ul style="list-style-type: none">◦ Example: updating oil formation volume factor at series of decreasing pressure values until bubble point pressure is attained

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Assessments	Learning Outcome	Assessment
	<p>LO2: Students should be able to create and assign values to variables; convert values/variables from one type to another; write executable Python statements involving mathematical and string operators</p>	<p>Acceptable evidence of mastery of this LO will be:</p> <ul style="list-style-type: none">Ability to create variables to hold computation parameters and outputs of a kinds (numeric, string, categorical or Boolean etc).<ul style="list-style-type: none">Example: a variable to hold lithology types ('shale', 'sandstone', 'limestone')Ability to construct Python statements to convert values from one type to another<ul style="list-style-type: none">Example: conversion of user-input from string to numeric before computation.Ability to implement petroleum engineering equations/formulae in Python programs without missing the order of operations (BODMAS).<ul style="list-style-type: none">Example: cost-per-foot formula in drilling engineering

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Assessments

Learning Outcome	Assessment
<p>LO3: Students should be able to develop Python scripts to implement conditional execution (if... else) and repetitive (for and while) loops.</p>	<p>Acceptable evidence of mastery of this LO will be:</p> <ul style="list-style-type: none">• Ability to identify binary courses in workflows, formulate Boolean expressions and construct Python if or if...else statements<ul style="list-style-type: none">◦ Example: advancing or terminating simulation cycles depending on average reservoir pressure.• Ability to formulate a for loop<ul style="list-style-type: none">◦ Example: looping through gridblocks and computing flow parameters in a discretized reservoir model• Ability to formulate a while loop<ul style="list-style-type: none">◦ Example: updating oil formation volume factor at series of decreasing pressure values until bubble point pressure is attained

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Assessments

Learning Outcome	Assessment
<p>LO4: Students should be able to create and call custom functions for common PE computational tasks; set or skip values for positional or keyworded arguments of functions</p>	<p>Acceptable evidence of mastery of this LO will be:</p> <ul style="list-style-type: none">• Ability to construct the header of a function, listing relevant arguments.<ul style="list-style-type: none">◦ Example: a function to compute solution gas-oil ratio, R_s• Ability to specify default values for function arguments.<ul style="list-style-type: none">◦ Example: setting standard temperature and pressure (STP) values in natural gas density computations• Ability to pass a function's output value via a return statement.<ul style="list-style-type: none">◦ Example: returning flowrate, q, from a function written to implement Vogel's inflow performance relationship• Ability students to alternate between positional and keyworded argument passing when calling in-built or custom functions.

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Assessments	Learning Outcome	Assessment
	<p>LO5: Students should be able to create and (re-)assign multiple values to data structures: lists, tuples and dictionaries; access element(s) of data structures; loop through the indices or values in data structures.</p>	<p>Acceptable evidence of mastery of this LO will be:</p> <ul style="list-style-type: none">Ability to deploy Python's in-built data structures (lists, tuples and dictionaries) in storing data multi-valued data encountered in PE workflow.<ul style="list-style-type: none">Example: storing gridblock permeability values to be used in a reservoir flow simulator.Ability to extract values stored in multi-valued data structures for use in repetitive workflows.<ul style="list-style-type: none">Example: extracting gridblock pressure for use in material balance computationsAbility to use a for... loop to iterate through a multi-valued data structure.Ability to match the 1-D indices of the data structures with the 2-D gridblock indices in a discretized reservoir.Ability to modify data structures using various in-built methods and functions.<ul style="list-style-type: none">Example: appending latest computed flowrate to a pre-defined list, tuple or dictionary while looping through simulation time-cycles

PET328: First-Day Package

APPETIZER

LEARners' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Assessments

	Learning Outcome	Assessment
	<p>LO6: Students should be able to automate common petroleum engineering computational tasks with Python code scripting.</p>	<p>Acceptable evidence of mastery of this LO will be:</p> <ul style="list-style-type: none">• Ability to script code chunks with a view to automate PE computational task.<ul style="list-style-type: none">◦ Example: a Python script to request reservoir properties and compute reservoir volumetrics such as BV, PV, HCPV and STOIIP.

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Assessments

	Learning Outcome	Assessment
	<p>LO7: Students should be able to develop algorithms and Python scripts to execute integrated petroleum engineering computational workflows.</p>	<p>Acceptable evidence of mastery of this LO will be:</p> <ul style="list-style-type: none">Ability to interpret a given PE problem statement, formulate algorithms and write a wholistic Python script to solve the problem.<ul style="list-style-type: none">Example: a script that completely implements the oil material balance equation for a discretized reservoir. The inputs being gridblock rock and fluid properties as well as gridblock pressure values per time. The output being various reservoir performance parameters such as well flowrates, cumulative oil produced, average reservoir pressure, etc.

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Learning Activities

In-Class (2hrs/week)

- ‘Vital-sign’ quizzes
- Lecture (review of pre-class assignments)
- Demos (in Jupyter Notebook)
- Class discussions
- Brainstorming
- Formative Assessments:
 - MCQs; Multiple T/F; FITB
 - Coding exercises (short, long)
 - Peer Instruction (think-pair-share)
- Digital whip-around
- Retrieval practice - recall concepts from previous classes
- Polls, exit surveys

Off-Class

- Pre-class Assignments:
 - videos,
 - readings
 - blended learning
- Office hours (1hrs/week)
- Recitations
- Programming assignments
- Problem Sets
- Discussion forums (on Telegram)

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Blended Learning Opportunities

DataCamp

Already secured 120 free licenses
(worth over 20,000 USD) - access to
500+ data science courses

A screenshot of the DataCamp member leaderboard for PET328. The table lists users by rank, name, email, courses completed, chapters completed, last XP, and XP earned. The top user is Oladimeji Ajala with 5100 XP. Other users include Jessica Ani, Olatunde Mosobalaje, David Adams, Ronald Agoha, and WISDOM OLUWAMODUPE AFOLABI.

Kaggle

Free courses (with certificate)

kaggle

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Course Contents

• Introduction to Computer programming

Input/Output Statements || Execution Control Structures || Collaboration using GitHub.

• Getting Started with Python

Basic Python Objects || Boolean Expressions || Logical Operators || Conditional Structures (if..., if...else) || Repetitive Loops (for, while)

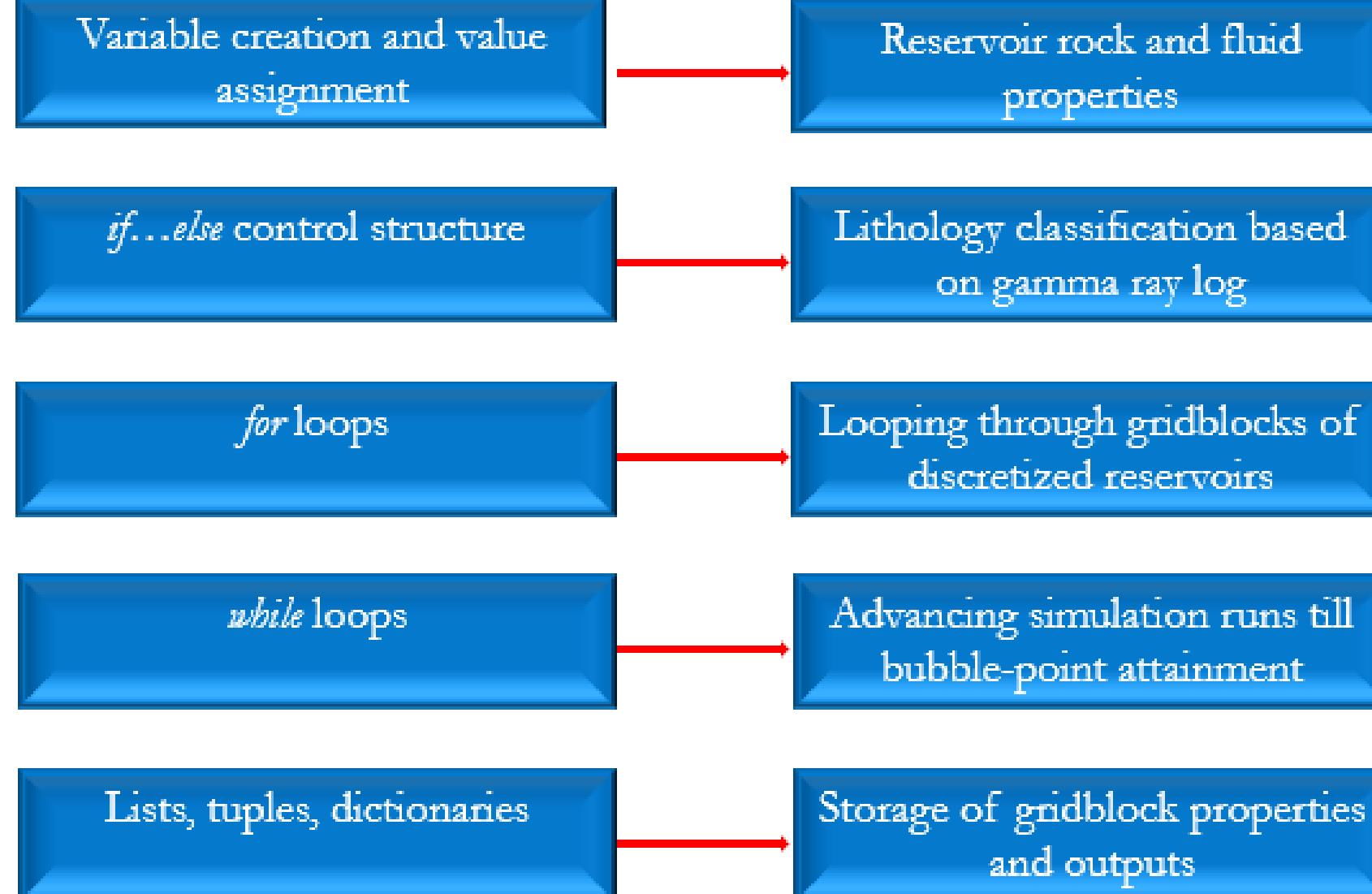
Reservoir Discretization || User-defined Functions.

• Python Data Structures

Lists: Creation and Accessing Element(s) || List Methods/Functions/Operations || Tuples || Dictionaries: Creation and Accessing Elements || Looping through Dictionaries.

• Application Projects

Hydrocarbon Reservoir Volumetrics || Material Balance Analysis || Fluid PVT Property Correlations || Reservoir Performance Prediction || Decline Curve Analysis || Reservoir Simulation.



PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Time Table

In-Class

Mondays, 11am - 1pm



Office-Hour (OH)

- For one-one with instructors
- Location: Zoom
- Make bookings here:
https://calendly.com/olatunde-mosobalaje-covenantuniversity/pet328_office_hour



PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Course Calendar

Week	Topic	Outline	Activities/Materials
1	First-day Package	<ul style="list-style-type: none">• Appetizer• Learners' Experience Design• Lesson plan• Toolbox• Deliverables	<ul style="list-style-type: none">• Assignment 1 (ungraded): Link - Installations:<ul style="list-style-type: none">◦ Python 3◦ Jupyter Notebook/Google Colab◦ GitHub account & app• Class Hour: 11am-1pm 24-03-2025<ul style="list-style-type: none">◦ Content link• Office Hour: booking here
2	Basic Python Objects	<ul style="list-style-type: none">• Jupyter Notebook basics• Values & Variables• Data Types• Statements• Input & Output Statements• Order of Arithmetic Operations	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 31/03/2025<ul style="list-style-type: none">◦ Content link• Office Hour: booking here• Problem Set 0 (ungraded) (link)

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Course Calendar

Week	Topic	Outline	Activity/Materials
3	Introduction to Control Structures in Computer Programming	<ul style="list-style-type: none">• Introduction to Conditional Structures• Introduction to Repetitive Structures• Introduction to User-defined Functions	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 07/04/2025• Office Hour: booking here• Programming Assignment 1 (graded) (link)
4	Conditional Structure	<ul style="list-style-type: none">• Boolean Values• Logical Expressions• Conditional Execution• Alternative Execution• Chained Conditional Structure	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 14/04/2025• Office Hour: booking here• Problem Set 1 (graded) (link)

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Course Calendar

Week	Topic	Outline	Activity/Materials
5	Definite Repetitive ('for...') Loops	<ul style="list-style-type: none">Introduction to Iterable ObjectsComponents of 'for...' Loops<ul style="list-style-type: none">HeaderBodyCounting with 'for...' LoopsAggregating with 'for...' Loops	<ul style="list-style-type: none">Pre-class Assignment<ul style="list-style-type: none">Video (link)Reading (link)Vital-sign QuizClass Hour: 11am - 1pm 21/04/2025Office Hour: booking hereProgramming Assignment 2 (ungraded) (link)
6	Nested 'for..' Loops	<ul style="list-style-type: none">Nesting 'for...' LoopsInter-relationship of Nested LoopsApplication to Discretized Reservoirs	<ul style="list-style-type: none">Pre-class Assignment<ul style="list-style-type: none">Video (link)Reading (link)Vital-sign QuizClass Hour: 11am - 1pm 28/04/2025Class Quiz (graded)Office Hour: booking here

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Course Calendar

Week	Topic	Outline	Activity/Materials
7	Indefinite Repetitive ('while...') Loops	<ul style="list-style-type: none">• Components of 'while...' Loops<ul style="list-style-type: none">◦ Header - the condition◦ Body• Updating the Iterator Variable• Loop Termination	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 05/05/2025• Office Hour: booking here• Problem Set 2 (graded) (link)
8	User-Defined Functions	<ul style="list-style-type: none">• Concepts of Code Re-usability• Function Header - parameters• Function Body• Return Statements• Default Parameters	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 12/05/2025• Class Quiz (graded)• Office Hour: booking here

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Course Calendar

Week	Topic	Outline	Activity/Materials
9	Function Calls	<ul style="list-style-type: none">Positional ArgumentsKeyworded ArgumentsAssigning CallsMultiple Return ValuesImporting Functions	<ul style="list-style-type: none">Pre-class Assignment<ul style="list-style-type: none">Video (link)Reading (link)Vital-sign QuizClass Hour: 11am - 1pm 19/05/2025Office Hour: booking hereProgramming Assignment 3 (graded) (link)
10	Multi-valued Data Structures: Lists	<ul style="list-style-type: none">Creating ListsIndexing ListsList OperationsList Methods	<ul style="list-style-type: none">Pre-class Assignment<ul style="list-style-type: none">Video (link)Reading (link)Vital-sign QuizClass Hour: 11am - 1pm 26/05/2025Class Quiz (ungraded)Office Hour: booking here

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Course Calendar

Week	Topic	Outline	Activity/Materials
11	Looping through Lists	<ul style="list-style-type: none">• Looping through List Elements• Looping through List Indices• List Comprehensions	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 02/06/2025• Office Hour: booking here• Problem Set 3 (graded) (link)
12	Multi-valued Data Structures: Tuples	<ul style="list-style-type: none">• Creating Tuples• Tuple Operations• Tuple Methods	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 09/06/2025• Class Quiz (graded)• Office Hour: booking here

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Course Calendar

Week	Topic	Outline	Activity/Materials
13	Multi-valued Data Structures: Dictionaries	<ul style="list-style-type: none">• Creating Dictionaries• Indexing Dictionaries• Looping through Dictionaries	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 16/06/2025• Office Hour: booking here• Problem Set 4 (graded) (link)
14	Revision	<ul style="list-style-type: none">• Creating the 'peteng' module	<ul style="list-style-type: none">• Pre-class Assignment<ul style="list-style-type: none">◦ Video (link)◦ Reading (link)• Vital-sign Quiz• Class Hour: 11am - 1pm 09/06/2025• Pre-exam briefing

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Grading

Grading Plan

- **DataCamp Course Completion - 10%**
- **Problem Sets - 10%**
- **Programming Assignments - 5%**
- **Graded Quizzes - 5%**
- **Final Exam - 70%**
 - **Applied questions**
 - **Set in quasi real-field contexts**
 - **Samples to be provided**

PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Python 3

Download:

<https://www.python.org/downloads/>



Jupyter Notebook

- Comes with Anaconda.
- See installation guide [here](#).



GitHub

- A GitHub account: Sign up here: <https://github.com/signup>
- GitHub Desktop app:
<https://desktop.github.com/download/>



PET328: First-Day Package

APPETIZER

LEARNERS' EXPERIENCE
DESIGN

LESSON PLAN

TOOLBOX

DELIVERABLES

Deliverables

- **DataCamp Certifications!**
- **Good Grades!!**
- **Professional enhancements!!!**
- **Internship opportunities!!!!**
- **Learning resources!!!!!!**
- **Admission to PDA_SIG!!!!!!**
- **Candies!!!!!!**
- **Lots of fun!!!!!!**



```
>>>#TTOWG!  
>>>print('..to the only wise God')
```