```
DATA P1;
INPUT
     YEAR    $    1-9
     MAJOR   $    11-30
     GPA           32-34
     HOURS         36-37
;
DATALINES;
Freshman  CS               3.0      10
Freshman  BUSINESS         3.5 12
Sophomore CS               3.4      26
Freshman  ART/ARCHITEKT/DESIGN   3.6  5
Freshman  MATH/STAT         3.4      15
Junior    CS               3.6    35
Junior    PHYSICS/CHEM/BIO   3.7      40
Sophomore MATH/STAT         2.8      7
Sophomore CS               2.9      9
Senior    BUSINESS         3.8    28
Junior    ART/ARCHITEKT/DESIGN    3.9  22
Graduate  BUSINESS         4.0  42
Senior    CS               3.2 28
Senior    CS               3.1 18
Senior    ENGINEERING       3.2 24
Senior    PHYSICS/CHEM/BIO   3.6    34
Senior    MATH/STAT         3.5    38
Senior    CS               3.6    40
Graduate  CS               3.6 46
Junior    BUSINESS         4.0    32
Freshman  ENGINEERING       2.9    6
Graduate  OTHERS           3.7    29
Senior    CS               3.3    18
Senior    MATH/STAT         3.2    16
Freshman  MATH/STAT         3.1 16
Sophomore MATH/STAT         3.3    25
Sophomore ENGINEERING       3.6    32
Senior    PHYSICS/CHEM/BIO   3.7    46
Senior    ENGINEERING       3.1  16
Junior    ENGINEERING       3.3  17
Freshman  MATH/STAT         3.3    20
Sophomore PHYSICS/CHEM/BIO    3.3    20
;
PROC MEANS DATA=P1 MIN Q1 MEDIAN Q3 MAX MEAN MAXDEC=2;
          VAR GPA HOURS;
PROC SGPLOT DATA=P1;
             VBOX GPA;
PROC SGPLOT DATA=P1;
             VBOX HOURS;
PROC SGPLOT DATA=P1;
             VBOX GPA / category=YEAR;
PROC SGPLOT DATA=P1;
             VBOX HOURS / category=YEAR;
PROC SGPLOT DATA=P1;
             VBOX GPA / category=MAJOR;
```
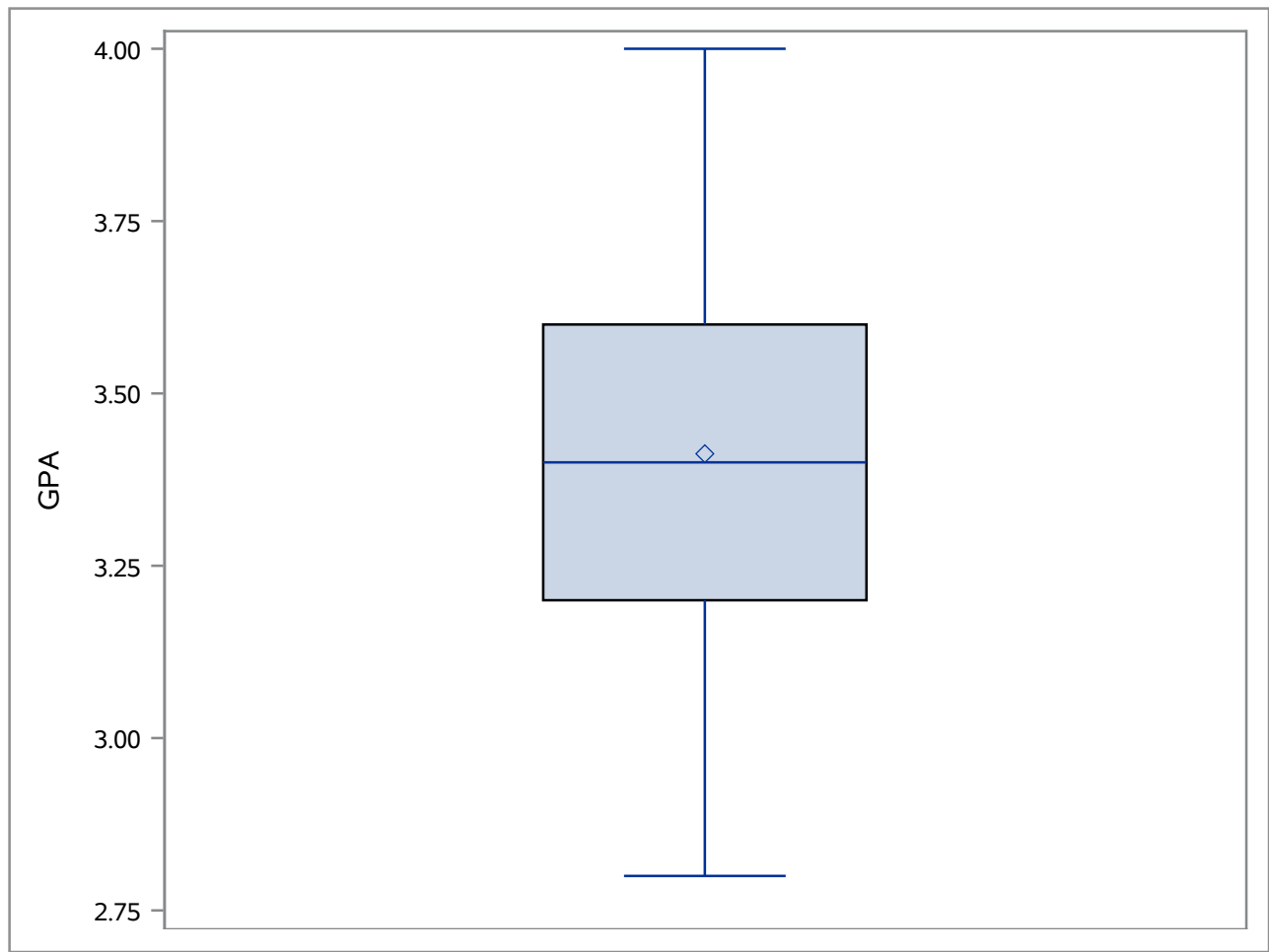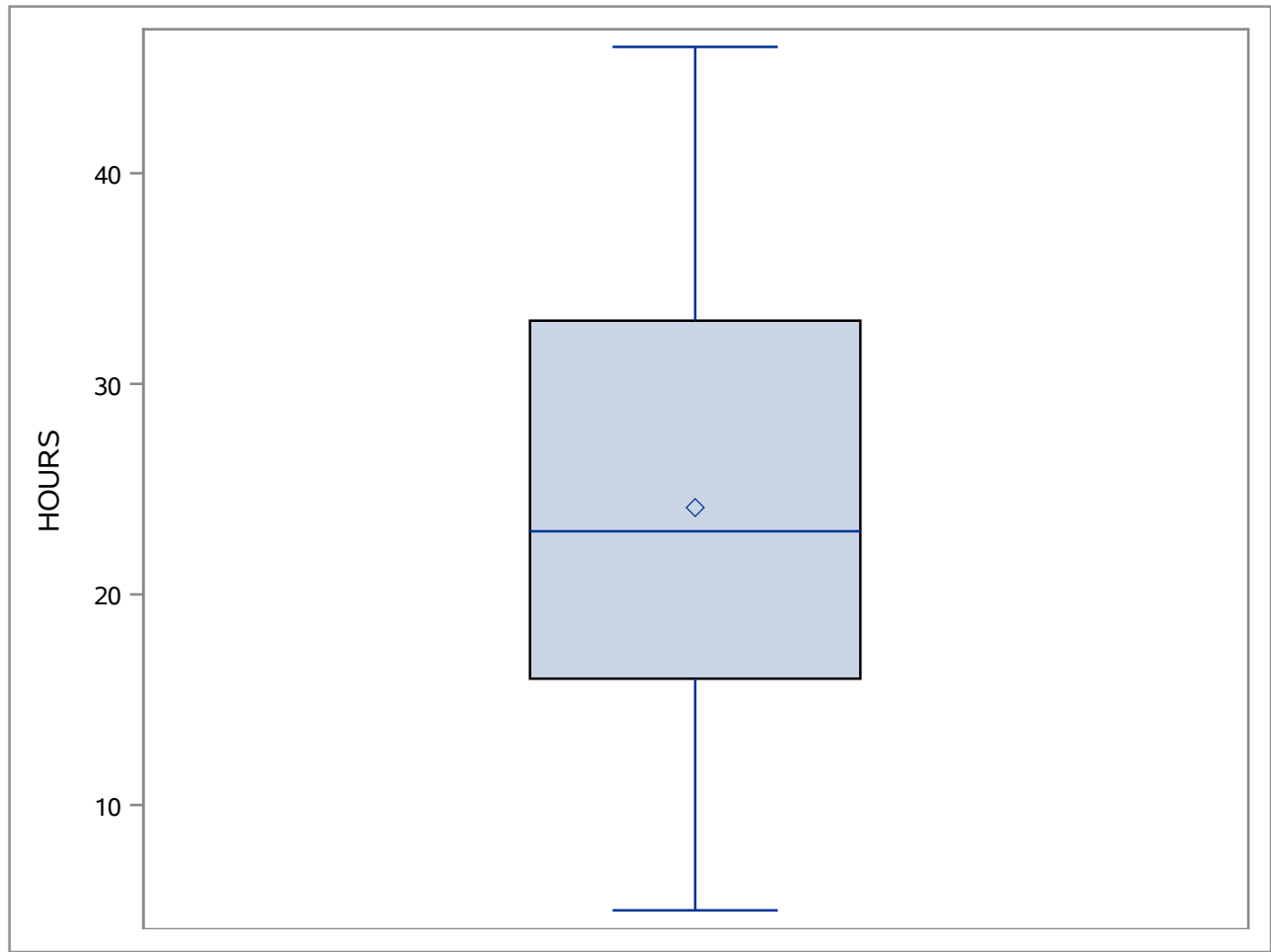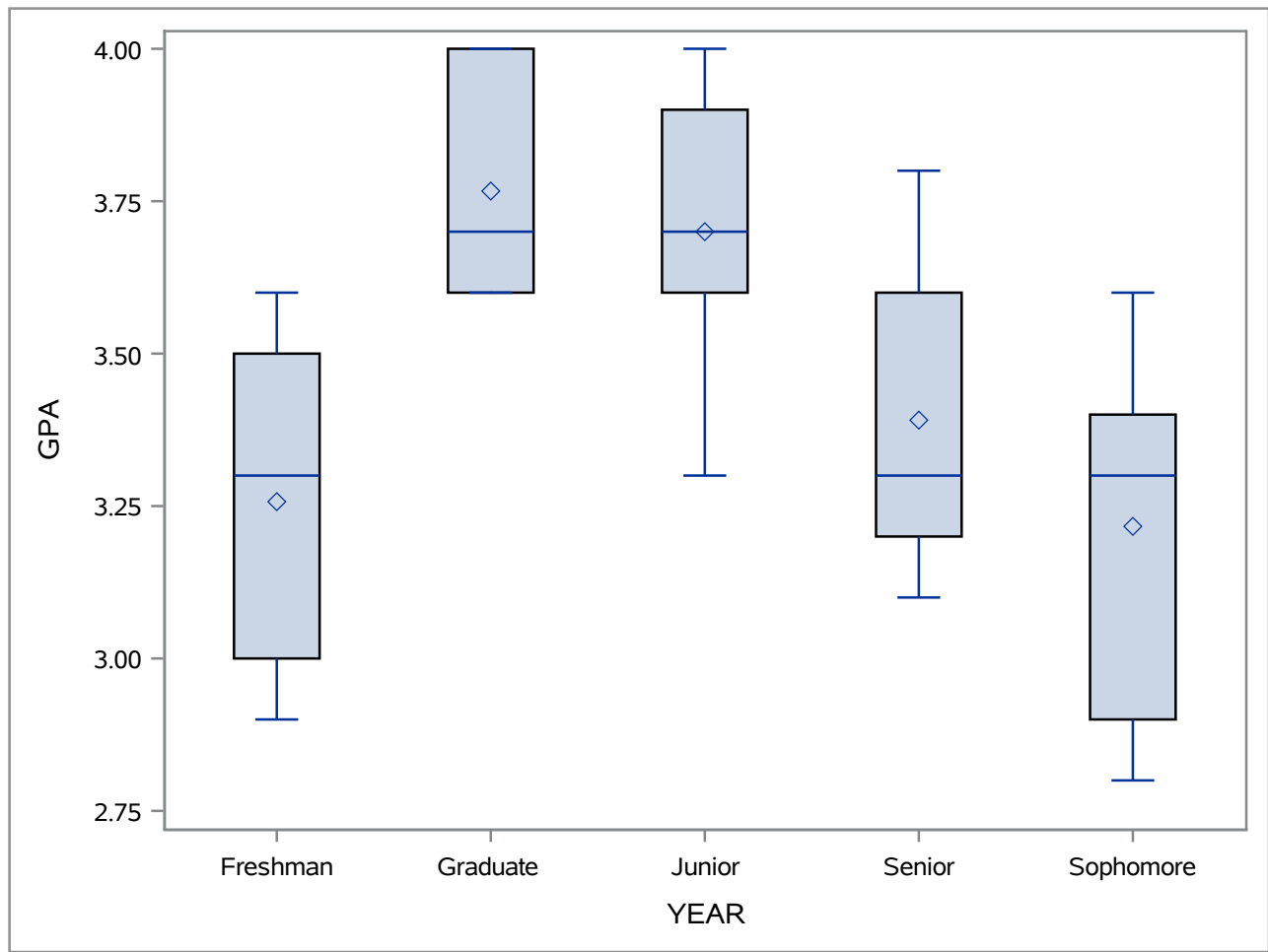
```
PROC SGPLOT DATA=P1;
              VBOX HOURS / category=MAJOR;
PROC UNIVARIATE DATA=P1;
                    PROBPLOT GPA HOURS;
PROC CORR DATA=P1;
      VAR GPA;
      WITH HOURS;
PROC FREQ;
TABLE YEAR MAJOR / NOCUM;
PROC GCHART;
PIE YEAR MAJOR / TYPE=PERCENT;
PROC PRINT;
RUN;
```
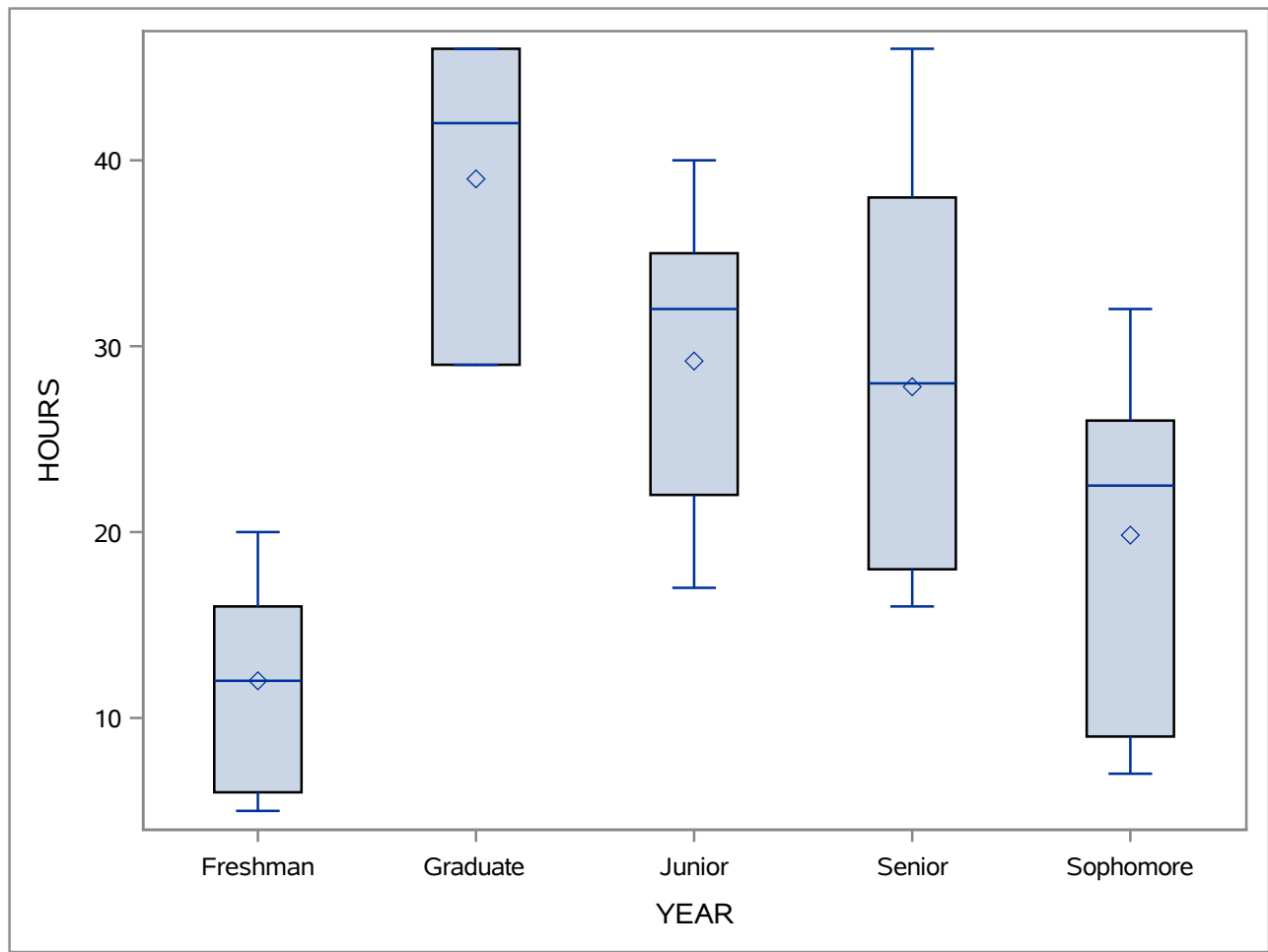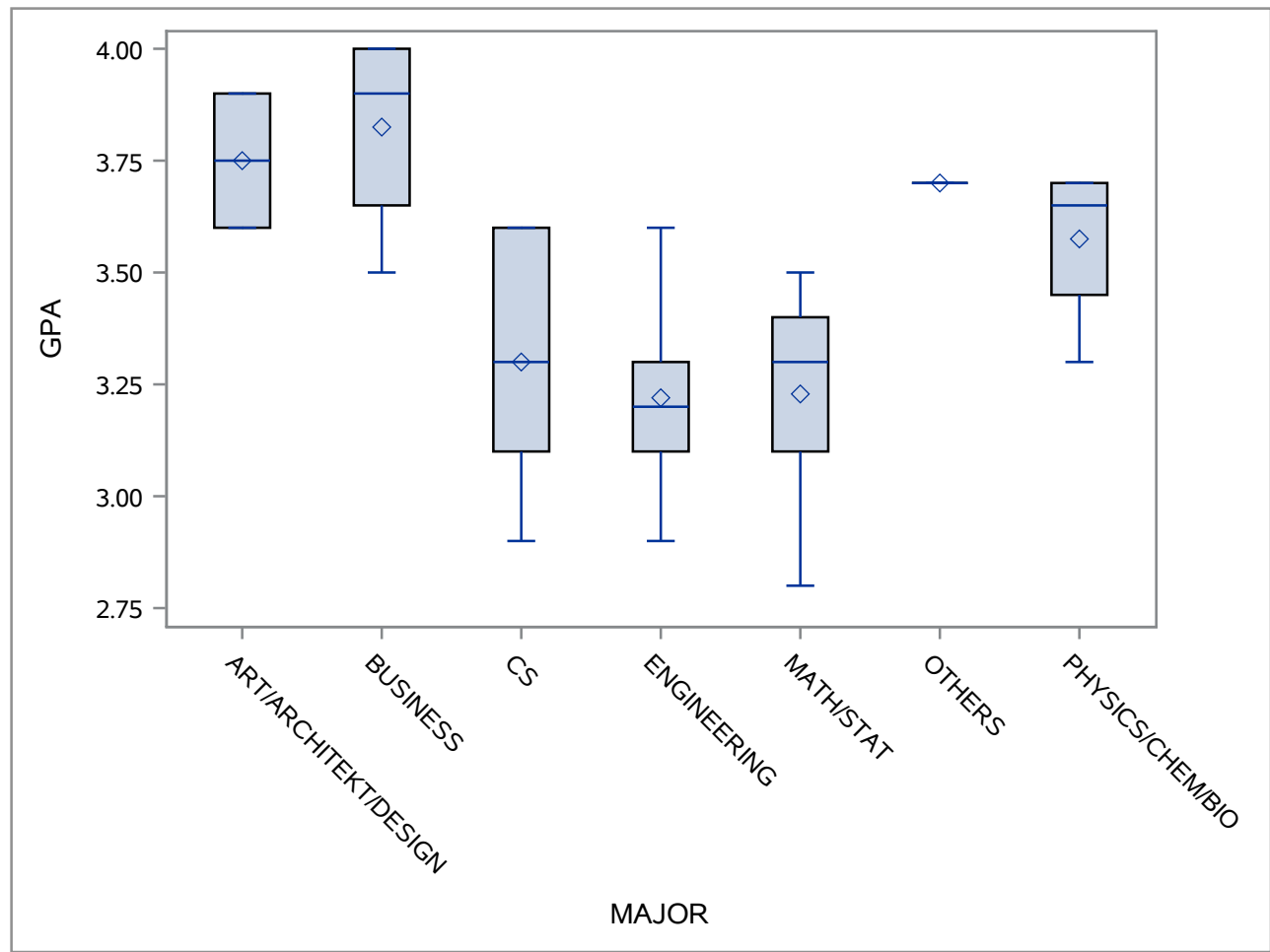
The MEANS Procedure

Variable	Minimum	Lower Quartile	Median	Upper Quartile	Maximum	Mean
GPA	2.80	3.20	3.40	3.60	4.00	3.41
HOURS	5.00	16.00	23.00	33.00	46.00	24.13
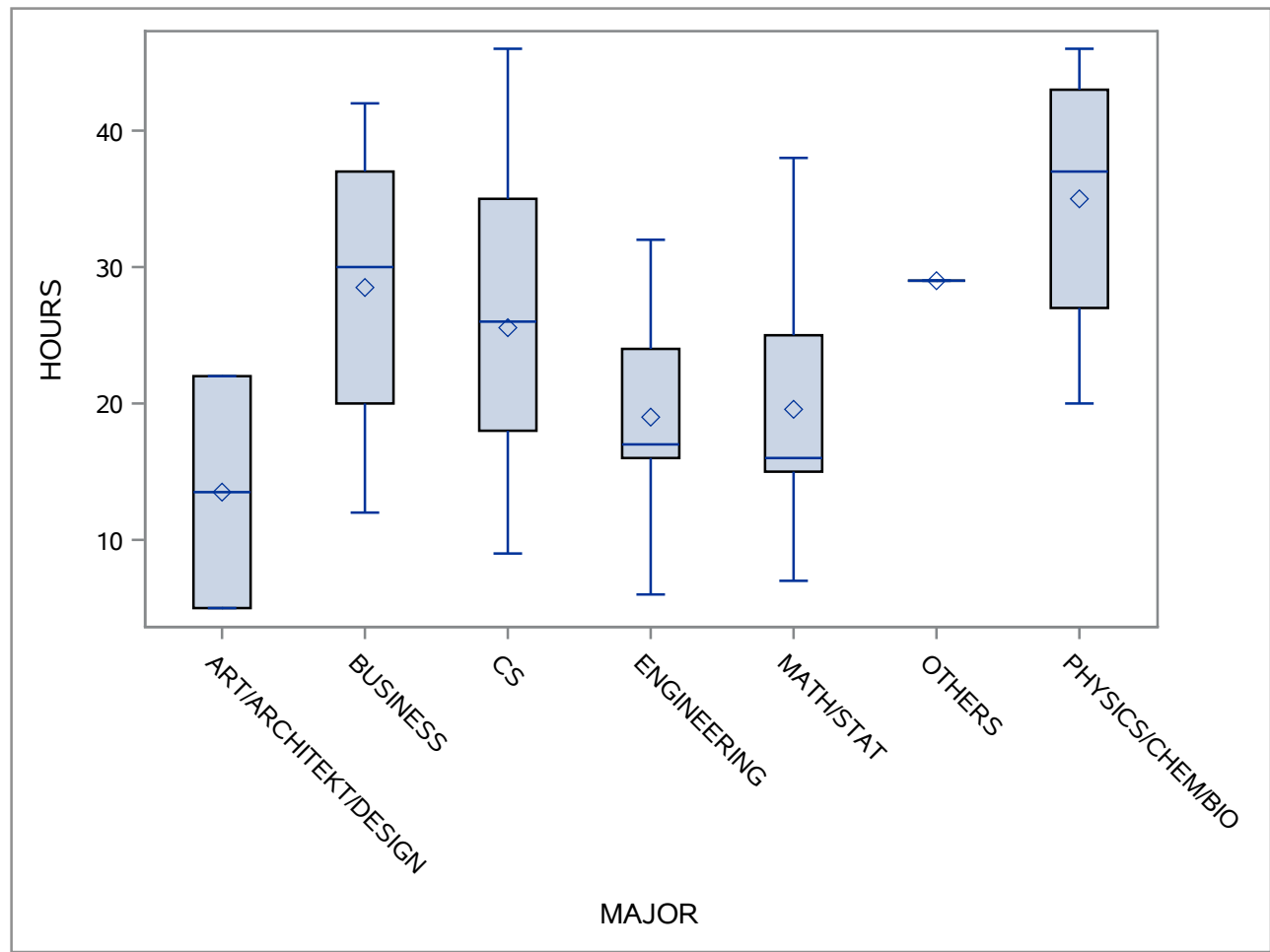
The UNIVARIATE Procedure
Variable: GPA

Moments			
N	32	Sum Weights	32
Mean	3.4125	Sum Observations	109.2
Std Deviation	0.31699191	Variance	0.10048387
Skewness	-0.0052662	Kurtosis	-0.6438101
Uncorrected SS	375.76	Corrected SS	3.115
Coeff Variation	9.28914022	Std Error Mean	0.05603678

Basic Statistical Measures			
Location		Variability	
Mean	3.412500	Std Deviation	0.31699
Median	3.400000	Variance	0.10048
Mode	3.600000	Range	1.20000
		Interquartile Range	0.40000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	60.8975	Pr > |t|	<.0001
Sign	M	16	Pr >= |M|	<.0001
Signed Rank	S	264	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Level	Quantile
100% Max	4.0
99%	4.0
95%	4.0
90%	3.8
75% Q3	3.6
50% Median	3.4
25% Q1	3.2
10%	3.0
5%	2.9
1%	2.8
0% Min	2.8

The UNIVARIATE Procedure
Variable: GPA

Extreme Observations			
Lowest		Highest	
Value	Obs	Value	Obs
2.8	8	3.7	28
2.9	21	3.8	10
2.9	9	3.9	11
3.0	1	4.0	12
3.1	29	4.0	20

The UNIVARIATE Procedure

Probability Plot for GPA
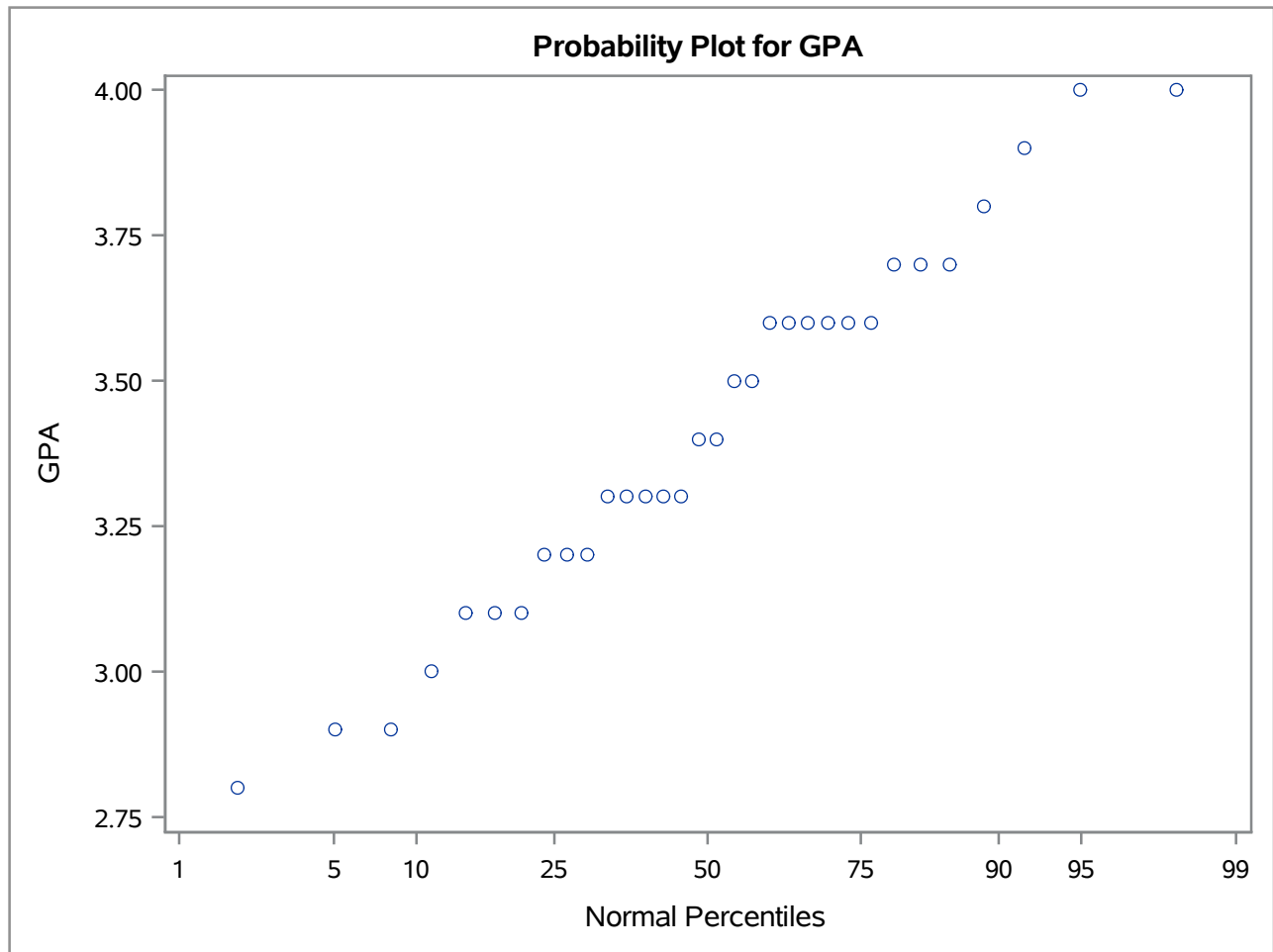
The UNIVARIATE Procedure
Variable: HOURS

Moments			
N	32	Sum Weights	32
Mean	24.125	Sum Observations	772
Std Deviation	11.8858821	Variance	141.274194
Skewness	0.23384079	Kurtosis	-0.9129053
Uncorrected SS	23004	Corrected SS	4379.5
Coeff Variation	49.2679051	Std Error Mean	2.10114696

Basic Statistical Measures			
Location		Variability	
Mean	24.12500	Std Deviation	11.88588
Median	23.00000	Variance	141.27419
Mode	16.00000	Range	41.00000
		Interquartile Range	17.00000

Tests for Location: Mu0=0				
Test	Statistic		p Value	
Student's t	t	11.48182	Pr > |t|	<.0001
Sign	M	16	Pr >= |M|	<.0001
Signed Rank	S	264	Pr >= |S|	<.0001

Quantiles (Definition 5)	
Level	Quantile
100% Max	46
99%	46
95%	46
90%	40
75% Q3	33
50% Median	23
25% Q1	16
10%	9
5%	6
1%	5
0% Min	5

The UNIVARIATE Procedure
Variable: HOURS

Extreme Observations			
Lowest		**Highest**	
Value	**Obs**	**Value**	**Obs**
5	4	40	7
6	21	40	18
7	8	42	12
9	9	46	19
10	1	46	28

The UNIVARIATE Procedure

Probability Plot for HOURS
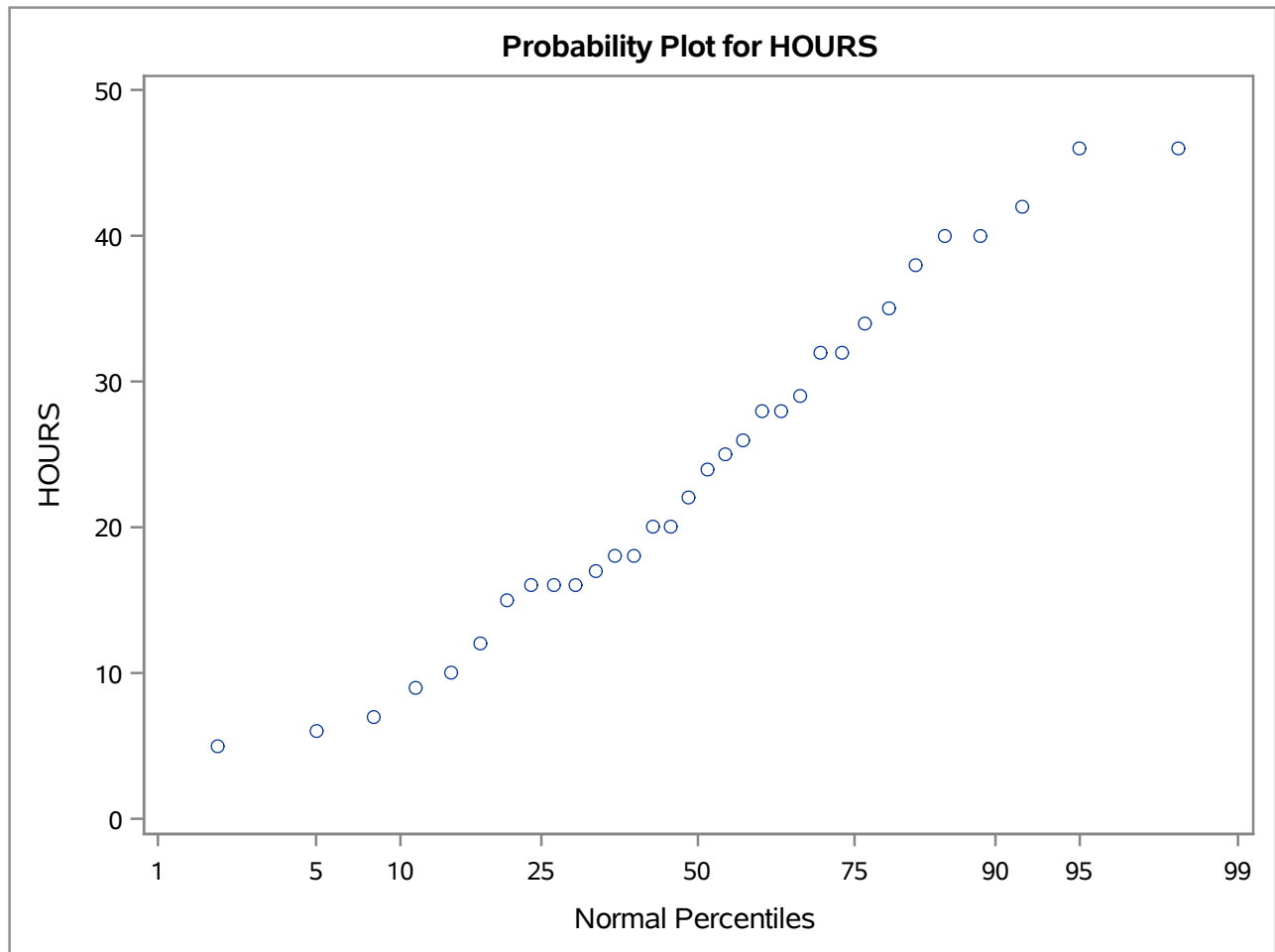
The CORR Procedure

1 With Variables:	HOURS
1 Variables:	GPA

Simple Statistics						
Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
HOURS	32	24.12500	11.88588	772.00000	5.00000	46.00000
GPA	32	3.41250	0.31699	109.20000	2.80000	4.00000

Pearson Correlation Coefficients, N = 32 Prob > |r| under H0: Rho=0	
	GPA
HOURS	0.68964 <.0001

The FREQ Procedure

YEAR	Frequency	Percent
Freshman	7	21.88
Graduate	3	9.38
Junior	5	15.63
Senior	11	34.38
Sophomore	6	18.75

MAJOR	Frequency	Percent
ART/ARCHITEKT/DESIGN	2	6.25
BUSINESS	4	12.50
CS	9	28.13
ENGINEERING	5	15.63
MATH/STAT	7	21.88
OTHERS	1	3.13
PHYSICS/CHEM/BIO	4	12.50

PERCENT of YEAR
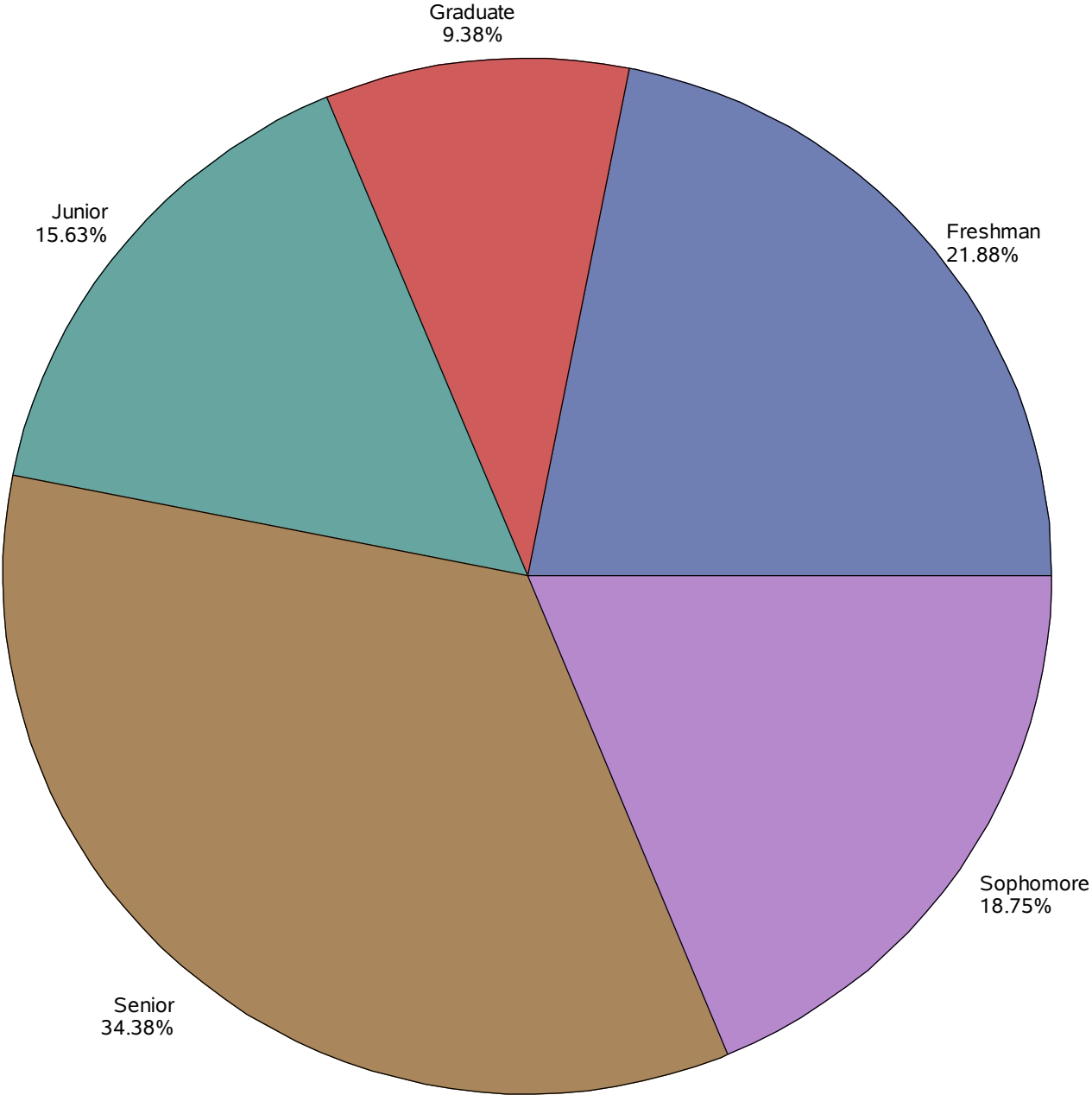
PERCENT of MAJOR
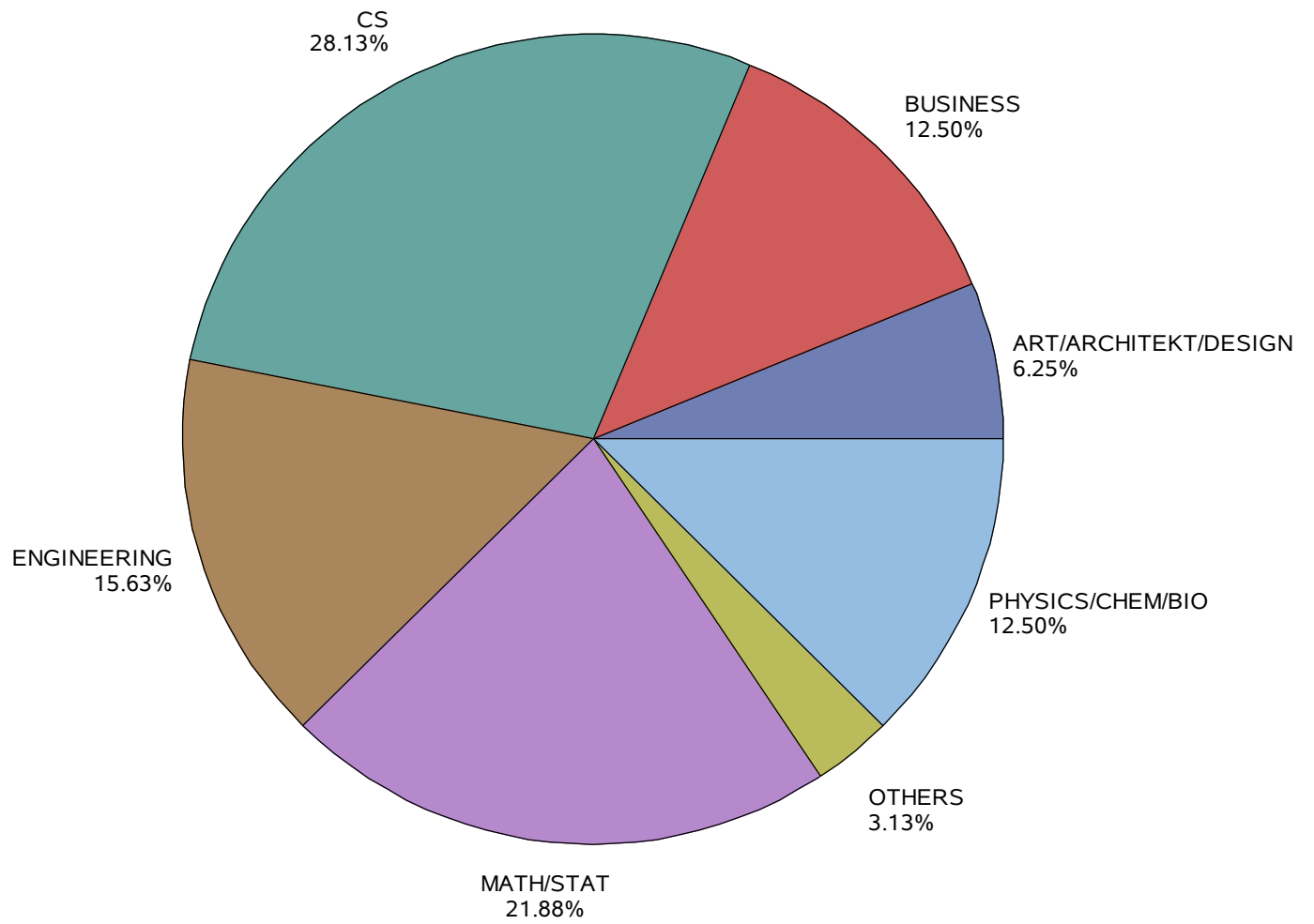
Obs	YEAR	MAJOR	GPA	HOURS
1	Freshman	CS	3.0	10
2	Freshman	BUSINESS	3.5	12
3	Sophomore	CS	3.4	26
4	Freshman	ART/ARCHITEKT/DESIGN	3.6	5
5	Freshman	MATH/STAT	3.4	15
6	Junior	CS	3.6	35
7	Junior	PHYSICS/CHEM/BIO	3.7	40
8	Sophomore	MATH/STAT	2.8	7
9	Sophomore	CS	2.9	9
10	Senior	BUSINESS	3.8	28
11	Junior	ART/ARCHITEKT/DESIGN	3.9	22
12	Graduate	BUSINESS	4.0	42
13	Senior	CS	3.2	28
14	Senior	CS	3.1	18
15	Senior	ENGINEERING	3.2	24
16	Senior	PHYSICS/CHEM/BIO	3.6	34
17	Senior	MATH/STAT	3.5	38
18	Senior	CS	3.6	40
19	Graduate	CS	3.6	46
20	Junior	BUSINESS	4.0	32
21	Freshman	ENGINEERING	2.9	6
22	Graduate	OTHERS	3.7	29
23	Senior	CS	3.3	18
24	Senior	MATH/STAT	3.2	16
25	Freshman	MATH/STAT	3.1	16
26	Sophomore	MATH/STAT	3.3	25
27	Sophomore	ENGINEERING	3.6	32
28	Senior	PHYSICS/CHEM/BIO	3.7	46
29	Senior	ENGINEERING	3.1	16
30	Junior	ENGINEERING	3.3	17
31	Freshman	MATH/STAT	3.3	20
32	Sophomore	PHYSICS/CHEM/BIO	3.3	20