Best Practices Guide for Satisfactory Research

* Advisor and advisee should agree upon several goals for the semester that could ideally be completed in parallel. Some goals may be ambitious, but a clear minimum level of achievement that constitutes satisfactory research should be agreed upon. The goals should include or align with satisfactory progress towards the degree (proposal, qualifying exam, 5 dissertation defense).

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| Major Goals | Anticipated completion date |
| 1. Study the normality test literature and come up with a short list of methods worth exploring. |  |
| 1. Complete the simulation studies to assess the utility of the normality tests. This can be done parallelly with 1. |  |
| 1. Gain insights on the results of the simulations, perhaps use some analytical approaches. |  |
| 1. This is a follow up of 1: Assess the short-listed methods. |  |
| 1. This is a follow up of 2: Start working towards a generic pipeline for a user interested in similar assessment for any normality test and downstream test |  |

I \_\_\_\_\_\_\_\_\_\_ agree that I must \_\_complete at least 1,2, and 3\_\_\_\_\_ to earn a grade of SR.

* Advisees are encouraged to keep a brief weekly or monthly log that outlines weekly/monthly assigned objectives and outcomes, and have the log signed by advisor.

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| Week | Assigned objective for this week | Outcome | For next week |
| 1 |  |  |  |
| 2 |  |  | We discussed the major goals going forward.  The goal for next week is to run some simulations with the power loss defined in a different way using permutation test approach. |
| 3 | Run some simulations with the power loss defined in a different way using permutation test approach. | Good start towards understanding permutation tests but the simulation structure needs some more work. | Continue working on permutation test-based simulation.  Try to think how to run a permutation-based one sample t-test |
| 4 | Continue working on permutation test-based simulation.  Try to think how to run a permutation-based one sample t-test | Improved simulations but results not quite correct. | Keep working on improving the simulation results.  Read and possibly add the one sample permutation test. |
| 5 | Keep working on improving the simulation results.  Read and possibly add the one sample permutation test | Simulation test codes well debugged | -use different effect sizes. Add uniform distribution, drop asymmetric distributions in one sample case, and add some smaller sample sizes.  - Calculate Type I error probabilities and inflation of Type I error rates |
| 6 | -use different effect sizes. Add uniform distribution, drop asymmetric distributions in one sample case, and add some smaller sample sizes.  - Calculate Type I error probabilities and inflation of Type I error rates |  |  |
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Characteristics of a good advisee are below

* + Always on time and well prepared for each meeting. Schedules meetings with advisor.
  + Shows initiative – does research beyond expected (reads extra articles, runs a simulation study to debug, etc).
  + Learns from mistakes
  + Has a positive attitude
  + Self-aware (some examples below). “Know what you know and know what you don’t know”
    1. Good: “This method can’t be applied here or this theorem isn’t true because ….[proof or counter example provided]”
    2. Good: “I’m not sure if this method can be applied or if this theorem is true because I haven’t been able to verify the third equality in the proof of line 3
    3. Good: I’m not able to get output from the M step in the algorithm yet. Data inputted needs processed differently. I’m reading the help file and vignette”
    4. Good: “I can see that you don’t follow my reasoning for this. Let me work on improving my communication and get back to you.”
    5. Poor: This method can’t be applied here or this theorem isn’t true because there are bugs in the code
    6. Poor: This theorem can’t be true: I can’t verify the proof.