

**NEP**

Syllabus for

**B.Sc. Computer Application**

**Major,  
Minor**

and

**Interdisciplinary**

Semester		Major	Lab	Minor	La b	Multidisciplinary	La b		
I	1	Computer Fundamentals	Y	Computer Fundamentals	Y	Computer Fundamentals	Y		
II	2	Programming with C	Y	Programming with C	Y	Programming with C	Y		
III	3	Data Structure	Y	Data Structures	Y	Data Structures	Y		
IV	4	Object Oriented Programing	Y			Operating System	Y		
	5	Operating Systems	Y						
	6	Computational Mathematics	N						
	7	Computer System Architecture	N						
V	8	Analysis of Algorithms	Y			Database Management System	Y		
	9	Database Management System	Y						
	10	Software Engineering	Y						
	11	Networking	N						
VI	12	Software Engineering	Y			Software Engineering	N		
	13	Artificial Intelligence	Y						
	14	Internet of Things	Y						
	15	Theory of Computation	N						
VII	16	Image Processing	Y			Operating Systems	Y		
	17	Data Science	N			Database Management System	Y		
VIII	18	Mobile Comp	N						
	19	Cyber Security and Cyber Laws	N						
	20	Big Data	N						
	21	Minor Project	LAB						
VIII	20	Mobile Comp/ Cyber Security and Cyber Laws/ Big Data	N					Honor s with Rese arch	
	21	Major Project	LAB						
		MDC	Lab	SEC	La b				
		Computer Fundamentals	Y	R Programming	Y				
		Document Processing with Open Office	Y	Python Programming	Y				
		Programming with Python	Y	Document processing with Latex	Y				

## CORE COURSES

### **CMAACOR02T: Computer Fundamentals**

**Theory: 45 Lectures**

#### **Introduction:**

**(3 Lectures)**

Functional units of a Computer Systems, Different Types of computers, Software and Hardware, Types of software: System s/w and Application s/w, Operating System as user interfaces

#### **Data Representation:**

**(8 Lectures)**

Base or radix, Number systems(Decimal,Binary,Octal and Hexadecimal) ,Conversion from one number system to another, binary arithmetic(addition and subtraction),Integer representation(Signed magnitude,1's complement,2's complement), Character representation and Floating Point representation.

#### **Boolean Algebra and Digital Logic:**

**(10 Lectures)**

Logic Gates: AND,OR & NOT(basic logic gates),NAND & NOR(universal logic gates),XOR,XNOR(graphical symbol,truth table and Boolean expression of all logic gates),Basic laws of Boolean Algebra, De Morgan's theorems, Canonical expressions, min terms and max terms, SOP and POS expressions and their conversion, Simplifications of expressions by both boolean algebra and K-MAP method(upto 4 variables),Don't-care conditions, Representation of simplified boolean expressions by NAND/NOR gates

#### **Combinational and Sequential Logic:**

**(12 Lectures)**

Sequential logic circuits: Adder (half adder and full adder), Subtractor (half subtractor and full subtractor), Encoder, Decoder, Multiplexer & Demultiplexer Combinational logic circuits: Flip-flops: latch, clocked, Types of flip-flops(RS,JK,D,T):characteristic tables, Excitation table and logic diagram, Registers, shift registers, registers with parallel loads, Counters, Types of counters: synchronous and asynchronous(diagram and explanation of how it counts)

#### **Devices:**

**(4 Lectures)**

Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera,monitor, printer, plotter

#### **Memory:**

**(4 Lectures)**

Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks

#### **Computer Organisation and Architecture:**

**(4 Lectures)**

C.P.U., registers, system bus, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips.

### **Text Books**

1. Mano, M. Morris. *Computer system architecture*. Prentice-Hall, Inc., 1993.
2. A. Goel, Computer Fundamentals, Pearson Education, 2010.

### **Reference Books**

1. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
2. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

### **CMAACOR02P: Computer Fundamentals Practical**

**(45 Lectures)**

### **MS-DOS**

1. Explain and execute the following DOS Commands

DIR, MD ,CD, RD ,COPY, MOV ,DEL, COPYCON ,PATH, DATE ,TYPE, REN, TREE,  
LABEL ,VOL

### **Exercise 1**

1. Create two new subdirectories labeled: PUBLIC and PRIVATE in the C:\Work directory. Create two subdirectories labeled PROGRAMS and DATAS in the PUBLIC directory . Create a subdirectory labeled DOCUMENT in the PRIVATE directory.
2. In the DOCUMENT directory create a text file named mylive.txt, and write your firstname, lastname, birth date in this file.
3. Copy the file mylive.txt to the DATA directory.
4. Rename the file from mylive.txt to your lastname, for example: kowalski.txt.

### **Exercise 2**

1. From the level of the C:\Work directory create a directory labeled LAB, and then create two subdirectories labeled: LAB2A and LAB3A in the LAB directory.
2. In the LAB3A directory create a subdirectory labeled LAB4.
3. In the LAB2A directory create files: file1.txt and write your firstname and lastname in this file, file2.txt and write the number of your index in it.
4. Place a data from the files: file1.txt and file2.txt into mydata.txt file.
5. Display the contents of the file mydata.txt.
6. Copy the file mydata.txt to the LAB3 directory renaming it to filescal.txt.
7. Rename the file from mydata.txt to mydata.lst.
8. Create a directory: C:\WORK\LABOR.
9. Remove the structure from the LAB directory to the LABOR directory.
10. Place the information about the structure of the C:\WORK directory in the file inflab.txt, and the information about the attributs of this structure in the file infolab2.txt.
11. Delete the tree of the C:\WORK\LAB directory.

### **Exercise 3**

1. Copy FILE1.TXT and make a file2.txt, file3.dat, file4.xyz, file5.txt. Pay attention to the names and extensions of the files.
2. List out the directory and see ALL the newly created files.
3. Now you just want to see a list of the files that have TXT as their extension.
4. Make a copy of file4.xyz and call it first.dat
5. Create a subdirectory under the directory you're currently in. Call this new directory TESTDIR
6. Copy all the files with an extension of DAT to the new subdirectory.
7. Change directories to the newly created directory and list all the files in there.
8. Delete file3.dat.
9. Go back up to the parent directory of the current directory you are in.
10. List all the file with an extension of DAT in the current directory and the one you just created. Use only one command to do so.
11. Change the name of file1.txt to file6.txt.
12. Delete the directory you created (TESTDIR). Are you able to do this ? Why or Why not ?
13. Change directories to the TESTDIR directory. Delete the remaining file. Change directories up to the parent directory (up one level) and now delete the directory.
14. List all the files that start with FI and have an extension of TXT.
15. List all the files that start with the word FILE, then a single digit an extension of TXT.

### **Text Editor (In Open source software like open office)**

1. Prepare a **material list** having four columns (Serial number, The name of the product, quantity and price) for the month of JUNE, 06.
  - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
  - The headings of the columns should be in 12-point and bold.
  - The rest of the document should be in 10-point Times New Roman.
  - Leave a gap of 12-points after the title.
2. Create a **telephone directory**.
  - The heading should be 16-point Arial Font in bold
  - The rest of the document should use 10-point font size
  - Other headings should use 10-point Courier New Font.
  - The footer should show the page number as well as the date last updated.
3. Design a **time-table form** for your school.
  - The first line should mention the name of the college in 16-point Arial Font and should be bold.
  - The second line should give the course name/teacher's name and the department in 14-point Arial.
  - Leave a gap of 12-points.
  - The rest of the document should use 10-point Times New Roman font.
  - The footer should contain your specifications as the designer and date of creation.
4. Pearson Publications plans to release a new book designed as per your syllabus. Design the **first page of the book** as per the given specifications.
  - The title of the book should appear in bold using 20-point Arial font.
  - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
  - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
  - The details of the offices of the publisher (only location) should appear in the footer.
5. Create the following one page documents.
  - a. Compose a note inviting friends to a birthday party at your house, Including a list of things to bring with them.
  - b. Design a certificate in landscape orientation with a border around the document.
  - c. Design a Garage Sale sign.
  - d. Make a sign outlining your rules for your bedroom at home, using a numbered list.
6. Create the following documents:
  - (a) A newsletter with a headline and 2 columns in portrait orientation, including atleast one image surrounded by text.
  - (b) Use a newsletter format to promote upcoming projects or events in your classroom or college.
7. Convert following text to a table, using comma as delimiter

Type the following as shown (do not bold).

Color, Style, Item  
Blue, A980, Van  
Red, X023, Car  
Green, YL724,  
Truck Name, Age,  
Sex  
**Bob, 23, M**  
Linda, 46, F  
**Tom, 29, M**

8. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

9. Wrapping of text around the image.
10. Create your CV by incorporating most of the options learned till now.
11. Following features of menu option must be covered  
FILE, EDIT, VIEW ,INSERT ,FORMAT ,TABLE, WINDOW, HELP, TOOLS (All options except Online collaboration, Tools on Macro, Templates)

## **Spreadsheet**

### **Exercise 1**

#### **Objectives:**

- ☑ Introduction to MS Excel files, Workbooks, Worksheets, Columns and Rows.
- ☑ Formatting Worksheets.

☒ AutoFill, Numeric formats, previewing worksheets.

	A	B	C	D	E	F	G
1	<b>Payroll</b>						
2	<b>Date:</b>	1/1/2011					
3	<b>EMPL Number</b>	<b>EMPL Name</b>	<b>Hourly Rate</b>	<b>Hours Worked</b>	<b>Gross Pay</b>	<b>S.S Tax</b>	<b>Net Pay</b>
4	E00001	Ford	7.5	35	?	?	?
5	E00002	Mino	8	30	?	?	?
6	?	Bell	6.5	25	?	?	?
7	?	Davis	9	40	?	?	?
8	?	Turro	10	39	?	?	?

1. Open a new workbook and save the file with the name “Payroll”.
2. Enter the labels and values in the exact cells locations as desired.
3. Use AutoFill to put the Employee Numbers into cells A6:A8.
4. Set the columns width and rows height appropriately.
5. Set labels alignment appropriately.
6. Use warp text and merge cells as desired.
7. Apply borders, gridlines and shading to the table as desired.
8. Format cell B2 to Short Date format.
9. Format cells E4:G8 to include dollar sign with two decimal places.
10. Calculate the Gross Pay for employee; enter a formula in cell E4 to multiply Hourly Rate by Hours Worked.
11. Calculate the Social Security Tax (S.S Tax), which is 6% of the Gross Pay; enter a formula in cell F4 to multiply Gross Pay by 6%.
12. Calculate the Net Pay; enter a formula in cell G4 to subtract Social Security Tax from Gross Pay.
13. Set the work sheet vertically and horizontally on the page.
14. Save your work.

## Exercise 2

### Objectives:

- ☑ Using Formulas.
- ☑ Header and Footers.

	A	B	C	D	E
1	<u>London Team Call Statistics</u>				
2					
3	<b>Name</b>	<b>No. calls</b>	<b>Hours worked</b>	<b>Calls per Hour</b>	<b>Bonus</b>
4	Adam	42	5	?	?
5	Jhon	6	4	↓	↓
6	Jamse	39	6	↓	↓
7	Alex	15	6	↓	↓
8	Emma	2	7	↓	↓
9					
10	<b>TOTAL</b>	?	?	?	?
11					
12	<b>Bonus Rate</b>	25%			

1. Open a new workbook and save the file with the name “Call Statistics”.
2. Delete Sheet 2 & 3, and rename Sheet 1 to (Call Statistics).
3. Enter the labels and values in the exact cells locations as desired.
4. Set the row height of rows 1 & 3 to size 30; and rows 4 until 10 to size 20.
5. Set labels alignment appropriately.
6. Use Warp Text, Orientation and merge cells as desired.
7. Apply border, gridlines and shading to the table as desired.
8. Format column E to include euro (€) sign with two decimal places.
9. Format cell B12 to include % sign with 0 Decimal places.
10. Calculate the Calls per Hour, enter a formula in cell D4 to divide numbers of calls by Hours worked. Using AutoFill, copy the formula to the remaining cells.
11. Calculate the Bonus. Enter a formula in cell E4 to multiply ‘Calls per Hours’ by the fixed Bonus Rate in cell B12. Using AutoFill, copy the formula to the remaining cells.
12. Calculate the ‘TOTAL’.
13. Set the worksheet vertically and horizontally on the page.
14. Create a header that includes your name in the left section, and your ID number in the right section. Create a footer that includes the current Date in the center.



## Exercise 3

### Objectives:

- ☑ Number, Commas and Decimal numeric formats.
- ☑ Working with Formulas (Maximum, Minimum, Average, Count and Sum).
- ☑ Percentage Numeric Formats.

	A	B	C	D	E	F
1	<b>Panda EST</b>					
2	<b>Monthly Sales Report - July</b>					
3						
4	<b>Emp. No.</b>	<b>Name</b>	<b>Salary</b>	<b>Sales Amount</b>	<b>Comission</b>	<b>Total Salary</b>
5	S101	Ahmed	1600	2500	?	?
6	S105	Hassan	1800	3000		
7	S112	Ali	1500	2200		
8	S107	Waleed	2000	4500		
9	S110	Mohammed	1700	3500		
10	S103	Samir	1600	2500		
11						
12		<b>Totals</b>	?	?	?	?
13		<b>Average</b>	?	?	?	?
14		<b>Highest</b>	?	?	?	?
15		<b>Lowest</b>	?	?	?	?
16		<b>Count</b>	?			

1. Create the worksheet shown above.
2. Set the **column widths** as follows: Column A: 8, Column B: 14, Columns C & D: 15, Columns E & F: 14.
3. Enter the formula to find COMMISSION for the first employee.  
The commission rate is 2% of sales, **COMMISSION = SALES \* 2%** Copy the formula to the remaining employees.
4. Enter the formula to find TOTAL SALARY for the first employee where:  
**TOTAL SALARY = SALARY + COMMISSION**  
Copy the formula to the remaining employees.
5. Enter formula to find **TOTALS, AVERAGE, HIGHEST, LOWEST, and COUNT** values. Copy the formula to each column.
6. Format numeric data to include **commas** and **two decimal places**.
7. Align all column title labels horizontally and vertically **at the center**.
8. Create a **Header** that includes your name in the left section, page number in the center section, and your ID number in the right section.
9. Create **footer** with DATE in the left section and TIME in the right section.
10. Save the file with name Exercise 3.

## Exercise 4

### Objectives:

- ☐ Working with the IF Statement.

	A	B	C	D	E	F	G
	ITEM NO.	NO. OF ITEMS	ITEM PRICE	TAX	TOTAL PRICE BEFORE TAX	TOTAL PRICE AFTER TAX	RATE
1							
2	100	115	30				
3	101	256	12				
4		49	56				
5		23	150				
6		840	5				
7		200	56				
8		294	300				
9		4	90				
10							
11	<b>Count of items</b>		?				
12	<b>Average of tax</b>		?				
13	<b>Min ITEM PRICE</b>		?				
14	<b>Max ITEM PRICE</b>		?				

For the above table find the following:

1. TAX (If ITEM PRICE is less than 100, TAX is 50, otherwise it should be 100).
2. TOTAL PRICE BEFORE TAX = NO. OF ITEMS \* ITEM PRICE.
3. TOTAL PRICE AFTER TAX = TOTAL PRICE BEFORE TAX + TAX.
4. RATE (If TOTAL PRICE AFTER TAX > 3500 then the rate is "HIGH", otherwise it is REASONABLE).
5. Find Count of Items, Average of Taxes, Min Item PRICE and Max Item PRICE.
6. Save file as Exercise 4.

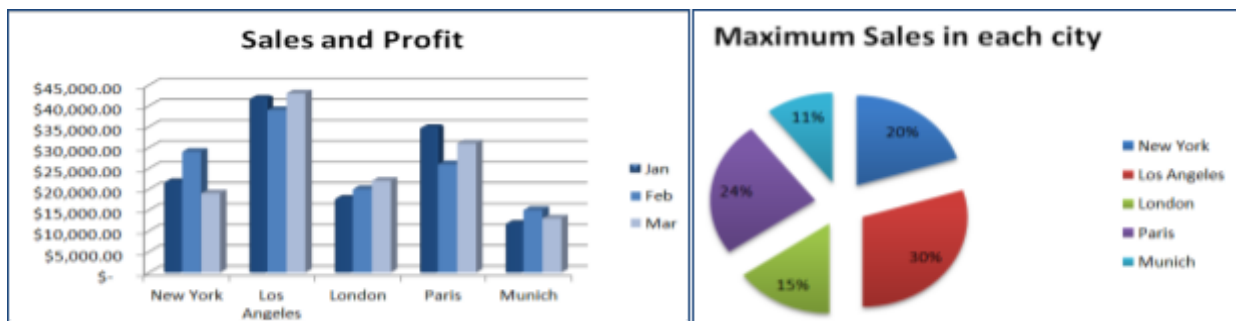
## Exercise 5

### Objectives:

- Working with Sum IF and Count IF statements.
- Inserting Charts.

	A	B	C	D	E	F	G
1	<b>Sales and Profit Report - First Quarter 2012</b>						
2	<b>No</b>	<b>City</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Average</b>	<b>Maximum</b>
3	C001	New York	\$22,000.00	\$29,000.00	\$19,000.00	?	?
4	C002	Los Angeles	\$42,000.00	\$39,000.00	\$43,000.00	?	?
5	?	London	\$18,000.00	\$20,000.00	\$22,000.00	?	?
6	?	Paris	\$35,000.00	\$26,000.00	\$31,000.00	?	?
7	?	Munich	\$12,000.00	\$15,000.00	\$13,000.00	?	?
8		<b>Total Sales</b>	?	?	?		
9		<b>Cost</b>	\$83,000.00	\$84,000.00	\$43,000.00		
10		<b>Profit</b>	?	?	?		
11		<b>10% Bonus</b>	?	?	?		
12							
13		<b>Total Sales greater than 30,000</b>	?	?	?		
14		<b>No Sales greater than 30,000</b>	?	?	?		

1. Create the worksheet shown above.
2. Set the Text alignment, Columns width and high appropriately.
3. Use AutoFill to put the Series Numbers into cells A5:A7.
4. Format cells C3:G7, C8:E11, C13:E13 to include dollar sign with two decimal places.
5. Find the Average Sales and Maximum Sales for each City.
6. Find the Total Sales for each Month.
7. Calculate the Profit for each month , where profit = Total Sales – Cost
8. Calculate the 10% Bonus, which is 10% of the Profit.
9. Find the Total Sales for each Month; only for sales greater than 30,000.
10. Find the No of Sales for each Month; only for sales greater than 30,000.
11. Create the following Charts:



## Exercise 6

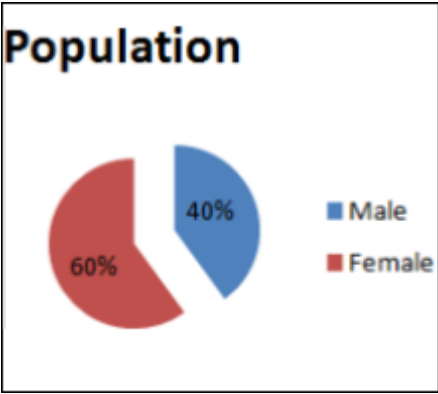
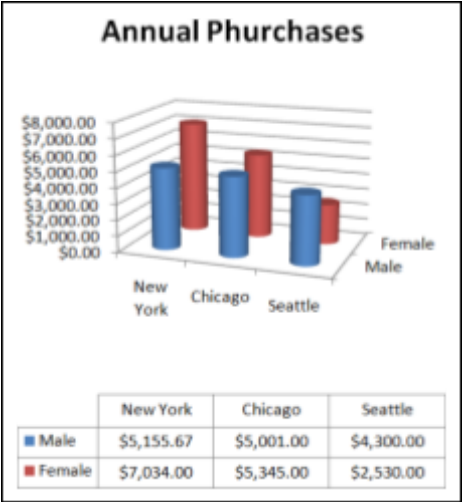
### Objectives:

- Working with Sum IF and Count IF statements.
- Inserting Charts.

	A	B	C	D	E	F
1	<b>USA Annual Purchases Report 2011</b>					
2	<b>Customer ID</b>	<b>Gender</b>	<b>City</b>	<b>Education</b>	<b>Annual Purchases</b>	<b>Annual Salary</b>
3	C11	M	New York	University	\$6,233	\$7,500
4	C12	M	New York	High School	\$4,233	\$4,999
5		F	Seattle	University	\$6,560	\$6,750
6		M	Chicago	University	\$5,001	\$12,000
7		F	New York	University	\$7,034	\$17,500
8		F	Chicago	University	\$5,345	\$13,150
9		F	Seattle	High School	\$790	\$3,799
10		F	Seattle	None	\$240	\$2,150
11		M	Seattle	University	\$4,300	\$22,450
12	▼	f	New York	None	\$232	\$2,500
13						
14						
15	<b>City</b>	<b>Total Annual Purchases</b>		<b>Annual Salary</b>	<b>Gender</b>	
16	New York	?		<b>City</b>	<i>Male</i>	<i>Female</i>
17	Chicago	?		New York	?	?
18	Seattle	?		Chicago	?	?
19				Seattle	?	?
20	<b>Education</b>	<b>Average Annual Purchases</b>				
21	University	?				
22	High School	?				
23	None	?				
24						
25	<b>Gender</b>	<b>Population</b>				
26	Male	?				
27	Female	?				

1. Open a new workbook and create the above worksheet.
2. Make sure that your worksheet looks like the picture (Alignment, Shading, Borders, Wrap text, Orientation ...).
3. Find the entire customer IDs.
4. Format Column E & D to Currency with dollar sign and two decimal places.
5. Find the Total Annual Purchases for each City.

- 6. Find the Average Annual Purchases for each Education.
- 7. Find the total number of customers from each gender.
- 8. Find the total annual salary for each gender in each city.
- 9. Create the following Chart:



### Exercise 7

The following worksheet contains Roll.Nos. & Marks in 5 subject of a student.

Calculate his grades as per the following :

Marks	Grades
0-40	4
40-50	3
50-60	2
60 & above	1

	A	B	C	D	E	F
1	Roll No.	ENG	HINDI	SCIENCE	MATHS	SO. SCI
2	110	45	56	67	78	60
3	GRADE					
4						
5						
6						
7						
8						
9						
10						
11						

### Exercise 8

The following worksheet contains Names & Sale for 10

salesmen. Calculate their bonus as per the following :

Sale	Bonus
0-30000	0
30000-40000	3000
40000-50000	4000
50000-60000	5000
60000-70000	6000
70000-80000	7000
80000 & above	8000

	A	B	C	D			H	I
1	NAM E	SALE	BONUS				0	0
2	Deep	30000					<b>3000</b> <b>0</b>	3000
3	Jayesh	40000					<b>4000</b> <b>0</b>	4000
4	Yash	45000					<b>5000</b> <b>0</b>	5000
5	Sara	48000					<b>6000</b> <b>0</b>	6000
6	Gita	55000					<b>7000</b> <b>0</b>	7000
7	Jinal	32000					<b>8000</b> <b>0</b>	8000
8	Kavita	66000						
9	Minal	23000						
10	Naresh	43000						
11	Rima	37000						

### Exercise 9

The following worksheet contains Customer No. , Number of units consumed for 10 customers.

Calculate their bill amount as per the following :

Number of units	Rate
< 200	Rs. 3
>=200, < 500	Rs. 6
>= 500	Rs. 10

	A	B	C	D			H	I
1	Cust. No.	No.of Units	Rate	Bill Amount			Units	Rate
2	1101	340					<b>0</b>	<b>3</b>
3	1102	180					<b>200</b>	6
4	1103	400					<b>500</b>	8
5	1104	600						
6	1105	350						

7	1106	470						
8	1107	890						
9	1108	200						
10	1109	500						
11	1110	360						

### **Exercise 10**

A worksheet contains Roll Number , Marks in 2 subjects for 50 students in a class. Calculate Result and Grade using the following:

A student is declared as PASS if he gets 40 or more in both the subjects , Otherwise FAIL.

All FAILED students will be given Grade IV

For PASSED students Grade will be obtained as follows :

AVERAGE	GRADE
$\geq 60$	I
$< 60$ but $\geq 50$	II
$< 50$ but $\geq 40$	III

	A	B	C	D	E	F
1	ROLL	SUB1	SUB2	AVERAGE	RESULT	GRADE
:						
51						

### **Exercise 11**

The following worksheet contains Name & Sales of 10 salesmen .Calculate commission as per the following:

Sales	Commission
First 30,000	5%
Next 40,000	10%
Excess	15%



	A	B	C
1	NAME	SALE	COMMISSION
2			
:			
:			
11			

### **Exercise 12**

The following worksheet contains Name & Taxable Income for 50 employees .Calculate Income Tax Surcharge and Total Tax for the following worksheet

	A	B	C	D	E
1	NAME	TAXABLE INCOME	INCOME TAX	SURCHARGE	TOTAL TAX
2					
:					
:					
50					

Income Tax is calculated as follows :

Taxable Income      Income tax

First 1,50,000      Nil

Next 1,00,000      10%

Next 75,000      20%

Excess      30%

Surcharge is 3% on Income Tax if Taxable income is above 5,00,000

### **Exercise 13**

**A worksheet contains following data :**

	A	B	C	D	E
1	NAME	GENDER	CLASS	CATEGORY	FEES
2	Deep	M	FY	Open	3000
3	Jayesh	M	SY	Reserved	1000
4	Yash	M	TY	Reserved	1000
5	Sara	F	FY	Reserved	500
6	Gita	F	FY	Open	3000
7	Jinal	F	TY	Open	5000
8	Kavita	F	SY	Open	4000

9	Minal	F	SY	Reserved	1000
10	Karan	M	TY	Reserved	1000
11	Abhay	M	TY	Open	5000
12	Bina	F	FY	Open	3000
13	Seema	F	FY	Reserved	500
14	Naresh	M	FY	Reserved	500
15	Rima	F	TY	Open	5000
16	Gajendra	M	SY	Open	4000

Filter the worksheet to show

- Female students from Reserved category
- Male students from TY
- Open category students paying fees > 3000

### Exercise 14

A worksheet contains name and marks in 3 subjects . Calculate Total Marks

	A	B	C	D	E
1	NAME	SUB 1	SUB 2	SUB 3	TOTAL MARKS
2	Deep	30	34	44	
3	Jayesh	40	35	45	
4	Yash	45	36	47	
5	Sara	48	32	50	
6	Gita	35	32	43	
7	Jinal	32	31	37	
8	Kavita	36	28	38	
9	Minal	23	25	40	
10	Naresh	43	27	50	
11	Rima	37	44	46	

- Construct 3D Pie Chart for Total marks
- Construct 2D Line Chart for Subject 1 and Subject 3
- Construct 2D Column Chart for Sub1,Sub2,Sub3
- Construct Stacked Column Chart for Sub1,Sub2,Sub3

**CMAACOR02T: Programming with C**

**Theory: 45 Lectures**

**Overview of Programming elements**

**(5 Lectures)**

History, Basic Structure, Algorithms, Structured programming constructs. Character sets, C Token, Keywords, Constants, Variables, Data Types, Declaration of storage classes.

**Operators, expressions and Preprocessor**

**(8 Lectures)**

Arithmetic, Relational, Logical and Assignment; Increment and Decrement and Conditional, Bitwise, Special operator, Operator Precedence and Associativity; Arithmetic Expressions, Evaluation of expression, type casting. Comments, Input and output operations. Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifdef, #ifndef and #undef), Macros

### **Decision & Loop Control Structure**

**(7 Lectures)**

If-else statements, Nested if-else, switch, Conditional operator. While, do-While, for loop, break statements, continue statements, goto statements.

### **Functions and Arrays**

**(7 Lectures)**

Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments. Creating and Using One Dimensional Arrays ( Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

### **Pointers**

**(4 Lectures)**

Definition and initialization, Pointer arithmetic, Pointers and arrays, String functions and manipulation, Dynamic storage allocation.

### **User defined Data types and memory Allocation**

**(6 Lectures)**

Enumerated data types, Structures. Structure arrays, Pointers to Functions and Structures, Unions. Differentiating between static and dynamic memory allocation, use of malloc, calloc and free functions, use of new and delete operators, storage of variables in static and dynamic memory allocation.

### **File Access**

**(4 Lectures)**

Opening and closing a file (use of fstream header file, ifstream, ofstream), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files,

### **Concept of Object Oriented Programming**

**(4 Lectures)**

Concept of objects and classes, Characteristics of object oriented programming

### **Text Books**

1. Programming in ANSI C, Balaguruswamy, McGraw Hill.
2. The C Programming Language, Kernighan and Dennis Ritchie, PHI.

### **Reference Books**

1. Programming with C, Byron S. Gottfried, McGraw Hill.
2. The Complete reference C, Herbert Schildt, McGraw Hill.
3. Programming Languages, Allen B. Tucker, Tata McGraw Hill.
4. Let Us C, Kanetkar, BPB Publication.

### **CMAACOR02P: Programming Fundamentals using C Practical Lectures**

**60**

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number. WAP to compute the sum of the first n terms of the following series  $S = 1 + 1/2 + 1/3 + 1/4 + \dots$
3. WAP to compute the sum of the first n terms of the following series S

=1-2+3-4+5.....

4. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
5. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
6. WAP to compute the factors of a given number.
7. WAP to print a triangle of stars as follows (take number of lines from user):

```
*
***
*****
*****
*****
```

8. WAP to perform following actions on an array entered by the user:
  - i. Print the even-valued elements
  - ii. Print the odd-valued elements
  - iii. Calculate and print the sum and average of the elements of array
  - iv. Print the maximum and minimum element of array
  - v. Remove the duplicates from the array
  - vi. Print the array in reverse order

The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

9. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
10. Write a program that swaps two numbers using pointers.
11. Write a program in which a function is passed address of two variables and then alter its contents.
12. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.
13. Write a menu driven program to perform following operations on strings:
  - a) Show address of each character in string
  - b) Concatenate two strings without using strcat function.
  - c) Concatenate two strings using strcat function.
  - d) Compare two strings
  - e) Calculate length of the string (use pointers)
  - f) Convert all lowercase characters to uppercase
  - g) Convert all uppercase characters to lowercase
  - h) Calculate number of vowels
  - i) Reverse the string
14. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
15. WAP to display Fibonacci series (i)using recursion, (ii) using iteration
16. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration
17. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
18. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
19. Write a program to retrieve the student information from file created in previous question and print it in following format:  
Roll No. Name Marks
20. Copy the contents of one text file to another file, after removing all whitespaces.
21. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.