FACULTY OF SCIENCE

SYLLABI FOR

POSTGRADUATE DIPLOMA

IN

COMPUTER APPLICATIONS

FOR

EXAMINATIONS 2020-21
(SEMESTER SYSTEM)

---:O:-
Outline of the Syllabi and Courses for Post Graduate Diploma in Computer Applications for Examination (Semester System).

**FIRST YEAR (SEMESTER –I)**

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Paper Name</th>
<th>Lect</th>
<th>Tutorial</th>
<th>Practicals/Weeks</th>
<th>Exam. Marks</th>
<th>Int.Ass. Marks</th>
<th>Total Marks</th>
<th>Exam Hours</th>
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<tr>
<td>PGD-1101</td>
<td>Computer Fundamentals</td>
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<td>PGD-1103</td>
<td>DataBase Management System</td>
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**TOTAL PERIODS =42**

**TOTAL MARKS = 450**

**FIRST YEAR (SEMESTER –II)**

<table>
<thead>
<tr>
<th>Paper Code</th>
<th>Paper Name</th>
<th>Lect</th>
<th>Tutorial</th>
<th>Practicals/Weeks</th>
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<td>PGD-2101</td>
<td>Object Oriented Concepts Using JAVA</td>
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<td>Project Work : Project will involve Development of Business Application / Web Site</td>
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**TOTAL PERIODS =48**

**TOTAL MARKS = 550**

Note: Pass Marks 40% marks in Theory, Internal Assessment, and Practical separately. 50% marks for Project Work. 50% marks in Aggregate to qualify the examinations.
Objective: The objective of the course is to familiarize students with basic concepts related to Computers, DOS, Windows, Linux and application software’s like Word-processing, Spreadsheet Software and Presentation Software.

Note:
i. The Question Paper will consist of Four units.
ii. Examiner will set total of NINE questions comprising TWO questions from each unit and ONE compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt ONE question from each unit and the Compulsory question.
iv. All questions carry equal marks unless specified.

UNIT - I
1. Basics of Computers: Characteristics of computer; History of computers; classification of computers based on size, architecture, and chronology; Applications of computers; Hardware, Software, and Firmware. Types of software: System and Application software; Input, Process and Output, Block diagram of a computer.

2. Representation of information: BIT, BYTE, Memory, Memory size; RAM, ROM, PROM, EPROM, Magnetic tapes, Disks, Organization of data on disks: Tracks, sectors, cylinders, heads, access time, seek time and latency time.
   ASCII and EBCDIC Codes, Binary, Octal, Decimal and Hexadecimal Number Systems and their Conversion, Integer and Floating Point Representation Input/Output devices.

UNIT - II
3. Disk Operating System: Booting sequence; Warm and Cold Booting; Concept of File and directory, Types of DOS commands: Internal and External; Internal Commands: DIR, MD, CD, CLS, COPY, DATE, DEL, PATH, PROMPT, REN, RD, TIME, TYPE, VER, VOL; External Commands: XCOPY, ATTRIB, BACKUP, RESTORE, FORMAT, DISKCOPY, Introduction to CONFIG.SYS and AUTOEXEC.BAT files.

4. Windows: GUI, Icons, Toolbar, Control panel, Files and folder management under windows, Accessories, Network Neighborhood, System Tools, Recycle Bin

5. LINUX: Overview of LINUX structure, Basic Linux commands such as date, echo, cal, bc, passwd, File and Directory commands such as ls, mkdir, pwd, cd, rmdir, cat, cp, mv, rm Understanding File Access Permissions using chmod, chown, chgrp. Comparison of main features of DOS, LINUX and Windows Operating Systems.
UNIT - III

6. Word Processing Software:
   **Basics of Word Processing**: creating, opening, saving, and printing document, Menu Toolbars.

   **Editing Text**: Copy, Paste, Delete, Move etc., Finding and Replacing Text, Spell Check, Autocorrect feature, language setting and thesaurus

   **Formatting**: Character, Paragraph and Page formatting, working with indents, Bulleted and numbered lists, adding Headers and Footers, setting up Multiple Columns

   **Working with tables**: Inserting/creating table using toolbar and drawing, formatting table, adding/deleting rows/columns, Applying borders to tables

   **Clipart**: Using clip art, Creating Word Art

   **Mail merge**: Creating merged envelopes, creating merged mailing labels

UNIT - IV

7. Spreadsheet Software:
   **Worksheet overview**: Row, Column, Cells, Menus, creating, opening, saving, and printing worksheet; working with Range

   **Editing information**: Entering text, numbers and formulae, AutoSum, AutoFill, spell checking

   **Working with Functions**: Statistical, Mathematical and String functions, date and Time functions, Trigonometric functions

   **Working with charts**: Line graphs, Pie charts, Bar graphs, adding Titles, Legends etc. to charts, Printing Charts

8. Presentation Software:
   Basic features, selecting design templates, creating, saving and printing a simple presentation, various views, Adding pictures, shapes, clipart, audio and movie.

**References**:

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<tr>
<td>3.</td>
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<td>5.</td>
<td>Rajaraman, V.</td>
</tr>
<tr>
<td>6.</td>
<td>Curtin</td>
</tr>
<tr>
<td>8.</td>
<td>Norton, P.</td>
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</table>
Objective: The objective of the course is to familiarize students with programming concepts of ‘C’ including functions, Arrays, strings etc.

Note:

i. The Question Paper will consist of Four units.

ii. Examiner will set total of NINE questions comprising TWO questions from each unit and ONE compulsory question of short answer type covering whole syllabi.

iii. The students are required to attempt ONE question from each unit and the Compulsory question.

iv. All questions carry equal marks unless specified.

UNIT - I


2. C Language Fundamentals: ‘C’ Language: History, Structure of a C program, Data types, Constants and variables, Operators and Expressions, Type conversion, Scope Rules: Local and Global variables, I/O functions, Control constructs( Sequencing, alteration and iteration)

3. Header files: stdio.h, ctype.h, string.h, math.h, stdlib.h, time.h

4. Storage classes: automatic, external, static, register

5. Preprocessor: #define, #include, #undef, #conditional compilation directives (#if, #else, #elif, #endif, #ifdef and #ifndef)

UNIT - II

6. Functions: library functions, user defined functions, scope rule of functions, Parameter passing: call by value and call by reference, Recursion

7. Arrays: One dimensional and two dimensional arrays, declaring arrays, initializing arrays, processing of arrays, passing arrays as arguments to functions

8. Pointers: Definition, Declaring pointers, accessing values via pointers, pointer arithmetic, pointer to strings, passing arguments using pointers, array of pointers

UNIT - III

9. Strings: Declaring String, built-in string functions-strlen(), strcpy(), strcat(), strcmp(), array of strings, two dimensional array of characters, Array of Pointers to Strings

10. Structure: Defining a structure type, declaring variables of structure type, initializing structures. Accessing Structure Elements, array of structures, Array in Structures, Difference between array and structure, nested structures

11. Unions: Declaring a Union, Accessing elements of a type union.
UNIT - IV

12. **Console Input/Output:** Console I/O Functions, Formatted Console I/O Functions, `sprintf()` and `sscanf()` Functions, Unformatted Console I/O Functions, `gets()`, `puts()`

13. **File Input/Output:** File Operations, Opening a File, File Opening Modes, Reading from a File, Trouble in Opening a File, Writing to a File, Closing the File.

**References:**

<table>
<thead>
<tr>
<th></th>
<th>Author(s)</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kanetkar, Yashavant</td>
<td><em>Let us C</em>, BPB Publications, New Delhi</td>
</tr>
<tr>
<td>2</td>
<td>Gottfried, B.</td>
<td><em>Theory and problems of Programming in C</em>, Schaum Series. N.D. TMH</td>
</tr>
<tr>
<td>3</td>
<td>Sinha, P.K.</td>
<td><em>Computer Fundamentals</em>, BPB Publications,</td>
</tr>
</tbody>
</table>
Objective : The objective of the course is to make the students understand Database concepts and SQL.

Note:
   i. The Question Paper will consist of Four units.
   ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each unit and **ONE** compulsory question of short answer type covering whole syllabi.
   iii. The students are required to attempt ONE question from each unit and the Compulsory question.
   iv. All questions carry equal marks unless specified.

UNIT - I

1. **Data Base Concept:** Data Base Vs File Oriented Approach, Basic DBMS terminology, Data Independence, General Architecture of a Data Base Management Software, Components of DBMS, Advantages and Disadvantages of DBMS. Distributed Databases, Structure and Design of Distributed Databases.

UNIT - II

2. **Data Base Design:** Introduction to Data Models, Entity Relationship Model, Entities, Attributes, E-R Diagrams, Conceptual Design of a relational data base model.

UNIT - III

3. **Relational Model:** Storage organization for Relations, Relational Algebra, Relational Calculus, Functional dependencies, multivalued dependencies, Candidate Key and Primary Key in a Relation, Foreign Keys, Normalization - Introduction, 1NF, Partial Dependencies, 2N, data Anomalies in 2NF Relations, Transitive Dependencies 3NF

4. **Database Security:** Database Security and Integrity: Data security risks, Password-related threats, Protecting the data within the database- database privileges, system privileges and object privileges, granting and revoking privileges and Roles. Concurrency: locking techniques for concurrency control. Recovery: Causes of failures, recovery from failures, Log based recovery, checkpoints

UNIT - IV

4. **Understanding SQL-1:** Data Types, Creating Tables, Creating a Table with data from Another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, Dropping a Column, Querying database tables, Conditional retrieval of rows, Working with Null Values, Matching a pattern from a table, Functions: Character Functions, Date Functions, Group Functions, Ordering the result of a Query Aggregate Functions, Grouping the Result of a Query.
UNIT - IV

5. **Understanding SQL-II**: Definition and Advantages of Views, Creating and Altering Views, Using Views, Querying Multiple Tables using Equi-Joins, Cartesian Joins, Outer Joins, Self-Joins, SET Operators: Union, Intersect, Minus; Introduction to Nested Queries, Define Transaction, COMMIT and ROLLBACK,

<table>
<thead>
<tr>
<th>References:</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Desai, B.C.</td>
<td>An Introduction to Database Systems, Galgotia Pub. New Delhi</td>
</tr>
<tr>
<td>5.</td>
<td>James T. Perry</td>
<td>Understanding ORACLE, BPB Publications</td>
</tr>
<tr>
<td>6.</td>
<td>O’Reilly</td>
<td>Oracle PL/SQL Programming, Shroff Publications Mumbai</td>
</tr>
<tr>
<td>7.</td>
<td>Rowski, Bob</td>
<td>Oracle Client server Computing, BPB publications</td>
</tr>
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Objective: The objective of the course is to make the students understand Layered structure of Networks and working of different Layered.

Note:

i. The Question Paper will consist of Four units.
ii. Examiner will set total of NINE questions comprising TWO questions from each unit and ONE compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt ONE question from each unit and the Compulsory question.
iv. All questions carry equal marks unless specified.

UNIT - I

1. Introduction to Computer networks and applications: Network Structure and Architecture, Network Hardware and Software (protocol hierarchies, design issues for layers, interfaces and services: connection oriented and connection less), Network structure and architecture-point to point, multicast, broadcast, Classification of networks on the basis of Geographical Span (PAN, LAN, MAN and WAN), LAN topologies (Bus, Ring, Star, Mesh, Tree and Hybrid). Network Connecting Devices: Repeaters, Hubs, Bridges, Routers, Gateways and Switches, Network Reference models: OSI model, TCP / IP model. Comparison between OSI and TCP/IP.

UNIT - II

2. Introduction to Data Communication: Analog Signal, Digital Signal, Analog vs Digital Communication; Band Width Limitation, Data rate of a channel; Physical Layer: Transmission media: Guided (Twisted-pair, Coaxial and Optical fiber) and Unguided (Radio, Microwave and infrared), Switching: Circuit switching, Packet Switching, Message Switching, Telephone system, modems. Modulation techniques: AM, PM, FM; Multiplexing Techniques- FDM, WDM, and TDM

UNIT - III


UNIT - IV

<table>
<thead>
<tr>
<th>References</th>
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<tbody>
<tr>
<td>1. Tanenbaum, Andrew S.</td>
<td>Computer Networks, PHI.</td>
</tr>
<tr>
<td>2. Behrouz A. Forouzan</td>
<td>Data Communication &amp; Networking, TMH</td>
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</table>
Title : Lab1 (Based on PGD - 1101 and PGD - 1102)

Paper Code : PGD-PR-1105

Time : 3 Hrs.
Max. Marks : 75
External : 60
Internal : 15

This laboratory course will be based on PGD- 1101 and PGD- 1102.

Note: Paper will be set at the time of examination. Due weightage may be given to the practical note-book and Assignments in evaluation.

Paper Title : Lab2 (Based on PGD - 1103)

Paper Code : PGD-PR-1106

Time : 3 Hrs.
Max. Marks : 75
External : 60
Internal : 15

This laboratory course will be based on PGD- 1103.

Note: Paper will be set at the time of examination. Due weightage may be given to the practical note-book and Assignments in evaluation.
SEMMESTER -II

Paper Title : Object Oriented Concepts Using JAVA  
Paper Code : PGD - 2101  
Time : 3 Hrs.  
Max. Marks : 75  
External : 60  
Internal : 15  

Course Duration: 60 Lectures of one hour each.

Objective : The objective of the course is to familiarize students with Object Oriented concepts including inheritance, visibility control etc. using JAVA programming language.

Note: 
   i. The Question Paper will consist of Four units. 
   ii. Examiner will set total of NINE questions comprising TWO questions from each unit and ONE compulsory question of short answer type covering whole syllabi. 
   iii. The students are required to attempt ONE question from each unit and the Compulsory question. 
   iv. All questions carry equal marks unless specified.

UNIT - I

1. OOPs concepts: Basic Concepts of Object-Oriented Programming (Objects and Classes, Data abstraction and encapsulation, Inheritance, Polymorphism, Dynamic binding, Message communication), difference between procedure oriented and object oriented approach, Benefits of OOP’s; Applications of OOP’s, Object-Oriented languages.

2. Object oriented programming with JAVA: Byte code, Java virtual machine, Java Development Kit, java tokens, constants, variables, data types, operators, expressions, control structures, defining class, creating objects, accessing class members, method overloading, static members

UNIT - II


4. Visibility Control: Public access, friendly access, protected access, private access, private protected access.

5. Arrays: One dimensional array, declaration, creation and initialization of arrays, Array length, Two dimensional array

6. Strings: String arrays, String methods, StringBuffer class

7. Interfaces: Defining interfaces, Extending Interfaces, Implementing Interfaces. Accessing Interface variables

8. Packages: Java API packages, Defining a package, Creating and Accessing packages, Adding class to a package, Hiding Classes.
9. **Multithreaded Programming**: Creating Thread, Extending the Thread class, Stopping and Blocking a Thread, Life cycle of a Thread.

**UNIT - IV**

10. **Errors and Exception Handling**: Fundamentals, error types, exception types, using Try and catch, finally statement, Built–in exceptions.

11. **Applet Programming**: Local and remote applets, Applet Life Cycle, Creating an executable Applet, Applet tag, Adding Applet to a HTML file, Passing parameters to Applets

<table>
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<th>References</th>
<th></th>
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<tbody>
<tr>
<td>1. Balaguruswamy, E.</td>
<td>Fundamentals of Java</td>
</tr>
<tr>
<td>2. Daniel Dang</td>
<td>An Introduction to Java Programming, PHI, New Delhi</td>
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<tr>
<td>3. Deitel &amp; Dietel</td>
<td>JAVA, How to Program, Pearson Education Asia</td>
</tr>
<tr>
<td>4. Liang</td>
<td>An Introduction to Java Programming PHI</td>
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</table>
Objective: This course familiarizes students with concepts of HTML, CSS, JAVA Scripts and PHP.

Note:
   1. The Question Paper will consist of Four units.
   2. Examiner will set total of **Nine** questions comprising **Two** questions from each unit and **One** compulsory question of short answer type covering whole syllabi.
   3. The students are required to attempt **One** question from each unit and the Compulsory question.
   4. All questions carry equal marks unless specified.

UNIT - I

1. **Introduction to HTML/DHTML:** Brief history of HTML, Building blocks of HTML, lists, links, images, image map, tables, frames, forms
2. **Introduction to cascading style sheets (CSS):** Introduction to Style Sheets, Types of style Sheets-Inline, embedded and external style sheets.

UNIT - II

3. **Fundamentals of Javascript:** Features, tokens, data types, variables, operations, control constructs, strings, arrays, functions, Document Object Model, event handling. Applications related to client side form validation.
4. **Javascript Objects:** Core language objects, The String Object, The Math Object, and The Date Object; User Defined Objects: Creating a User Defined Object, Instances, Objects within Objects

UNIT - III

5. **Introduction to PHP:** Embedding PHP code in a Web Page, Basic Syntax, Defining variable and constant, PHP Data types, Operators and Expressions
6. **Control Structures:** Making Decisions, Doing Repetitive task with looping, File inclusion statements.
7. **Functions:** Defining a function, Call by value and Call by reference, recursive function, Library functions
8. **Strings:** Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function.

UNIT - IV

9. **Arrays:** Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with associative array using each() and foreach(), Some useful Library function: current(), next(), prev(), reset(), end(). **Working with Forms:** Super global variables, super global array, Importing and accessing user input, Combine HTML and PHP code.
10. **Working with files and Directories**: Opening, closing, Coping, renaming and deleting a file, working with directories, File Uploading & Downloading

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<tbody>
<tr>
<td><strong>1.</strong> Phillips</td>
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<td><strong>2.</strong> Bayross, Ivan</td>
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<td><strong>3.</strong> Wanger &amp; Wyke</td>
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<td><strong>4.</strong> Steve Suehring</td>
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<td><strong>5.</strong> Steven Holzner</td>
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<td><strong>6.</strong> Kelvin Tetroi</td>
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Objective: This course makes students understand concepts related to Software Engineering including process model, project management, design and testing.

Note:
   i. The Question Paper will consist of Four units.
   ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each unit and **ONE** compulsory question of short answer type covering whole syllabi.
   iii. The students are required to attempt **ONE** question from each unit and the Compulsory question.
   iv. All questions carry equal marks unless specified.

UNIT - I

1. **Software Engineering Fundamentals**: Characteristics, Components, Applications, principles of software engineering, skills of software engineer.
3. **Software Project Management**: Software Project management Plan(SPMP), Project scheduling Techniques- Work Breakdown Structure(WBS), Project Evaluation Review Technique (PERT), Gantt Charts, Critical path method (CPM)
5. **Software Design**: Software Design Process, Design Failures and Remedies
### References:

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<tr>
<th></th>
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<th>Title</th>
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<tr>
<td>2</td>
<td>Lewis, T.G.</td>
<td>Software Engineering, McGraw Hill.</td>
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<td>3</td>
<td>Meyers, G.</td>
<td>The Art of Software Testing, Wiley-Inter-Science</td>
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<td>4</td>
<td>Hibbard, P.G</td>
<td>Constructing Quality Software, North Holland Publication</td>
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<td>5</td>
<td>Shere, Kenneth</td>
<td>Software Engineering &amp; Management, Prentice Hall</td>
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<tr>
<td>7</td>
<td>Doug Bell, Ian Murrey and John Pugh</td>
<td>Software Engineering: A Programming Approach, Prentice Hall</td>
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<tr>
<td>8</td>
<td>Pressman:</td>
<td>Software Engineering, Tata McGraw Hill</td>
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<tr>
<td>9</td>
<td>Ghazzi, Carlo</td>
<td>Fundamentals of Software Engineering, PHI</td>
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Course Duration: 60 Lectures of one hour each.

Objective: This course makes students understand accounting principles and computerized accounting.

Note:
1. The Question Paper will consist of Four units.
2. Examiner will set a total of Nine questions comprising Two questions from each unit and One compulsory question of short answer type covering the whole syllabus.
3. The students are required to attempt One question from each unit and the Compulsory question.
4. All questions carry equal marks unless specified.

UNIT - I
Accounting: Principles, concepts and conventions, double entry system of accounting, introduction of basic books of accounts of sole proprietary concern, control accounts for debtors and creditors, closing of books of accounts and preparation of trial balance.
Final Accounts: Trading, profit and loss accounts and balance sheet of sole proprietary concern with normal closing entries.

UNIT - II
Introduction to Manufacturing Account, final accounts of partnership firms, limited company.
Introduction to Computerized Financial Accounting, coding logic and codes required, master files, Transaction files, Introduction to documents used for data collection, processing of different files, outputs obtained.

UNIT - III
Introduction to Computerized Inventory Control, types of inventory and associated documents, Inventory reports—nature and types, Inventory Control: ABC and ABC analysis, Methods of Stock validation: LIFO, FIFO, actual bases, Interfacing Inventory with Financial Accounting, Purchasing Sub-Systems, Sales Order processing.

UNIT - IV
Introduction to Computerized Payroll & Invoicing Applications, Exposure to Structure, Processing and Reports, Interfacing these applications to financial Accounting.
Use of Accounting package Tally: Introduction to Tally, Groups, Ledgers, Vouchers, Orders, Cost Centers and Categories, Stock, Reports in Tally.
<table>
<thead>
<tr>
<th><strong>References:</strong></th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Van Home, James, C., 2004</td>
<td>Financial Management &amp; Policy, Prentice Inc</td>
</tr>
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</table>
Paper Title: Lab3 (Based on PGD-2101)

Paper Code: PGD-PR-2105  Time: 3 Hrs.
Max. Marks: 75
External: 60
Internal: 15

This laboratory course will be based on PGD-2101.

Note: Paper will be set at the time of examination. Due weightage may be given to the practical note-book and Assignments in evaluation.

Paper Title: Lab4 (Based on PGD-2102)

Paper Code: PGD-PR-2106  Time: 3 Hrs.
Max. Marks: 75
External: 60
Internal: 15

This laboratory course will be based on PGD-2102.

Note: Paper will be set at the time of examination. Due weightage may be given to the practical note-book and Assignments in evaluation.

Paper Title: Project Work.

Paper Code: PGD-2107  Max. Marks: 100
Major Project on any database application using any database development tool is to be developed/ Development of a Web Site using Database connectivity