# GENIUS GEMS

GRADE 9-10

| Lecture Name | | Detailed concepts |
|---|---|---|
| **"Programming Fundamentals - 1 (JavaScript)"** | | |
| 1 | **Introduction to Javascript** | Features of JS, Variables. Constants, Input/Output, Data Types, Simple Operators & Operands |
| 2 | **Operators** | Different types of operators, Assignment, Arithmetic operators, Comparison & Logical Operators, Bitwise Operators |
| 3 | **Conditional Statements** | Understanding conditional constructs, IF, IF-else,Nested IFs. switch |
| 4 | **Loops** | Understanding loops with for, while/do-while, break, continue |
| 5 | **Data Structures** | Introduction to DS, Strings & Arrays |
| 6 | **Data Structures** | Stack and Queue |
| 7 | **Functions** | Types of Functions (User Defined / Built-in Functions), Function Definition, Function Calls, Passing Arguments, Returning Values." |
| 8 | **The Quizzard - 1** | Quiz game based on all the concepts covered so far |
| **"Programming Fundamentals - 2 (JavaScript)"** | | |
| 9 | **Introduction to Object Oriented Programming** | OOPS, Class, Objects, few methods and properties with implementation. |
| 10 | **Objects** | Objects types, object methods, mutable, new keyword, object methods. |
| 11 | **Event Handling** | Event handling in JavaScript. Onclick, onload, onchange, onmouseover, onmouseout, onkeydown, onload |
| 12 | **The Quizzard - 2** | Quiz game based on all the concepts covered so far. |
| **Web Development** | | |
| 13 | **Intorudction to HTML** | Introduction to HTML and Demonstration of various html tags with suitable examples |
| 14 | **HTML with CSS** | Introduction to CSS, Inline, Internal, External, CSS Selectors and Box Model (Content, Padding, Border, Margin) |
| 15 | **More about CSS** | Backgrounds, Opactiy, and different types of positioning (Static, Absolute, Relative, Fixed) |

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GRADE 9-10

| Lecture Name | | Detailed concepts |
|---|---|---|
| **"Programming Fundamentals - 1 (JavaScript)"** | | |
| 16 | Planet Earth | Creating an animated planet earth webpage. |
| 17 | Digital Clock | Creating a digital clock |
| **"Games Development - 1"** | | |
| 18 | Big Fact Hunt | Basic HTML-CSS-JS webpage with Javascript Quiz Game |
| 19 | Big Fact Hunt | Project Continued. |
| 20 | Finding Nemo | Accessing elements,Responding to a Click,Changing Website Content |
| 21 | Finding Nemo | Accessing elements,Responding to a Click,Changing Website Content |
| 22 | The Drum Kit | Drumkit project |
| 23 | The Drum Kit | Project continued. |
| **API - 1** | | |
| 24 | Book Information App using Google Book API | Book Information App using Google Book API |
| 25 | Bot Development (BotUI Javascript Framework) | Implementation of bot with various features using BotUI framework of JavaScript |
| **Artificial Intellegence- 1** | | |
| 26 | Introduction to Artificial Intelligence | Introduction to AI, Machine Learning, Deep Learning, Natural Language Processing with real time examples and showcasing through games |
| 27 | Sentiment Analysis (P5.js & ml5.js) | Sentiment Analysis of Movie Reviews using P5.js & ML5.js |
| 28 | Snake Game - 1 | Implementing Snake Game using P5.js and teachable machine |
| 29 | Snake Game - 2 | Game Continued |

# GENIUS GEMS

GRADE 9-10

| Lecture Name | | Detailed concepts |
|---|---|---|
| **App Development** | | |
| 30 | Introduction to Thunkable | Introduction to thunkable platform |
| 31 | web app | Making the web app using thunkable |
| 32 | Tic Tac Toe Part-1 | Making the tic tac toe game using thunkable (design) |
| 33 | Tic Tac Toe Part-2 | Making the tic tac toe game using thunkable (coding) |
| 34 | Smart App Part 1 | Making the smart app using thunkable (design) |
| 35 | Smart App Part 2 | Making the smart app using thunkable (coding) |
| 36 | Chat App Part-1 | Making the chat app using thunkable (design) |
| 37 | Chat App Part-2 | Making the chat app using thunkable(coding) |
| 38 | FINAL PROJECT | Create a final project in thunkable |
| 39 | FINAL PROJECT | Publish the app to Play Store |
| **"Programming Fundamentals - 1 (Python)"** | | |
| 40 | Introduction to Python | Features of Python, Variables, Constants, Input/Output, Data Types |
| 41 | Operators | Different types of operators, Arithmetic, Assignment, Comparison & Logical Operators, identity, membership and bitwise operators |
| 42 | Conditional Statements | Understanding conditional constructs, IF, IF-else,Nested IFs. |
| 43 | Loops | Understanding loops with for, while, breakm continue. Usage of range function and in operator with loops. |
| 44 | File Handling | Indroduction to Files, Read/Write operations with file handling. |
| **"Programming Fundamentals - 2 (Python)"** | | |

# GENIUS GEMS

## GRADE 9-10

| Lecture Name | | Detailed concepts |
|---|---|---|
| 45 | Data Structures | Introduction to DS, Lists and Tuples with various inbuilt and user defined functions |
| 46 | Data Structures | Dictionaries and String with various inbuilt and user defined functions. Overview of Stack, Queue, Tree, Hash etc. |
| 47 | Functions | Types of Functions (User Defined / Built-in Functions), Function Definition, Function Calls, Passing Arguments, Returning Values. |
| 48 | Introduction to Object Oriented Programming | OOPS in Python. Class, Objects, few methods and properties with implementation |
| 49 | Exception Handling | Understanding exceptions with try and except. Inbuilt and user-defined exceptions |
| 50 | CV Builder | CV Builder based on all the concepts covered so far |
| 51 | CV Builder | CV Builder based on all the concepts covered so far |

## Game Development - 2

| | | |
|---|---|---|
| 52 | Pong Game | Ping Pong game using Turtle Library |
| 53 | Cannon Game | Cannon Game using Turtle Library |

## API - 2

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|---|---|---|
| 54 | Weather Detector App | Understanding OpenWeatherAPIs, creating a token identifier. Exporting necessary packages, creating a simple weather app |

## Artificial Intelligence - 2

| | | |
|---|---|---|
| 55 | NLP based Chatbot | NLP based Chat Bot using Python NLTK library |

## Data Analysis

| | | |
|---|---|---|
| 56 | Introduction to Data Analysis | Introdution to Data Analysis and use cases. Installing Python and introducing Google Collab |
| 57 | Numpy - 1 | "Introduction to numpy, Installing and Importing. Difference between a Python list and a NumPy array?, Creating and Accessing array, Adding, removing, and sorting elements" |

# GENIUS GEMS

GRADE 9-10

| | Lecture Name | Detailed concepts |
|---|---|---|
| 58 | Numpy - 2 | "Reshaping an Array. Converting a 1D array into a 2D array. Indexing & Slicing. Creating matrices. Generating random numbers. Transposing and reshaping a matrix. Working with mathematical formulas" |
| 59 | Pandas - 1 | "Setting Up Your Environment Using the Pandas Python Library Getting to Know Your Data Displaying Data Types Showing Basics Statistics Exploring Your Dataset Getting to Know Pandas' Data Structures Understanding Series Objects Understanding DataFrame Objects" |
| 60 | Pandas - 2 | "Accessing Series Elements Using the Indexing Operator Using .loc and .iloc Accessing DataFrame Elements Using the Indexing Operator Using .loc and .iloc Querying Your Dataset Grouping and Aggregating Your Data" |
| 61 | Pandas - 3 | "Manipulating Columns Specifying Data Types Cleaning Data Missing Values Invalid Values Inconsistent Values Combining Multiple Datasets" |
| 62 | Data Visualization with MatPlotLib | "Introduction to Matplotlib, Object Hierarchy, Understanding plt.subplots() Notation, Plotting in Pandas " |
| 63 | Data Visualization with SeaBorn | "Seaborn vs Matplotlib, To Load Data To Construct Seaborn Plots, Loading A Built-in Data Set, Loading Your Pandas DataFrame, To Show Seaborn Plots, To Use Seaborn With Matplotlib Defaults, To Use Seaborn's Colors As A colormap in Matplotlib?, To Scale Seaborn Plots For Other Context, To Temporarily Set The Plot Style,To Set The Figure Size in Seaborn, To Rotate Label Text, To Set xlim or ylim in Seaborn, To Set Log Scale, To Add A Title" |
| 64 | Gradebook | Make a Gradebook |
| 65 | Gradebook | Make a Gradebook |

## Database

| | | |
|---|---|---|
| 66 | Introduction to DBMS | Introduction to Databases, Database Tools, Creating, Inserting, Updating and accessing the data using database tools |
| 67 | SQL | Introduction to SQL, Introduction to DDL and DML statements. Command based and GUI based database operations |
| 68 | DDL/DML | DML with commands, SQL Operators and real time scenarios using SQL queries |
| 69 | Constraints | Constraints in SQL with NOT NULL, CHECK, UNIQUE, DEFAULT, PRIMARY KEYs, FOREIGN KEYs |
| 70 | Keys | More about keys using Primary Key, Foreign Key, Super Keys, Composite Keys etc with implementation |

# GENIUS GEMS

GRADE 9-10

| Lecture Name | | Detailed concepts |
|---|---|---|
| 71 | Joins | Introduction to JOINs. Inner Join, Left outer join and right outer joins with examples |

## AR/VR

| | | |
|---|---|---|
| 72 | AR | Introduction to Augmented Reality with simple project implementation |
| 73 | VR | Introduction to Virtual Reality with simple project implementation |
| 74 | PROJECT ON VR | Create a project on AR/VR. |
| 75 | PROJECT ON VR | Project Continued. |

## ROBOTICS

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|---|---|---|
| 76 | Introduction to Arduino Programming | "Structure of Arduino Program, setup, loop, Variables, Constants, Keywords, Datatypes, Separators, Header files and Comments." |
| 77 | Loops and Conditional | "Loops – while and for loop. Conditional – If, If else, nested if" |
| 78 | Hardware Devices | "Breadboard, Resistors, Pins - Understanding Digital and Analog Pins. Reading Data from Digital Pins, Writing Data to Digital Pins, DigitalRead(), DigitalWrite(),Setting up pins using pinMode()." |
| 79 | Input / Ouput | "Input and Ouput – Taking Input from the user, displaying the results, using Serial. Delaying the response using delay(). Writing simple Arduino Programs (LED Blink),Upload Sketch, Compile Sketch." |
| 80 | Traffic Signal System | Arduino based project with traffic light simulation |