COURSE: MAE3145 Orbital Mechanics and Space Dynamics,   SECTION: 10,   **Fall 2016**

INSTRUCTOR: Taeyoung Lee

Instructor Course Outcome Assessment Form

PART 1

Place a check mark next to the correct number.[1]
Please return the survey to the MAE Department Office after completing the course.

1. Students showed the knowledge expected from the prerequisites
    1__   2__   3__   4_x_   5__

2. The prerequisites to the course were sufficient and appropriate
    1__   2__   3__   4_x_   5__

3. All the topics specified in the course outline handed out were taught
    1__   2__   3__   4__   5_x_

4. The course learning objectives were the same as when last taught
    1__   2__   3__   4__   5_x_

5. The classroom and laboratory facilities were adequate
    1__   2__   3__   4_x_   5___

6. The students were actively engaged in the class (they asked questions, etc.)
    1__   2__   3__   4__   5_x_

7. What was the average attendance?
    (0-20%)   1__   2__   3__   4__   5_x_   (80-100%)

For answers with a score of 3 or below, please provide the question number and an explanation below:

---

[1] Please provide assessment on a scale for from 1 to 5, where, in response to the statement given, 1=strongly disagree, 2= disagree, 3=neither, 4= agree, 5= strongly agree.

PART 2

A) Please complete Table 1, providing:

Table 1. Summary of course learning objectives assessment[2]

	CLO (Course Learning Objective)	Direct Assessment (instructor)	Indirect Assessment (student)	ABET a-k
1	Explain the Newtonian gravitational force and gravitational potential between particles	4.5	4.4	a
2	Analyze the characteristics of circular, elliptic, parabolic and hyperbolic orbits in a two-dimensional plane	4.1	4.5	e
3	Describe the geometry of an orbit in a three-dimensional space from orbital elements	3.8	4.5	e
4	Find an orbital position as a function of time	4.2	4.4	e
5	Design the required velocity change for impulsive orbital maneuvers	4.0	4.5	e,c
6	Apply the method of patched conics for interplanetary spacecraft missions	4.5	4.3	e
7	Describe the feasible solutions of the circular restricted three-body problem	3.8	4.4	e
8	Use Matlab, STK for numerical orbital analyses	4.5	4	k

B) Please provide recommendations for course improvement (if any).

The direct assessments for CLO3 and CLO7 are relatively low.

CLO3 deals with the geometric properties of three-dimensional orbits, and students had difficulties in visualizing orbits in the three-dimensional space. In the next year, various examples for 3D orbits will be visualized in class with Matlab and STK.

The direct assessment for CLO7 has been improved over the last few years, but it is still relatively low compared with other CLOs. The instructor has made several improvements

---

[2] Please provide assessment on a scale for from 1 to 5, where, in response to the statement "the course learning objective was accomplished", 1=strongly disagree, 2= disagree, 3=neither, 4= agree, 5= strongly agree.

regarding CLO7. For example, the mathematical derivation of the equations of motion have been reduced, and it is explained trough more concrete example. A new handout for CLO7 is provided in this year. The efforts to make the materials of CLO7 more accessible will be continued through the next year. In particular, various orbits for the three-body problem will be demonstrated by using Matlab.

C) Please provide status of prior recommendations (if applicable)

The direct assessment for CLO7 was relatively low (3.8), which remains unchanged in this year. As discussed above, the new development for this year includes additional handout and extended discussion on examples. In the next year, additional numerical orbital analysis will be provided with Matlab to help students visualizing the complicated orbits in the three-body problem.

| | HW1 | HW2 | | | HW3 | | | | HW4 | | | HW5 | | |
	Q1	Q1	Q2	Q3	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q1	Q2	Q3
CLO	1,8	2	2	2	4	4	3,8	3	5	8	5	5	5,8	6
Possible Points	35	8	10	8	8	8	15	9	9	12	21	15	18	9
#1	35	7	9	4	8	7	15	6	8	10	20	9	17	9
#2	35	8	10	7	8	8	6	7	0	12	21	15	17	9
#3	35	8	10	8	8	7	12	8	9	12	21	13	16	9
#4	35	8	10	6	8	8	15	9	9	12	21	15	18	9
#5	35	8	10	7	8	8	13	9	9	12	21	15	17	9
#6	35	8	10	8	8	8	15	8	8	12	21	14	18	9
#7	35	8	10	7	8	8	15	8	8	12	19	15	16	9
#8	35	8	10	7	8	8	15	9	8	12	19	15	15	9
#9	35	0	0	0	0	0	0	0	8	0	7	0	0	0
#10	35	8	10	7	6	6	10	0	7	12	21	14	18	9
#11	35	8	10	8	8	7	14	8	9	12	21	15	17	9
#12	35	7	10	5	7	8	12	7	9	12	20	9	16	9
#13	35	8	10	7	8	8	4	4	8	12	20	14	17	9
#14	35	8	10	8	8	8	14	8	9	12	21	15	17	9
#15	35	7	8	8	8	8	9	8	6	10	21	15	17	9
#16	35	7	8	8	8	7	14	5	8	12	19	15	17	9
#17	35	8	10	7	8	8	14	8	9	12	21	11	16	9
#18	35	8	10	6	8	8	15	8	9	12	21	14	18	9
#19	35	8	10	8	8	8	15	8	8	12	21	15	17	9
#20	35	7	10	8	8	7	13	8	8	12	21	15	17	9
#21	35	8	10	8	8	7	15	8	9	12	21	15	17	9
#22	35	8	10	8	8	7	14	9	9	12	21	15	17	9
#23	35	8	10	7	8	8	15	8	9	12	21	15	17	9
#24	35	8	10	8	8	8	15	8	9	12	21	14	17	9
#25	35	0	0	0	0	0	0	0	0	12	0	15	18	9
#26	35	8	10	8	7	2	6	3	8	12	13	8	5	9
Weighed Average	**5**	4.5	4.5	4.2	4.5	4.3	**3.9**	3.7	4.3	**4.7**	4.5	4.4	4.4	4.8

| | HW6 | | | Midterm | | | | | Final | | | | |
	Q1	Q2	Q3	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
CLO	6	6	6	2,3	1,2	2	2,4	3	5,6	4,5	3,5	6	7
Possible Points	8	10	12	15	12	12	16	15	20	15	20	15	10
#1	6	8	10	15	9	9	12	13	8	14	11	13	9
#2	8	9	11	15	2	7	12	10	11	10	15	13	2
#3	7	10	12	15	6	3	14	12	4	11	7	13	9
#4	7	10	11	12	9	5	10	9	11	6	11	10	8
#5	8	10	12	12	9	3	16	7	16	12	10	12	8

#6	8	10	11	15	12	10	11	15	16	15	20	15	9
#7	7	9	11	15	10	6	14	10	12	15	17	15	6
#8	7	9	11	15	7	8	11	13	4	15	17	10	8
#9	0	0	0	15	9	4	9	10	4	7	2	8	8
#10	6	9	10	6	4	6	7	15	16	15	6	15	9
#11	7	9	11	7	10	3	9	15	16	15	12	13	8
#12	6	9	11	9	8	5	12	8	8	11	16	11	8
#13	7	9	11	12	12	4	13	9	12	15	14	12	8
#14	7	10	12	15	12	3	16	14	20	15	13	15	9
#15	7	9	11	15	8	10	11	12	20	6	6	9	7
#16	7	9	11	15	12	5	12	12	16	15	18	11	9
#17	8	9	11	15	12	12	16	13	12	15	19	11	5
#18	7	10	12	12	12	10	16	15	20	15	20	13	10
#19	7	10	11	15	12	12	16	13	15	14	16	15	9
#20	7	9	11	15	7	10	13	11	12	11	1	15	8
#21	7	9	11	15	12	7	9	13	12	15	17	15	8
#22	7	9	11	15	7	11	15	15	7	13	16	13	7
#23	8	10	11	15	10	11	16	15	15	15	20	15	9
#24	7	9	12	15	12	11	13	14	16	12	15	15	6
#25	7	9	10	6	9	5	16	10	12	7	4	13	6
#26	7	9	10	12	12	8	16	15	8	11	13	11	7
Weighed Average	4.3	4.5	4.4	4.4	3.9	3	4	4.1	3.1	4.2	3.2	4.2	3.8

CLO	Average
CLO1	4.5
CLO2	4.1
CLO3	3.8
CLO4	4.2
CLO5	4.0
CLO6	4.5
CLO7	3.8
CLO8	4.5

The assessment values were determined by finding the average score of the related questions. For example, questions related to CLO8 are marked by bold face font at the above table, and their averaged values are computed as follows:

CLO8=(5+3.9+4.7)/3=4.5

The assessment values of other CLOs were determined similarly by using the EXCEL function, averageif.