

# San José State University, College of Engineering

## BME 299, Master's Thesis, Fall 2018

### Course and Contact Information

<b>Instructor:</b>	Dr. Mindy Simon
<b>Office Location:</b>	E 233
<b>Email:</b>	melinda.simon@sjsu.edu
<b>Office Hours:</b>	TBD
<b>Class Days/Time:</b>	TBD
<b>Classroom:</b>	TBD
<b>Prerequisites:</b>	<b>Admission to candidacy, BME 291, BME 298</b>

### Course Format (Delete if not applicable)

BME 299 meets several times during the semester to cover material required for the student to complete their final thesis. This includes final oral and written defense requirements and regular progress reports. Students will need to meet with their SJSU research advisor on a regular basis to ensure satisfactory progress on thesis milestones.

### Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the Canvas learning management system course website. You are responsible for regularly checking announcements posted on Canvas or email messages sent out through Canvas to learn of any updates.

### Course Description

Upon completion of BME 291, all BME Master's students must enroll in 2 units of BME 298. Student pursuing a thesis must then enroll in an additional 3 units of BME 299. All BME Master's students who have completed BME 291 must be registered for at least 1 unit of BME 298 or 299 or UNVS 1290R for each semester (excluding summer and winter) until they finish their thesis. UNVS 1290R is a special course with reduced tuition-type fees as described in the ["RP Policy" Continuous Enrollment Guidelines](http://www.sjsu.edu/gup/gradstudies/policy/rpguidelines) at <http://www.sjsu.edu/gup/gradstudies/policy/rpguidelines>.

Concurrent enrollment in BME 291 and 298 or 298 and 299 is allowed under specific circumstances. Concurrent enrollment requires the permission of both your department and your thesis advisor. There is a financial risk to co-enrollment. Failing to complete your thesis within the bounds of the semester will result in a *no credit* (NC) grade for the second class in the series. For instance, a student co-enrolled in 298 and 299 who fails to complete their thesis before the end of the semester but otherwise completes the requirements of 298 will receive a grade of *report pending* RP in 298 and NC in 299. Additional information regarding available grades is discussed in the Grading Policy section.

## Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

1. **deliver** a professional written report;
2. **demonstrate** a level of writing quality and technical analysis suitable for publication (whether or not the focus is original enough to be published);
3. **communicate** effectively in oral format;
4. **relate** their thesis to work reported in the literature
5. **defend** their experimental results based on established and accepted engineering, science and statistical principles;
6. **demonstrate** awareness of the global impact of their work on society, including the ethical, environmental, and economic impact of their work.

## Required Texts/Readings

None.

## Library Liaison

Anamika Megwalu

Phone: (408) 808-2089

Email: [anamika.megwalu@sjsu.edu](mailto:anamika.megwalu@sjsu.edu)

## Course Requirements and Assignments

Students must complete the following to receive a grade of RP or CR for each semester you are registered:

- a) Submit monthly status updates to the primary SJSU research advisor in the form of a powerpoint presentation. Presentations must be submitted to the advisor at least one full week prior to the presentation date and must be approved before the student is allowed to present. An email from the advisor to the instructor stating their approval will satisfy this requirement.
- b) Submit a file with the presentation slides to Canvas, 24 hours prior to your presentation date and time. (Emailing the instructor the presentation is not acceptable.)
- c) Deliver a monthly status update presentation to the class. The presentation must be reviewed and accepted by the primary advisor prior to presenting. The advisor must email his or her approval to the course instructor. It is the student's responsibility to obtain this permission. Unless extenuating circumstances are present, **students will not be allowed to present unless their advisor has approved the presentation.**
- d) Fully attend all class sessions. Make-up presentations will be allowed under emergency situations only and at the discretion of the instructor.
- e) Provide feedback on classmates' presentations in written/oral format, as requested.

Once confirmation has been received that you have completed the experimental portion of your master's thesis, you no longer need to attend BME 299. Confirmation will need to be provided to the instructor from the student's primary advisor before you will be excused from the remaining classes. In some circumstances, your advisor may require you to continue attending class even after you have completed your experimental work. Your advisor has the final say in this matter and the class instructor will honor their request.

Students who submit less than 90% of the class assignments will receive a NC in the class and will need to repeat the class in a subsequent semester. Similarly, failing to attend any of the class sessions without express permission from the instructor, failing to present or any of the other bulleted items above may result in a grade of NC.

If you receive a grade of RP, you will need a department official to change your grade once you complete your thesis. You will need to contact BME program's graduate student advisor.

“Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.”

### ***Status update presentations***

Status update presentations must be succinct. On all but the first presentation date, you will have a maximum of five minutes to deliver your presentation. Make sure to include the following in each:

- The title of your thesis, your name, program of study, and primary advisor's name
- One slide that briefly discusses the scope of your thesis. This is very high level and is intended only to remind the audience of what you are doing. It is recommended to avoid *walls-of-text* and limit this slide to 30 seconds of speech, maximum.
- Provide a status update on your work since your last presentation. This should be the bulk of your brief presentation.
- One slide indicating your action items for the next month.
- A Gantt chart showing your milestones from the start of the current semester through your anticipated completion date. Do not include information from BME 291 unless you are taking it concurrently with BME 299.

Your first presentation will be slightly different from the rest and will be discussed on the first day of class. Your advisor's approval is not required for this presentation.

### ***Committee Members***

Per BCME and University guidelines, the official Reading Committee for thesis students must include at least one BCME tenured or tenure-track faculty member, a second SJSU faculty member who can be tenured/tenure track or temporary, and a third member who can be another faculty, tenured/tenure track or temporary, an industrial representative who has a Ph.D. or is a senior level manager. If the work is being sponsored off-site, then the Reading Committee must include a senior representative from the company/agency sponsoring the work. Reading Committee membership may change between the proposal defense and the thesis defense provided that the Reading Committee members from the required categories are represented.

### ***Final Written Report***

Thesis students must both submit final written reports. Thesis reports must follow the BCME thesis guidelines. The thesis report must also follow the SJSU thesis guidelines. These are available on the BCME graduate advising website. Students should be in frequent contact with your primary SJSU research advisor throughout the writing of the report. Contact your committee members at least one month before your anticipated date of the defense to schedule the date and update them on your thesis. A final draft following SJSU and BCME Thesis Guidelines and that has been proofread to remove all formatting, referencing, grammar and spelling errors needs to be delivered to your primary SJSU research advisor at least 3 weeks before the intended oral defense date. Depending on the structure of the report, quality of writing, and technical analysis, some drafts may require extra time before a defense is allowed. A copy of your final draft is due to the remaining committee members at least one week before your oral defense date. An Executive Summary must also be attached to your report. If you do not submit the required written report to your committee on time, your final oral defense may be canceled. For thesis students, the APPROVED final report is due mid-semester to graduate

studies. For the exact due date, see graduate studies website. The final thesis report must be uploaded to Turnitin.com and reviewed by your primary SJSU research advisor. Your advisor will sign off on the review of this at your oral defense. All Reading Committee members should be provided a bound copy of the thesis after it has been bound by Graduate Studies or a corrected copy of the thesis report.

### ***Final Oral Defense***

Thesis students must have an oral defense. The defense date should be scheduled at least two weeks prior to the **semester due date** of the final written report. This means a complete final **draft** with minimal errors of any type (editing, formatting, grammar, spelling) must be submitted to your SJSU research advisor at least six weeks before the final report due date. The SJSU Research Advisors will not schedule a defense date until they approve the final draft of the complete thesis report. **If you do not allow enough time to make corrections you will not be able to defend in the current semester.**

An oral defense will last typically last an hour or more. You should plan to speak for approximately 30 to 45 minutes, with the balance of time for questions. The defense must utilize professional presentation software such as Power Point including the guidelines presented in BME 291. The committee members **shall be provided hard copies of the slides at the presentation.** The included rubric will be used by the committee members during the oral defense.

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) at <http://www.sjsu.edu/senate/docs/F69-24.pdf> states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

### **Classroom Protocol**

#### ***Attendance and arrival times***

Students are expected to be set up for lecture by the time the class begins. Attendance in class is not mandatory and shall not be used per se as a criterion for grading. However, class attendance and participation are highly recommended.

#### ***Behavior***

Students should remain respectful of each other at all times. Interruptive or disruptive attitudes are discouraged. While in the classroom, the use of electronic devices (laptops, tablets, smartphones) should be limited to activities closely related to the learning objectives. While in the classroom, electronic devices should not be used for personal communication, included messaging and use of social media. All cell phones must be silenced prior to entering the classroom.

#### ***Assignments***

Students are encouraged to collaborate on all types of assignments. However, lecture-based assignments must be individually prepared and submitted by each student.

#### ***Safety***

Students should familiarize themselves with all emergency exits and evacuation plans. Especially since class concludes in the evening, when departing the building, students should be aware of their surroundings, and carry a cell phone.

## **University Policies**

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on the [Office of Graduate and Undergraduate Programs' Syllabus Information webpage](http://www.sjsu.edu/gup/syllabusinfo) at <http://www.sjsu.edu/gup/syllabusinfo>

## FINAL GRADUATION CHECKLIST

The following list of items need to be turned in to the graduate coordinator AFTER their oral and written final defense has been approved. The student should turn in all items EXCEPT the first item. All requested documents should be turned in to the Graduate Coordinator as soon as possible so that the student can meet semester graduation deadlines. The Graduate Coordinator cannot process the final paperwork without the following items.

The **SJSU Research Advisor** should personally turn in the original of this form to the Graduate Coordinator, although they may give a copy to the student.

- the original Final Defense Approval form including the signature for the statement “The Turnitin.com report has been reviewed”. There is a yellow copy of this form available in the main office. It is the same form appearing in this document; the yellow color is to make it more identifiable.

The **student** should collect the following items and turn them in to the Graduate Coordinator:

- a copy of the title page
- a copy of the signed signature page that goes after the title page with the date of the defense listed
- a list of EACH 298/299 that currently has an RP or Incomplete grade listed, along with the semester you originally enrolled and the number of units you took.
- the student ID number
- a request to have your Graduate Coordinate submit a Verification of Culminating Experience form to Graduate Studies

# Supplemental Information

## Writing Your Final Thesis Report

You must follow the SJSU and BCME thesis guidelines when you write your final Thesis and give your oral defense of your Thesis. The minimum sections that must be included are listed below (you may also have a background chapter, you may also have a separate results chapter and discussion chapter, you may also have a separate future work chapter, etc.)

- Title Page as all pre-Introduction Pages as per SJSU thesis guidelines following SJSU and BCME format rules
- Table of Contents
- Abstract
- Introduction
- Literature Review
- Hypothesis/Objectives
- Materials and Methods
- Results and Discussion (including future work if applicable)
- Conclusions
- References in BCME guideline format
- Appendices (if necessary)

All details of your work should be included in your report so that someone could recreate your experiments while only using your report for instructions. This means all chemicals, equipment, important size information, data, etc. should be included. Some of this information can appear in the appendices.

## Modification of BME 291 Proposal

You have the first four chapters by the time you pass BME 291, but need to modify:

1. Your literature review, which should have all the new literature from the time you end BME 291 to the time you defend. You might also find you need to add some basic literature review in order to adequately discuss your results.
2. Change the future tense in your materials and methods section to past tense and modify any procedures that you modified when you actually ran your experiments.

Your written report should include all results and all experimental details, especially since you might write a paper a few months down the road and need some detail that seemed trivial at the time but later some of your results will hinge on knowing the answer to that detail.

## Results and Discussion

For your final Thesis written and oral presentation, your committee will be looking for the following to be covered in your results and discussion section where applicable:

1. Good presentation of your results (this is merely how you choose to present your results so that you can show the details that are important, curves, histograms, tables etc. If you are comparing two models, for instance, it is best to put them on the same graph so differences are obvious. The author, meaning you, must decide what the best presentation is, so this is one area on which you are evaluated; do you pick an effective style to present your results?)

2. Discuss the trend of the results. This is merely saying whether there is a trend such as a linear curve, a maximum, a minimum etc. exhibited by the results.
3. A discussion as to what the results mean. This is the skill that distinguishes you from a technician and what your committee will be most interested in. This is where you should, in most cases, discuss your results in comparison to work that has been done by other researchers that has been reported in the literature (and why you may find you need to add some papers to your literature review if they weren't there originally) or that has been done by other SJSU students. You will discuss where your work is consistent with theory or other researchers. Where it is not consistent you will discuss your thoughts as to why it is not, usually in reference to theory although you could also postulate with regards to the trends that were exhibited and what they might mean.
4. This is the part that goes in a separate Discussion chapter if you choose to keep your discussion separate from your results (you can have a single Results and Discussion chapter, or a separate chapter for each).
5. You can include a Future Work Section in your discussion in which you describe other experiments you think would be worthwhile to do based on your results, and your expertise in the area.
6. Discussion of the goodness of your data. You need to show your data is meaningful. Comparison to a known baseline, repeated runs with low standard deviation, consistency with theory or with others who have run the exact same experiments, etc. are some of the ways you can show this. You need to include some discussion of error and the goodness of your data if you do experimental work.
7. You also need a Conclusions Chapter. This should only focus on what you actually showed in your experiments (what you can prove per se). There should not be any global conclusions about what would happen in regions other than those you ran your experiments. Also, there should be no postulation as to meaning; postulation is only for the discussion section. The Conclusions Chapter is only for those facts you can definitively show based on your experimental results.

### **Common Written Presentation Errors**

The following are some errors that showed up in a number of written presentations and/or that Graduate Studies refused to accept some recent theses showing these errors:

1. Do not use bold characters on your Title Page or in the Table of Contents. (Graduate Studies)
2. Two spaces are required after any period or colon anywhere in your report.
3. Fives spaces is needed at the beginning of each paragraph. Graduate Studies takes this as indenting 0.5 inch. If you space over 5 times they consider that only 2.5 spaces (they are going by letters not empty spaces).
4. Graduate Studies requires a comma between nouns for three or more in a sentence; e.g. There are an apple, a banana, and an orange on the table.
5. The month and year that should appear on the title page is your graduation month such as May 2014, August 2014 or December 2014 (not your defense month if it is different).
6. In case of long headings (more than one line) for figures, tables or Table of Contents sections, these should be single-spaced. Double-space between one heading and the next in your Table of Contents. The same is true for the references. They are single-spaced within a reference but double-spaced from one reference citation to the next.
7. When referring to Chapter, Section, Appendix, etc. in the text, these should always begin with capital letter (same as Figure 3 or Table 4). For example: As mentioned in Chapter Three; As shown in Appendix A.
8. Your Objectives/Hypothesis Chapter must have a few paragraphs in order to be considered a chapter.



## **Final Thesis Oral Presentation**

The oral thesis defense presentation should follow the BME 291 proposal defense guidelines in terms of using PowerPoint adequately and having a 30 minute time limit. Review those guidelines and remember the time limit!!

Your oral presentation should cover:

- Title Page including Committee Members
- Outline
- Introduction
- Literature Review
- Hypothesis/Objectives
- Materials and Methods
- Results and Discussion
- Conclusions (including future work if applicable)
- Acknowledgements

All of this in 30 minutes so you should have no more than about 35 slides. Review the BME 291 oral presentation guidelines in the BME 291 Syllabus.

Your introduction can be the basic definitions of importance when you will discuss your results and the significance of your study, why was it important to do this study, what the potential benefit is. Your literature review can be the few key papers you will compare your results to, and perhaps the summary of the literature, at least what is pertinent to your results. Your objective(s)/hypothesis(s) should be shown, as well as the key parts of your methods sections such as your overall flowchart and experimental matrix. This should take no more than 12 minutes of your time.

Here, the main emphasis and time significance should be given to your results and discussion. You do not have to discuss every tiny result, but you do need to figure out which results were significant and show enough detail as to why those are significant.

You should end with a future work, if applicable, conclusions and acknowledgements.

## **Common Oral Presentation Errors**

The main corrections for the oral presentations are:

- Do a spell check. Make sure to spell your committee member's names (including Dr.), affiliations, correctly.
- Be consistent in your capitalizing, if you capitalize only the first letter of the first word of your bullets do that for each one, if you prefer to capitalize the first letter of each word do that for each bullet.
- Watch your use of the laser pointer so you are not running the laser through the audience.

## **Laboratory Notebook Guidelines**

Many students will run experiments or build equipment as part of their thesis. Even if you are doing a theoretical thesis, you should keep a lab notebook. The following guidelines will be useful for your thesis work and/or if you do laboratory work in industry. I took most of this information off web sites but if I modified something I put my initials next to it.

### ***Recording Practices***

Write everything in a bound laboratory notebook immediately, don't write it anywhere else, especially on any scraps of paper.

A table of contents should be maintained for each book. Leave the first few pages free for this purpose

Especially when you are doing multi-year experiments you will want to be able to find certain runs or troubleshooting information immediately, especially if your results run to multiple lab notebooks.

It is also helpful to color-code information so you can find it quickly. For instance, the first time you mention equipment model numbers or chemical brand information you can box it in green.

For troubleshooting equipment, procedures etc. you can box those in red.

Since many of these things happen infrequently, so are rarely mentioned in the notebook, it is very helpful to color-code when you go back to look for them, for instance when the equipment problem happens again but a year later and you can't remember how you fixed it, or you're writing a paper and you need to get the chemical information for some reagent.

I box the topic by color in the Table of Contents, red for troubleshooting, green for equipment etc. info, no box for typical runs, but you need to keep up your Table of Contents in order to do that effectively. Otherwise at least box part of the page in some color or tab the pages using color-coded tabs.

If you don't have some method of finding this information, it can be like looking for a needle in a haystack, especially if you have multiple notebooks.

Notebook entries should follow these procedures (if there is no chance they will be used in legal proceedings you should follow as many as feasible. These are written assuming the notebooks might be part of legal proceedings at some time):

1. Make entries in permanent medium.
2. Use consecutive pages (don't skip pages or if you do draw a line diagonally across them so it is obvious they were meant to be blank).
3. Date entries.
4. Identify subject matter.
5. Include sketches, diagrams, etc.
6. Explain sketches, etc.
7. Photos, drawing, etc., should be identified and permanently attached.
8. Avoid erasures (draw a single line through an erroneous entry so what was originally written is still legible).
9. Don't change entries; make a new entry.
10. Pages should be signed and dated after inked entries by the person or persons performing the activity and by at least one corroborating witness.