*1. Course number and name*

 **ENGR 295: Design Methodology**

*2. Credits, contact hours, and categorization of credits in Table 5-1 (math and basic science, engineering topic, and/or other).*
1 credit; one 50-minute lecture per week; engineering and the theories of design.

*3. Instructor’s or course coordinator’s name*

 Dipendra K. Sinha

*4. Text book, title, author, and year*

 No required texts.

 *a. other supplemental materials*

 Supplemental online content (animations, videos, web-based tools, etc.) delivered via course webpage

1. Design Thinking & Creativity (Moses Myth):

<https://video-alexanderstreet-com.jpllnet.sfsu.edu/watch/what-is-design-thinking?utm_campaign=Video&utm_medium=MARC&utm_source=aspresolver>

1. Itirative Nature Of Design Process (Video):

[Designer Case Studies - Video - Films On Demand (sfsu.edu)](https://fod-infobase-com.jpllnet.sfsu.edu/p_ViewVideo.aspx?xtid=129064)

1. Design In Civil Engineering:

<https://fod-infobase-com.jpllnet.sfsu.edu/p_ViewVideo.aspx?xtid=155103>

1. Urge To Innovate:

<https://fod-infobase-com.jpllnet.sfsu.edu/p_ViewVideo.aspx?xtid=117868>

1. Green Design:

<https://video-alexanderstreet-com.jpllnet.sfsu.edu/watch/green-design-2?utm_campaign=Video&utm_medium=MARC&utm_source=aspresolver>

1. Product Development:- (visualization and thinking)

[**https://video-alexanderstreet-com.jpllnet.sfsu.edu/watch/design-tool-visualization?context=channel:university-of-virginia-darden**](https://video-alexanderstreet-com.jpllnet.sfsu.edu/watch/design-tool-visualization?context=channel:university-of-virginia-darden)<https://video-alexanderstreet-com.jpllnet.sfsu.edu/watch/design-thinking?context=channel:60-minutes>

1. Brain Storming: (the beginning of Design Methodology)

<https://video-alexanderstreet-com.jpllnet.sfsu.edu/watch/step-eight-brainstorming?context=channel:university-of-virginia-darden>

1. Cradle To Grave:

<https://ilearn.sfsu.edu/ay2122/mod/lesson/view.php?id=100456>

1. Taguchi Method Of Robust Design:

<https://www.youtube.com/watch?v=x6dMpEFAyBI>

*Recommended Reading (optional):*

1. Madhavan, Guru,**Applied Minds: How Engineers Think**,W.W.Norton & Co. (2015)
2. Howell, Steven K**., Enginering Design and Problem Solving,** Prentice Hall (2002)
3. Pahl, G and W. Beitz, **Engineering Design,**Springer-Verlag
4. Cross, Nigel, **Engineering Design Methods,** John Wiley & Son
5. Dym, Clive C., Patrick Little, **Engineering Design,** John Wiley and Sons. Inc. (2004)
6. Pugh, Stuart, **Total Design,**  Addison Wesley Publishing Co. (1991)
7. Lewis, L. and Andrew Samuel, **Engineering Design**, Prentice hall (1998)
8. Petroski,Henry, **To Engineer is Human**: The Role of Failure in Successful Design, Vintage Book (Random House,Inc.), New York (1992)

*5. Specific course information*

*a. brief description of the content of the course (catalog description)*

Systematic methods for the design of engineering systems. Strategies to resolve technical and non-technical issues in engineering design. (Plus-minus letter grade only)

 *b. prerequisites or co-requisites*

Restricted to Engineering students with sophomore standing or above.

*c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*

 Elective for Mechanical Engineering program.

*6. Specific goals for the course*

*a. specific outcomes of instruction (e.g. The student will be able to explain the significance of current research about a particular topic.)*

* The student will understand the iterative nature of engineering design process,
* The student will learn from specific examples role of creativity in product development,
* The student will see the art of improvisation and problem solving,
* Students will learn to work in groups and the art of delegation.

*b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.*

ABET student outcomes: 1, 2, 5

*7. Brief list of topics to be covered*

* Engineering problem solving
* Solving Engineering Analysis Problems
* The Design Process
* Communicating Solutions
* Scheduling and Planning a Design Project