

CUCS19001 : DATA SCIENCE USING R

Hours: 30

Course Objective:

- To make the students to understand the Data Science using R software.

Course Outcomes:

After successful completion of the course, the student will be able to:

- differentiate structured, unstructured, machine generated data using data processing
- create box plot, probability and sampling, U test, Correlation & Covariance, chi square distribution and F distribution
- compare Linear Regression Model, k- Nearest Neighbours, K-means clustering, Hierarchical clustering and DBSCAN
- construct control statements, Functions, Vectors, Arrays, Matrices, Data Frames and R Data Interfaces
- develop R-plotting, Scatter Plot, Bar Plot, Pie Chart and Histogram

Unit 1: Introduction

4 hrs

Introduction to Data Science – different types of data: Structured, Unstructured and machine generated data – Data Science Process – Data processing on data Science.

Unit 2: Statistics and Data Science

7 hrs

Introduction to Statistics- Terminologies-Types of analysis- Descriptive Statistics –Box Plot – Probability & Sampling – Inferential Statistics. Hypothesis: Overview – U test – Correlation & Covariance - Chi square distribution – F distribution & F ratio

Unit 3: Data Science Algorithms

7 hrs

Introduction to MLA & Regression: Linear Regression Model - k-Nearest Neighbours (k-NN) – Fitting the model - Non Regression model. Clustering: Introduction - K-means –Hierarchical - DBSCAN

Unit 4: Data Science using R

7 hrs

Overview: R for Data Science – Data types & Syntax – Variables – Control Statements, Functions, Vectors, Arrays, Matrices, Data Frames, R Data Interfaces.

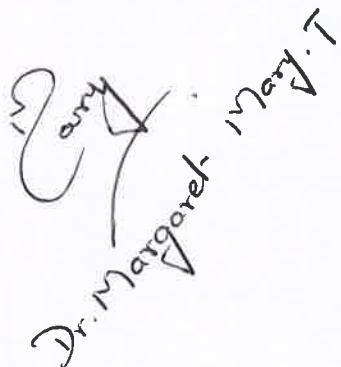
Unit 5: Data Visualization

5 hrs

Data Visualization in R – Plotting, Scatter Plot, Bar Plot, Pie Chart, Histogram & Box Plot

References:

- Cathy O’Neil and Rachel Schutt. *Doing Data Science, Straight Talk from The Frontline*. O’Reilly. 2014.
Dawn Griffiths (2008). *Head First Statistics (A Brain Friendly Guide)*. O’Reilly
Garrett Golemund (2014). *Hands-On Programming with R*. O’Reilly


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CUCS19002: MOBILE APP DEVELOPMENT

Hours: 30

Course Objective:

To make students understand mobile platforms and development of applications using the same

Course Outcome:

After successful completion of the course, the student will be able to:

- developing mobile applications for specific requirements

Unit 1: Introduction to Mobile App Development

5 hrs

Introduction to Android, Android versions - feature set -The various Android devices on the market. Types of Mobile OS - Creating Android Virtual Devices.Android Software Development Platform -Creating an Example Android Application.

Unit 2: Android Studio Architecture

6 hrs

Components of Android Studio-.Android Architecture Overview-Android Life cycle-Android Framework Overview-Android Services-Android Fragments-Hands-on-Session.

Unit 3: Android Graphics

6 hrs

Android Graphics-Types of Graphics- Android Styles & Themes-Android View & View group-Graphical User Interface Screen with views- Creating Animation ,Multimedia: Audio, Video and Camera.

Unit 4 :Working with Android Controls

7 hrs

Displaying Text with Text View, Retrieving Data from Users, Buttons, Check Boxes and Radio Groups-Hands-on-Session.Android Sensors-Types of Sensors-Progress Bar, Working with Menus-Displaying Pictures-Grid View, and Image View views to display images.

Unit 5: Block Coding for mobile app development

6 hrs

Downloading AI companion for mobiles and emulator, introduction to block codes using MIT app inventor, developing app using user interfaces, layouts ,media for developing; Roll dice app, juice shop bill calculator app, car game app,multiple screen app,gallery view app, DOB calculator app.

References:

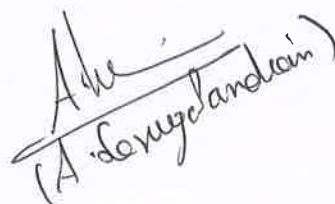
Mobile Application Development using Android Studio First Edition CIIT Publication
G.Prathap, K.Aruna Devi and A.Deva Kumari

Android Studio IDE Quick Reference A Pocket Guide to Android Studio Development, Ted Hagos

Learn Android Studio Build Android Apps Quickly and Effectively, Adam Gerber, Clifton Craig, David Selvaraj

Beginning Android Programming with Android Studio Kindle Edition, Roger Deutsch


(G. Prathap)


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CUCS19003 : CERTIFICATE COURSE IN PYTHON PROGRAMMING

Hours: 30

Course Objective:

- To understand the fundamental approach to solve the real world problems and to introduce the basic Python programming language and Python tools to work productively with data.

Course Outcomes:

After completing this course, the student will be able to:

- identify the right data analytics structure to solve a problem using Python.
- formulating to choose the right packages to suit the client/customer requirement and generate an effective solution.

Unit 1: Introduction to Python

5 Hours

Basics of Python – Introducing the python interpreter; Using the Interactive Prompt; Running Files with command lines; IDLE Basics; Using IDLE; Other IDEs.
Python's Core Data types; Numbers; Strings; Lists; Dictionaries; Tuples; Numeric type basics; Numeric literals; Built-in Numeric tools; Python Expression operators; Variables and Basic expressions; Taking input and displaying output; Adding comments.

Unit 2: Data structures in Python

5 Hours

Strings – Basic operations; Indexing and Slicing; String Methods; Lists in Action – Basic List operations; List Iteration and Comprehensions; Indexing, Slicing and Matrixes; Dictionaries – Basic Dictionary operations; Changing Dictionary in-place; More Dictionary methods; Tuples – Tuples in Action.

Unit 3: Decision making and Functions


5 Hours

Control flow statements; if statement; General format; Basic examples; if else statement; while loops; for loops; break, continue, pass and the Loop else; use of compound expression in conditional and looping construct.

Functions – Grouping code under a name, Coding functions, def statements. Python Scope Basics- Scope rules; Name resolution: The LEGB rule; Scope example. Argument-passing basics- Arguments and Shared references.

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Unit 4: Object Oriented Programming using Python

5 Hours

Creating a class, the class statement; General form, Example; Methods; Inheritance; Operator overloading; Static and Class Methods;
Exception Handling: Errors in a python program, Default Exception Handler, Catching Exceptions; Raising Exceptions; User-Defined Exceptions. The try/except/else statement, the assert statement. Modules and packages: Creating modules and packages, Module Usage; The import statement; the from statement; the from * statement; Package import basics; Package import example.

Unit 5: NumPy and Panda libraries

10 Hours

Introduction to Pandas; How to Install Python Pandas on Windows and Linux; Pandas DataFrame; Creating a Pandas DataFrame; Pandas Series; Pandas Working With Text Data; Pandas Merging, Joining, and Concatenating; Numpy ndarray; Array Creation; indexing; Basic Slicing and Advanced Indexing in NumPy Python; Sorting, Searching and Counting.

Text Books:

B. Muthukumar (2010). *Information Technology for Management*, Oxford Higher Education.
Dr. Michael Arock, (2014). *Fundamentals of programming with C*. Yes Dee publishing. IITL
Balagurusamy. E, (2016). *Introduction to computing and problem solving using Python*. McGraw Hill Education Private Ltd.
Wes McKineey. (2013). *Python for Data Analysis*. (1st Edition). O'Reilly
Mark Lutz. (2009). *Learning Python*. (4th Edition). O'Reilly.

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Course Objective:

- To inculcate knowledge in PL/SQL & Database Connectivity.

Course Outcomes:

On successful completion of the course, the students should be able to

- explain the concepts of SQL Environment and DDL Commands
- illustrate data retrieval with PL/SQL Commands
- develop PL/SQL triggers, cursors and functions

Unit 1: Introduction to SQL**5 hrs**

SQL Environment – SQL – Logging into SQL - SQL Commands – Errors & Help – Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Create, Display, Alter, Drop, Rename Tables.

Unit 2: Working with Table**6 hrs**

DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – DEFINE command – CASE structure. Built-in functions – Grouping Data - Join – Set operations.

Unit 3: PL/SQL - A Programming Language**7 hrs**

History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures – Nested Blocks – SQL in PL/SQL

Unit 4: PL/SQL Cursors and Exceptions**7 hrs**

Cursors – Implicit and Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

Unit 5: PL/SQL Composite Data Types**5 hrs**

Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages – Triggers – Data Dictionary Views.

References:

- Dr.P.S.Deshpande, *SQL & PL/SQL for Oracle 11g Black Book*, dreamtech
 Steven Feuerstein, Bill Pribyl, *Oracle PL/SQL Programming, (6th Edition)*
 Steven Feuerstein, *Oracle PL/SQL Best Practices, (2nd Edition)*, O'Reilly

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VUCS17002: PYTHON PROGRAMMING

Hours: 30

Unit 1: Introduction

10 hrs

History -Features -Setting up path -Working with Python -Basic Syntax -Variable and Data Types – Operator, Environment Setup, Basic Syntax, The python interface, usage of python, Variable and Data Types, Operators, Decision making, control statements and Loops, String Manipulation.

Unit 2: Lists and Dictionaries

10 hrs

Python Lists-creation of list, different types, select the valid list, list of lists, sub setting lists, slicing and dicing, list manipulation, replace list elements, extend the list elements, deleting the list elements. Tuples, Dictionaries-mkdir(), chdir(), getcwd(), rmdir(), File & Directory Related Methods.

Unit 3: Functions and File Handling

10 hrs

Functions-Defining a Function, The Anonymous Functions, Scope of Variables, The import Statement, The PYTHONPATH Variable, Built-in functions-dir(),reload(), globals, locals(),packages, Printing to the Screen-Reading Keyboard Input, Opening and Closing Files, Renaming and Deleting Files, Modules, Input-Output, Exception Handling.

References:

Guido van Rossum and Fred L. Drake Jr, “An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Robert Sedgewick, Kevin Wayne, Robert Dondero, “Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

Kenneth A. Lambert, “Fundamentals of Python: First Programs”, CENGAGE Learning, 2012.

Lutz, M. and Ascher, D. (1999) *Learning Python*, O'Reilly Media.

Gries, P., Campbell, J., and Montojo, J. (2013) *Practical Programming: An Introduction to Computer Science Using Python*, Pragmatic Programmers

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VUCS18001 : ADVANCED EXCEL

Hours: 30

Course Objectives:

- To acquaint students with basic concepts in Excel.
- To introduce opening excel, cell basics, formula and functions, working with data and working with charts.

Course Outcomes:

After the completion of the VAC course the student will be able to

- building basic worksheets by entering text, numbers, and formulas.
- developing skills in formatting, saving, and printing accurate, readable worksheets.
- creating formulas using absolute and relative references, if and average functions, autoSum, and grand total. Developing skills in managing multiple-sheet worksheets.
- generating pie and column charts by using the chart wizard.

Unit 1: Introduction

06 hrs

MS Excel- Excel Basics; Introduction: opening Excel, Getting Started, The Excel Interface, The Excel Interface, The Quick Access Toolbar, Menus, Commands, Toolbars and their Icons; customizing excel: The Ribbon, customizing the Ribbon, Using and customizing Autocorrect, changing Excel's default options

Unit 2: Basic Operation in a Worksheet

06 hrs

Spreadsheet applications (elementary level), The Workbook Window: Basics concepts of spreadsheet and other features such as, The Formula Bar, The Name Box, The Backstage View, The Worksheet Views, entering text, menus, commands, To rename a worksheet, To insert a new worksheet, To delete a worksheet, To copy a worksheet, To move a worksheet, To change the worksheet color, column width, copy, paste, to insert rows/columns, formatting, formula, print, sort, filter and other basic operations

Unit-3: Formatting Attributes


06 hrs


Compatibility mode, To convert a workbook, Saving and Sharing Workbooks, Save and Save As, To save a workbook, Using Save As to make a copy, Exporting workbooks, Cell Basics: Understanding Cells, Cell Content, Formatting Attributes, Formulas and Functions, To drag and drop cells, To use the fill handle, To continue a series with the fill handle


Unit-4: Writing Formula

06 hrs

Formatting Cells, Wrapping text and merging cells, Formulas and Functions, Simple Formulas, To create a formula using the point-and-click method, Complex Formulas, Relative and Absolute Cell References, Functions, Creating a function, The Function Library, SUM, COUNT, COUNTA, LEN, VLOOKUP, IF Statements, Working with Data, Freezing Panes and View Options, To split a worksheet.


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Unit-5 Functions

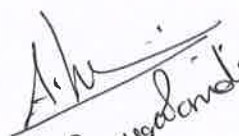
06 hrs

Mathematical functions: sum, sumif, sumifs countif, countifs, Averageif, AVERAGEIFS: protecting excel- File level protection, workbook, worksheet protection: Text functions: Upper, lower, proper, left, mid, right, Trim, concatenate, find and substitute. Working with Charts, Chart layout and style, other chart options.

References:

M.L. Humphrey. Excel for Beginners, Amazon Asia-Pacific Holdings Private Limited.
Professional Excel Development: The Definitive Guide to Developing Applications Using Microsoft Excel, VBA, and .NET.


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VUCS18002 : ENERGY PHYSICS

Hours: 30

Course Objective:

- To make the students acquire an understanding the qualitative ideas about Solar energy, Physical principle of conversion of solar energy into heat energy solar energy.

Course Outcomes:

After completing this course, the student will be able to:

- understand basic principle of wind energy conversion and basic components of wind energy conversion systems
- learn elementary idea of Geothermal energy sources, its applications and method of obtaining energy from biomass.
- know about other non-conventional energy sources like Ocean Thermal Energy Resources, Wind energy and Chemical energy resources.

Unit 1 : Renewable Energy Sources

6 hrs

solar energy - nature of solar radiation - components - solar heaters solar ponds, solar cookers - photovoltaic generation basics - merits and demerits of solar energy.

Unit 2 : Biomass Energy

6 hrs

Biomass energy - classification - photosynthesis - biomass conversion process - Geothermal energy - wind energy.

Unit 3 : Ocean Thermal Energy

6 hrs

Ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas).

Unit 4 : Energy consumption

6 Hrs

Conversion of energy - patterns of energy consumption in domestic, industrial, transportation, agricultural sectors.

Unit 5 : Sustainable Energy

6 Hrs

Energy options for the developing countries - energy storage and hydrogen as a fuel (basics) - impact due to non-conventional energy sources - global warming.

Reference Books:

Solar Energy by G.D. Rai, Ed. V, 1995.

Solar energy by S.P. Sukhatme, Tata McGraw-Hill Publishing Company, Ed. II, 1997.

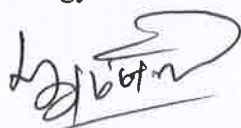
Non Conventional Energy Sources, G.D. Rai, 4th Edition, 1997.

Energy Technology by S. Rao and Dr. B.B. Parulekar 2nd Edition, 1997.

Power Plant technology by A.K. Wahil 1993

Renewable Energy: Power for a sustainable Future by G. Boyle, A. Oess Ltd., Oxford, 1996


Energy models for 2000 and beyond by Jyoti Parikh, Tata McGraw Hill Publishing Company, New Delhi, 1997



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VUCS18003: WEB PROGRAMMING [HTML]

Hours: 30

Course Objectives:

- To learn how to combine basic HTML elements to create Web pages.
- To understand how to use HTML tags and tag attributes to control a Web page's appearance.
- To learn how to add absolute URLs, relative URLs, and named anchors to your Web pages.

Course Outcomes:

After completing this course, the student will be able to:

- Implement interactive web page(s) using HTML, CSS.
- Develop responsive web applications.

Unit 1 : Introduction to HTML

10 hrs

Introduction; History of HTML, HTML Tags and Attributes, HTML Tag vs. Element, HTML Attributes, HTML Basic Tags,

Unit 2: Formatting Tags

5 hrs

HTML Formatting Tags, HTML Color Coding, , Quotation and Citation Elements, HTML Comment Tags, Colors, HTML Links – Hyperlinks, Div and Span Tags for Grouping, titles; footers; text formatting; forms; images.

Unit 3: HTML Lists

5 hrs

Lists in HTML: Ordered and Unordered; Directory; special characters; Hyperlinks;

Unit 4: Tables and Links

5 hrs

Tables and Frames: Adding a Border, Collapsed Borders, Adding Cell Padding, Align Headings, Adding a Caption

Unit 5 : Cascading Style Sheets (CSS)

5 hrs

Introduction; Internal style sheet; External style sheet; Controlling text; Text formatting; Selectors; Box Model; Backgrounds; Tables; Lists.

Text Books

1. Robert W. Sebesta "Programming the World Wide Web", 4th Edition, Pearson Education, 2008. (Chapters 1 to 9)

Reference Books

1. M. Deitel, P.J. Deitel, A. B. Goldberg: Internet & World Wide Web How to program, 3rd Edition, Pearson Education / PHI, 2004.
2. Chris Bates: Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2006.
3. Xue Bai et al: The Web Warrior Guide to Web Programming, Thomson, 2003

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Adh (A. Saranya)


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VUCS19001 : BASIC ELECTRONICS

Hours: 30

Course Objective:

- To make the students understand and learn the fundamental Concepts of Electronics
- To provide sufficient fundamental theoretical and practical knowledge to pursue advanced topics in analog and digital integrated circuits.

Course Outcomes:

After successful completion of the course, the student will be able to:

- Analyze and Design the Electronics Circuits.

Unit 1: Introduction to Passive Components:

10 hrs

Resistors-colour code, classification, series and parallel combination. Capacitors-classification, colour code, number code, series and parallel combination. Inductors-classification, colour code, series and parallel combination. Circuits based on RLC-construction.

Unit 2: Introduction to Active Components:

10 hrs

Transistors-terminal identifications, classification, circuits based on transistor-construction. IC-Introduction, terminal identification, classification, working with ICs-circuits based on ICs.

Unit 3: Design and development of mini Electronics Project:

10 hrs

Voltage regulators-pin diagram, circuit, working principle. DC Power supply- introduction, classification, working with DC power supply. Functional generator, CRO- working principle. Mini project-implementation on bread board.

References:

- R.S. Sedha (2005). *Text book of Applied Electronics*, (1st ed.), S. Chand and Co, Ltd.
B. Basavaraj (2002). *Fundamentals of Electronics*, (1st ed.), Omkar Publications
B. L. Theraja, (2012). *Basic Electronics*, (5th ed.), S. Chand and Co. Ltd.

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VUCS19002 : BASICS OF HTML

Hours : 30

Course Objectives:

- To learn how to combine basic HTML elements to create Web pages.
- To understand how to use HTML tags and tag attributes to control a Web page's appearance.
- To learn how to add absolute URLs, relative URLs, and named anchors to your Web pages.

Course Outcomes:

After completing this course, the student will be able to:

- Implement interactive web page(s) using HTML, CSS.
- Develop responsive web applications.

Unit 1: Introduction

8 hrs

Introduction; History of HTML, HTML Tags and Attributes, HTML Tag vs. Element, HTML Attributes, HTML Basic Tags, HTML Formatting Tags, HTML Color Coding, , Quotation and Citation Elements

Unit 2: HTML Tags

8 hrs

HTML Comment Tags, Colors, HTML Links – Hyperlinks, Div and Span Tags for Grouping, titles; footers; text formatting; forms; images

Unit 3: HTML Lists, Tables and Links

8 hrs

Lists in HTML: Ordered and Unordered; Directory; special characters; Hyperlinks; Tables and Frames: Adding a Border, Collapsed Borders, Adding Cell Padding.

Unit 4: Cascading Style Sheets (CSS)

6 hrs

Introduction; Internal style sheet; External style sheet; Controlling text; Text formatting; Selectors; Box Model; Backgrounds; Tables; Lists.

References:

- Robert W. Sebesta "Programming the World Wide Web", 4th Edition, Pearson Education, 2008. (Chapters 1 to 9)
- M. Deitel, P.J. Deitel, A. B. Goldberg: Internet & World Wide Web How to program, 3rd Edition, Pearson Education / PHI, 2004.
- Chris Bates: Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2006.
- XueBai et al: The Web Warrior Guide to Web Programming, Thomson, 2003
- Sklar : Principles of web design , 1st Edition, 2008 Cengage Learning India
- Sklar : The Web Warrior Guide to Web Design Technologies, 1st Edition, Cengage Learning India.

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VUCS19003: LASER PHYSICS

Hours: 30

Course Objective:

- To make the students acquire an understanding the LASER and Applications.

Course Outcomes:

After completing this course, the student will be able to:

- learn about the background on LASER.
- understanding behaviour of Laser and properties of Laser beams.
- develop knowledge of applications of Laser.

Unit 1 : Introduction- Laser

6 hrs

Summary of black body radiation, Quantum theory for evaluation of the transition rates, Stimulated and spontaneous emission.

Unit 2 : Solid State Lasers

6 hrs

Ruby & Nd:YAG lasers. He-Ne laser, Dye laser, semiconductor diode laser.

Unit 3 : Gas Lasers

6 hrs

Molecular gas lasers- CO₂ laser & N₂ lasers.

Unit 4 : Population Inversion

6 hrs

Einstein's A & B coefficients- relation between them- condition for light amplification- Population inversion- Pumping methods and schemes.

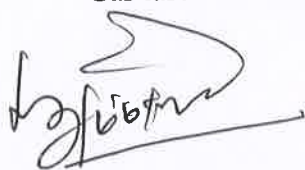
Unit 5 : Laser- Applications

6 hrs

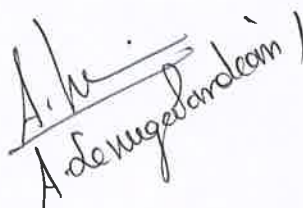
Lasers in mechanical industry, Electronics industry, nuclear energy, medicine, Defense, communication- measurement of distance and velocity.

References:

- G.D.Barugh - Lasers and Non-linear Optics, Pragati Prakashan, Meerut, IIIrd Edition, 2009.
M.N.Avadhanulu, An Introduction to Lasers: Theory and Applications, S.Chand and Company Ltd, New Delhi, 1st Edition, 2001
Principles of lasers- O Svelto
Solid State Laser Engineering- W Koechner
Laser- B A Langyel
Gas laser- A J Boom



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VUCS19004: QUANTITATIVE APTITUDE AND NUMERICAL ABILITY

Hours: 30

Course Objective:

- To develop and strengthen the foundation of basic mathematics.

Course Outcomes:

After completing the course students will be able to:

- Express problems in mathematical language.
- Use mathematical techniques to find solutions to problems.
- Develop skills in communicating results and defining problems.

Unit 1: Number System

Number Series, Divisibility Test; HCF & LCM of Numbers; Simplifications; Problems on Ages

8 hrs

Unit 2: Speed and Distance

Problems on speed, distance and Time, Relative speed, Problems on Train

7 hrs

Unit 3: Ratios and Proportions

Ratio, Proportion, Chain rule, Time and work; Decimal Fractions

7 hrs

Unit 4: Interest

Simple Interest, Compound Interest, Stock and Share

8 hrs

References:

- Aggarwal R S, *Objective Arithmetics*, Reprint. New Delhi: S Chand and Co. Pvt. Ltd., 2013.
Praveen, R. V. *Quantitative Aptitude and Reasoning*. PHI Learning Pvt. Ltd., 2013.
Sharma, Arun. *Verbal Ability And Rc For Cat*. Tata McGraw-Hill Education, 2011.
Sinha, Nishit K. *Quantitative Aptitude for the CAT*. Pearson Education India, 2016.
Khattar, Dinesh. *The Pearson Guide to Quantitative Aptitude for Competitive Examinations, 3e*.
Pearson Education India, 2016.


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VUCS19005: STATISTICAL ANALYSIS USING STATGRAPHICS

Hours: 30

Course Objective:

- To acquaint students with basic concepts in STATGRAPHICS.
- To introduce Descriptive Statistics, Correlation Analysis, Simple Linear Regression Model.

Course Outcomes:

After the completion of the course the student will be able to

- Represent graphically, analyze statistically and interpret univariate data. i.e. Summary Statistics and descriptive statistics.
- Analyze statistically to interpret bivariate and trivariate data sets.i.e. Simple linear regression, Multiple regression.

Unit 1 : Getting started

6 hrs

Installation, Running the program, Entering Data, Reading a saved data file, Analyzing the data, Using the analysis toolbar, Saving your work.

Unit 2 : Data Management

6 hrs

The DataBook, Accessing Data, Reading Data from a STATGRAPHICS Centurion Data File, Reading Data from an Excel, ASCII, XML, or Other External Data File, Copying and Pasting Data, Creating New Variables from Existing Columns, Transforming Data, Generating Data.

Unit 3 : Running Statistical Analysis

6 hrs

Data Input Dialog Boxes, Additional Input Dialog Boxes, Analysis Windows, Input Dialog Button, Analysis Options Button, Tables and Graphs Button, Save Results Button.

Unit 4 : Analyzing a Single Sample

6 hrs

Running the One-Variable Analysis Procedure, Summary Statistics, Testing for Outliers, Histogram, Quantile Plot and Percentiles.

Unit 5 : Regression Analysis

6 hrs

Correlation Analysis, Simple Regression, Examining the Residuals, Multiple Regression.

Reference.

STATGRAPHICS® Centurion Centurion 18 User Manual. Statpoint Technologies. Inc.

Dr. Vinoth Balakrishnan



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(A. Senyapandian)



DEAN
FACULTY OF SCIENCE
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VPCS17001: APTITUDE & CAREER ENHANCEMENT COURSE

Hours: 30

Course Objective:

- To hone the core competencies of the students.
- To build confidence in students and develop right attitude
- To enhance their communication skills.
- To enhance numerical aptitude and technical knowledge
- To prepare the students for Placement and Internship drive.

Course Outcomes:

After completing the course students will be able to:

- evaluate the right answers to quantitative and reasoning questions that are asked for various competitive exams and placements
- apply the right method to solve questions related to grammar and comprehension of passages
- formulate better strategies in group discussion and Interviews
- identify the correct answers while appearing for placement oriented technical and aptitude tests

Unit 1: Numerical Aptitude & Logical Reasoning Aptitude

10 hrs

Numerical Aptitude: Number system, Fractions, Ratio and Proportions, Speed and Distance, Boats and Streams, Time and Work, Profit and Loss, Simple and Compound Interest and Permutation and Combination, Clocks and Calendars and Data interpretation, Logical Reasoning: Verbal and Non-Verbal Reasoning, Letter, Symbol and Number series, Codes and Relationships, Analogies, Deductive and Inductive Reasoning, Mood and Figure, Cause and Effect.

Unit 2: Language Aptitude

10 hrs

Grammar/ Comprehension, Presentation, Written and Oral Communication skills, Group Discussion and Interview Preparations

Unit 3: Technical Aptitude:

10 hrs

Networks, C programming, OOPS, Java, UNIX, OS, DBMS & Data Structures


References:

Quantitative Aptitude for Competitive Examinations (2017), R S Aggarwal , S Chand Publishers

Acing the GATE: Computer Science and Information Technology (2019), Anil Kumar Verma, Gaurav Sharma, Wiley Publishers

Objective English for Competitive Examination (2016), Edagar Thorpe and Showick Thorpe, Pearson Publishers

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VPCS18001: AWS CLOUD FOUNDATIONS ACF

Hours: 30

Course Objective:

- To provide the students an overall understanding of cloud computing concepts, independent of specific technical roles.
- To provide a detailed overview of cloud concepts, AWS core services, security, architecture, pricing, and support.

Course Outcomes:

After successful completion of the course, the student will be able to:

- analyse cloud computing architecture, characteristics, environment and the principles of virtualization
- apply Aneka framework to set up cloud environments for cloud programming
- contrast concurrent and MapReduce programming model used in cloud computing
- discuss issues involved in energy efficient cloud computing and market models for cloud computing systems

Unit 1: Cloud Concepts Overview

5 hrs

Introduction to Cloud Computing, What is Cloud Computing?, Six Advantages of Cloud Computing, What is Amazon Web Services (AWS), The AWS Cloud Adoption Framework (CAF), Cloud Concepts, Introduction to the AWS Infrastructure, AWS Service and Service Category Overview.

Unit 2: Compute & Storage

15 hrs

Introduction to Compute, Introduction to Amazon Elastic Compute, Amazon EC2 Console Demo, Introduction to AWS Lambda, Introduction to AWS Elastic Beanstalk, Introduction to Storage, Amazon Elastic Block Store (EBS), Amazon Simple Storage Service (S3), Amazon Elastic File System (EFS), Amazon Glacier, Amazon S3 Demo.

Unit 3: VPC & Database

10 hrs


Introduction to the Amazon Virtual Private Cloud (VPC), Amazon VPC Security Groups, Build your VPC and Launch a Web Server, Amazon CloudFront, Amazon Relational Database Service (RDS), Amazon DynamoDB, Amazon DynamoDB Demo.

References:

Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, (2013), *Mastering Cloud Computing*, TMGH.
Dr. Kumar Saurabh, *Cloud Computing -Insight into New Era Infrastructure*, Wiley India.
John Rhoton, *Cloud Computing Explained*, Recursive Press.
Judith Hurwiz, *Cloud Computing of Dummies*, Wiley Publishing.

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VPCS19001: CAPACITY BUILDING & ATTITUDINAL TRAINING

Hours: 30

Course Objective:

- To make the students to understand the larger issues of life & Living
- To introduce various skills needed for leading a life to the students

Course Outcomes:

After successful completion of the course, the student will be able to:

- Understand the personality traits required to improve one's personality.
- Know various aspects that influence personality & strategies to manage them.

Unit 1: Self Awareness and Leadership Development

10 hrs

Meaning of self-awareness-Components-Improving Self Awareness – Benefits of understand self - Meaning and Importance – Types of Leadership Styles – Theories of Leadership

Unit 2: Goal Setting and Interpersonal Skills

6 hrs

Meaning of Goal & Goal Setting – Short, Medium & Long Term Goals – Importance of goal setting – Choices/Selection of setting goals – Steps for goal setting – SMART goals. Meaning of Creativity – Difference with Innovation – Barriers to Creativity- Understanding and importance of human values – Difference with Ethics, Ideals in life- Becoming a Role Model

Unit 3: Interpersonal Skills

4 hrs

Meaning of Interpersonal Skills – Need for Developing Interpersonal Skills – Components of interpersonal Skills – Techniques required to improve skills – Benefits of Effective Interpersonal Skills

Unit 4: Stress Management

3 hrs

Meaning of Stress – Factors causing stress- Positive and Negative types of stress – Effects of stress on body and mind – Stress removal Techniques

Unit 5: Time Management

7 hrs

What and why of Time Management – Necessity and benefits of Time Management - Tools of Time Management – How to manage time wisely

References:

- Elizabeth B. Hurlock (2007). *Personality Development*. Tata McGraw Hill: New Delhi.
R.M. Omkar (2008). *Personality Development and Career Management*. S.Chand & Co. Ltd.
Barun K. Mitra (2012). *Personality Development and Soft Skills*. Oxford University Press.

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Course Objective:

- To give knowledge and understanding of the essentials of research
- To comprehend on interpretation and research writing

Course Outcomes:

After completing the course students will be able to:

- learn about designing of experiments for research
- get to know the systematic way of interpreting results
- acquire knowledge on report writing and paper publication

Unit 1: Research Methodology

10 hrs

Meaning, Basic and applied research, Essential steps in research, Defining the research problem, Research/Experimental design, Research and Scientific Methods; Literature collection, Significance of research.

Unit 2: Interpretation and Report Writing

10 hrs

Meaning of interpretation; Techniques of interpretation; Precautions in Interpretation; Synopsis/ Dissertation/Thesis/Report/Abstract/Manuscript/Review/Project/writing: Meaning, concept, objectives and scope, components, format, types, layout, different steps involved, Significance and Bibliography


Unit 3: Publications and Statistical Analysis

10 hrs

Publishing research articles in Journals, Books, Proceedings. Citation Index, Impact factor, Abstract Index, Oral and Poster presentation. Statistical Methods: Collection and presentation of Data (Tables, Graphs, Diagrams). Standard deviation and standard error.

References:

- Kumar K. L.' (1997), *Educational Technology*, New Age International (P) Ltd., New Delhi.
Kothari, C.R; II ed. (2004), *Research Methodology*, Methods and techniques; New Age International (p) Ltd., Publishers, New Delhi.
Jerrald H. Zar (1999), *Biostatistical analysis of Prentice Hall International*, Inc. Press, London
Tony Bates A.W. Technology, (2005), *e-Learning and Distance Education*, New York, Routledge.

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Course Objective:

- To impart an understanding on the process of drug discovery using computational tools.
- To increase the employability quotient of students by introducing to the students a set of tools routinely used in pharmaceutical drug development processes

Course Outcomes:

After completing the course students will be able to:

- Appreciate the general principles underlying the process of drug discovery
- Identify characteristics of a molecule that would make it a potential drug-lead
- Employ computational tools and approaches to rationally design drugs

Unit 1: Introduction to drug discovery

6 hrs

History and scope, Stages of drug discovery and development, Role of computers and informatics in drug discovery, Computational resources in drug discovery: databases, online and standalone resources, Target identification and validation, lead identification and validation.

Hands-on experience: Zinc, ChemSpider and PubChem databases

Unit 2: Drug properties

8 hrs

SMILES notation, Drug-likeness properties, Structural descriptors that contribute to drug-likeness, ADME, Drug solubility and permeability, Blood Brain Barrier, Models for Drug Likeness: Veber rule, Lipinski's rule of five, 2D and 3D QSAR, Pharmacokinetics and Pharmacodynamics.

Hands-on experience: ADME prediction: SwissADME, Molinspiration, CRDD, Osiris, Screening for optimal ADME using FAF-Drugs4, QSAR using excel, Build QSAR

Unit 3: Molecular Modelling

8 hrs

Structure/Ligand based Modelling, Target based modelling, Computational methods for modelling, Quantum mechanics and Molecular mechanics, Force fields, Components of a force field, Energy minimization, Conformation search, Molecular dynamics simulation, Pharmacophore modelling.

Hands-on experience: Jmol, Pymol, Use of force fields and Conformer search using Marvin Sketch, MOPAC, Molecular descriptor search using ChemDes, E-Dragon, Pharmacophore modelling using ZincPharmer and PharmaGist

Unit 4: Target based drug Design

8 hrs

Drug Targets, Protein structure, Protein structure determination: in-vitro and in-silico methods, Model validation, Chemistry of ligand-target interactions, Methods for target based drug design, Molecular docking.

Hands-on experience: Protein Homology Modelling, Molecular Docking using Autodock

References:

- Merz, K. M., Ringe, D., & Reynolds, C. H. (2010). *Drug Design: Structure- and Ligand-Based Approaches*. Cambridge University Press.
- Bultinck, P., Winter, H. D., Langenaeker, W., & Tollenare, J. P. (2003). *Computational Medicinal Chemistry for Drug Discovery*. CRC Press.
- Voit E (2012) *A First Course in Systems Biology*. Garland Science.
- Klipp E (2009) *Systems biology: a textbook*. Wiley-VCH.
- Cavasotto, C. N. (2015). *In silico drug discovery and design: Theory, methods, challenges, and applications*, CRC press

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Course Objective:

- Students will be able to compost in a less space and will get the knowledge of composting.
- Students will get the employment and can generate employments.
- Students will turn towards organic farming it helps to maintain the environment pollution free.

Course Outcomes:

After completing the course students will be able to:

- Management of solid organic waste
- Production of vermicompost from organic waste by earthworms
- Reduction of environmental pollution.

Unit 1: Introduction to Vermiculture/ Vermicompost**8 hrs**

Introduction to vermiculture, definition, meaning, history, economic important and their role in maintenance of soil structure and production of organic fertilizers, The Difference between Vermiculture and Vermicomposting.

Unit 2: Biology of Earthworms and Rearing**6 hrs**

Morphology & Anatomy: Earthworms – Taxonomic position , external features- shape, size, colour, segmentation, setae & clitellum, Body wall, coelom, locomotion, digestive, circulatory, respiratory, excretory & nervous system.

Unit 3: Vermicompost Technology (Methods and Products)**8 hrs**

Small Scale Earthworm farming for home gardens (Earthworm compost for home gardens) Conventional commercial composting (Earthworm Composting larger scale), Extraction (harvest), vermicomposting, harvest and processing. Nutritional Composition of Vermicompost for plants, comparison with other fertilizers, Enemies of Earthworms and Sickness of worms.

Unit 4: Economic important of vermiculture technology**8 hrs**

Economic importance of Earthworms: In sustainable agriculture, organic farming, earthworm activities, soil fertility & texture, soil aeration, water impercolation, decomposition & moisture, bait & food.

References:

- Bhatt J.V. & S.R. Khambata (1959) "Role of Earthworms in Agriculture" Indian Council of Agricultural Research, New Delhi
- Dash, M.C., B.K.Senapati, P.C. Mishra (1980) " Verms and Vermicomposting" Proceedings of the National Seminar on Organic Waste Utilization and Vermicomposting Dec. 5-8, 1984, (Part B), School of Life Sciences, Sambalpur University, Jyoti Vihar, Orissa.
- Edwards, C.A. and J.R. Lofty (1977) "Biology of Earthworms" Chapman and Hall Ltd., London.
- Lee, K.E. (1985) "Earthworms: Their ecology and Relationship with Soils and Land Use" Academic Press, Sydney.
- Kevin, A and K.E.Lee (1989) "Earthworm for Gardeners and Fisherman" (CSIRO, Australia, Division of Soils)
- Rahudakar V.B. (2004). *Gandul khatashivay Naisargeek Paryay*, Atul Book Agency, Pune.
- Satchel, J.E. (1983) "Earthworm Ecology" Chapman Hall, London.
- Wallwork, J.A. (1983) "Earthworm Biology" Edward Arnold (Publishers) Ltd. London..

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VLSC19001: ENVIRONMENTAL ISSUES AND CONSERVATION

Hours: 30

Course Objective:

- To understand the various environmental issues
- To analyse the cause and effects of the environmental issues
- To gain knowledge on environmental conservation

Course Outcomes:

After completing the course students will be able to:

- summarise the importance of conserving the natural resources.
- explain the causes, effects and prevention of pollution.
- assess the reasons for climate change and its effects.
- adopt sustainable management and conservation of environment.

Unit 1: Types of Environmental issues

8 hrs

Depletion of Natural Resource, Loss of Biodiversity, Pollution, Population growth, Waste production, Climate change, Genetic modification of crops.

Unit 2: Types of Pollution and Waste Management

8 hrs

Water Pollution, Air Pollution, Soil Pollution, Thermal Pollution, Radioactive Pollution, Noise Pollution, Light Pollution and control measures; Waste management.

Unit 3: Climate change and effects

8 hrs

Ozone depletion, polar ice caps, ocean acidification, acid rain: its effects on the environment, Global Warming.

Unit 4: Environmental Conservation and Sustainability

6 hrs

Sustainable management of natural resources, Sustainable agriculture, Protect health of ecosystems, Prevent consequences of global warming, Protection of species- gene bank conservation.

References:

- Ambast R S (2014), *Environment And Pollution: An Ecological Approach*, CBS Publication, ISBN: 9788123923499
- Daniel D Chiras (2014), *Natural Resource Conservation*, ISBN: 9789332536685
- Peter P. Rogers, with Kazi F. Jalal, John A. Boyd (2007), *An Introduction to Sustainable Development*, ISBN 978-1-84407-521-8.

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VLSC19002: MUSHROOM CULTIVATION

Hours: 30

Course Objective:

- To enable the students to identify the edible and poisonous mushrooms.
- To provide hands-on training on mushroom cultivation and harvesting.
- To acquaint students with diseases of mushrooms.
- To provide the students awareness about the nutritive value of mushrooms.
- To help the students to learn a means of self-employment and income generation.

Course Outcomes:

After completing the course students will be able to:

- gain knowledge of cultivation of different types of edible Mushroom
- understand the different methods of composting for Mushroom cultivation and know the methods of harvesting of Mushroom
- acquire knowledge of diseases affecting Mushroom and their control in Mushroom cultivation

Unit 1: Mushroom Morphology and Classification

6 hrs

Different parts of a typical mushroom & variations in mushroom morphology. Key to differentiate edible from poisonous mushrooms. Classification based on occurrence- Epigenous & Hypogenous, Natural Habitats-Humicolous, Lignicolous & Coprophilous, Colour of spores- white, yellow, pink, purple brown & black, Morphology- fruiting layers exposed to air, fruiting layers not exposed to air, plants with predominantly pitted cap, cap saddled shape & saucer shape, Structure and texture of fruit bodies-gilled fungal & pore fungal, Fruit bodies and spores- Ainsworth et al (1973) classification. Recent Classification- 8th edition of Ainsworth & Bisby's 'Dictionary of Fungi'. Types of Mushrooms- Button, Straw & Oyster- General morphology, distinguishing characteristics, spore germination and life cycle.

Unit 2: Nutrient Profile and Health benefits of Mushroom

4 hrs

Nutrient content - Protein, amino acids, calorific values, carbohydrates, fats, vitamins & minerals. Health benefits- Antiviral value, antibacterial effect, antifungal effect, anti-tumour effect, haematological value, cardiovascular & renal effect, in therapeutic diets, adolescence, for aged persons & diabetes mellitus.

Unit 3: Cultivation Techniques and Farm design

14 hrs

Principles of mushroom cultivation- Sterilization and disinfections of substrates- Pasteurization of different substrates; Spore printing - Isolation and culture of spores, culture media preparation; Spawn production- Production of mother spawn, multiplication of spawn, pure culture and their storage and maintenance; Composting technology- Principles of composting, bed, polythene bag preparation, machinery required for compost making, materials for compost preparation. Methods of Composting- Long method of composting (LMC) & Short method of composting (SMC); Casing - Importance of casing mixture, Quality parameters of casing soil, different types of casing mixtures, commonly used materials. Structure and construction of mushroom house- layout of Traditional and Greenhouse method- maintenance of sanitation in mushroom plants. Cultivation of oyster and paddy straw mushroom - preparation of pure culture & spawn cultivation methods, harvest. Cultivation of button mushroom - morphology, raising a pure culture & spawn preparation. Preparation of compost & cultivation of *Agaricus bisporus*. Post-harvest management - Harvest - preservation of mushrooms, storage, methods; Quality assurance of mushroom. Demonstration of Mushroom cultivation.

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Unit 4: Microbial Diseases of Mushroom

6 hrs

Factors influencing contamination and diseases in mushrooms in mushroom cultivation -Environmental, fungal, bacterial, viral, insect pests, nematode diseases, and competitor moulds; Diseases of mushrooms- Bacterial, Brown blotch disease, yellowing of oyster mushrooms, Bacterial soft rot- fungal-fungal brown blotch, Wet bubble, Dry bubble, Cobweb, Green blotch. Visit to relevant Labs/Field Visits.

References:

- Pathak Yadav Gour (2010), *Mushroom Production and Processing Technology*, Agrobios (India).
Nita Bhal. (2006), *Handbook on Mushrooms*. Vol. I and II. (4th Ed.), Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
Suman B C. & Sharma VP. (2007), *Mushroom Cultivation in India*, Daya Publishing House, Delhi.
Joran P. & Wheeler S. (2011), *The Complete Book of Mushrooms*, Anness Publishing Ltd., Leicestershire.
Kannaiyan S. & Ramasamy K. (1980), *A hand book of edible mushroom*, Today & Tomorrows Printers & Publishers, New Delhi.
Tripathi, D.P. (2005), *Mushroom Cultivation*, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
Ignacimuthu, S. (1997), *Applied plant biotechnology*, Oxford & IBH Publishing co. Pvt. Ltd., New Delhi
Tewari Pankaj Kapoor, S. C. (1988), *Mushroom Cultivation*, Mittal Publication, New Delhi.
V.N. Pathak, Nagendra Yadav and Maneesha Gaur (2000), *Mushroom Production and Processing Technology*, Vedams Ebooks Pvt Ltd., New Delhi.
Kaul T N. (2001), *Biology and conservation of mushrooms*. Oxford and IBH Publishing Company N. Delhi

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VLSC19003: PRIVATE DETECTIVES AND INVESTIGATION

Hours: 30

Course Objective:

- To provide an understanding on the role private detectives
- To provide knowledge of the process of private investigation

Course Outcomes:

After completing the course students will be able to:

- comprehend the role of a private investigator
- practice the techniques that can be used in the process of investigation
- know how the field of forensic science can be applied in the private sector

Unit 1: Introduction to Private Investigation

6 hrs

An introduction to a private investigator; Civil and criminal laws in India; Importance and role of a private investigator; The code of ethics; Obtaining a license as a private investigator.

Unit 2: Methodology of Investigation

5 hrs

Explanation and process of investigation of: theft, fraud, deception, assault, accident and trespass.

Unit 3: Science and Investigation

13 hrs

Crime scene investigation and forensic photography; Criminal profiling; Portrait-parle; Modus operandi; Forensic science and criminology basics; Forensic experts; Scientists and investigators; Fingerprint verification and handwriting examination; Methods of identification and sources of information; Evidence: gathering, preserving and presenting.

Unit 4: Future of Private Investigation

6 hrs

Background Investigations; Protection and security; Writing opinions; preparing a case file or reporting to client; Starting a business and career as an investigator.

References:

- Kahn, H. (2019). *Becoming a Private Investigator*. New York: Simon and Schuster.
- Smith, D. B. (2016). *The Private Investigator: Beginner's Guide*. Chicago: Create Space Independent Publishing Platform.
- Travers, J. A. (2005). *Introduction to Private Investigation: Essential Knowledge and Procedures for the Private Investigator*. Illinois: Charles C Thomas Publisher.
- Willard, R. J. (1997). *PI: A Self-Study Guide on Becoming a Private Detective*. Paladin: Paladin Press.

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