



## Program Assessment Report (PAR)

### Applied Statistics (STT) Masters Degree

**REPORT PREPARED by:** Wang, Weizhen

**ACADEMIC YEAR COVERED BY THIS REPORT:** 2021-2022

### I. PROGRAM LEARNING OUTCOMES

The graduates should master a broad range of modern statistics while establishing a strong ability to solve problems, apply their knowledge to other areas, create rigorous theoretical arguments and interpret the results in plain language. The program prepares the graduates to further their statistical education in a Ph.D. program, to teach at the undergraduate level, or to work in government or business.

### II. PROCEDURES USED FOR ASSESSMENT

#### A. Direct Assessment

**Student Learning Outcome:** Students in the Graduate Statistics Program will be able to communicate statistical ideas and arguments effectively both orally and in writing. **Assessment Measure:** At the end of Spring 2022, one stat faculty member appointed by the Statistics Program Committee (SPC) attended the final presentation in STT 7910 (Statistical Consulting). Each of the three students in the classes presented one of the projects they did with clients during the semester. These projects dealt with real-world problems. The written project reports were collected and analyzed by the faculty member appointed by the SPC. **Course Attendance:** The evaluation was based on the submitted materials from all three students in the class. • Student 1's Project is on how different variables impact GAD psychological scores using repeated measures ANOVA analysis and SAS software. • Student 2's project is on how different variables influence preeclampsia, i.e. consistent high-blood pressure during pregnancy/post-partum using logistic regression and R software. • Student 3's project is on the design of experiments and analysis of defense business systems using realistic simulation studies and Minitab Software.

## B. Scoring of Student Work

Criteria: The exposition is judged by the following criteria: 1. Correctness: Are all of the statements made in the project valid? Yes, all of the statements from the three students are valid. One reason is that the final report used in the evaluation has been revised by the students based on the comments provided by the faculty or one of the statistical consultants after reading the initial version of the project. Details are as follows. • All parts in Student 1's ANOVA analysis and results are correct. • All parts in Student 2's logistic analysis and results are correct. • All parts in Student 3's experimental designs, simulations, and results are correct. 2. Clarity: Is the topic well motivated and can it be read without undue difficulty? Yes, all three topics from the three students are well-motivated and they can be read without undue difficulty. Details are as follows. • Student 1's project slides are well-formatted and organized by including clear motivations, analysis, results, SAS codes and output, and conclusions. There is no difficulty to read it. • Student 2's project slides are well formatted by including background, study details, descriptive statistics, model, and results with R codes. The background and study details sections have provided good motivations and it can be read without undue difficulty. • Student 3's project slides are well formatted by providing propositions of research problems, concepts, business systems, design of experiments, performance measurements, simulation results, and implications of results. The topic is well-motivated and it can be read easily. 3. Conciseness: Is the exposition to the point? Yes, the expositions from the three students are to the point. Details are as follows. • Student 1's expositions are to the points based on the tables and SAS analytical results. • Student 2's expositions are to the points based on tables and R analytical results. • Student 3's expositions are to the points based on graphs, tables, and Minitab analytical results. 4. Is the exposition easy to understand? Yes, the exposition is easy to understand for all three students. Details are as follows. • Student 1 has put SAS codes and analytical results together with the same slide for each analytical topic. It is very clear and easy to understand. • Student 2 has provided clear R codes, and outputs, together with the analytical results. In addition, the student has additionally provided more details on the background of the question and explained the results in plain English, with multiple tables. • Student 3 has provided clear expositions on the research problem, design of experiments, performance measurements, simulation studies, and Minitab analytical results. The use of multiple tables, figures, and clear precise explanations makes the exposition easy to understand. In summary, we find that we have achieved a 100% success rate on this goal.

## C. Indirect Assessment

We have started to conduct exit interviews with graduates and collect feedback from alumni.

### **III. ASSESSMENT RESULTS/INFORMATION:**

We found that 100% students passed the statistical consulting class (STT 7910).

According to the assessment plan we expect 75% of our graduates to meet the learning outcome. This is achieved in the three assessments that we have conducted this time.

[Analysis]

### **IV. ACTIONS TO IMPROVE STUDENT LEARNING**

Before and after the meetings among the students, the clients and the statistical consultant at Statistical Consulting Center, the consultant discussed with each student, to understand the background, identify the research problem, pick appropriate statistical methods, how to implement using statistical software, and prepare a report to clients. From the discussion, we find that the students need more training in statistical theory, statistical programming, interpretation of statistical results and communication skills with clients.

### **V. SUPPORTING DOCUMENTS**

Additional documentation, when provided, is stored in the internal Academic Program Assessment of Student Learning SharePoint site.