

Minor Group Project Report



SAS Programming for Faculty Demographics Data

As a part of Practical Course in 20BT604 Biocomputing with SAS®

Submitted by:

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6th Semester B.E. Biotechnology

Mentored by:

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Department of Biotechnology Engineering

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NITTE
EDUCATION TRUST

**NMAM INSTITUTE
OF TECHNOLOGY**

(An Autonomous Institution affiliated to VTU, Belagavi)
NITTE - 574 110, Karkala Taluk, Udupi District, Karnataka, India
ISO 9001:2015 Certified, Accredited by NAAC with 'A' Grade

Department of Biotechnology Engineering

Certificate

This is to certify that a student team of 6th semester B.E. Biotechnology

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has satisfactorily completed a Minor Project on "SAS Programming for Faculty Demographics Data" as a part of the practical course in 20BT604 Biocomputing with SAS of Biotechnology Engineering as prescribed by the VTU, Belagavi for B.E. VI Semester Biotechnology (Autonomous) for the academic year 2022-23.

Date: 8.5.2023

Mentor

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MINOR PROJECT BSAS LAB

PROJECT TEAM

Team Code: **20BTP12**

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Problem Statement:

FACULTY DEMOGRAPHICS

Background: Faculty demographics data provides basic information of the faculty profile. At an engineering institution, there are multiple departments in which faculty of different cadre are working as course facilitators. This demographic data can be represented at various levels through tables and charts for quick review and analysis.

About the dataset: There are several information provided in the dataset. An explanation is provided here that could be useful while coding to obtain the necessary output. There are 60 faculty whose data is provided.

- **Staff Id:** Each staff has unique Id Number
- **Name:** Name of the faculty is hidden here in the form of Name 1 to Name 60.
- **Gender:** Male is M and Female is F
- **Dept:** The department to which a faculty belongs
- **Qualification:** Highest qualification of the faculty member: PHD or PG. Note that PG stands for Postgraduation and could be either M.Tech. or M.Sc. Qualification PHD is superior to PG.
- **Cadre:** Faculty cadre depends on the years of experience and qualification. There are 3 types of cadre in the institution and follows this order: Professor (Higher), Associate Professor (Mid) and Assistant Professor (Lower).
- **DOB:** Date of birth in the form DD-MM-YYYY
- **DOJ:** Date of Joining the Institute. Note that a faculty could have worked at some other place (Institution/Industry) before joining this institute.
- **Total Exp:** The years of experience in teaching. This number of years is cumulative of experience of the faculty at this institute and earlier.

- **Journals:** Number of journals published by the faculty in his/her entire career.
- **Salary Monthly:** Monthly salary in INR.
- **Residence:** The place from where the faculty commutes daily to college.
- **Age:** Age of the faculty calculated from their Date of Birth.
- **Department:** Dept column converted to their full form which tells the department to which a faculty belongs.

Analytics Requirements:

1. Prepare department wise faculty list with Staff Id, Name, Cadre, Qualification, Date of Joining, Experience. Name should be with their salutation like Dr. (faculty with PHD qualification), Mr. / Ms. Based on gender for PG qualification. Name must be in upper case. The list must be sorted according to Cadre. Check table 1 in mock shell for reference.
2. Create a summary statistics table for gender distribution.
3. Draw charts for Dept wise for number of faculty, Dept wise cadre distribution.
4. Calculate the average experience dept wise.
5. Generate Line chart for Department-wise Comparison of Monthly Salary by Cadre.
6. Generate a Scatter plot Relationship between Total Experience and Monthly Salary.
7. Generate a Clustered Bar Chart for Gender Distribution by Residence Location.
8. Calculate Department wise Qualification Count and create tables and a clustered bar chart.
9. Create a Bubble Plot for Age, Salary, and Experience of Staff Members.
10. Export & submit the overall report as in Mock Shell in the form of PDF.

Mock Shell

NMAM Institute of Technology, Nitte, Karkala

Faculty Demographics

Table 1. Department wise faculty list

Dept: Biotechnology Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
	Dr. NAME1	Professor		
	Mr. NAME2	Associate Professor		
	Ms. NAME3	Assistant Professor		

Similar tables for all departments

Table 2. Summary Statistics of Faculty

xx. Gender Distribution

Gender	n	%
Female		xx.xx
Male		xx.xx

“Pie Chart”

Figure 1. Dept wise for number of faculty

“Clustered Bar Chart”

Figure 2. Dept wise cadre distribution

Table 3. Average Experience of faculty department wise

Dept	Average Experience (Years)
	xx.X

“Line Chart”

Figure 3. Department-wise Comparison of Monthly Salary by Cadre

“Scatter Plot”

Figure 4. Relationship between Total Experience and Monthly Salary

“Clustered Bar Chart”

Figure 5. Gender Distribution by Residence Location

Table 4. Department wise Qualification Count

Department	Qualification	Number of Faculties
	PG or PHD	x
		x

“Clustered Bar Chart”

Figure 5. Department-wise Faculty Qualification Count

“Bubble Plot”

Figure 7. Age, Salary, and Experience of Staff Members

OUTPUT

Table 1. Department wise faculty list

Department=Biotechnology Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM02	Dr. Kunal Sharma	Professor	PHD	33
NM01	Dr. Rajesh Patel	Associate Professor	PHD	21
NM07	Dr. Gayatri Sharma	Associate Professor	PHD	21
NM28	Dr. Pallavi Gandhi	Assistant Professor	PHD	12
NM45	Mr. Aniket Goswami	Assistant Professor	PG	11
NM29	Ms. Asha Dixit	Assistant Professor	PG	10
NM46	Mr. Praveen Ghosh	Assistant Professor	PG	9
NM03	Mr. Suraj Mukherjee	Assistant Professor	PG	5
NM58	Ms. Kirti Venkatesh	Assistant Professor	PG	4

Department=Civil Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM09	Dr. Suman Kaur	Professor	PHD	29
NM08	Dr. Deepak Singh	Professor	PHD	28
NM10	Dr. Akshara Rathod	Professor	PHD	27
NM49	Dr. Richa Rajan	Associate Professor	PHD	20
NM48	Dr. Aditi Sareen	Associate Professor	PHD	19
NM60	Mr. Ashish Thakur	Assistant Professor	PG	12
NM50	Mr. Sunil Biswas	Assistant Professor	PG	11
NM51	Ms. Radha Narayan	Assistant Professor	PG	11
NM59	Mr. Mahesh Balakrishnan	Assistant Professor	PG	11
NM32	Mr. Rishi Kamble	Assistant Professor	PG	10
NM33	Mr. Puneet Verma	Assistant Professor	PG	8
NM31	Dr. Vibha Dutta	Assistant Professor	PHD	7
NM47	Mr. Satish Shukla	Assistant Professor	PG	6
NM57	Mr. Vik Khandelwal	Assistant Professor	PG	5

Table 1. Department wise faculty list**Department=Computer Science Engineering**

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM34	Dr. Sanjay Dey	Professor	PHD	32
NM04	Dr. Aisha Chakraborty	Professor	PHD	30
NM05	Dr. Anushka Jha	Associate Professor	PHD	19
NM36	Dr. Rohit Jain	Associate Professor	PHD	19
NM44	Dr. Smita Majumdar	Associate Professor	PHD	19
NM06	Ms. Isha Rao	Assistant Professor	PG	9
NM30	Ms. Chandni Iyer	Assistant Professor	PG	8
NM52	Dr. Pradeep Kapoor	Assistant Professor	PHD	8
NM43	Mr. Jatin Deshpande	Assistant Professor	PG	6

Department=Electronics & Communication Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM13	Dr. Jeevan Mishra	Professor	PHD	30
NM12	Dr. Tarun Yadav	Professor	PHD	24
NM14	Dr. Hemant Pandey	Associate Professor	PHD	22
NM11	Dr. Darshan Gupta	Associate Professor	PHD	21
NM15	Dr. Lokesh Nair	Associate Professor	PHD	20
NM35	Dr. Akshay Chatterjee	Associate Professor	PHD	19
NM16	Ms. Nandini Menon	Assistant Professor	PG	12
NM38	Ms. Shikha Bhatia	Assistant Professor	PG	12
NM37	Ms. Avantika Sethi	Assistant Professor	PG	11
NM39	Mr. Santosh Saxena	Assistant Professor	PG	11
NM41	Mr. Gopal Soni	Assistant Professor	PG	11
NM42	Ms. Bhavna Bhattacharya	Assistant Professor	PG	7
NM40	Dr. Vaibhav Sinha	Assistant Professor	PHD	6
NM55	Dr. Neha Mahajan	Assistant Professor	PHD	6
NM56	Ms. Anjali Gokhale	Assistant Professor	PG	2

Table 1. Department wise faculty list

Department=Mechanical Engineering

Staff Id	Name	Cadre	Qualification	Experience (Years)
NM17	Dr. Sakshi Chauhan	Professor	PHD	29
NM20	Dr. Siddharth Malik	Professor	PHD	27
NM18	Dr. Bhuvan Desai	Professor	PHD	26
NM19	Dr. Shivani Choudhary	Professor	PHD	25
NM25	Dr. Shantanu Roy	Associate Professor	PHD	22
NM24	Dr. Pragya Srivastava	Associate Professor	PHD	21
NM21	Dr. Kavita Kulkarni	Associate Professor	PHD	20
NM26	Mr. Nikhil Kumar	Assistant Professor	PG	10
NM23	Ms. Sonal Shah	Assistant Professor	PG	9
NM27	Ms. Urvashi Sharma	Assistant Professor	PG	8
NM54	Mr. Manoj Malhotra	Assistant Professor	PG	8
NM53	Ms. Devanshi Chawla	Assistant Professor	PG	7
NM22	Dr. Meenakshi Amin	Assistant Professor	PHD	2

Table 2. Summary Statistics of Faculty
A. Gender Distribution

Department=Biotechnology Engineering

Gender	Number of Faculties	Percentage %
Female	4	44.44
Male	5	55.56

Department=Civil Engineering

Gender	Number of Faculties	Percentage %
Female	6	42.86
Male	8	57.14

Department=Computer Science Engineering

Gender	Number of Faculties	Percentage %
Female	5	55.56
Male	4	44.44

Department=Electronics & Communication Engineering

Gender	Number of Faculties	Percentage %
Female	6	40.00
Male	9	60.00

Department=Mechanical Engineering

Gender	Number of Faculties	Percentage %
Female	8	61.54
Male	5	38.46

Pie Chart

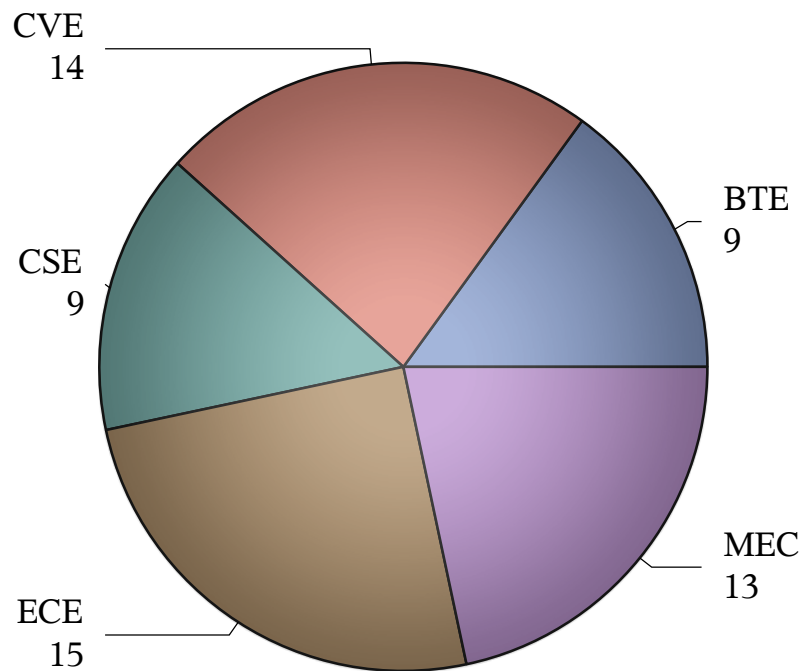


Figure 1. Dept wise for number of faculty

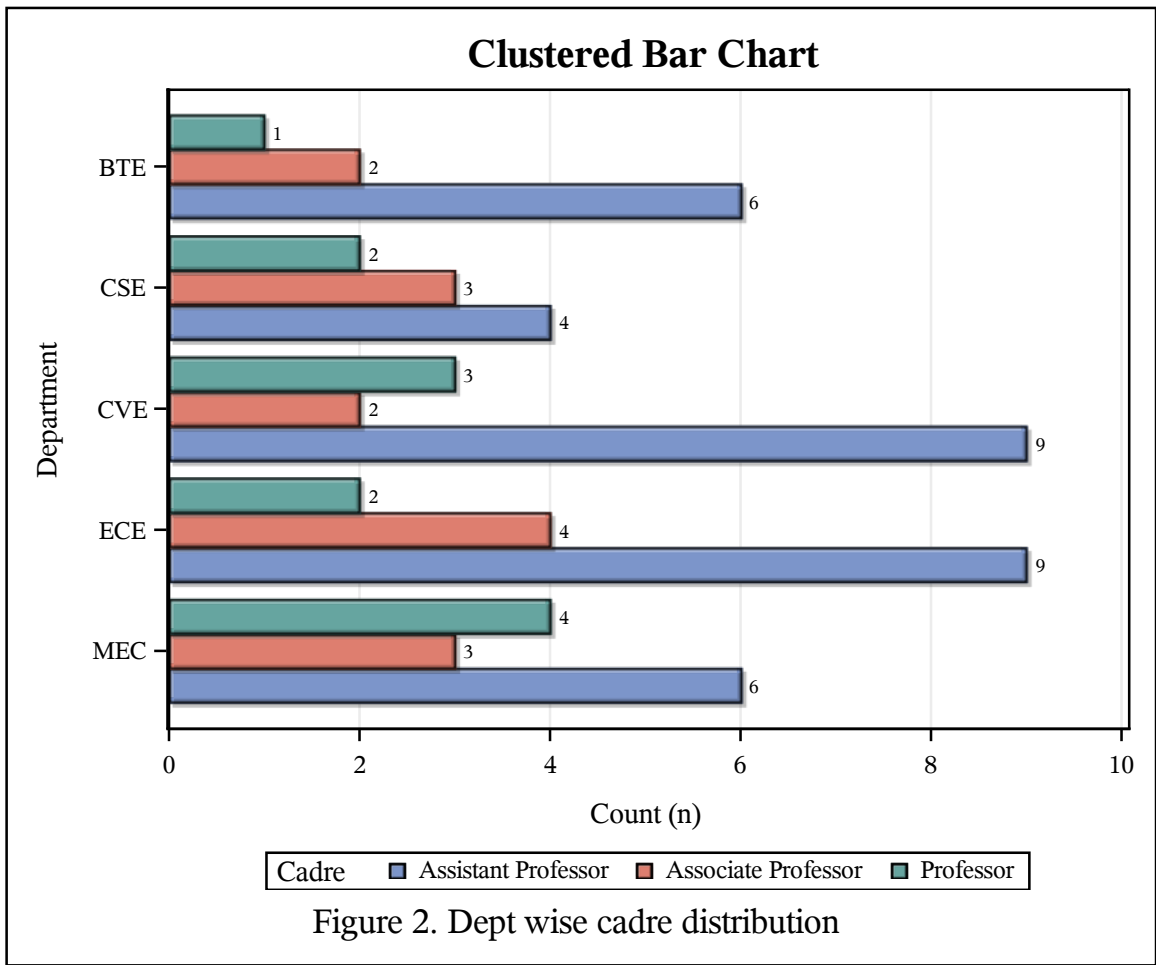
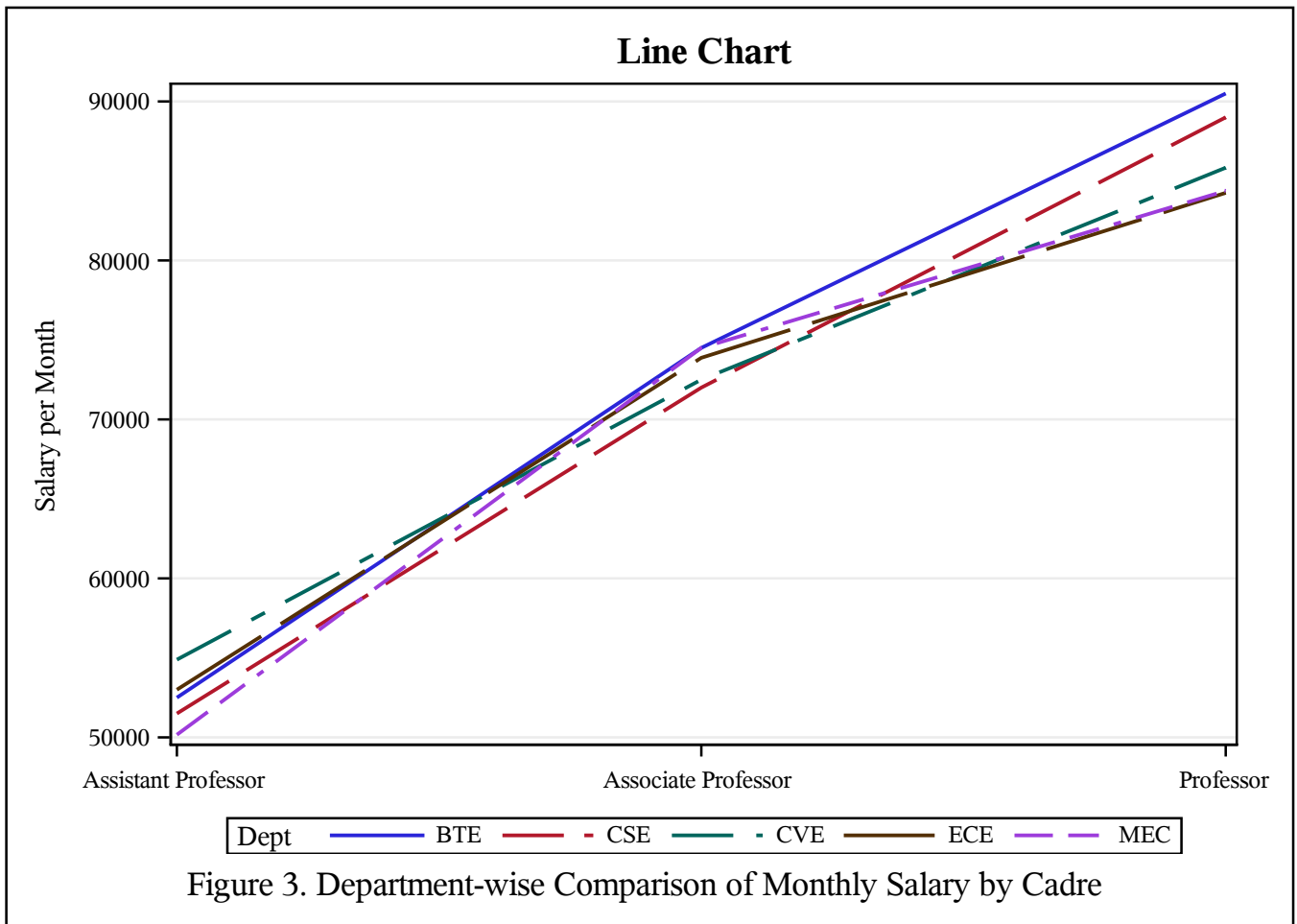
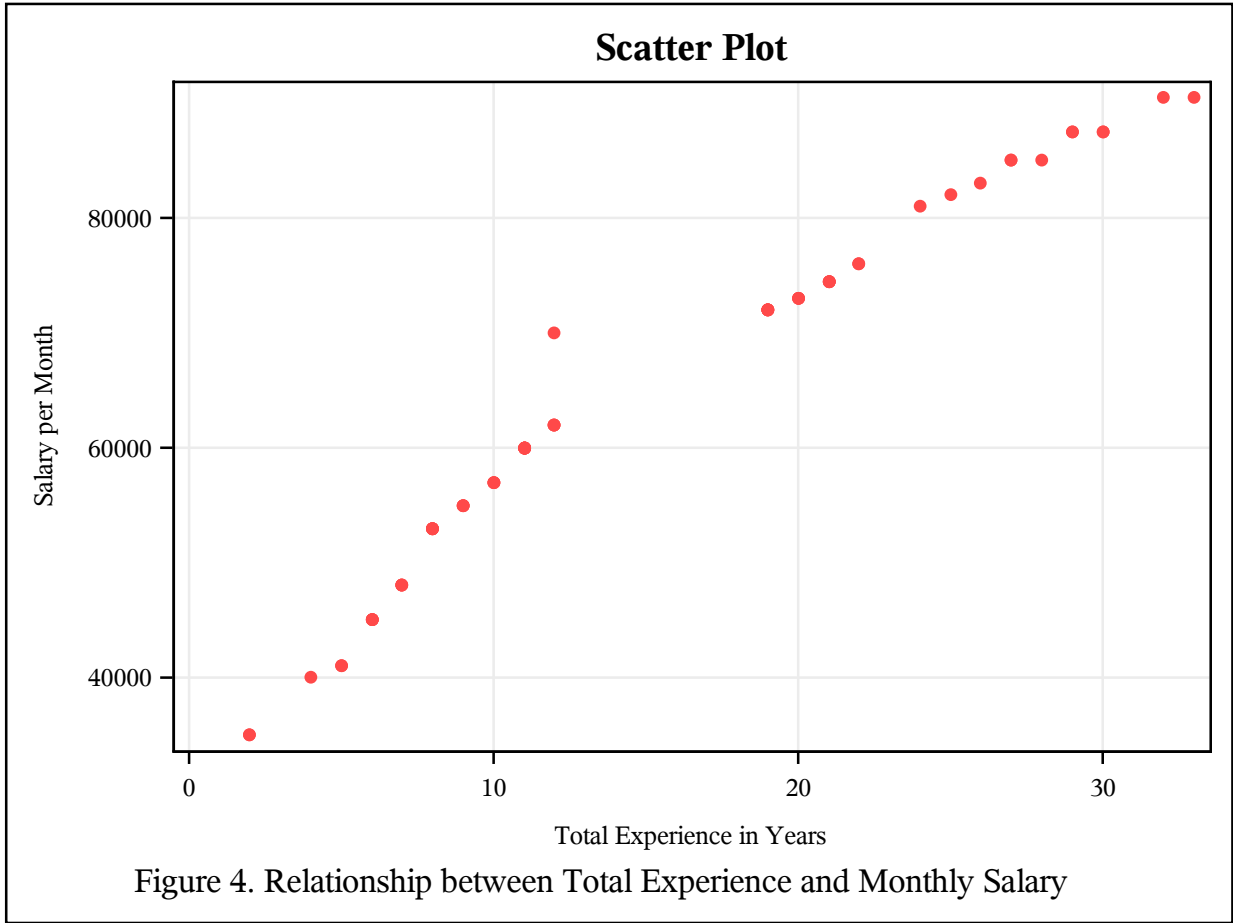


Table 3. Average Experience of faculty department wise

Department	Average Experience (Years)
BTE	14.0
CSE	16.7
CVE	14.6
ECE	14.3
MEC	16.5





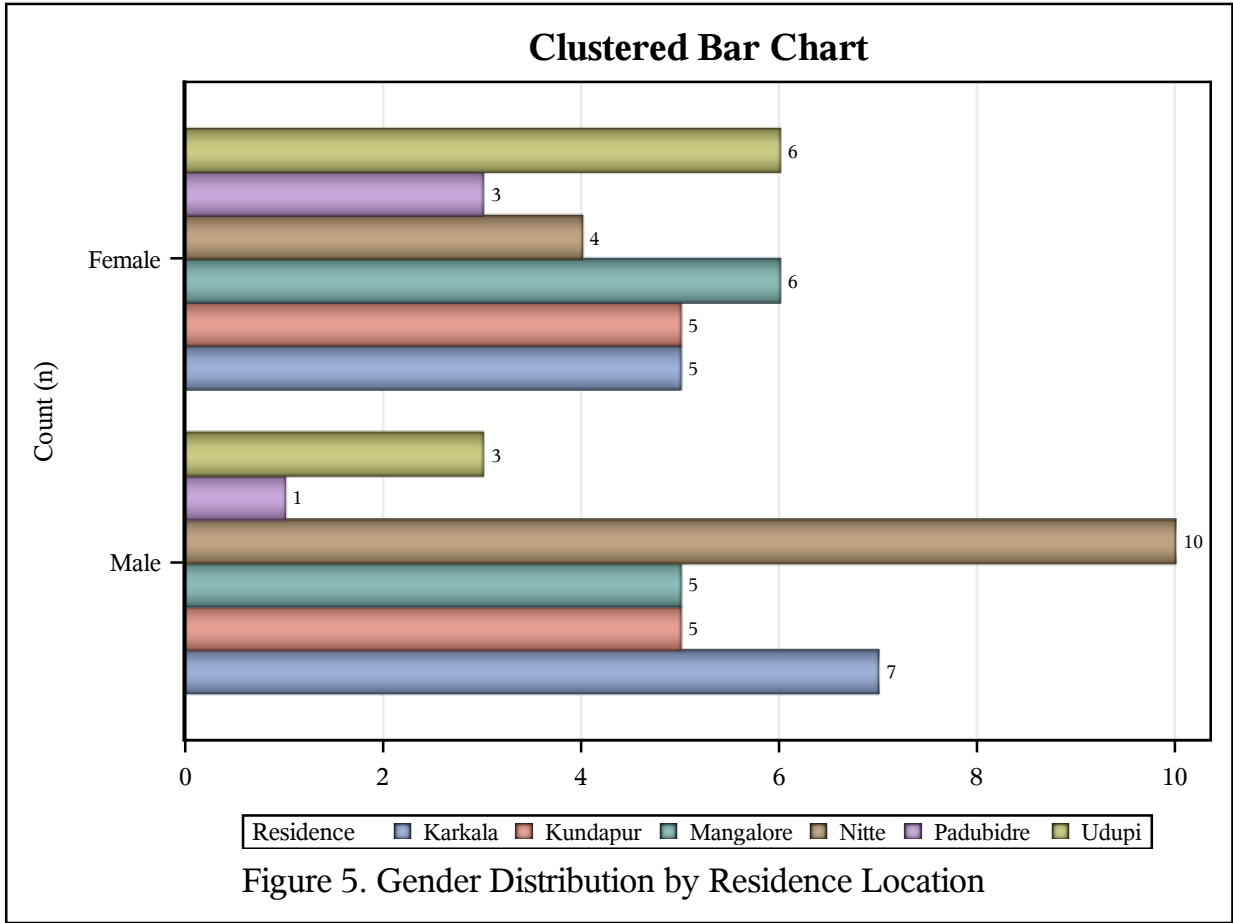
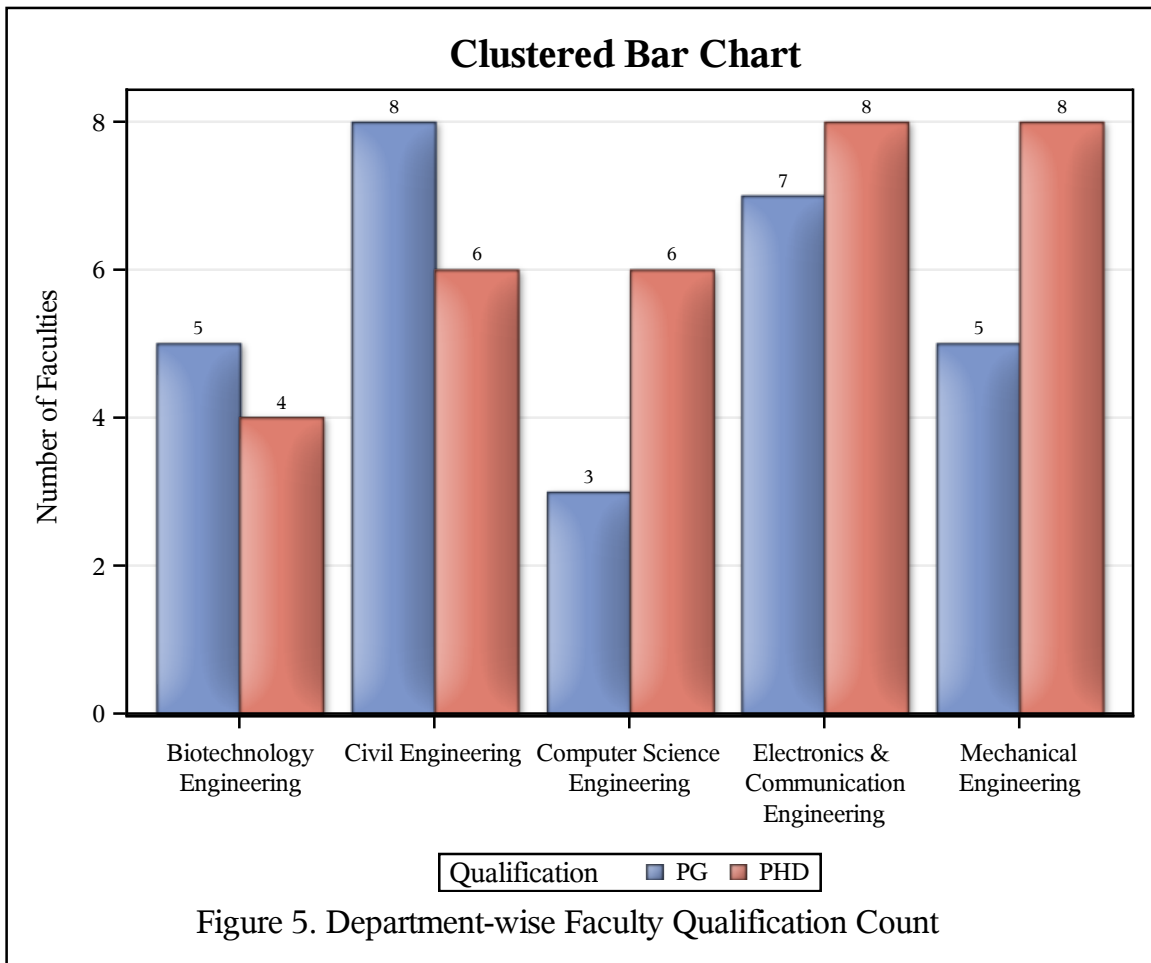
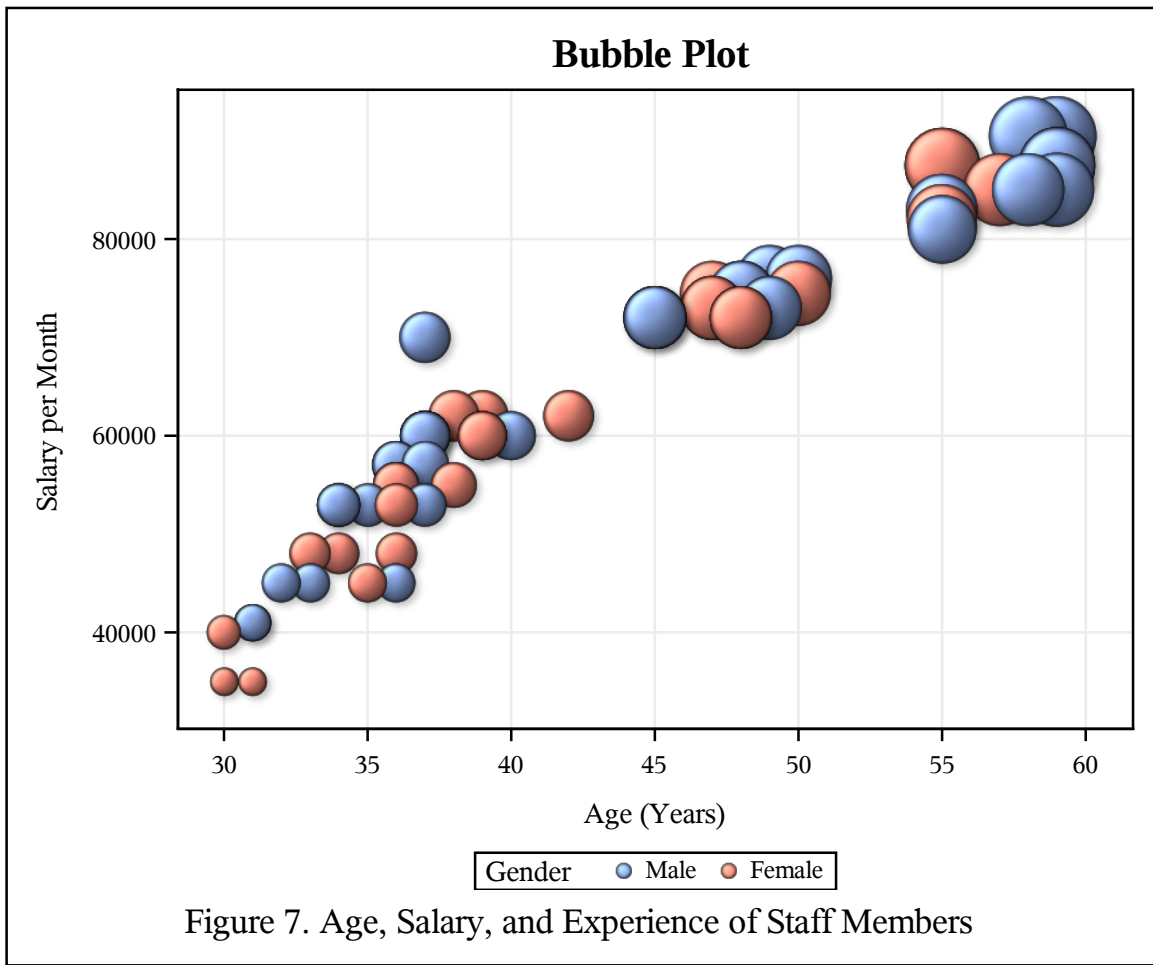


Table 4. Department wise Qualification Count

Department	Qualification	Number of Faculties
Biotechnology Engineering	PG	5
Biotechnology Engineering	PHD	4
Civil Engineering	PG	8
Civil Engineering	PHD	6
Computer Science Engineering	PG	3
Computer Science Engineering	PHD	6
Electronics & Communication Engineering	PG	7
Electronics & Communication Engineering	PHD	8
Mechanical Engineering	PG	5
Mechanical Engineering	PHD	8





```

1  /* Library is created and linked to the data folder which can be accessed in the future */
2  libname bsaspro "/home/u59606296/BSAS MINOR PROJECT/Data";
3
4  /* Raw Data excel file is converted into a sas table which is saved in the data folder and also can be accessed
5  form the library */
6  options validvarname=v7;
7  proc import datafile="/home/u59606296/BSAS MINOR PROJECT/Data/Faculty_Demographics_RawData.xlsx"
8          dbms=xlsx out=bsaspro.rawdata
9          replace;
10
11 run;
12 *****;
13 *****;
14 /* Checking the contents of the raw data sas table. */
15 /* Checking for various variables present in the raw data sas table */
16 proc contents data=bsaspro.rawdata;
17 run;
18
19 /* Dept, Cadre, Qualification and Residence variables do not have unique values */
20 proc freq data=bsaspro.rawdata;
21     tables Dept Cadre Qualification Residence / nocum nopercnt;
22 run; /*NOCUM and NOPERCNT is used to remove unnecessary values from ouput*/
23
24 /* Observation: */
25 /* There are 5 Dept.They are BTE,CSE,CVE,ECE and MEC. */
26 /* There are 4 types of Cadre.They are Professor, PROFESSOR ,Associate Professor and Assistant Professor.*/
27 /* Here Professor is repeated twice since some are in Upper case and some in proper case.
28 Hence 4 types of cadres
29 are displayed */
30 /* There are 2 Qualifications. They are PG and PHD. */
31 /* Faculties reside in 5 different locations. They are Mangalore, Karkala, Padubidre, Nitte, Kundapur
32 and Udupi. */
33 *****;
34 *****;
35 /* Resolving the issue of the value 'PROFESSOR'&'Professor' */
36 data bsaspro.rawdata;
37     set bsaspro.rawdata;
38     if Cadre="PROFESSOR" then Cadre="Professor";
39 run;
40 /* Cross-checking the values again */
41 proc freq data=bsaspro.rawdata;
42     tables Cadre;
43 run;
44
45 /* Observation: */
46 /* Since Professor and PROFESSOR both are same, this issue has been resolved using an IF condition. */
47 /* Now there are only 3 types of Cadre. */
48
49 /* The Cadre must be in the order Professor,Associate Professor and Assistant Professor. */
50 /* This can be done by assigning them with values and later sorting these values. */
51 data bsaspro.rawdata;
52     set bsaspro.rawdata;
53     if Cadre="Professor" then rank=1;
54     else if Cadre="Associate Professor" then rank=2;
55     else rank=3;
56 run;
57
58 /* Name and Surname are concatenated using the catx function. */
59 /* Since the default length of Name is 9 after concatenating the values will be truncated. */
60 /* To overcome this issue the length of the Name is set to 50 */
61 data bsaspro.rawdata;
62     length Name $50;
63     format Name $50.;
64     set bsaspro.rawdata;
65     Name=catx(' ',name,surname);
66 run;
67
68 /* This data steps assigns the specific title for specific names based on their Qualification and Gender. */
69 /* Faculties with a PHD Degree is assigned with Dr. title in front of their Name. */
70 /* Male and Female Faculties who don't have PHD degree are assigned with Mr. and Ms. respectively. */
71 data bsaspro.rawdata;
72     set bsaspro.rawdata;
73     if Qualification="PHD" then Name="Dr. " || Name;
74     else if gender="Male" and Qualification ne "PHD" then Name="Mr. " || Name;
75     else Name="Ms. " || Name;
76 run;
77
78 /* Labels are assigned to the Column names which will be displayed in the Results */

```

```

79 data bsaspro.rawdata;
80     set bsaspro.rawdata;
81     label    DOB="Date of Birth" DOJ="Date of Joining"
82             Total_Exp="Experience (Years)" Salary_Monthly="Salary per Month";
83 run;
84
85 /* Age of the Faculties is calculated using the intck function by extracting the year from their
86 Date of Birth. */
87 data bsaspro.rawdata;
88     set bsaspro.rawdata;
89     Age = intck('YEAR',DOB,today());
90     format age 2.;
91 run;
92
93 /* New column is created called Department for full forms of the column Dept which tells us the
94 department to which a faculty belongs */
95 data bsaspro.rawdata;
96     set bsaspro.rawdata;
97     length Department $50;          /*Setting the length and format of the new column*/
98     format Department $50.;
99     if dept="BTE" then Department="Biotechnology Engineering";
100    else if dept="CSE" then Department="Computer Science Engineering";
101    else if dept="ECE" then Department="Electronics & Communication Engineering";
102    else if dept="CVE" then Department="Civil Engineering";
103    else if dept="MEC" then Department="Mechanical Engineering";
104 run;
105
106 /* The Data is sorted by Department, after sorting Department wise it is again sorted by Rank and at
107 last it is sorted by Experience. */
108 /* Descending option is used to sort Experience form highest to lowest. */
109 /* Sorting again to avoid any errors in upcoming procedures but using the Department
110 and not Dept Column*/
111 proc sort data=bsaspro.rawdata;
112     by Department Rank descending Total_Exp ;
113 run;
114
115 /* The data is copied into another sas table so that the copied data can be used for further
116 analysis without manipulating the original data */
117 data bsaspro.masterdata;
118     set bsaspro.rawdata;
119 run;
120
121 /* Before the Final Print all the coding required for Analytics is done in upcoming lines */
122 /* Necessary titles are given before the proc step making the titles global statement*/
123 title1 "NMAM Institute of Technology, Nitte, Karkala" ;
124 title2 "Faculty Demographics" ;
125 title3 "Table 1. Department wise faculty list";
126
127 proc print data=bsaspro.masterdata label noobs
128     STYLE(header)={backgroundcolor=lightblue color=black};
129     by Department;
130     var Staff_Id Name Cadre Qualification Total_Exp;
131 run;
132 title1;
133 title2;
134 title3;
135
136 *****;
137 *****;
138 /* Proc freq step has been carried out using the masterdata sas table. */
139 /* Gender column is selected for the summary statistics to be carried out to produce frequency tables. */
140 /* The output table is saved in the bsaspro library for further use. */
141
142 proc freq data=bsaspro.masterdata notitle;
143     table Gender / nocum out=bsaspro.summary;
144     by department;
145 run;
146
147 /* Necessary Titles are given. */
148 title1 "Table 2. Summary Statistics of Faculty";
149 title2 "A. Gender Distribution";
150 /* The output table from the previous proc freq step is printed here.
151 Labels are given for the column names. */
152
153 proc print data=bsaspro.summary noobs label;
154     where gender;
155     by department;
156     var Gender COUNT PERCENT;
157     label Gender="Gender" Count="Number of Faculties" Percent="Percentage %";
158     format Percent 5.2;
159 run;
160 title1;

```

```

158 title2;
159
160 *****;
161 *****;
162 /* Pie Chart */
163 /* Pie Chart is created using the GUIs in Tasks and Utilities */
164 /* Department wise total faculty no. is visualized using a Pie Chart */
165
166 proc template;
167     define statgraph SASStudio.Pie;
168         begingraph;
169         entrytitle "Pie Chart" / textattrs=(size=15) ;
170         entryfootnote halight=center "Figure 1. Dept wise for number of faculty" /
171             textattrs=(size=13);
172         layout region;
173         piechart category=Dept / datalabellocation=callout datalabelattrs=(size=13)
174             dataskin=prescribed;
175         endlayout;
176         endgraph;
177     end;
178 run;
179 ods graphics / reset width=6in height=5in imagemap;
180
181 proc sgrender template=SASStudio.Pie data=BSASPRO.MASTERDATA;
182 run;
183
184 ods graphics / reset;
185 *****;
186 *****;
187 /* Clustered Bar Chart */
188 /* Clustered Bar Chart is plotted using GUIs in Tasks and Utilities. */
189 /* This is done by selecting Category as Dept and Subcategory as Cadre */
190 /* This gives the visualization of Count of faculties in each Department which is again branched
191 based on their Cadre */
192
193 ods graphics / reset width=6in height=5in imagemap;
194
195 proc sgplot data=BSASPRO.MASTERDATA;
196     title height=15pt "Clustered Bar Chart";
197     footnote2 justify=center height=13pt "Figure 2. Dept wise cadre distribution";
198     hbar Dept / group=Cadre groupdisplay=cluster datalabel dataskin=crisp;
199     yaxis label="Department";
200     xaxis max=10 grid label="Count (n)";
201 run;
202
203 ods graphics / reset;
204 title;
205 footnote2;
206 *****;
207 *****;
208 /* Average Experience of faculty department wise */
209 /* This is done using the proc means procedure. */
210 /* Proc means initiates the PROC MEANS procedure to calculate summary statistics for the masterdata
211 dataset. */
212 /* "class Dept" specifies the variable "Dept" as a classification variable, indicating that
213 the analysis */
214 /* should be performed separately for each unique value of the variable. */
215 /* "var Total_Exp" specifies the variable "Total_Exp" as the numeric variable */
216 /* for which the summary statistics are to be calculated. */
217 /* output out creates a new output dataset. */
218 /* "mean=AvgExp" calculates the mean (average) Total_Exp */
219 /* for each unique value of "Dept" and stores the result in a new variable called "AvgExp". */
220
221 proc means data=bsaspro.masterdata;
222     class Dept;
223     var Total_Exp;
224     output out=bsaspro.dept_avg_exp mean=AvgExp;
225     label Dept="Department" AvgExp="Average Experience (Years)";
226 run;
227
228 /* The output table is displayed using the proc print procedure. */
229 /* By using the "where TYPE=1" statement in the "proc print" code, SAS will only print observations */
230 /* that correspond to the summary statistics for each department, which is what we are interested in
231 for this analysis */
232
233 title "Table 3. Average Experience of faculty department wise";
234 proc print data=bsaspro.dept_avg_exp label noobs;
235     format AvgExp 5.1;
236     var Dept AvgExp;
237     where _TYPE_=1;
238

```

```

237 run;
238 title;
239 *****;
240 *****;
241 /* Department-wise Comparison of Monthly Salary by Cadre */
242 ods graphics / reset width=7in height=5in imagemap;
243
244 proc sgplot data=BSASPRO.MASTERDATA;
245     title height=14pt "Line Chart";
246     footnote2 justify=center height=13pt
247         "Figure 3. Department-wise Comparison of Monthly Salary by Cadre";
248     vline Cadre / response=Salary_Monthly group=Dept lineattrs=(thickness=2)
249         stat=mean;
250     xaxis display=(nolabel);
251     yaxis grid;
252 run;
253
254 ods graphics / reset;
255 title;
256 footnote2;
257 *****;
258 *****;
259 /* Relationship between Total Experience and Monthly Salary */
260 ods graphics / reset width=6.4in height=4.8in imagemap;
261
262 proc sgplot data=BSASPRO.MASTERDATA;
263     title height=14pt "Scatter Plot";
264     footnote2 justify=center height=12pt
265         "Figure 4. Relationship between Date of Joining and Monthly Salary";
266     scatter x=Total_Exp y=Salary_Monthly / markerattrs=(symbol=circlefilled
267         color=CXff4949 size=8);
268     xaxis grid label="Total Experience in Years";
269     yaxis grid;
270 run;
271
272 ods graphics / reset;
273 title;
274 footnote2;
275 *****;
276 *****;
277 /* Gender Distribution by Residence Location */
278 ods graphics / reset width=6.4in height=4.8in imagemap;
279
280 proc sgplot data=BSASPRO.MASTERDATA;
281     title height=14pt "Clustered Bar Chart";
282     footnote2 justify=center height=13pt
283         "Figure 5. Gender Distribution by Residence Location";
284     hbar Gender / group=Residence groupdisplay=cluster datalabel dataskin=preserved;
285     yaxis label="Count (n)";
286     xaxis grid display=(nolabel);
287 run;
288
289 ods graphics / reset;
290 title;
291 footnote2;
292 *****;
293 *****;
294 /* To calculate total number of faculties for each qualification from each daprtment */
295 proc freq data=bsaspro.masterdata notitle;
296     tables Department*Qualification / nocum nocol nopercnt norow out=bsaspro.qualitable;
297 run;
298
299 title1 "Table 4. Department wise Qualification Count";
300 proc print data=bsaspro.qualitable noobs label STYLE(header)={backgroundcolor=lightblue color=black};
301     var Department Qualification COUNT;
302     label Count="Number of Faculties" Percent="Percentage %";
303     format Percent 5.2 ;
304 run;
305
306 /* Clustered Bar Chart */
307 ods graphics / reset width=6in height=5in imagemap;
308
309 proc sgplot data=BSASPRO.MASTERDATA;
310     title height=15pt "Clustered Bar Chart";
311     footnote2 justify=Center height=12pt
312         "Figure 5. Department-wise Faculty Qualification Count";
313     vbar Department / group=Qualification groupdisplay=cluster datalabel
314         dataskin=matte;
315     xaxis display=(nolabel);
316     yaxis grid label="Number of Faculties";
317 run;
318

```



```

316
317 ods graphics / reset;
318 title;
319 footnote2;
320 *****;
321 *****;
322 /* Bubble Plot */
323 ods graphics / reset width=6in height=5in imagemap;
324
325 proc sgplot data=BSASPRO.MASTERDATA;
326     title height=15pt "Bubble Plot";
327     footnote2 justify=center height=13pt
328         "Figure 7. Age, Salary, and Experience of Staff Members";
329     bubble x=Age y=Salary_Monthly size=Total_Exp/ group=Gender dataskin=sheen
330         bradiusmin=7 bradiusmax=20;
331     xaxis grid label="Age (Years)";
332     yaxis grid;
333 run;
334
335 ods graphics / reset;
336 title;
337 footnote2;
338 *****;
339 *                FINAL REPORT PRINT                *;
340 *****;
341 ods pdf file="/home/u59606296/BSAS MINOR PROJECT/Output/Faculty Demographics.pdf"
342     style=printer startpage= now pdftoc=1;
343 options nodate;
344 options nonumber;
345 title1 "NMAM Institute of Technology, Nitte, Karkala" ;
346 title2 "Faculty Demographics" ;
347 title3 "Table 1. Department wise faculty list";
348
349 proc print data=bsaspro.masterdata label noobs
350     STYLE(header)={backgroundcolor=lightblue color=black};
351     by Department;
352     var Staff_Id Name Cadre Qualification Total_Exp;
353 run;
354 title1;
355 title2;
356 title3;
357 title4;
358
359 *****;
360 *****;
361
362 title1 "Table 2. Summary Statistics of Faculty";
363 title2 "A. Gender Distribution";
364
365 proc print data=bsaspro.summary noobs label STYLE(header)={backgroundcolor=lightblue color=black};
366     where gender;
367     by department;
368     var Gender COUNT PERCENT;
369     label Gender="Gender" Count="Number of Faculties" Percent="Percentage %";
370     format Percent 5.2;
371 run;
372 title1;
373 title2;
374
375 *****;
376 *****;
377
378 /* Pie Chart */
379 proc template;
380     define statgraph SASStudio.Pie;
381         begingraph;
382         entrytitle "Pie Chart" / textattrs=(size=15) ;
383         entryfootnote halight=center "Figure 1. Dept wise for number of faculty" /
384             textattrs=(size=13);
385         layout region;
386         piechart category=Dept / datalabellocation=callout datalabelattrs=(size=13)
387             dataskin=pressed;
388         endlayout;
389         endgraph;
390     end;
391 run;
392
393 ods graphics / reset width=6in height=5in imagemap;
394
395 proc sgrender template=SASStudio.Pie data=BSASPRO.MASTERDATA;
396 run;
397

```

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395
396 ods graphics / reset;
397 *****;
398 *****;
399 /* Clustered Bar Chart */
400
401 ods graphics / reset width=6in height=5in imagemap;
402
403 proc sgplot data=BSASPRO.MASTERDATA;
404     title height=15pt "Clustered Bar Chart";
405     footnote2 justify=center height=13pt "Figure 2. Dept wise cadre distribution";
406     hbar Dept / group=Cadre groupdisplay=cluster datalabel dataskin=crisp;
407     yaxis label="Department";
408     xaxis max=10 grid label="Count (n)";
409 run;
410
411 ods graphics / reset;
412 title;
413 footnote2;
414 *****;
415 *****;
416 title "Table 3. Average Experience of faculty department wise";
417 proc print data=bsaspro.dept_avg_exp label noobs;
418     format AvgExp 5.1;
419     var Dept AvgExp;
420     where _TYPE_=1;
421 run;
422 title;
423 *****;
424 *****;
425 /* Department-wise Comparison of Monthly Salary by Cadre */
426 ods graphics / reset width=7in height=5in imagemap;
427
428 proc sgplot data=BSASPRO.MASTERDATA;
429     title height=14pt "Line Chart";
430     footnote2 justify=center height=13pt
431         "Figure 3. Department-wise Comparison of Monthly Salary by Cadre";
432     vline Cadre / response=Salary_Monthly group=Dept lineattrs=(thickness=2)
433         stat=mean;
434     xaxis display=(nolabel);
435     yaxis grid;
436 run;
437
438 ods graphics / reset;
439 title;
440 footnote2;
441 *****;
442 *****;
443 ods graphics / reset width=6.4in height=4.8in imagemap;
444
445 proc sgplot data=BSASPRO.MASTERDATA;
446     title height=14pt "Scatter Plot";
447     footnote2 justify=center height=12pt
448         "Figure 4. Relationship between Total Experience and Monthly Salary";
449     scatter x=Total_Exp y=Salary_Monthly / markerattrs=(symbol=circlefilled
450         color=CXff4949 size=8);
451     xaxis grid label="Total Experience in Years";
452     yaxis grid;
453 run;
454
455 ods graphics / reset;
456 title;
457 footnote2;
458 *****;
459 *****;
460 ods graphics / reset width=6.4in height=4.8in imagemap;
461
462 proc sgplot data=BSASPRO.MASTERDATA;
463     title height=14pt "Clustered Bar Chart";
464     footnote2 justify=center height=13pt
465         "Figure 5. Gender Distribution by Residence Location";
466     hbar Gender / group=Residence groupdisplay=cluster datalabel dataskin=pressed;
467     yaxis label="Count (n)";
468     xaxis grid display=(nolabel);
469 run;
470
471 ods graphics / reset;
472 title;
473 footnote2;
474
475

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474
475 *****;
476 *****;
477 title "Table 4. Department wise Qualification Count";
478 proc print data=bsaspro.qualitable noobs label style(header)={backgroundcolor=lightblue color=black};
479     var Department Qualification COUNT;
480     label Count="Number of Faculties" Percent="Percentage %";
481     format Percent 5.2 ;
482 run;
483 /* Clustered Bar Chart */
484 ods graphics / reset width=6in height=5in imagemap;
485
486 proc sgplot data=BSASPRO.MASTERDATA;
487     title height=15pt "Clustered Bar Chart";
488     footnote2 justify=Center height=12pt
489         "Figure 5. Department-wise Faculty Qualification Count";
490     vbar Department / group=Qualification groupdisplay=cluster datalabel
491         dataskin=matte;
492     xaxis display=(nolabel);
493     yaxis grid label="Number of Faculties";
494 run;
495 ods graphics / reset;
496 title;
497 footnote2;
498
499 *****;
500 *****;
501 ods graphics / reset width=6in height=5in imagemap;
502
503 proc sgplot data=BSASPRO.MASTERDATA;
504     title height=15pt "Bubble Plot";
505     footnote2 justify=center height=13pt
506         "Figure 7. Age, Salary, and Experience of Staff Members";
507     bubble x=Age y=Salary_Monthly size=Total_Exp/ group=Gender dataskin=sheen
508         bradiusmin=7 bradiusmax=20;
509     xaxis grid label="Age (Years)";
510     yaxis grid;
511 run;
512
513 ods graphics / reset;
514 title;
515 footnote2;
516 *****;
517 *****;
518
519 ods pdf close;
520
521
522
523
524
525
526
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529
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