Faculty of Medicine
School of Medical Sciences

School of Medical Sciences
Research Internship

SOMS3001

(6 UOC)

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SEMESTERS 1 & 2 and SUMMER SEMESTER, 2014
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COURSE AIMS

The main aim of the course is to introduce undergraduate students to research in the biomedical sciences. Students will undertake a supervised research project that places emphasis on advanced disciplinary knowledge, the use of specialised techniques relevant to their chosen research area, critical thinking and scientific communication. Students gain experience in semi-independant research activity, scientific writing and oral presentation.

SOMS3001 Convenor
Dr Patsie Polly
patsie.polly@unsw.edu.au
Wallace Wurth Building
Ph: 9385 2924

GRIEVANCE RESOLUTION

If you have a grievance, in the first instance, you should consult the member of the Honours committee who has been assigned as your mentor. If you are unable to reach an acceptable resolution of the issue you should then contact the Honours Coordinator. If you are still unable to resolve any grievance, you should consult the School's nominated Grievance Resolution Officer, Dr Priti Pandey, 9385 2483.

APPROACH TO LEARNING AND TEACHING

The learning and teaching philosophy underpinning this course is centred on students taking on the role of a researcher, under close supervision. The student serves as an intern or, more appropriately, an apprentice. In doing so, they develop advanced disciplinary knowledge, the use of specialised techniques relevant to their chosen research area, critical thinking, evaluation and synthesis of information in addition to scientific research communication in the oral and written forms. The principal form of teaching is based on research supervision and direction by specialist researchers within the Faculties of Science or Medicine. The technical knowledge for this course, in the form of techniques, protocols, technical tips and materials, is provided by each laboratory and supervisor. The scientific knowledge is gathered independently, using Web-based and other resources. It is up to the student to take major responsibility for their own learning and completion of tasks within the course.

STUDENT LEARNING OUTCOMES

At the conclusion of this course, students should be able to:

1. demonstrate an understanding and practice of workplace health and safety in addition to laboratory safety standard operating procedures
2. access, critically evaluate, synthesise and reference a body of scientific literature that informs their research topic
3. demonstrate practical skills in research, including techniques directly related to their specific research topic, accurate recording of experimental data and ability to work in a team
4. critically assess their research data, integrate it into the wider field, and communicate effectively the findings in both oral and written formats
ATTENDANCE REQUIREMENTS

The course extends for one semester. Attendance requirements will be dictated by the nature of the work in relation to preparing and writing a literature review and subsequently a manuscript, preparing and delivering two seminars and by the nature of the research project. Attendance requirements will be agreed mutually between student and supervisor, depending on the nature of the work at the time. As with academic staff, the minimum time required is 8 hrs/week.

The University acknowledges that students are involved in many extra-curricular activities throughout their studies. The School of Medical Sciences is generally supportive of students’ activities but must be confident that these do not significantly impact on research activities or completion of assessment requirements.

MEDICAL CERTIFICATES AND SPECIAL CONSIDERATION

Students who are unable to attend an assessment or submit an assessment by the due date should lodge a medical certificate to the Honours Co-ordinator as soon as possible, and within 3 days of the missed deadline/date at the latest. Certificates lodged after 3 days will not be accepted. If you believe that your performance in this course has been adversely affected by sickness or for any other reason, you should notify the Registrar and ask for special consideration in the determination of your results. Such requests should be made as soon as practicable after the problem occurs. When submitting a request for special consideration you should provide all possible supporting evidence (e.g. medical certificates). In exceptional circumstances, further assessment may be given. Special Consideration applications must be made via Online Services in myUNSW.

Please refer to https://my.unsw.edu.au/student/atoz/SpecialConsideration.html for further details regarding special consideration.

STUDENT RIGHTS AND RESPONSIBILITIES

https://my.unsw.edu.au/student/resources/Policies.html#StudentResponsibilities&Conduct

APPEAL PROCEDURES

Details can be found at myUNSW via the Student Central link.


HEALTH AND SAFETY

UNSW aims to provide a physically safe, healthy and secure learning and working environment for all students. Your supervisors in this course are responsible for your safety during dedicated research time. In return you are expected to behave with respect toward them and your fellow students; you are expected to follow instructions from your supervisors and complete the necessary training. If you are concerned about your health or safety during the course please tell your supervisor immediately.

It is important that you familiarise yourself with the risks and hazards involved with your research work and the control measures in place to prevent harm to you and others. At the start of your honours year you must complete mandatory H&S courses, and identify with your supervisor other H&S courses or training you need to undertake. Before commencing specific laboratory tasks you should familiarise yourself with any relevant risk assessments.
and safe work procedures. You should document your completion of these H&S activities. You should discuss specific training and other requirements with your supervisor.

Information and contacts regarding H&S training and requirements can be found at: http://medicalsciences.med.unsw.edu.au/staff/health-safety/induction-and-training

Below is a list of the mandatory and other common H&S courses that honours students at SOMS undertake. Students will be bulk enrolled into the mandatory courses following enrolment.

- OHS awareness training (online, mandatory for all students)
- Ergonomics training (online, mandatory for all students)
- Green lab (online, mandatory for all students undertaking laboratory work)
- Lab safety awareness and hazardous substances for students (online, mandatory for all students undertaking laboratory work)
- PC2 Biosafety training (mandatory for all students who will be working in a PC2 laboratory, enrol via MyUNSW)
- Ionising radiation training (mandatory for all students who will be working with radiation, enrol via MyUNSW)
- Others – Animal Handling, S8 drugs, GMOs – as required (discuss with supervisor).
ASSESSMENT

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Literature Review</td>
<td>20%</td>
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<tr>
<td>Research Seminar Presentation</td>
<td>20%</td>
</tr>
<tr>
<td>Laboratory Performance</td>
<td>20%</td>
</tr>
<tr>
<td>Research Report</td>
<td>40%</td>
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</tbody>
</table>

**Literature Review** 20%

**Description:** The literature review should be 1,500 words and should give a detailed account of published scientific literature most directly relevant to the project being undertaken. It should contain a brief introduction that identifies briefly the problem under investigation and background to it, the body of the review and a conclusion relating the body of knowledge to the research aims and objectives. The review should be critical, highlighting limitations of the literature and/or areas of controversy. It should be adequately referenced with recent and appropriate studies and have clear and logical flow. The word count for the literature review excludes non-text elements such as diagrams and tables, which can be used. Penalties will apply for an inability to observe the word limit. The general and referencing style should follow that of a journal relevant to the area of research.

**Feedback Process:** Assessment and feedback are based on a rubric aligned with that used for Honours in SOMS. Criteria within the rubric address the following: Background, Critical Analysis, Project Rationale, Hypotheses, Aims, Integration of Methods, References and Presentation. The review will be marked and feedback provided by the supervisor.

**Learning Outcomes Assessed:** Access, critically evaluate, synthesise and reference a body of scientific literature that informs their research topic

Due: TBA
Length: 1,500 words +/- 10%
Copies: Two hard copies. One soft copy must be submitted via Turnitin© via Blackboard.
Attachment: One assignment coversheet to accompany the hard copy.
Research Seminar Presentation

Description: The seminar is of 15 minutes duration, with 12 minutes for presentation and 3 minutes for questions. The presentation should largely cover the results of the research project. A clear, concise and appropriate introduction should be provided which identifies the limitations of the literature and areas of controversy. Clear and valid aims and hypotheses should also be stated. Presentation of the results should be clear and logical and should use text, figures, tables as appropriate. The significance of any important findings should be addressed and appropriate conclusions made. The results of the study should be placed within a broader context and suggestions should be made for future experiments. The seminar should have clear and logical flow, good pace (i.e. neither hurried nor laboured) and use good quality visual aids. The student should demonstrate understanding of the questions raised during question time by giving appropriate answers.

Feedback Process: Assessment and feedback are based on a rubric aligned with that used for Honours in SOMS. Criteria within the rubric address the following: Background, Hypotheses, Aims, Methods, Results, Discussion, Presentation Skills and Questions. The seminar will be marked and feedback provided by the supervisor and guest academics and/or research group members.

Learning Outcomes Assessed: Access, critically evaluate, synthesise and reference a body of scientific literature that informs their research topic.

Critically assess their research data, integrate it into the wider field, and communicate effectively the findings in both oral and written formats

Date: TBA
Venue: TBA
Length: 15 minutes in duration. 12 minute presentation, 3 minute question time
Laboratory Performance  20%

**Description:** The supervisors, including the primary supervisor and other members of the research group closely associated with the project, will provide an assessment of the level of research skill demonstrated throughout the research project. This assessment will be based on student's research performance throughout the course including motivation and organisational skills, research (laboratory) skills (including adherence to good lab practice and work health and safety), note keeping, critical analysis and the ability to respond to feedback.

**Feedback Process:** Assessment and feedback are based on a rubric aligned with that used for Honours in SOMS. Criteria within the rubric address the following: Motivation and Organisational Skills, Research Skills, Laboratory Notebook, Critical Analysis Skills and Written Communication Skills. Laboratory performance will be assessed and feedback provided by the supervisor and any members of the laboratory closely associated with execution of the research project.

**Learning Outcomes Assessed:** Demonstrate an understanding and practice of workplace health and safety in addition to laboratory safety standard operating procedures.

Demonstrate practical skills in research, including techniques directly related to their specific research topic, accurate recording of experimental data and ability to work in a team.
Research Report

Description: The general format of the research report is aligned with the guidelines for the project manuscript assessment item submitted for Honours in the School of Medical Sciences. It should contain an abstract, acknowledgments, brief introduction with aims and hypotheses, materials and methods, results, discussion and references sections. The word count should be 2,500 words. This word limit excludes the abstract, acknowledgements and references sections, as well as supplementary data (if present), tables, figures and legends used in the text. Penalties will apply for an inability to observe the word limit. The abstract should succinctly and accurately summarise the aims and outcomes of the project. The acknowledgments are to be used to indicate how much of the research was performed independently or cooperatively. The brief introduction, aims and hypothesis section should define the problem being examined and place it in the context of published work in the area without being a complete review of the literature. It should identify the limitations of the literature and areas of controversy and give clear and valid aims and hypotheses. The methods should be appropriate and valid for the stated aims and clearly described and fully referenced. The results should reflect the body of laboratory work including sufficient controls and replicates and analysis of data using appropriate statistical tests. Material needed for a complete understanding or evaluation of the work, but which does not fit well in the manuscript format, should be included as supplementary data. Presentation of the results should be clear and logical and should communicated appropriately (using figures and tables as well as text). The discussion should be relevant to the introduction, methods, and results sections, logical in presentation and scientific content, show critical/creative analysis, place the findings of the study in the context of past studies and have suggestions for future studies. Please note that all work which is integral to the manuscript but was not performed by the student (i.e. undertaken by another member of the research group) is to be clearly disclosed in the Methods and/or Results sections of the report, where appropriate. This work may then be referred to in the Discussion and be assessed in the context of the methods and results attained by the student. The referencing style of the project manuscript should align with the requirements of the literature review.

Feedback Process: Assessment and feedback are based on a rubric aligned with that used for Honours in SOMS. Criteria within the rubric address the following: Introduction, Hypotheses, Aims, Materials and Methods, Results, Discussion, References and Overall Presentation. The report will be marked and feedback provided by the supervisor.

Learning Outcomes Assessed: access, critically evaluate, synthesise and reference a body of scientific literature that informs their research topic

Critically assess their research data, integrate it into the wider field, and communicate effectively the findings in both oral and written formats

Due: TBA
Length: 2,500 words +/- 10%
Copies: Two hard copies. One soft copy must be submitted via Turnitin© via Blackboard.
Attachment: One assignment coversheet to accompany the hard copy.

GUIDELINES FOR SUPERVISION

The primary supervisor should be a SoMS Academic member of staff.
GUIDELINES FOR EXAMINATION
SOMS3001 GRADES

>85 (HD): Work of superior quality in all aspects of research, scientific writing, and oral presentation, demonstrating the ability to organise information in a clear and concise manner, the integration of information from a wide range of sources and containing clear examples of excellent critical evaluation.

75-84 (DN): Work of very good quality in all aspects of research, scientific writing, and oral presentation, but showing lesser ability to organise information in a clear and concise manner, integrate information from range of sources and critically evaluate the literature and research data.

65-74 (CR): Good quality in all aspects research, scientific writing, and oral presentation but with inadequacies in understanding, critical skills, organisation and presentation.

50-64 (PS): Adequate quality work with significant deficiencies in understanding, critical skills, organisation and presentation.

Title Page
Title: The title should contain no more than 150 characters (including spaces) and clearly indicate the subject matter of the paper.
Authors: The author’s name in full and the name and addresses of the department(s) and institution(s) to which the work should be attributed.
Word Count: The word count excluding abstract, acknowledgments, references and figure legends should be listed.
Abbreviations: list all abbreviations used

Abstract
An abstract of up to 250 words should follow the title page. The abstract should provide the background for the study, experimental approach, major findings and conclusions. It should be understandable without reference to the rest of the paper. References may not be cited.

Introduction
The introduction should give a clear account of the background for the study, and the research objective or hypothesis tested should be stated. The introduction should be understandable to a non-specialist.

Methods
The methods must be described in sufficient detail to allow the experiments to be interpreted and repeated by an experienced investigator. Give references to established methods, provide references and brief descriptions for methods that have been published but are not well known; describe new or substantially modified methods. Identify the apparatus, drugs and chemicals used, give the manufacturer’s name and address in parentheses after each item. Describe the statistical methods used and define all statistical terms, abbreviations, and symbols. Specify the computer software used. Where appropriate, describe your selection of the subjects (patients or laboratory animals, including controls), identify the age, sex, strain, number used and other important characteristics of the subjects.

Results
Present your results in logical sequence in the text, tables, graphs and illustrations. The description of the experimental results should be succinct, but in sufficient detail to allow the experiments to be analysed and interpreted by the reader. Where data is presented the mean results with standard errors, the number of observations, and statistical significance, should be given where appropriate. The rationale for performing the experiments may be briefly mentioned in the Results section, but conclusions or interpretation of results should not be presented. Do not repeat in the text all the data that is presented in the tables or graphs. Headed paragraphs maybe used to aid in the presentation of the results.
Please note that all work which is integral to the manuscript but was not performed by the honours student (i.e. was undertaken by another member of the supervisor's and/or co-supervisor's research group) is to be clearly disclosed in the Methods, Results and/or Acknowledgments as appropriate.

Discussion

In the discussion explore possible mechanisms or explanations for the findings of your study, compare and contrast your results with those from other relevant studies, state the limitations of the study, and explore the implications of the findings for future research. Do not repeat in detail data or other material given in the Introduction or the Results sections. The main conclusions should be conveyed in the final paragraph.

Acknowledgements

The author should acknowledge those who have provided funds, reagents, technical help and scientific advice.

References

In the text, references to other work should take the form: (Bolton and Kitamura, 1983) or ‘Bolton and Kitamura (1983) showed that...’ When a paper written by two authors is cited, both names are given; for three or more authors only the first name is given, followed by ‘et al.’ References to unpublished observations or personal communications should be mentioned in the text only, and not included in the list of references. Direct reference to original research sources should be used whenever possible.

The reference list at the end of the manuscript must be arranged alphabetically according to the surname of the first author. When the names of first authors are identical, the alphabetical order of the surnames of subsequent authors takes precedence over the year of publication. The authors’ names are followed by the year of publication in brackets. If more than one paper by the same authors in one year is cited, a, b, c, etc. are placed after the year of publication, both in the text and in the list of references. All authors should be quoted for papers with up to seven authors; for papers with more than seven authors, the first six should be quoted followed by et al.

The format for references to papers and books, and to chapters in books, is as follows:


For those articles published on online ahead of print, that have not been assigned full publication details the DOI (digital object identifier) should be used. See example below:

Tables

Each table should be given on a separate page. Tables are numbered consecutively according to the order in which they have been first cited in the text. Tables should be numbered with Arabic numerals and the number should be followed by a brief descriptive title at the head of the table. Tables should be self-explanatory, with necessary descriptions provided in footnotes underneath the table. Give each column a short or abbreviated heading.

Figures and Legends

Figures should be numbered consecutively according to the order in which they have been first cited in the text. Figure legends can appear below the figure and/or on a separate page. Each figure should be given a title and a legend that explains the figures in sufficient detail that, whenever possible, they can be understood without reference to the text. All symbols and abbreviations should be explained within the legend. If a figure has been published, acknowledge the original source.

Supplementary Data

Material needed for an in depth evaluation of the work, but which does not fit well in manuscript format, should be included as Supplementary Data. These data should only be included if they enhance the overall understanding of the research but should not be essential for the understanding of the manuscript.

Abbreviations, Units and Symbols

Use only standard abbreviations; the full term for which an abbreviation stands should precede its first use in the text. SI units and symbols should be used for physicochemical quantities. Gene names and loci should be in italics, and proteins should be in roman. Virus nomenclature (and acronyms) should follow the guidelines of the International Committee on the Taxonomy of Viruses (ICTV). Chemical nomenclature should follow the International Union of Pure and Applied Chemistry (IUPAC) definitive rules for nomenclature. Pharmacological units should follow the guidelines given in the British Journal of Pharmacology.

Formatting and Technical Instructions

Text should be times roman, 12 point font, with 1.5 line-spacing throughout the manuscript. Margins should be 3 cm on the left-hand side, 2 cm on the right-hand, 2 cm at the top and 2 cm at the bottom. The manuscript should be no more than 5000 words excluding; the abstract, acknowledgements and references, tables, figures, legends, and supplementary data.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Literature Review (Mark out of 10 for each marking criteria)</th>
</tr>
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<tbody>
<tr>
<td><strong>Background</strong></td>
<td>Highly detailed and focused introduction.</td>
</tr>
<tr>
<td><strong>Critical Analysis</strong></td>
<td>Comprehensive critical analysis of strengths and limitations of the literature.</td>
</tr>
<tr>
<td><strong>Project Rationale, Hypotheses &amp; Aims</strong></td>
<td>Project rationale, hypotheses and aims clearly outlined and comprehensively justified.</td>
</tr>
<tr>
<td><strong>Integration of Methods</strong></td>
<td>Clear and concise description of proposed experiments and clear integration with the literature. Clear relevance to the research field. Well developed, very clear and concise links between hypotheses, aims and literature.</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>Predominant use of primary articles. Many articles presented from recent or seminal publications.</td>
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<tr>
<td>Criteria</td>
<td>Research Report (Mark out of 10 for each marking criteria)</td>
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<tr>
<td><strong>Introduction, Hypothesis &amp; Aims</strong></td>
<td><strong>Outstanding</strong></td>
</tr>
<tr>
<td>____/10 X 1.5</td>
<td>Concise and clear account of the scientific background and the rationale of the experiment. Very clear links between hypotheses / aims and literature.</td>
</tr>
<tr>
<td><strong>Materials &amp; Methods</strong></td>
<td>Clear description of experiments and data analysis (including statistical analysis).</td>
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<tr>
<td>____/10 X 1.5</td>
<td>Logical and clear description of the experimental results with reference to tables and figures. No conclusions or interpretation of results presented. Sufficient controls and replicates with appropriate data analysis (including statistics) performed correctly.</td>
</tr>
<tr>
<td><strong>Results: Description &amp; Content</strong></td>
<td>____/10 X 1.5</td>
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<td>(Cont.)</td>
<td>10-9.0 Outstanding</td>
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<tr>
<td>Results: Presentation</td>
<td>- Graph axes labelled and units of measurement given in parentheses. Legends explain the figures in sufficient detail that they can be understood without reference to the text. Tables clearly labelled with clear footnotes if necessary so self-explanatory. No errors in presentation.</td>
</tr>
<tr>
<td>Discussion</td>
<td>- Discussion is insightful, clear and logical. Extensive interpretation of the results with reference to previous scientific studies. Significance of findings extensively placed within the broader context of the field. Comprehensive critical analysis of strengths and limitations of experiments. Future directions identified and clearly justified.</td>
</tr>
<tr>
<td>References</td>
<td>- Predominant and comprehensive use of primary articles. Many articles presented from recent or seminal publications. Citation style correct and consistent throughout. Reference list completely accurate with no errors.</td>
</tr>
<tr>
<td>Overall Presentation</td>
<td>- No grammatical or spelling errors. Professional expression and style used consistently. All figures accurate, focussed and informative. Word count 5000±500</td>
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<tr>
<td>Criteria</td>
<td>Research Seminar (Mark out of 10 for each marking criteria)</td>
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<tr>
<td>Background, Hypotheses &amp; Aims &amp; Methods /10 x 1.5</td>
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<tr>
<td>Results /10 x 2</td>
<td><img src="table_content" alt="Table content" /></td>
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<tr>
<td>Discussion /10 x 1.5</td>
<td><img src="table_content" alt="Table content" /></td>
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<tr>
<td>Presentation: Structure &amp; Material /10 x 1</td>
<td><img src="table_content" alt="Table content" /></td>
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<tr>
<td>Presentation: Engagement /10 x 1</td>
<td><img src="table_content" alt="Table content" /></td>
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<tr>
<td>Questions /10 x 3</td>
<td><img src="table_content" alt="Table content" /></td>
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<tr>
<td>Criteria</td>
<td>Laboratory Performance (Mark out of 10 for each marking criteria)</td>
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<tr>
<td><strong>Motivation &amp; Organisational Skills</strong></td>
<td><strong>10 – 9.0 Outstanding</strong></td>
</tr>
<tr>
<td>______/10 X 2</td>
<td>● Exceptionally planning and time-management skills</td>
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<td><strong>Research Skills</strong></td>
<td><strong>10 – 9.0 Outstanding</strong></td>
</tr>
<tr>
<td>______/10 X 2</td>
<td>● Exceptionally high laboratory/research skills, required minimal teaching and supervision</td>
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<tr>
<td><strong>Laboratory Notebook</strong></td>
<td><strong>10 – 9.0 Outstanding</strong></td>
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<tr>
<td>______/10 X 2</td>
<td>● The protocols for all experiments are described with enough detail to allow another researcher to follow with ease</td>
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<td>(cont.)</td>
<td>10 – 9.0 Outstanding</td>
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</table>
| **Critical Analysis Skills** | • Excellent knowledge of relevant literature and the ability to relate the relevant literature to interpretation of results  
• Thorough awareness of limitations of the study and appreciation of future directions | • Able to discuss, interpret and apply the relevant literature to own data with minimal supervisory guidance  
• Good appreciation of the limitations of the data and can suggest future directions for the study | • Able to discuss, interpret and apply the relevant literature to own data with some supervisory guidance  
• Understands the limitations of the data and can suggest future directions for the study | • Limited ability to discuss, interpret the relevant literature. Replied on heavily on supervisor for critical analysis and interpretation of the data  
• Has some appreciation of the limitations of the data and future directions of the study | • Has no knowledge of the relevant literature  
• Unable to critically analyse and interpret own data  
• Little or no appreciation of the limitations of the study. Unable to suggest future directions. | |
| _____/10 X 2 | | | | | | |
| **Written Communication Skills** | • No supervisor contribution needed to complete assessment tasks  
• Written work is excellent in every way. No correction necessary.  
• Results presented suitable for publication, including appropriate graphical presentation and consistency in treatment of data | • Minimal supervisor contribution needed to complete assessment tasks  
• Written work is coherent well-structured and very easy to follow and read. Few corrections required.  
• Results presented in a manner that is largely suitable for publication, including appropriate graphical presentation and consistency in treatment of data | • Some supervisor contribution needed to complete assessment tasks  
• Written work easy to read and follow. Few structure, grammatical or typographical errors present  
• Presented results in a manner that is satisfactory but not necessarily ideal minor inconsistent in the presentation | • Some supervisor contribution needed to complete assessment tasks  
• Written work has many structure, grammatical or typographical errors.  
• Results presented in a manner that is mostly satisfactory with some errors in the presentation | • Significant supervisor contribution needed to complete assessment tasks  
• Written work lacked structure and required significant correction of spelling and grammar.  
• Results presented in a manner that is unsatisfactory with many errors | • Large amount of supervisor contribution needed to complete assessment tasks  
• Written work lacked structure. Very poor written English skills.  
• Presentation of results inappropriate with many errors. Not all results presented. |