

SP3172: Integrated Science Project

Student Kit, AY2019/20
Last updated: 30th July 2019

As part of SPS's vision of nurturing budding scientists, SP3172 gives students a head-start in research opportunities and a chance to plan, execute and analyse their research projects. SP3172 integrated science project serves as a continuation from SP2171 Discovering Science where students translate insights from their literature review into research projects.

Through SP3172, students will learn to develop a scientific hypothesis, plan and execute experiments to investigate the hypothesis. Students are guided in this process by working in a research laboratory based in Singapore and their learning is facilitated by lab mentors and senior SPS mentors.

I. Learning outcomes

The module aims to develop and hone students' research skills by providing them with (1) first-hand experience in applying scientific methodology (from hypothesis, to experimental design, to experimentation, and data analysis) in real research environment, and (2) a platform to share, debate and defend their research findings in a public setting (i.e. SPS Congress).

At the end of the module, students should be able to:

1. Design, develop and implement a series of experiments to investigate a scientific question or hypothesis.
2. Able to critically analyse experimental data and present findings coherently.
3. Communicate and discuss experimental data through written and oral communication in the form of a scientific article and/or scientific conference presentation.
4. Develop critical thinking, troubleshooting and collaborative skills.

II. Components

There are five components that students have to deliver during the course of this module, namely **Written Report, Viva, Poster, Final Presentation** and **Continual Assessment**. In addition, students are required to submit learning reflections every three weeks during the semester. **All** students are to attend the beginning of semester briefing for SP3172 on **13th Aug 2019, 7pm** to help orient themselves. Subsequently, there will be an ungraded mid-semester poster presentation in Week 6. The Written Report will be submitted in Week 12, followed by a Viva with your assessors and staff supervisors over the next two weeks. The module will then culminate in the **SP3172 Congress on 16th Nov 2019**, where students put up their Poster and do their Final Presentation. The deliverables are as follows:

Deliverables	Deadline	Remarks
Groupings	2 nd Aug 2019, 11:59 pm (Week -1)	Confirmation of student groupings, PI and SPS mentors for their group.
Semester Briefing	13 th Aug 2019, 7:00 pm (Week 1)	All students and mentors of SP3172 need to attend this meeting
Mid-Sem Poster	21 st Sept 2019, 9:00 am (Week 6)	Poster Presentation will be held on 21 st Sept 2019, 9:15 am - 12:15 pm Posters are to be put up 15 min before the start of presentation Will not be graded
Learning reflections	Week 3, 6, 9, 12	A total of 4 learning reflections will have to be submitted every 3 weeks
Written Report	4 th Nov 2019, 12:00 pm (Week 12)	

Viva	6 th Nov 2019 – 15 th Nov 2019 (Week 12-13)	Groups to arrange viva timings with assessors and staff supervisors
Final Poster and Congress	Soft copy on LumiNUS: 15 th Nov 2019, 23:59 pm (Week 13) Hard copy at SPS Room: 16 th Nov 2019, 8:45 am (Week 13)	Congress will be held on 16 th Nov 2019, 9:00 am - 4:30pm Posters are to be put up 15 min before start of congress Each group presentation is allocated 25 min.

NOTE: Any form of non-adherence to deadlines (e.g. late submissions) and instructions will result in penalisation of grades or marks for the components.

Formation of SP3172 Student Group

1. Students enrolled in SP3172 are required to form groups of strictly **2 or 3 students per project**. The confirmation of the student grouping, SPS mentors and staff supervisor is due **2nd August 2019, 2359 hrs**
2. As part of the module, students are asked to contact potential research labs to check if they will be interested to take on the supervisor of the research project. SP3172 students may consult senior/graduate or even staff mentors for suggestions or recommendation if they are unsure.
3. Each group will be guided by 2-3 SPS mentors (comprising of 2 senior mentors and 1 junior mentors, or 1 graduate, 1 senior and junior mentors).

Role of SP3172 SPS mentors

1. Mentors are to provide supervision, advice and suggestions to students during the entire duration of SP3172
2. Mentors supervise weekly meetings and comment on the student learning reflections.
3. It is compulsory for all mentors to be present for the entire session on week 6 (poster practise session) and week 13 (SP3172 Congress).
4. To set a good example to mentees, all mentors should be punctual for all official SP3172 sessions.
5. Either the senior or graduate mentor in each SP3172 group should be prepared to grade at least two reports. This would be communicated to the head mentors at the start of the semester.
6. Ask questions during SP3172 congress to other groups and stimulate discussion.

III. Assessment

Research Integrity Policy for SP3172

Taken from [NUS website](#) and [NTU website](#) :

Research conducted with integrity ensures that all research data generated by the researcher is beyond reproach. Research Integrity can be broadly defined as (1) practicing the use of honest and supported methods when performing and reporting research, (2) ensuring accuracy in reporting, (3) maintaining proper records of data generated and (4) adhering to statutory requirements.

Any dishonesty of any kind in academic research, be it plagiarism, data fabrication, falsification and misrepresentation or a failure to properly attribute credit, erodes trust in the student researcher and his/her work. This is a serious offence. **If any SPS student is found to have falsified data or have committed action related to academic fraud**, a zero score will be awarded for the module and his/her offence will be reported to the SPS programme director for further disciplinary actions by the University.

Assessments and Assessors

The components of SP3172 will be graded by the following assessors:

- a) Project Staff Supervisor [Academic staff whose lab you are working at*]
- b) SPS Instructor [One of the SPS instructors / Professor Liou Yih- Cherng]
- c) Internal Mentor [Student / graduate mentor who is mentoring you]
- d) External Mentor [Student / graduate mentor]
- e) Congress Grader [Graduate mentor who are not mentoring any group]

*In the case that a group has more than one Staff Supervisor, the main Staff Supervisor will be the personnel who will be grading the group.

	Project Staff Supervisor	SPS Instructor	Internal Mentor	External Mentor	Congress Grader
<i>Written Report</i> 30% (Group)	X	X		X	
<i>Viva</i> 20% (Individual)	X	X		X	
<i>Poster</i> 10% (Group)	X				X
<i>Final Presentation</i> 20% (Individual)	X				X
<i>Continual Assessment</i> 10% (Individual)	X				
<i>Learning Reflections</i> 10% (Group)			X		

IV. Detailed breakdown of assessments

a. Written Report (30%, group)

The SP3172 report should outline in detail all the choices made during the research process and why, as well as the outcomes of each phase of the research process. It should **not** be merely factual or explanatory; but rather interpretive and persuasive in nature. It should be the goal of the writer to use acceptable academic reasoning and argumentation to persuade the audience that your choice of experiments, results and conclusions are relevant to, and appropriate within the context of the main theme you have chosen. Furthermore, the research process must be described in sufficient detail to allow other researchers to replicate your study, test the findings, or assess whether the conclusion derived are scientifically acceptable. The written report should be accessible to a broad audience of scientists who may not be from the same field of research.

Submission instructions

The finalised written report will have to be submitted to SPS Headmentors in SPS room no later than **12 noon, 4th November 2019** (Monday, Week 12). Early submissions are welcomed. The written report will be assessed on a group basis. Any submission beyond the deadline will be subjected to a penalty as illustrated below

First 30 mins	1% of report component per minute
Subsequent 1 hr	5% of report component per hour
After 4 pm	0 marks for report

Structure of the written report

The format of the written report should follow a typical scientific journal article as listed below:

Title: A specific statement that conveys the topic and conclusion of the paper.

Abstract: A complete summary of the paper designed for experts and non-experts.

Introduction: The beginning of a paper that transitions from a general background to a specific research question or goal.

Materials and Methods: A brief but detailed description about the tools and methods you used to perform experiments and analyse results.

Results: A presentation of all your experiments and data, represented both as text and in tables, charts, diagrams, and photographs.

Discussion: An opportunity to discuss your interpretation of your results and explore your findings within the context of the larger scientific record.

References: Your citations. There is no specific style required, students can use either APA, or Harvard style of referencing. Once you have determined the method to follow, use it consistently in your report.

Supplemental Material/appendix: Additional figures, videos, and elaboration on methods and computational analysis.

You may put extra material as appendix but do noted that essential data for understanding your report should be in the main section, not the appendix. Examiners are not obliged to read your appendix for grading. A more [detailed written report guide](#) for SP3172 is provided and the format of the written report will be included in the grading rubrics.

b. Oral Viva (20%, individual)

During the viva, you will be required to answer questions regarding various aspects of your project. Students will be graded on the clarity of explanations and their understanding of the project. Each student will be assessed individually for the Viva.

Submission instructions

The oral viva session will be arranged to be conducted during the period between **written report submission and the final presentation (6th Nov 2019 – 15th Nov 2019)**. Students are to take the initiative to arrange for a suitable time-slot with all your assessors (staff and student mentors). It should be conducted after your assessors have had the chance to read your reports. Detailed instructions on the format will be included in the grading rubrics.

c. Poster presentation (10%, group)

The purpose of a scientific poster is to visually present a summary of your research that complements your interactions with other SPS students or examiner during a poster session. Similar to slides in your presentation, a poster is a visual aid that supports your oral communication of information.

Submission instructions

The printed poster (A1 size, Portrait Orientation) will have to be put up in SPS room **15 minutes before the start of SP3172 congress on 16th Nov 2019**. The poster should be left until the end of the congress. Students should be around at their posters to present to anybody who is interested. Your poster will be graded by your host laboratory supervisor, the congress grader and a group grade will be awarded for the poster presentation. *A soft copy of your poster is required to be uploaded into LumiNUS folder by 2359hr, 15th Nov 2019.*

Reimbursement for Poster Printing for SP3172

Every group is allowed to use part of their allocated \$400 budget for SP3172 to print their final poster only. With that, original receipt has to be kept and submitted, together with the claim form which will be given to every group upon the submission of your written report.

Original receipt has to be pasted on an A4 white blank paper without any tape on the printing and written marks on the receipt itself. Receipt has to be intact and all information printed clearly. Then fill in the RFP form (see below), detailing your name, student ID and bank account number.

You are advised to take a photo or scan the receipts before the receipt fades for record purposes. In the event that the receipt has faded, claims cannot be made from that receipt. **Claim form has to be submitted latest by 16th Nov 2019 to either Dr Robert or Headmentors.**

d. Final presentation (20%, individual)

Submission instructions

The final group presentation will be delivered on the SP3172 Congress, held on **16th Nov 2019, 9:00 am to 4:30 pm**, in SPS room. Grading will be done individually.

- **Duration:** Each group will be allocated a **25-minute time slot**, comprising of 15 minutes of presentation, 7 minutes of Q&A and 3 minutes of buffer time to set up the slides and to pack up after the entire presentation
- **Attendance:** All students should arrive punctually and attend the whole duration of SP3172 congress. Non-compliance will result in marks deduction on the overall SP3172 score.

e. Continual assessment (10%, individual)

Submission instructions

The Continual Assessment is a form of evaluation of the student's contribution to the project work in the host PI lab and this is graded by the host laboratory PI.

- **Grading component:** The CA grading includes general work attitudes (attendance, initiative and self-motivation), problem solving ability, presentation/communication of ideas, and data analysis during the duration of the project. Students are recommended to be consistently and actively involved in their project and maintain favourable group dynamics with other members of the group.
- **Duration:** The duration over which the continual assessment takes place will be the entire course of the project, from start to end. However, the actual grading of the continual assessment component will take place in the same week as the congress.

f. Learning reflections (10%, individual)

Submission instructions

Each group should reflect at regular intervals on their learning, progress and any difficulties faced during the duration of the semester. Learning reflections will be assessed and graded by your **internal mentor** only. There is no page limit or word limit. This will be done on a google word document, following the template as assigned by the module coordinator.

There is no fixed format for your learning reflections, but groups are encouraged to discuss some of these points:

1. Your perceptions of the research work and the content.
2. Any problem that you encounter in your research work and how you decide to resolve it?
3. Any questions you might have.
4. Experiences, ideas and observations you have had, and how they relate to the course or topic.
5. What you found confusing, inspiring, difficult, interesting and why.
6. Possibilities, speculations, hypotheses or solutions.
7. Alternative interpretations or different perspectives on what you have read or done in your course.
8. How new ideas challenge what you already know.
9. What you need to explore next in terms of thoughts and actions.

V. Conclusion

Any enquiries or question for SP3172 should be directed at Dr Robert Lieu (dbslzz@nus.edu.sg) or SPS Headmentors (headmentors@sps.nus.edu.sg)