Digital Technology Learning Modules

Session 06-DEC17

COURSES INCLUDED BELOW

050 - Digital Sciences Essentials

WEEK 1: **Orientation**

WEEK 2: **050-A - Design Thinking for Innovation**

About 7.5 hours

Explore design thinking as a problem solving approach to uncover and evaluate creative opportunities

https://www.coursera.org/learn/design-thinking-innovation

Knowledge, Skills, and Practices Covered

Successfully identify design thinking and examine what kinds of challenges are best-suited for design thinking

Successfully identify mindset for seeing and taking action when opportunity arises

Successfully identify disciplines used to explore real-life user problems, look for patterns, and ask "what if?"

Successfully identify how to determine which ideas are likely to produce outcomes, and test assumptions.

Jeanne Liedtka, University of Virginia

WEEK 3: **050-B - Fundamentals of Project Planning and Management**

About 9 hours

Explore key concepts of planning and executing projects, including factors that lead to project success.

https://www.coursera.org/learn/uva-darden-project-management

Knowledge, Skills, and Practices Covered

Successfully identify what a project is and isn't

Use the steps in developing a project plan

Identify, assess, and prioritize project risks

Document the execution phase of a project

Successfully identify alternative methods for project execution such as Agile, Scrum, and Kanban

Yael Grushka-Cockayne, University of Virginia

WEEK 4: **050-C - Introduction to User Experience Design**

About 5 hours

Explore process of designing experiences to help people meet their needs in the most effective, efficient, and satisfying manner.

https://www.coursera.org/learn/user-experience-design

Knowledge, Skills, and Practices Covered

Gather requirements with techniques that are relevant for understanding users and tasks

Apply usability constraints to the user requirements to mobile and alternative interfaces

Design a prototype to allow rapid testing and feedback

Rosa I. Arriaga, Georgia Tech

WEEK 5: **050-D - Programming for Everybody (Getting Started with Python)**

About 8 hours

Learn the basics of programming computers: how to construct a program from a series of simple instructions

https://www.coursera.org/learn/python

Knowledge, Skills, and Practices Covered
Understand the "big picture" of programming so you get a "table of contents" for your programming tasks
Understand how a program uses the computer's memory to store, retrieve and calculate information
Write sequential code that simply runs one line of code after another, and then conditional code where some steps are skipped.
Create a reusable function that integrates a series of instructions
Create a repeatable loop that integrates a series of instructions to do things over and over

Chuck Severance, University of Michigan

WEEK 6: **050-E - Business Metrics for Data-Driven Companies**

About 3 hours

Learn the essentials of data science and big data, including concepts in statistics and machine learning, and important terminology used in successful data science projects.

https://www.coursera.org/learn/analytics-business-metrics

Knowledge, Skills, and Practices Covered
Describe the structure of a successful data science project
Understand how statistics, machine learning, and software engineering are used in data science
Know the key terms, tools, and roles in data science

Daniel Egge, Duke University

WEEKS 6-7: **Review Short Courses**

062 - Development and Programming Fundamentals

WEEK 1: **Orientation**

WEEK 2: **062-A - Programming for Everybody**

About 8.5 hours

Learn the basics of programming computers: how to construct a program from a series of simple instructions

https://www.coursera.org/learn/python

Knowledge, Skills, and Practices Covered
Understand the "big picture" of programming
Understand how a program uses the computer's memory to store, retrieve and calculate information
Write sequential code that simply runs one line of code after another, and then conditional code where some steps are skipped.
Create a reusable function that integrates a series of instructions
Create a repeatable loop that integrates a series of instructions to do things over and over

Chuck Severance, University of Michigan

WEEK 3: **062-B - Python Data Structures**

About 6 hours

Learn core data structures, including lists and dictionaries, to perform increasingly complex data analysis.

https://www.coursera.org/learn/python-data

Knowledge, Skills, and Practices Covered

Understand strings and basic data structures, and install Python on your laptop

Read, scan, and process real data by exchanging data to and from files

Store, organize, and retrieve values from within a single list variable.

Store data as key / value pairs in dictionaries, in essence a database in a single variable

Use tuples to sort or loop through all of the data in a dictionary.

Chuck Severance, University of Michigan

WEEK 4: **062-C - Using Python to Access Web Data**

Learn how to use the Internet as a source of data by scraping, parsing, and reading web data as well as accesses data using web APIs.

About 8 hours

https://www.coursera.org/learn/python-network-data

Knowledge, Skills, and Practices Covered

Understand how to use regular expressions to search strings and extract data from strings

Understand the protocols that browsers and web applications use to interact with Application Program Interfaces (APIs).

Understand how to retrieve and parse XML (eXtensible Markup Language) data.

Work with Application Program Interfaces / Web Services using the JavaScript Object Notation (JSON) data format

Chuck Severance, University of Michigan

WEEK 5: **062-D - Using Databases with Python**

Learn the basics of the Structured Query Language (SQL) as well as basic database design for storing data.

About 7 hours

https://www.coursera.org/learn/python-databases

Knowledge, Skills, and Practices Covered

Understand the basics of Object Oriented (OO) patterns and terminology

Use the four core CRUD operations (Create, Read, Update, and Delete) of SQL to manage data stored in a database

Understand how data is stored across multiple tables in a database and how rows are linked

Create code to retrieve and process data and then visualize the data

Chuck Severance, University of Michigan

WEEKS 6-7: **Review Short Courses**

064 - Interaction and Interface Fundamentals

WEEK 1: **Orientation**

WEEK 2: **064-A - Human-Centered Design - An Introduction**

Learn techniques for rapidly prototyping and evaluating multiple interface alternatives

About 11 hours

Scott Klemmer, University of California, San Diego

https://www.coursera.org/learn/human-computer-interaction

Knowledge, Skills, and Practices Covered

Understand ten key principles of good design, including the importance of feedback and helping people recover from errors

Determine user needs by integrating observation and interviewing

Choose appropriate strategies for rapid prototyping, including storyboarding and mock-ups

WEEK 3: **064-B - Design Principles - An Introduction**

About 12 hours

Learn fundamental principles of visual design in order to effectively organize and present information.

Scott Klemmer, University of California, San Diego

Knowledge, Skills, and Practices Covered

Demonstrate how to approach manipulation in real interfaces, including mental models and cognition distribution

Understand visual and information design, including scale, contrast, pattern, shape, color, typography, and layout.

Understand how to design, run, and analyze experiments by testing ideas with people and using what you learn to make them better

https://www.coursera.org/learn/design-principles

WEEK 4: **064-C - Social Computing**

About 7 hours

Learn the major challenges and opportunities for creating online communities through social collaboration

Scott Klemmer, University of California, San Diego

Knowledge, Skills, and Practices Covered

Understand multiple types of social software and how to think about physical collaboration and digital collaboration using the same framework

Understand the ways that distance does and doesn't matter, how to design for this reality and how to create technologies that go beyond being present

Understand the possibilities and limits of crowdsourcing, including strategies for using crowdsourcing successfully

https://www.coursera.org/learn/social-computing

WEEK 5: **064-D - User Experience: Research & Prototyping**

About 6 hours

Learn the fundamental methods of design research that enable designers to to effectively understand people and the sequences of their actions

Elizabeth Gerber, University of California, San Diego

Knowledge, Skills, and Practices Covered

Understand research methods to identify the ways people's needs, goals, values play out in their day-to-day lives

Understand five popular ideation techniques that designers use when they have a problem they want to solve

Present actionable insights on data through personas, journey maps, diagramming and the 2x2 matrix

Create prototyping forms including storyboards, role-plays, walkthroughs and touch-points

https://www.coursera.org/learn/user-research

WEEKS 6-7: **Review Short Courses**

066 - Analysis and Data Fundamentals

WEEK 1: **Orientation**

WEEK 2: **066-A - Crash Course in Data Science**

About 3 hours

Learn the essentials of data science and big data, including concepts in statistics and machine learning, and important terminology used in successful data science projects.

Jeff Leek, Brian Caffo, Roger Peng, Johns Hopkins University

Knowledge, Skills, and Practices Covered
Describe the structure of a successful data science project
Understand how statistics, machine learning, and software engineering are used in data science
Know the key terms, tools, and roles in data science

https://www.coursera.org/learn/data-science-course

WEEK 3: **066-B - Data-driven Decision Making**

About 8.5 hours

Learn about designing and implement realistic predictive models and reduce uncertainty for decision-makers based on math, statistics, and data

Alex Mannella, PwC

Knowledge, Skills, and Practices Covered
Explore essential Excel skills to address typical business situations
Use AUC and ROC algorithms to compare and classify data
Understand when and how to use "probability" and "entropy" uncertainty metrics
Use linear regression measures to forecast future outcomes

https://www.coursera.org/learn/decision-making

WEEK 4: **066-C - Customer Analytics**

About 9.4 hours

Learn how to better communicate business-relevant implications of data analyses

Eric Bradlow, Peter Facer, Raghu Iyengar, Ron Berman, University of Pennsylvania

Knowledge, Skills, and Practices Covered
Streamline analyses and highlights implications using visualizations in Tableau
Make visualizations that harness perceptual and cognitive tendencies to convey conclusions directly and clearly
Design and present business “data stories” that use business-tested methods and design principles

https://www.coursera.org/learn/wharton-customer-analytics

WEEK 5: **066-D - Introduction to Big Data**

About 14 hours

Learn about the use of relational databases in business analysis

Ilkay Altintas, Amarnath Gupta, University of California, San Diego

Knowledge, Skills, and Practices Covered
Use entity-relationship diagrams to display the structure of data
Use query and table aggregation statements for business analysis
Summarize rows of data using aggregate functions
Combine and manipulate data from multiple tables

https://www.coursera.org/learn/big-data-introduction

WEEKS 6-7: **Review Short Courses**

068 - Project Management Fundamentals

WEEK 1: **Orientation**

WEEK 2: **068-A - Initiating and Planning Projects**

About 5 hours

Learn the key roles and responsibilities of the project manager and project team.

Margaret Meloni, University of California, Irvine

Knowledge, Skills, and Practices Covered
Identify the key characteristics of a project, including roles and responsibilities of the project manager and project stakeholders
Understand the use of a project charter and Work Breakdown Structure
Identify common sources of conflict within a project environment

https://www.coursera.org/learn/project-planning

WEEK 3: **Note: Complete TWO short Courses by the end of this week**

068-B1 - Budgeting and Scheduling Projects

About 3 hours

Learn how to develop a project budget and schedule in order to ensure the success of your projects.

Margaret Meloni, University of California, Irvine

Knowledge, Skills, and Practices Covered
Decompose work packages into activities and identifies the resource needs of the project
Estimate activity durations and quantities and costs of resources
Create a network diagram, determines the critical path, and defines milestones

https://www.coursera.org/learn/schedule-projects

068-B2 - Managing Project Risks and Changes

About 2.5 hours

Learn how to identify, analyze, and communicate inevitable changes to project scope and objectives.

Margaret Meloni, University of California, Irvine

Knowledge, Skills, and Practices Covered
Learn how to identify, analyze, and communicate inevitable changes to project scope and objectives
Define components of a communications management plan for reporting project scope, schedule, and cost performance.
Identify, prioritize, and respond to project risk events
Identify and analyze changes to project scope

https://www.coursera.org/learn/project-risk-management

WEEK 4: **068-C - Getting Started: Agile Meets Design Thinking**

About 13 hours

Learn how to determine and define user value through testable narratives and shared perspective.

Margaret Meloni, University of California, Irvine

Knowledge, Skills, and Practices Covered
Explain key concepts and practices from the agile product development methodology
Create a strong shared perspective and drive to value using personas and problem scenarios
Facilitate narrative collaboration with user stories and prototypes

https://www.coursera.org/learn/uva-darden-getting-started-agile

WEEK 5: **068-D - Running Design Sprints**

About 12.5 hours

Learn how to run situation-appropriate sprints, whether testing for user motivation, interface usability, or solution fit

Margaret Meloni, University of California, Irvine

Knowledge, Skills, and Practices Covered	*https://www.coursera.org/learn/running-design-sprints*
Plan and conduct a design sprint that delivers valuable, actionable insights *Effectively test motivation and value propositions* *Effectively test user interface (even without working software)* *Focus and drive to actionable conclusions on questions of approach and architecture*	

WEEKS 6-7: Review Short Courses