Guided Project 2-3

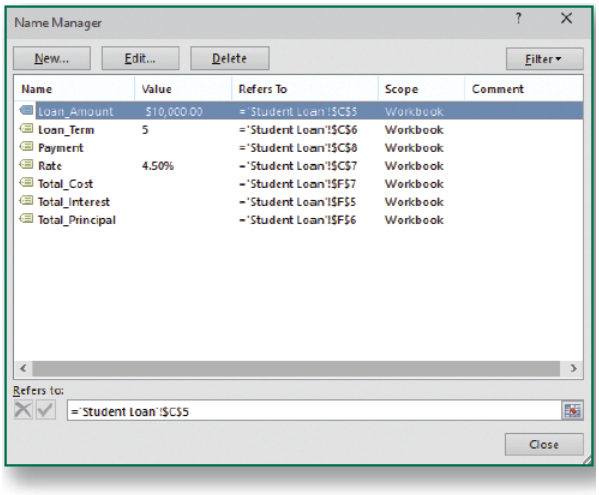
Sierra Pacific Community College District (SPCCD) consists of four individual community colleges. The workbook for this project includes an amortization schedule for student loans and a fee and credit hour summary for several departments.

Skills Covered in This Project

- Name cell ranges.
- Create and copy formulas.
- Set mathematical order of operations.
- Use absolute references in formulas.
- Insert the current date as a function.
- Use the *PMT* function.
- Audit formulas.
- Use *SUMIF* and *SUMPRODUCT*.

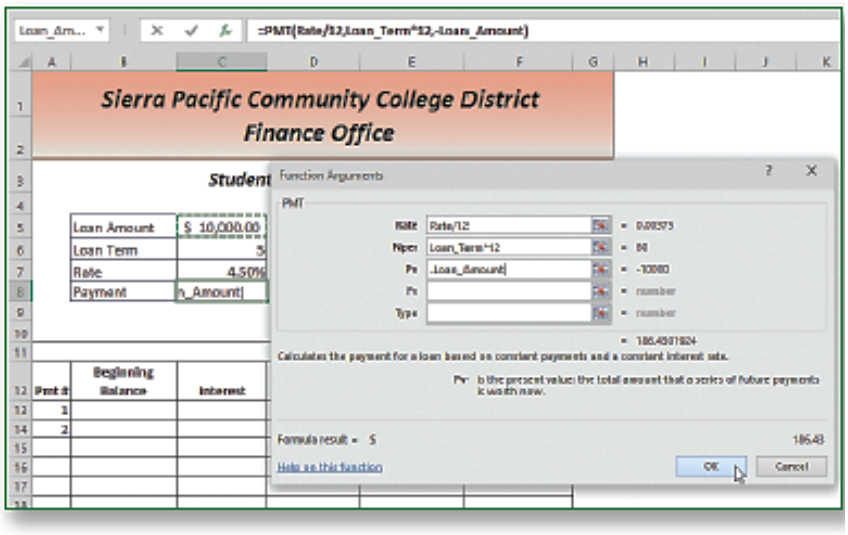
Step 1: Download start file

1. Open the ***SierraPacific-02.xlsx*** start file. If the workbook opens in *Protected View*, click the **Enable Editing** button so you can modify it. The file will be renamed automatically to include your name. Change the *project file name* if directed to do so by your instructor, and **save** it.
2. Set range names for the workbook.
   a. On the **Student Loan** sheet, select cells **B5:C8**.
   b. Click the **Create from Selection** button [*Formulas* tab, *Defined Names* group].
   c. Verify that the **Left column** box in the *Create Names from Selection* dialog box is selected.
   d. Deselect the **Top row** box if it is checked and click **OK**.
   e. Select cells **E5:F7**. Repeat steps a–d to create range names.
   f. Click the **Name Manager** button [*Formulas* tab, *Defined Names* group] to view the names in the *Name Manager* dialog box (Figure 2-90).
   g. Click **Close**.
3. Enter a *PMT* function.
   a. Select **C8**.
   b. Click the **Financial** button [*Formulas* tab, *Function Library* group] and select **PMT**.
   c. Click the **Rate** box and click cell **C7**. The range name *Rate* is substituted.
   d. Type **/12** immediately after **Rate** to divide by 12 for monthly payments.
   e. Click the **Nper** box and click cell **C6**. The substituted range name is *Loan_Term*.
   f. Type ***12** after **Loan_Term** to multiply by 12.
   g. Click the **Pv** box and type a minus sign (**–**) to set the argument as a negative amount.
   h. Click cell **C5** (*Loan_Amount*) for the *pv* argument. A negative loan amount reflects the lender's perspective, since the money is paid out now (Figure2-91)
   i. Leave the *Fv* and *Type* boxes empty.
   j. Click **OK**. The payment for a loan at this rate is $186.43, shown as a positive value.

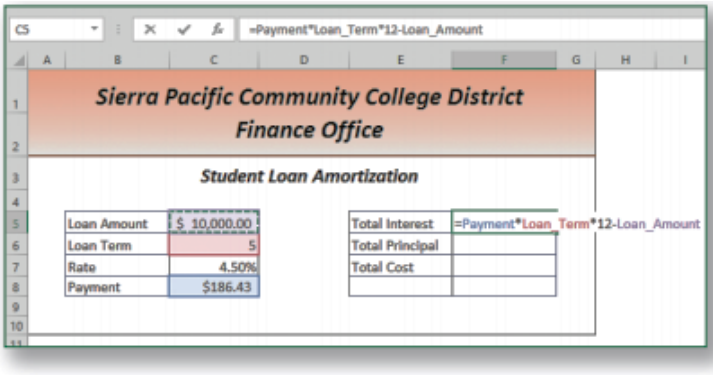


2-90 *Name Manager* dialog box

4. Create a total interest formula.
   a. Click cell **F5** (*Total_Interest*). This value is calculated by multiplying the monthly payment by the total number of payments to determine total outlay. From this amount, you subtract the loan amount.
   b. Type **=** and click cell **C8** (the *Payment*).
   c. Type ***** to multiply and click cell **C6** (*Loan_Term*).
   d. Type ***12** to multiply by 12 for monthly payments.
   e. Type − immediately after ***12** to subtract.
   f. Click cell **C5** (the *Loan_Amount*). The formula is *Payment*Loan_Term*12-Loan_Amount*. Parentheses are not required, because the multiplications are done from left to right, followed by the subtraction (Figure 2-92).
   g. Press **Enter**. The result is $1,185.81.



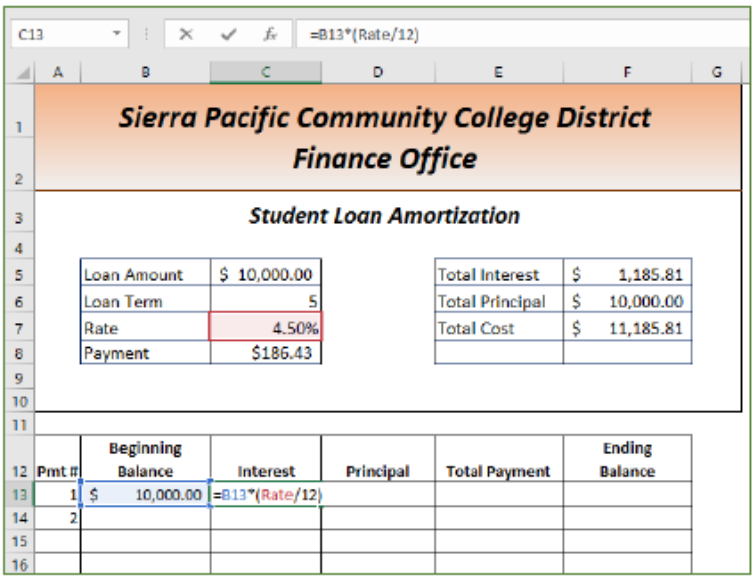
2-91 *Pv* argument is negative in the *PMT* function



2-92 Left-to-right operations

5. Create the total principal formula and the total loan cost.
   a. Select cell **F6** (*Total_Principal*). This value is calculated by multiplying the monthly payment by the total number of payments. From this amount, subtract the total interest.
   b. Type **=** and click cell **C8** (the *Payment*).
   c. Type ***** to multiply and click cell **C6** (*Loan_Term*).
   d. Type ***12** to multiply by 12 for monthly payments.
   e. Type **−** immediately after ***12** to subtract.
   f. Click cell **F5** (the *Total_Interest*). The formula is *Payment*Loan_Term*12-Total_Interest*.
   g. Press **Enter**. Total principal is the amount of the loan.
   h. Click cell **F7**, the *Total_Cost* of the loan. This is the total principal plus the total interest.
   i. Type **=**, click cell **F5**, type **+**, click cell **F6**, and then press **Enter**.
6. Build an amortization schedule.
   a. Click cell **B13**. The beginning balance is the loan amount.
   b. Type =, click cell **C5**, and press **Enter**.
   c. Format the value as **Accounting Number Format**.
   d. Select cell **C13**. The interest for each payment is calculated by multiplying the balance in column B by the rate divided by 12.

e. Type **=** and click cell **B13**.
f. Type ***(** and click cell **C7**.
g. Type **/12)**. Parentheses are necessary so that the division is done first (Figure 2-93).
h. Press **Enter** and format the results as **Accounting Number Format**.
i. Select cell **D13**. The portion of the payment that is applied to the principal is calculated by subtracting the interest portion from the payment.
j. Type **=**, click cell **C8** (the *Payment*).



2-93 The interest formula

k. Type **−**, click cell **C13**, and press **Enter**.
l. Click cell **E13**. The total payment is the interest portion plus the principal portion.
m. Type **=**, click cell **C13**, type +, click cell **D13**, and then press **Enter**. The value matches the amount in cell **C8**.
n. Select cell **F13**. The ending balance is the beginning balance minus the principal payment.
o. Type **=**, click cell **B13**, type **−**, click cell **D13**, and then press **Enter**. The ending balance is $9,851.07.

Formulas in cells B13:F13

B13	=Loan_Amount
C13	=B13*(Rate/12)
D13	=Payment-C13
E13	=C13+D13
F13	=B13-D13

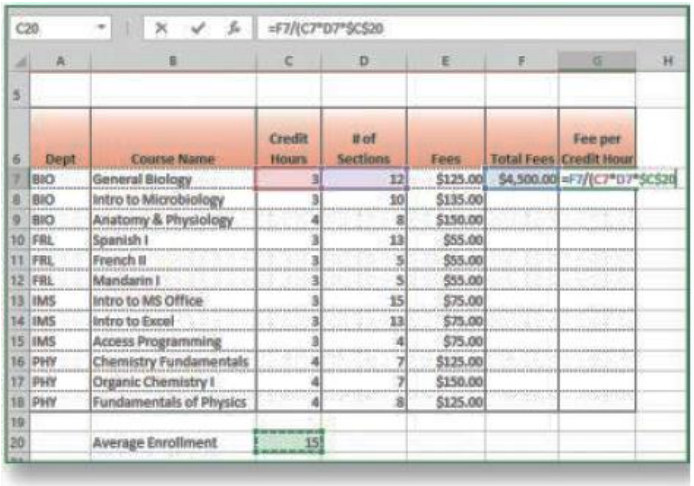
7. Fill data and copy formulas.
   a. Select cells **A13:A14**. This is a series with an increment of 1.
   b. Drag the *Fill* pointer to reach cell **A72**. This sets 60 payments for a five-year loan term.
   c. Select cell **B14**. The beginning balance for the second payment is the ending balance for the first payment.
   d. Type **=**, click cell **F13**, and press **Enter**.
   e. Double-click the *Fill* pointer for cell **B14** to fill the formula down to row **72**. The results are zero until the rest of the schedule is complete.
   f. Select cells **C13:F13**.

g. Double-click the *Fill* pointer at cell **F13**. All of the formulas are filled (copied) to row **72** (Figure2-94).
h. Scroll to see the values in row **72**. The loan balance reaches 0.
i. Press **Ctrl+Home**.

8. Build a multiplication formula and set order of mathematical operations.
   a. Click the **Fees & Credit** sheet tab and select cell **F7**. Credit hours times number of sections times the fee calculates the total fees from a course.
   b. Type **=**, click cell **C7**, type *****, click cell **D7**, type *****, click cell **E7**, and then press **Enter**. No parentheses are necessary because multiplication is done in left to right order.
   c. Select cell **G7**. Fee collected per credit hour is determined by dividing the value in cell F7 by the number of sections times credit hours times average enrollment.
   d. Type =, click cell **F7**, and type **/ (**. Parentheses are necessary so that left to right order is overridden.
   e. Click cell **C7**, type *****, and click cell **D7**.
   f. Type *****, click cell **C20**, and press **F4 (FN+F4)** to make the reference absolute (Figure 2-95).
   g. Press **Enter**. A message box notes that the closing parenthesis is missing.
   h. Click **Yes** in the message box.
   i. Select cells **F7:G7** and double-click the *Fill* pointer to copy the formulas.
   j. Format cells **F7:G18** as **Currency** and set a bottom border for cells **F18:G18**.

12	Pmt #	Beginning Balance	Interest	Principal	Total Payment	Ending Balance
13	1	$ 10,000.00	$ 37.50	$ 148.93	$ 186.43	$ 9,851.07
14	2	$ 9,851.07	$ 36.94	$ 149.49	$ 186.43	$ 9,701.58
15	3	$ 9,701.58	$ 36.38	$ 150.05	$ 186.43	$ 9,551.53
16	4	$ 9,551.53	$ 35.82	$ 150.61	$ 186.43	$ 9,400.92
17	5	$ 9,400.92	$ 35.25	$ 151.18	$ 186.43	$ 9,249.74
18	6	$ 9,249.74	$ 34.69	$ 151.74	$ 186.43	$ 9,098.00
19	7	$ 9,098.00	$ 34.12	$ 152.31	$ 186.43	$ 8,945.69
20	8	$ 8,945.69	$ 33.55	$ 152.88	$ 186.43	$ 8,792.80
21	9	$ 8,792.80	$ 32.97	$ 153.46	$ 186.43	$ 8,639.35
22	10	$ 8,639.35	$ 32.40	$ 154.03	$ 186.43	$ 8,485.31
23	11	$ 8,485.31	$ 31.82	$ 154.61	$ 186.43	$ 8,330.70
24	12	$ 8,330.70	$ 31.24	$ 155.19	$ 186.43	$ 8,175.51
25	13	$ 8,175.51	$ 30.66	$ 155.77	$ 186.43	$ 8,019.74
26	14	$ 8,019.74	$ 30.07	$ 156.36	$ 186.43	$ 7,863.38
27	15	$ 7,863.38	$ 29.49	$ 156.94	$ 186.43	$ 7,706.44
28	16	$ 7,706.44	$ 28.90	$ 157.53	$ 186.43	$ 7,548.91
60	48	$ 2,361.15	$ 8.85	$ 177.58	$ 186.43	$ 2,183.57
61	49	$ 2,183.57	$ 8.19	$ 178.24	$ 186.43	$ 2,005.33
62	50	$ 2,005.33	$ 7.52	$ 178.91	$ 186.43	$ 1,826.42
63	51	$ 1,826.42	$ 6.85	$ 179.58	$ 186.43	$ 1,646.84
64	52	$ 1,646.84	$ 6.18	$ 180.25	$ 186.43	$ 1,466.58
65	53	$ 1,466.58	$ 5.50	$ 180.93	$ 186.43	$ 1,285.65
66	54	$ 1,285.65	$ 4.82	$ 181.61	$ 186.43	$ 1,104.05
67	55	$ 1,104.05	$ 4.14	$ 182.29	$ 186.43	$ 921.76
68	56	$ 921.76	$ 3.46	$ 182.97	$ 186.43	$ 738.78
69	57	$ 738.78	$ 2.77	$ 183.66	$ 186.43	$ 555.12
70	58	$ 555.12	$ 2.08	$ 184.35	$ 186.43	$ 370.77
71	59	$ 370.77	$ 1.39	$ 185.04	$ 186.43	$ 185.73
72	60	$ 185.73	$ 0.70	$ 185.73	$ 186.43	$ 0.00

2-94 Formulas copied down columns

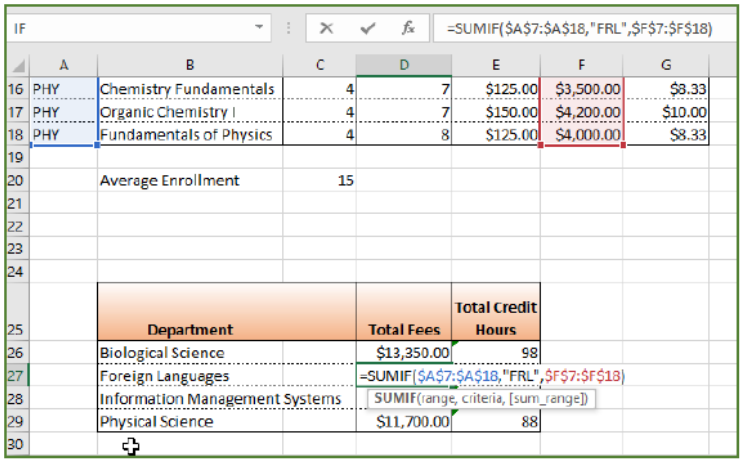


2-95 Formula to calculate fee per credit hour

9. Use *SUMIF*.
   a. Select cell **D26**. Fees by department can be calculated.
   b. Click the **Math & Trig** button [*Formulas* tab, *Function Library* group] and select **SUMIF**.

c. Click the **Range** box and select cells **A7:A18**. This range will be matched against the criteria.
d. Press **F4 (FN+F4)** to make the reference absolute.
e. Click the **Criteria** box and type **BIO**.
f. Click the **Sum_range** box, select cells **F7:F18**, and press **F4 (FN+F4)**.
g. Click **OK**. Total fees for the Biology department are 13350.
h. Format the results as **Currency**.

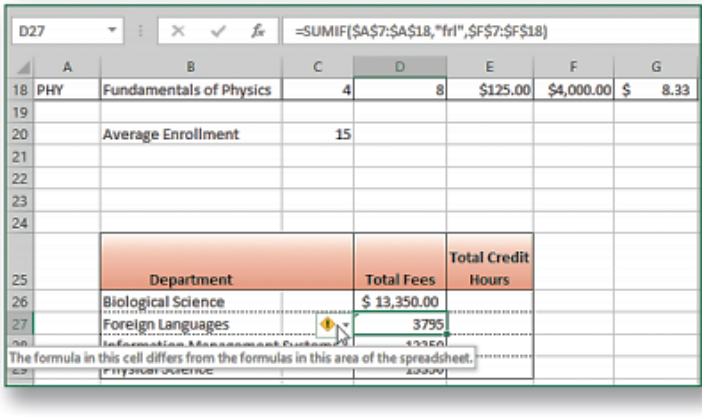
10. Copy a *SUMIF* function and check formula errors.
a. Click cell **D26** and drag its *Fill* pointer to copy the formula to cells **D27:D29** without formatting.
b. Double-click cell **D27**. You need to change the criteria.
c. Edit the criteria argument in the *Formula* bar or in the cell to display **FRL**. Do not change the quotation marks or any other punctuation (Figure 2-96).



2-96 Edit the SUMIF criteria in the cell or in the *Formula* bar

d. Press **Enter** or click the **Enter** button in the *Formula* bar. An error triangle appears in the top left corner of cell **D27**.
e. Click cell **D27** and point to its **Trace Error** button to see the *ScreenTip* (Figure 2-97). The formula has different criteria than the immediately preceding formula, but this is correct.
f. Click the **Trace Error** button and choose **Ignore Error**.
g. Double-click cell **D28** and edit the criteria argument to display **IMS**.
h. Edit the argument in cell **D29** to show the department initials.
i. Format cells **D27:D29** as **Currency**.

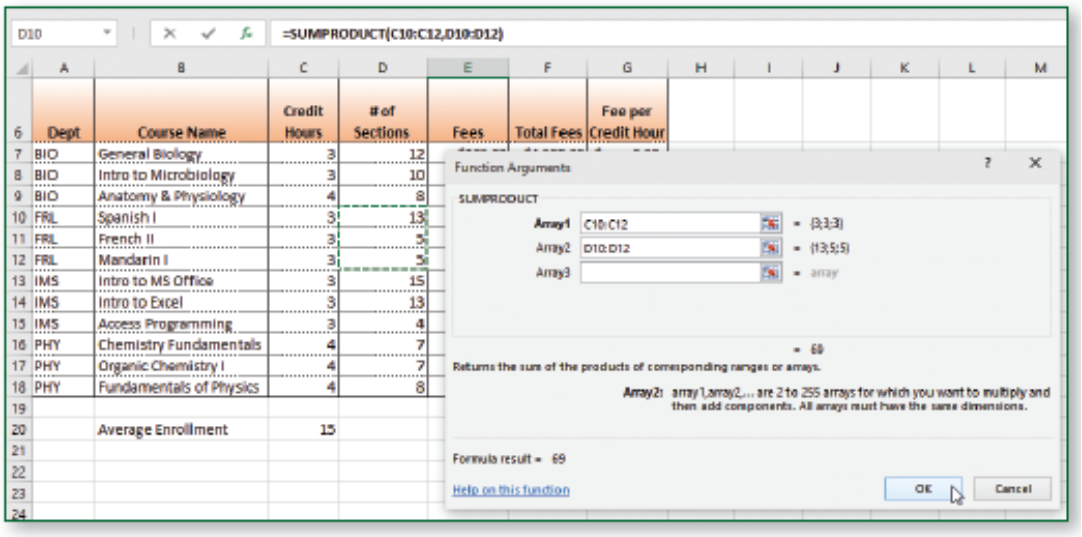
11. Use *SUMPRODUCT* and trace an error.
a. Select cell **E26** and click the **Formulas** tab.
b. Click the **Math & Trig** button in the *Function Library* group and select **SUMPRODUCT**.



2-97 *Trace Error* button and its *ScreenTip*

c. Click the **Array1** box and select cells **C7:C9**, credit hours for courses in the Biology Department.
d. Click the **Array2** box and select cells **D7:D9**, the number of sections for the Biology Department.
e. Click **OK**. The Biology Department has 98 total credit hour offerings.
f. Click cell **E26** and point to its **Trace Error** button. The formula omits adjacent cells in columns C and D, which is correct.
g. Click the **Trace Error** button and select **Ignore Error**.

12. Copy and edit *SUMPRODUCT*.
    a. Click cell **E26** and drag its *Fill* pointer to copy the formula to cells **E27:E29** without formatting.
    b. Click cell **E27** and click the **Insert Function** button in the *Formula* bar.
    c. Select and highlight the range in the *Array1* box and select cells **C10:C12**. The range you select replaces the range in the dialog box (Figure 2-98).



2-98 Replace the *ArrayN* arguments

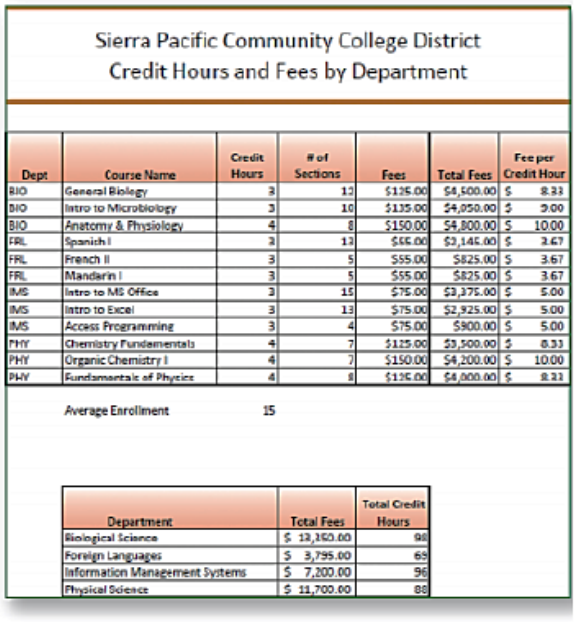
    d. Select the range in the *Array2* box and select cells **D10:D12**.
    e. Click **OK**.
    f. Edit and complete the formulas in cells **E28:E29** and ignore errors.
13. Insert the current date as a function.
    a. Select cell **G30**.
    b. Type **=to** and press **Tab** to select the function.
    c. Press **Enter**.
    d. Press **Ctrl+Home**.
14. Paste range names.
    a. Click the **New sheet** button in the sheet tab area.
    b. Name the new sheet **Range Names**. Select cell **A1**.
    c. Press **F3 (FN+F3)** to open the *Paste Name* dialog box. Or click **Use in Formula** arrow [*Formulas* tab, *Defined Names* group] and select **Paste Names…**
    d. Click the **Paste List** button.
    e. *AutoFit* each column.

Step 2 Upload & Save

15. Save and close the workbook (Figure 2-99).
16. Upload and save your project file.

Step 3 Grade my Project

17. Submit project for grading.



Sierra Pacific Community College District
Credit Hours and Fees by Department

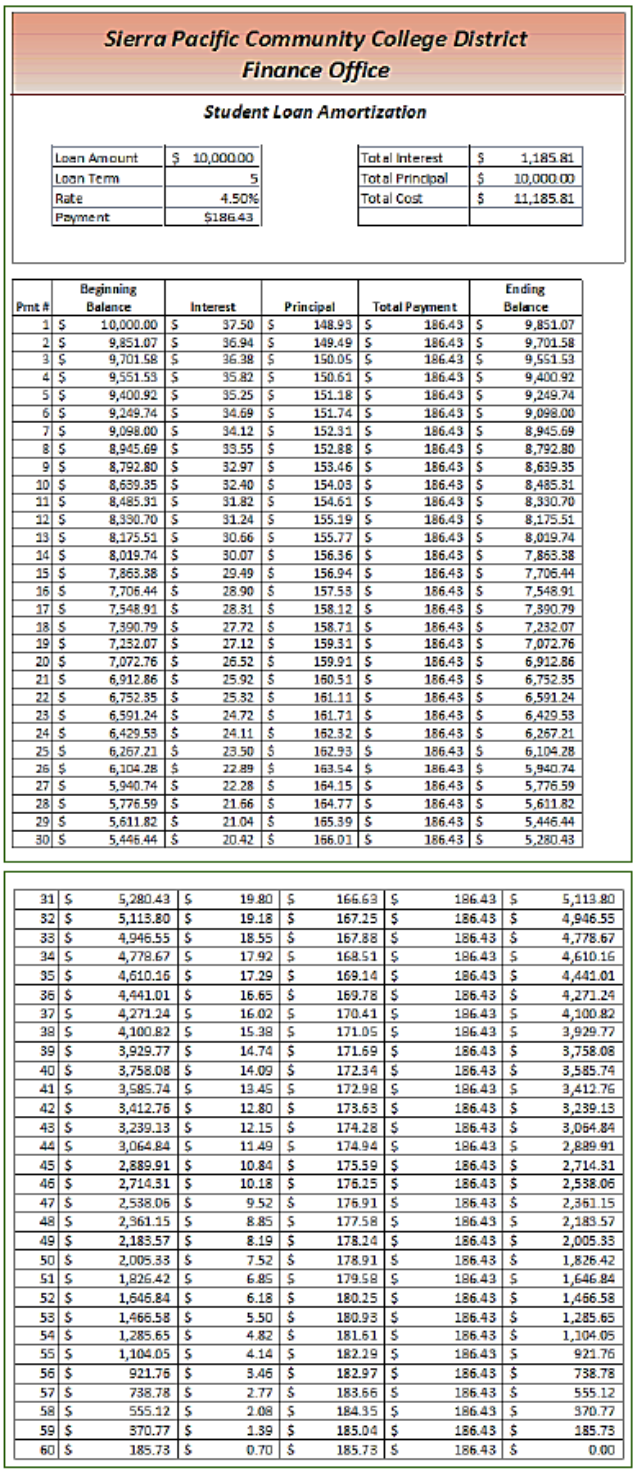
Dept	Course Name	Credit Hours	# of Sections	Fees	Total Fees	Fee per Credit Hour
BIO	General Biology	3	12	$125.00	$4,500.00	$ 8.33
BIO	Intro to Microbiology	3	10	$135.00	$4,050.00	$ 9.00
BIO	Anatomy & Physiology	4	8	$150.00	$4,800.00	$ 10.00
FRL	Spanish I	3	13	$65.00	$3,145.00	$ 3.67
FRL	French II	3	5	$55.00	$825.00	$ 3.67
FRL	Mandarin I	3	5	$55.00	$825.00	$ 3.67
IMS	Intro to MS Office	3	15	$75.00	$3,375.00	$ 5.00
IMS	Intro to Excel	3	13	$75.00	$2,925.00	$ 5.00
IMS	Access Programming	3	4	$75.00	$900.00	$ 5.00
PHY	Chemistry Fundamentals	4	7	$125.00	$3,500.00	$ 8.33
PHY	Organic Chemistry I	4	7	$150.00	$4,200.00	$ 10.00
PHY	Fundamentals of Physics	4	8	$125.00	$4,000.00	$ 8.33

Average Enrollment 15

Department	Total Fees	Total Credit Hours
Biological Science	$ 12,160.00	98
Foreign Languages	$ 3,795.00	69
Information Management Systems	$ 7,200.00	96
Physical Science	$ 11,700.00	88

Loan_Amount	='Student Loan'!$C$5
Loan_Term	='Student Loan'!$C$6
Payment	='Student Loan'!$C$8
Rate	='Student Loan'!$C$7
Total_Cost	='Student Loan'!$F$7
Total_Interest	='Student Loan'!$F$5
Total_Principal	='Student Loan'!$F$6

2-99 Completed Excel 2-3



Sierra Pacific Community College District
Finance Office

Student Loan Amortization

Loan Amount	$ 10,000.00
Loan Term	5
Rate	4.50%
Payment	$186.43

Total Interest	$ 1,185.81
Total Principal	$ 10,000.00
Total Cost	$ 11,185.81

Pmt #	Beginning Balance	Interest	Principal	Total Payment	Ending Balance
1	$ 10,000.00	$ 37.50	$ 148.93	$ 186.43	$ 9,851.07
2	$ 9,851.07	$ 36.94	$ 149.49	$ 186.43	$ 9,701.58
3	$ 9,701.58	$ 36.38	$ 150.05	$ 186.43	$ 9,551.53
4	$ 9,551.53	$ 35.82	$ 150.61	$ 186.43	$ 9,400.92
5	$ 9,400.92	$ 35.25	$ 151.18	$ 186.43	$ 9,249.74
6	$ 9,249.74	$ 34.69	$ 151.74	$ 186.43	$ 9,098.00
7	$ 9,098.00	$ 34.12	$ 152.31	$ 186.43	$ 8,945.69
8	$ 8,945.69	$ 33.55	$ 152.88	$ 186.43	$ 8,792.80
9	$ 8,792.80	$ 32.97	$ 153.46	$ 186.43	$ 8,639.35
10	$ 8,639.35	$ 32.40	$ 154.03	$ 186.43	$ 8,485.31
11	$ 8,485.31	$ 31.82	$ 154.61	$ 186.43	$ 8,330.70
12	$ 8,330.70	$ 31.24	$ 155.19	$ 186.43	$ 8,175.51
13	$ 8,175.51	$ 30.66	$ 155.77	$ 186.43	$ 8,019.74
14	$ 8,019.74	$ 30.07	$ 156.36	$ 186.43	$ 7,863.38
15	$ 7,863.38	$ 29.49	$ 156.94	$ 186.43	$ 7,706.44
16	$ 7,706.44	$ 28.90	$ 157.53	$ 186.43	$ 7,548.91
17	$ 7,548.91	$ 28.31	$ 158.12	$ 186.43	$ 7,390.79
18	$ 7,390.79	$ 27.72	$ 158.71	$ 186.43	$ 7,232.07
19	$ 7,232.07	$ 27.12	$ 159.31	$ 186.43	$ 7,072.76
20	$ 7,072.76	$ 26.52	$ 159.91	$ 186.43	$ 6,912.86
21	$ 6,912.86	$ 25.92	$ 160.51	$ 186.43	$ 6,752.35
22	$ 6,752.35	$ 25.32	$ 161.11	$ 186.43	$ 6,591.24
23	$ 6,591.24	$ 24.72	$ 161.71	$ 186.43	$ 6,429.53
24	$ 6,429.53	$ 24.11	$ 162.32	$ 186.43	$ 6,267.21
25	$ 6,267.21	$ 23.50	$ 162.93	$ 186.43	$ 6,104.28
26	$ 6,104.28	$ 22.89	$ 163.54	$ 186.43	$ 5,940.74
27	$ 5,940.74	$ 22.28	$ 164.15	$ 186.43	$ 5,776.59
28	$ 5,776.59	$ 21.66	$ 164.77	$ 186.43	$ 5,611.82
29	$ 5,611.82	$ 21.04	$ 165.39	$ 186.43	$ 5,446.44
30	$ 5,446.44	$ 20.42	$ 166.01	$ 186.43	$ 5,280.43
31	$ 5,280.43	$ 19.80	$ 166.63	$ 186.43	$ 5,113.80
32	$ 5,113.80	$ 19.18	$ 167.25	$ 186.43	$ 4,946.55
33	$ 4,946.55	$ 18.55	$ 167.88	$ 186.43	$ 4,778.67
34	$ 4,778.67	$ 17.92	$ 168.51	$ 186.43	$ 4,610.16
35	$ 4,610.16	$ 17.29	$ 169.14	$ 186.43	$ 4,441.01
36	$ 4,441.01	$ 16.65	$ 169.78	$ 186.43	$ 4,271.24
37	$ 4,271.24	$ 16.02	$ 170.41	$ 186.43	$ 4,100.82
38	$ 4,100.82	$ 15.38	$ 171.05	$ 186.43	$ 3,929.77
39	$ 3,929.77	$ 14.74	$ 171.69	$ 186.43	$ 3,758.08
40	$ 3,758.08	$ 14.09	$ 172.34	$ 186.43	$ 3,585.74
41	$ 3,585.74	$ 13.45	$ 172.98	$ 186.43	$ 3,412.76
42	$ 3,412.76	$ 12.80	$ 173.63	$ 186.43	$ 3,239.13
43	$ 3,239.13	$ 12.15	$ 174.28	$ 186.43	$ 3,064.84
44	$ 3,064.84	$ 11.49	$ 174.94	$ 186.43	$ 2,889.91
45	$ 2,889.91	$ 10.84	$ 175.59	$ 186.43	$ 2,714.31
46	$ 2,714.31	$ 10.18	$ 176.25	$ 186.43	$ 2,538.06
47	$ 2,538.06	$ 9.52	$ 176.91	$ 186.43	$ 2,361.15
48	$ 2,361.15	$ 8.85	$ 177.58	$ 186.43	$ 2,183.57
49	$ 2,183.57	$ 8.19	$ 178.24	$ 186.43	$ 2,005.33
50	$ 2,005.33	$ 7.52	$ 178.91	$ 186.43	$ 1,826.42
51	$ 1,826.42	$ 6.85	$ 179.58	$ 186.43	$ 1,646.84
52	$ 1,646.84	$ 6.18	$ 180.25	$ 186.43	$ 1,466.58
53	$ 1,466.58	$ 5.50	$ 180.93	$ 186.43	$ 1,285.65
54	$ 1,285.65	$ 4.82	$ 181.61	$ 186.43	$ 1,104.05
55	$ 1,104.05	$ 4.14	$ 182.29	$ 186.43	$ 921.76
56	$ 921.76	$ 3.46	$ 182.97	$ 186.43	$ 738.78
57	$ 738.78	$ 2.77	$ 183.66	$ 186.43	$ 555.12
58	$ 555.12	$ 2.08	$ 184.35	$ 186.43	$ 370.77
59	$ 370.77	$ 1.39	$ 185.04	$ 186.43	$ 185.73
60	$ 185.73	$ 0.70	$ 185.73	$ 186.43	$ 0.00