

CONTENTS

SECTION

- 1.0 Stokes Research Institute Contact Information (Internal)**
- 2.0 Registration**
- 3.0 Working Arrangements**
- 4.0 Work Targets**
- 5.0 Financial Procedures and Insurance**
- 6.0 Office and Laboratory Equipment**
- 7.0 Guidelines for Making a Presentation**
- 8.0 Guidelines for Writing a Report**
- 9.0 Guidelines for Publishing a Paper**
- 10.0 Guidelines for Writing a Proposal**

1.0 Stokes Research Institute Telephone Numbers and Room Numbers

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Vanessa Egan	ER2-009	(20) 3487	(086) 1717205	vaneesa.egan@ul.ie
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David Kinahan	ER2-011	(21) 3112	(087) 7523912	david.kinahan@ul.ie
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Michael Sayers	ER2-012	(21) 3103		michael.sayers@ul.ie

Postgraduate Handbook

Noel Sirr	ER2-012	(21) 3103		noel.sirr@ul.ie
Ed Walsh	ER3-019	(21) 3181		edmond.walsh@ul.ie
Pat Walsh	ER2-013	(20) 2471	(086) 3011926	pat.walsh@ul.ie

Other Useful UL Contacts

Mary Allen	Fees Office	(20) 2026	Mary.Allen@ul.ie
Cliona Donnellan	Buildings/Insurance	(20) 2496	Cliona.Donnellan@ul.ie
Margaret Dillon	Expenses	(20) 2383	Margaret.Dillon@ul.ie
Olivia Nestor	Postgraduate Payroll	(20) 2339	Olivia.Nestor@ul.ie
Anne Mc Mahon	Engineering Librarian	(21) 4248	Anne.McMahon@ul.ie
Bridie O'Sullivan	Purchase Orders	(20) 2027	Bridie.O'Sullivan@ul.ie

The graduate studies website <http://www.ul.ie/graduatestudies/> contains other useful information on:

- Postgraduate Application Form
 - Postgraduate Research Forms
 - Postgraduate Prospectus
 - Postgraduate Charter
- | |
|----------------------------------|
| Postgraduate Regulations |
| Scholarships |
| Research Centres in the Colleges |
| Postgraduate Student Association |

2.0 Registration

In order to register, the student must go to the Fees Office E001A. Students in receipt of a Higher Education Grant must bring a letter from the Grant Authority stating that the student's grant is being extended. Appropriate fees must be paid by self-funding students. Fees for funded students will be paid internally. A refundable damage deposit €60 must also be paid for which you should receive a receipt. The Fees Office will stamp the student's enrolment form, which the student has already received by post. The stamped enrolment form should be taken to the Admissions office where the student is registered. It is only possible to enrol/register on Wednesday afternoons.

Student ID Cards – Renewal/Replacement

Each full time student at the University is required to carry a current valid student identity card while on campus. The I.D. card is issued initially at enrolment. There is no charge for the first card and there is a charge of €6 for replacement cards. Student Services will issue replacement cards during normal opening hours. In certain circumstances cards may also be posted to your home.

Library Cards

To register as a Library user, each student must go to the Library Issue Desk, present their student ID card and fill in a form. The student will then be registered as a Library user.

Getting Paid

In the case of funded students, the Fees Office have already received a copy of the students Financial Aid Form from the Postgraduate Committee. This form contains details of how much the student will be paid and the account be paid from. A copy of this form is given to the student. The Financial Aid form, together with the stamped enrolment form, must be taken to the Accounts Department A2029. The administrator of the Postgraduate Payroll (ext. 2339) will request tax and banking details from the student. Once these details are furnished, the student can expect to be paid on the 25th day of each month. All information for processing in the payroll must be received before the second Friday of each month.

Parking Permit

Not all post-graduates qualify for parking permits, only those postgraduates involved in teaching. What is needed is a current ID card, a current payslip for teaching hours, and vehicle registration certificate or log book naming the postgraduate as the owner of the vehicle. If all three documents are available

Postgraduate Handbook

then the buildings office issue permits between 12noon-1pm; Monday-Wednesday. Room AM-056.

3.0 Work Arrangements

Working Hours

The normal working day is 09h00 to 17h00. From time to time, it may be necessary to work extra hours. It is not the custom and practice of the University to pay for overtime.

Annual Leave

Each postgraduate student is entitled to 20 days annual leave, not including official University Holidays. Students should notify their supervisor in advance of taking annual leave.

Sick Leave

A student who is absent from work due to illness should notify their supervisor at the beginning of the illness. A doctor's certificate may be required for absences in excess of 2 working days.

Invigilation

The Exam Coordinator (ext 2376, Room No: EO001) usually sends out an email requesting details of those who wish to be considered for invigilation work in week 6/7. Only research postgraduates can invigilate for exams. Postgraduate students wishing to invigilate **must** have permission from their supervisors. After receiving student's details, the Exam Coordinator will forward an examination schedule to students who are chosen to invigilate. Students who are invigilating for the first time will receive training 3 days before the first exam. All invigilators will meet Senior Invigilators on the day before the exam. Claim forms will be distributed. At the end of the exams claim forms should be filled in by the student and handed back to the Exam Coordinator who will authorise payment and forward the forms to salaries.

Timesheets

All staff and postgraduate students are required to fill in weekly timesheets. Timesheets must be signed by the student and the project leader and submitted to the SRI Administrator on the first Monday of each month. Timesheets are required by Institutions who fund projects. A timesheet template is available from the Stokes Server ((\\Xp7sbbm1jfoconn\stokeserver\Intellectual Property) in the folder SRIFORMS. Contact your supervisor or administration for details of how to complete timesheets.

Curriculum Vitae

Each student and staff member is required to complete a CV within 1 month of joining SRI. A CV template is available from the Stokes Server ((\\Xp7sbbm1jfoconn\stokeserver\Intellectual Property) in the folder

SRIFORMS. An electronic version of your CV should be saved in the CV folder under the relevant year.

Colloquium

It is expected that all students attend the bi-weekly colloquium. This is held at 11h00 on Tuesday and Thursday mornings.

Reserved Visitor Car Park

The car park is intended for use by visitors on business to the University who are assisting with the mission of the University in teaching, research and development. If you are expecting a visitor, you should forward the following information to the Stokes Administrator in advance.

- Visitors name
- Date and expected time of arrival
- Expected duration of stay
- Contact person within UL

The SRI Administrator will notify the Car Park Attendant who will allocate a parking space to your visitor. There are 37 available parking spaces within this car park. The building is manned from 8.30 am to 4.30 pm each weekday. You should inform the visitor that they should go to the Reserved Visitor Car Park on arrival. From here the visitors will be directed to Main Reception where full reception services are provided. Any cancellations should also be notified by e-mail, to ensure efficient management of the car park

4.0 WORK TARGETS

Research students embark on many different types of projects and therefore the targets of their research can vary widely. Research specific targets will be agreed by the student and their supervisor.

However, it is generally expected that:

- The student will present their first colloquia during the second semester of their first year of research.
- Students will be involved in the tutorials and laboratories of undergraduate students for not more than 6 hours per week. It is expected that the modules taught by the student will be commensurate with their field of study. Final year PhD students will not be expected to do tutorials or laboratories.
- After one year from the start of registration, it is expected the student will transfer to PhD provided that sufficient progress in their research has been made. This transfer will necessitate writing a report based on the first year of work and a presentation that will be assessed by two members of faculty.
- Submission of the PhD thesis is normally made after three full-time years of research.

5.0 Financial Procedures

Purchasing goods

- Clear purchase of goods with project leader/supervisor.
- Complete purchase requisition; have it signed by project leader and return to SRI Administration.
- The form then given to director(s) for authorisation. All purchase requisitions must be authorised by both the project leader and the director(s).
- Requisitions should show supplier ID which you will find on the University's WEB pages.
- Requisitions should show VAT rate. It is currently 21%.
- Requisition should also include carriage if the vendor is shipping directly.
- For purchases valued between €2000 and €2000 (including VAT) three written quotations must be supplied.
- If goods are in excess of €2,000, the Procurement and Contracts Office must be consulted and a formal tender procedure must take place.
- It is your responsibility to ensure that the Purchase Requisition is fully completed.

Please note that the expiry date of purchase orders is as follows: Standard - expires five months from date of the purchase order. Blanket - expires at end of the Financial Year/Project. If the purchase order has not been paid by this date, it will be deleted from the system. In the past, Accounts have notified us when a purchase order is due to expire and allowed us to keep it on the system. However, you should check the status of such purchase orders with Accounts (ext. 2027). It is possible that you will need to raise a new purchase order.

A blanket purchase order exists for Farnell. This means that you can order goods directly without raising a purchase order. A fax template is available for use when purchasing from Farnell. You will need to include part number, part description and price on the fax. The form must be authorised by director(s) before faxing to Farnell. The original should be stamped as sent and given to the SRI Administrator.

When you receive your order, check that everything is correct. You should also receive a delivery docket or advice note. This may come directly or from Deliveries. If everything is in order, sign the docket, photocopy it and give both copies to the SRI Administration. A copy will be kept on file and the original will be sent to Deliveries. Once the delivery note is signed, accounts have permission to pay for the goods.

You may or may not receive an invoice. If you do, sign it and forward it with a copy to the SRI Administration. A copy will be kept on file and the original will be sent to Accounts. If you don't receive an invoice, don't worry. They are sometimes sent directly to accounts. This is why it is so important to return delivery dockets.

If you have any problems with any part of this process please contact SRI Administration (ext 2449). Deviation from this process can result in delays in the processing of the Purchase Requisition.

Purchase Requisition forms are available from the website or SRI Administration.

Travel

A purchase requisition should be raised for the flight. You should allow two weeks for processing. Flights in excess of €1000 must also be authorised by the President. This will be arranged by the SRI Administrator but may delay the process. Therefore you should allow extra time for processing.

A blanket purchase order exists for Creation Travel. This enables you to buy flights directly from the web without using personal credit cards. If you wish to buy a flight from the web, contact the SRI Administration who will arrange this with Creation Travel. This purchase requisition can also be used where there is very short notification of travel.

When traveling to Dublin on business, train ticket vouchers should be used. These are available from SRI Administration.

Claiming Expenses

Expenses forms can be used to claim any expenses you may incur on behalf of SRI, such as mileage, purchases or travel. Simply, fill in the expenses form, attach all receipts and give to SRI Administration. Please note that expenses cannot be claimed without receipts. Please allow two weeks for processing.

If you are travelling on behalf of SRI and expect to incur costs, such as hotel bills, you can submit an expenses form for the amount you expect to spend in advance of travelling. 80% of this amount will be paid to you. The remainder will be paid when you submit the final claim with receipts for expenses incurred. If the final cost is less than the advance, the difference must be repaid to the Accounts Department (ext. 2383).

Attending Conferences

If you are attending a conference or a course, please complete the claim form for Conference and Course Fees. The form should be given to the SRI

Administrator who will arrange for it to be authorised and forwarded to accounts.

Insurance

People traveling on behalf of the University are covered under the University's Insurance Policy No: PP92235849/04 valid until 30 September 2005. The insurance company is Royal Sun Alliance. The following is a summary of cover:

Insured Persons:	All employees or persons engaged on the business of the insured including their spouses and children accompanying them on business trips and holiday trips as an extension.
Age Limits:	16 – 75 years
Operative Time:	From time of leaving home or place of business (whichever is the later) during the whole time away and until return to place of business or home (whichever is the earlier). Internal trips within Republic of Ireland. Pleasure trips as an extension of business trips are also included.
Territorial Limits:	Trips on business both within and outside the Republic of Ireland.
Benefits:	<u>Section A</u> Medical and Additional Expenses – limit per person €5,000,000 (restricted to €1,270 within the Republic of Ireland). Cancellation or Curtailment – limit per person €3,175. <u>Section B</u> Personal Accident – sum insured (each person) €63,487, children under 16 years of age, maximum €1,270 death benefit. <u>Section C</u> Baggage and personal effects €3,175 Money sum insured €953 per person

Postgraduate Handbook

Additional Extensions:

AIR AMBULANCE: If a doctor certifies an Air Ambulance is necessary to repatriate an injured person, Underwriters will pay cost up to €25,000 in addition to any medical expenses.

Personal Liability:

PERSONAL LIABILITY: Limit of Indemnity €2,539,477 each Insured Person.

In case of medical emergency contact Europ Assistance:-

Tel: [Access Code] +44-208-763 3315

Fax: [Access Code] +44-208-763 3035

Email: international.opsefirstassist.co.uk

Web: www.firstassist.co.uk

For further information telephone 2496

6.0 Office and Laboratory Equipment

The following equipment is stored in ER2-010.

- Fax Printer
- Projector Camera
- Laser Pointer Keys

Students may borrow the projector, camera and keys. These items must be signed out at the Administrator's desk.

Telephones

Telephones are available throughout the SRI. Students have direct access to internal lines only. Please ensure that your voicemail is set up. Instructions for the use of the different types of telephone handsets and other relevant information is contained in the following website <http://rhw.ul.ie/pport/web/Classification/3/1.1.3.1>

The cost of all calls made from each extension is charged monthly to each department. Private calls should be booked through the switchboard operator. The Finance Office issues invoices for private calls and payment should be made to the Finance Office.

Please use the telephone responsibly. A significant amount of money is spent each month by individuals ringing Directory Enquiries to ascertain telephone numbers. There are several ways of reducing such costs. You can use the following WEB links:

Eircom Directory Enquiries:	www.eircom.ie/phonebook/
Golden Pages:	www.goldenpages.ie
UL Internal Phone Book:	www.ul.ie/main/search

The University Telephone directory is available on-line from the University WEB site. You may also download the directory to an Excel file which you may then print, save to your own PC or perhaps download to your PDA.

All internal extension numbers maybe dialled directly from outside the University (by-passing the switchboard) by prefixing the 2000 series extension numbers by the two digits 20 e.g. extension 2999 becomes 202999, by 21 for the 3000 extension numbers, 23 for 4000 extension numbers.

On-line forms are available at <http://rhw.ul.ie/pport/web/Classification/3/1.1.3.1> if you wish to request or remove a phone or report a fault. Alternatively you can report faults by dialing 2440 and the Siemens help desk will pick up internal telephone faults directly from telephone users.

Laboratory Equipment and Etiquette

The following equipment is stored in the laboratory:

- Voltmeters
 - Micromanometers
 - Power supplies
 - Baladyne, balancing equipment
 - Thermocouple monitors and handheld meters
 - Calibration bath*
 - Environmental chamber
 - Digital Callipers
 - Spectrum analyser and logic analyser
 - National instrument data acquisition system*
- Oscilloscopes
 - Function generators
 - Soldering Equipment
 - Data loggers
 - PIV system*
 - Eurotherm controllers
 - Vibration table
 - Infra red camera*
 - D space*

**These items of equipment require specialist training.*

Facilities are also available to have certain models and rigs made up. Contact your supervisor about this. Please contact a technician for equipment located in the laboratories. These items need to be booked for use 48 hours in advance.

Signing out procedure

All equipment must be signed out before use and location of equipment being borrowed and return time and date must be entered.

Access to Laboratories:

For access to LB006 (Electronics Laboratory)	Vivienne O'Keeffe
For access to LB008 (Restricted access)	Paddy O'Regan
For access to LB009	Bryan Rodgers

Laboratory Etiquette

Always treat the equipment with great care. The equipment is usually quite expensive and is used by many students. Always leave your workspace cleaner than you found it. Detergents and paper towels are available for cleaning. If equipment is not in good working order, notify technicians immediately. The following safety rules must be followed by everyone at all times in the laboratory

- All students must obtain their own safety goggles, bring them to the laboratory and wear them at all times in the laboratory

- No food or drink or cigarettes are to be taken into the Laboratory
- Avoid excessive noise and improper behaviour. It annoys others
- Shoes must completely cover the foot (i.e. no open-toed sandals)
- Laboratory coats are required in the laboratory
- If you make a mess, clean it up. Do not leave it for someone else to find
- Report all accidents immediately

Be familiar with the locations of emergency exit routes, fire extinguishers and first aid kits. Bags, coats, etc should be stored in designated areas only (not where they may cause someone to trip over them). Safety is the responsibility of everybody. Remember to consider others' safety as well as your own. Please be courteous to staff and fellow students.

You are required to comply with any instruction given by a University staff member or security officer.

Submitting a Job Request to the Model Shop

Should you require low/medium tolerance parts, models or prototypes to be made, the SRI has a dedicated Model Shop (located in LB-008) that includes a lathe, a milling machine and a band saw. Most metals (e.g. steel, aluminium, brass) and plastics (e.g. ABS, Perspex) can be machined to a reasonable tolerance for constructing prototype parts and experimental rigs.

Before requesting parts to be made, you should discuss your requirements with your supervisor. If it is necessary to purchase specialist materials or equipment prior to submitting your job, you will need to find a suitable supplier and complete a purchase requisition as per normal.

A job request must be accompanied by adequate drawings for each of the parts to be made. A sketch on the Job Request Sheet may be acceptable. If more substantial drawings are required, ensure that they include sufficient dimensions (with tolerances if necessary), part quantities, material requirements, surface finishes and assembly details.

The protocol for submitting jobs to the model shop is as follows:

Fill in a Job Request Sheet (available from the administrator)

1. Have it signed by your supervisor
2. Attach it to your drawings if necessary
3. Give the drawings and request sheet to the Model Shop technician (Mr Paddy O'Regan)
4. The technician will add your job to the board in the Model Shop

7.0 Guidelines for Making a Presentation

Planning the presentation

It is important to define the purpose of the presentation, and to identify the target audience. In order to help you choose the correct pitch for your presentation, clarify the following:

- What is the purpose of my talk? Information sharing? Promotion of a paper? Examination?
- Who is the audience? Colleagues? Peers? Experts? Examiners? Is it technical or non-technical?

As a postgraduate, you will present colloquia and conference papers at some stage during your studies. Key features of these presentations are as follows:

- The objective of a **colloquium** is to share your research with your colleagues in order to promote discussion. Colloquia are somewhat informal events, of typical duration 40-45 minutes with 15-20 minutes of discussion – so it is appropriate to cover your work in some detail.
- The aim of a **conference presentation** is to promote your publication – in essence, to ‘sell’ your research. Conference sessions tend to be reasonably formal, controlled by a chairperson. Duration is typically 15-20 minutes, with 5-10 minutes of questions. Members of the audience have access to printed copies of your paper, so you should only present the salient features of your work – with appropriate emphasis. Refer the audience to the printed paper for particular details.

For a technical presentation – a colloquium or paper – a typical **structure** is as follows:

- Introduction – outline the background to your work, stating some form of ‘need’
- Objectives – define the specific aims of the work
- Approach – describe how you tackled the problem: theory, experimentation
- Results and discussion – state what have you found, and discuss its significance
- Conclusions / recommendations – list the main points only
- Summary – provide a brief overview of the presentation

The **pace** of your presentation is critical – for clear communication on a technical subject, a pace of about 150 words per minute is suitable. If your delivery is too fast or too slow, the audience will lose interest: bear this in mind when compiling your presentation material.

Visual aids

In general, most contemporary technical presentations rely on PC-driven slide shows. Some tips are listed here for best composition and use of such slides:

- Aim to generate slides that are clear: don't clutter the slide! Use large fonts!
- As a guide, aim to cover **one idea** per slide – for text-only slides, try not to exceed six words per line, and six lines per slide.
- In terms of timing, allow *at least* one minute to cover a typical slide: certain slides may warrant more time, however, to present fully.
- Use diagrams, rather than text, to illustrate ideas – such graphics should be clear and simple.
- Use graphs, rather than tables, to present data: ensure that the text on the graphs is clearly visible.
- When presenting theoretical work, do not present extensive derivations: cover only the salient steps and key equations.
- Use animations sparingly – these tend to become very irritating to the audience. In particular, do not 'uncover' lines of text sequentially: this interrupts the flow of the presentation.
- Movies incorporated within your slide show can be very illustrative, but ensure that the transitions between the various software packages are swift.
- Props such as test pieces may help to illustrate your work, but they can also be a distraction. Consider carefully if a prop will enhance what you wish to communicate.

Ensure that a flip chart or white board is available in case additional sketches or text are required in order to clarify queries during the presentation.

Delivery

Good delivery is the key to a successful presentation: even with well-prepared material and visual aids, a poor speaker will not hold the interest of the audience. It can take much practice to become a competent speaker – and a few tips are presented here:

- **Nerves:** most people are very nervous about speaking in public. Preparation is the key to confidence: to guide your speech, compile prompting cards with words or simple phrases printed in large, clear letters. Learn the first few sentences of your speech by heart in order to ensure a good start to the presentation. Practice your presentation until you

have your speech and timing perfect: speak in front of a mirror, or in a lecture theatre. Enlist your colleagues or friends as critics.

- **Speech:** A common mistake is to run too quickly through your speech, risking mispronunciations and poor syntax. Speak slowly and clearly, but be careful to vary your emphasis to avoid monotones. Watch out for mannerisms in your speech – repetitive ‘ums’ and ‘ams’ – and avoid use of slang or colloquialisms.
- **Eye contact:** It is imperative to maintain eye contact with your audience! Break the audience into sections – left, right, front, middle, back, depending on the room – and scan through these sections at various stages as you speak. Allow a second or so to scan a section, making eye contact with audience members in that section.
- **Stance:** Your stance during the presentation is important: choose a set of positions at which to stand; some to address the audience, others to highlight details on slides. Avoid standing in one spot: you may inadvertently ignore sections of the audience, or block their view of the screen.
- **Hands:** Use your hands to enhance the presentation – for example, point out details on slides directly, or with a short pointer. (This tends to engage the audience far more than laser or mouse pointers). Be careful, however, to avoid repetitive or meaningless gestures – these are likely to distract and annoy the audience. Don’t fiddle with objects such as pens or pointers.

Finally, put **energy** into your delivery! If you don’t exude enthusiasm, how can you expect it from your audience?

8.0 Guidelines for Writing Reports

1. TECHNICAL REPORT

In general, a technical report should contain most, if not all, of the following sections:

- Cover page
- Abstract
- Initial sections: contents list, nomenclature, lists of figures and tables
- Introduction and Literature survey
- Theory
- Experimentation
- Results
- Discussion
- Conclusions and recommendations
- References
- Appendices

The structure should be tailored to meet the requirements of the report: the literature survey may be incorporated within the introduction, for example, or the results may be combined with the discussion. Sections may be omitted, or their order changed, as appropriate. In the following sections, the purpose and form of each of these sections is outlined.

Cover page

The cover page of the report should include:

- Title of report
- Revision number – starting at rev.0
- Author or authors
- Date of issue

The title should clearly express the theme of the report. The cover page should also indicate the purpose of the report – an interim report on a research project, for example, or a first year postgraduate report. Moreover, it may be appropriate to include the affiliation of the authors, and print the cover on headed paper. If the report is a draft, then this should be clearly indicated on the title page: draft status may also be stated in the header or footer of each page of the report, or as a watermark.

Abstract

The abstract should directly follow the cover page. Its purposes are twofold:

1. to give a clear statement of the scope, objective, approach and findings of the paper;
2. and to provide key words for indexing.

For a short report or paper, abstract lengths of 100 to 200 words are typical: a long report or thesis may require lengths of up to 500 words – such abstracts should be presented on one page, however.

The abstract should be compiled when all other sections are complete. Key sentences should be extracted from each section, and then refined to form a concise paragraph or set of paragraphs. A statement of the key findings of the report should be included.

Initial sections: contents list, nomenclature, lists of figures and tables

After the abstract, a set of indexing sections may be presented: these are described in the following sub-sections.

Contents list

The contents of the report should be presented in tabular form, with columns entitled ‘Section’, ‘Title’ and ‘Page’. Recommendations for section and page numbering are as follows:

- Chapters or major sections should be numbered sequentially in the form 1.0, 2.0, with sections as 1.1, 1.2, and sub-sections as 1.1.1, 1.1.2. It is not recommended to subdivide further, but lists may be bulleted with alphabetic characters, arabic numerals or roman numerals. Appendices should be denoted as A, B and so on, with their sections and sub-sections in the form of A.1 and A.1.1 respectively.
- Pages in the main body of the report should be numbered sequentially, but each appendix should be numbered separately: appendix A should be numbered as A.1, A.2 and so on. The indexing sections of a long report or thesis should be numbered with roman numerals.

Nomenclature

All nomenclature abbreviations used in the paper should be clearly defined in tabular form, with columns entitled ‘Symbol’, ‘Description’ and ‘Units’. The nomenclature should be listed in alphabetical order, followed by Greek symbols, non-dimensional parameters, then subscripts or superscripts.

Lists of figures and tables

Lists of figures and tables are somewhat anachronistic, but these are generally required for theses. Each list should be presented in tabular form, with columns entitled ‘Figure’ (or ‘Table’), ‘Title’ and ‘Page’.

Introduction

The purposes of an introduction are threefold: to outline the background for the work presented in the report; to define the need for the investigation; and to state its objectives. Content should be as follows:

- The initial parts of an introduction should guide the reader from a general overview of the subject area, to the specific details of the problem addressed in the report. In this context, a literature survey may be presented to indicate the state-of-the-art.
- A reason or need for the work presented in the report should then be stated.
- A clear statement of the objectives of the work should be presented.

The introduction may close with a paragraph outlining the structure of the report.

Literature survey

A literature survey may be included as a separate section, or incorporated as part of the introduction. Its purpose is to provide a context for the work presented in the report – to indicate the state-of-the-art. It should not simply comprise a list of relevant sources, but it should be clearly structured: a long literature survey should be concluded with a summary. References should be incorporated into the flow of the text, as illustrated in the following examples:

“A solution to the Laplace equation was derived by Holman (1989)...”

“Eckert et al (1957) presented an approach to calculating local heat flux to nonisothermal surfaces...”

Note that it is usual to cite literature elsewhere in a report in order to support specific points. Cross-references to other sections of the report should simply be indicated as the section number. Finally, when including material from other sources, ensure that the sources are clearly referenced: otherwise it is plagiarism!

Theory

The purpose of this section is to present any theoretical models or analyses used in the investigation. In developing a theoretical model, the geometry, governing equation and boundary conditions should be described, with all assumptions stated. Only the key steps of the method of solution should be outlined: detailed derivations should be presented, if relevant, in an appendix. Each equation should be numbered, and formatted such that no character is less than 8 point in size. The theory section may include simulations – Finite Element (FE), for example, or Computational Fluid Dynamics (CFD) – but it may be appropriate to present these as a separate section. Details of the simulations should be

defined fully: simulation software, solution technique, assumptions, boundary conditions and so on.

Experimentation

The purpose of this section is to describe the experimentation clearly, with sufficient detail such that the work could be repeated in an identical manner. This section could be structured as follows:

- **Apparatus:** The test specimens and measurement apparatus should be clearly defined. Diagrams and schematics may be the best way to convey the information. The make and model of each item of equipment should be specified.
- **Procedure:** Key steps performed during the experimentation should be described. Numbered lists may be used to present the steps.

Equipment details such as serial numbers and calibration certificates should be listed in an appendix.

Results

The purpose of this section is to present the results – measured and predicted – of the investigation. It may be sufficient to list observed data in this section, but if derived quantities are of more importance, then the derived data should be listed: the observed data should then be presented in an appendix. In all cases, data should be presented in figures or tables:

- **Figures:** A reference number and title should be presented *after* each figure. The reference number should be formatted as “Figure 1.1”, for example, and the title should clearly define the figure. For graphs, it is essential that the title and units of each axis are indicated. Experimental data should be shown as individual points: curves may be fitted to the data, but the curve-fitting scheme should be clearly defined, with some measure of goodness-of-fit indicated. Extrapolation, if used, should be explicitly stated. Theoretical predictions can be shown as continuous curves, if appropriate.
- **Tables:** A reference number and title should be presented *before* each table. The reference number should be formatted as “Table 1.1”, for example, and the title should clearly describe the table. Columns and rows should be clearly titled, and it is essential that units are defined. A table should not run over a page.

The results section should also contain details of any analyses performed on the data. If derived data is presented, then the steps of the derivation should be described. Statistical quantities, if calculated, should be clearly defined. An error analysis¹ of the data may also be appropriate.

Discussion

This section should be a critical and objective appraisal of the results of the investigation. The results should be interpreted with reference to meeting the stated objectives of the report. Measured and predicted data should be compared, and discussed with reference to other sources. Weaknesses in the investigation – errors, omissions and so on – should be addressed. Conclusions drawn from the results should be stated, and recommendations for further work outlined.

Conclusions and recommendations

This section is a statement of the main findings of the report, and recommendations for further action. Conclusions and recommendations are key elements of a report, and must be well written and concise. It is imperative for the conclusions to relate to the stated objectives of the report – if not, then both the conclusions and the objectives should be reassessed. Conclusions should be stated explicitly – or, at least, strongly implied – in previous sections of the report; and the recommendations should follow logically from the conclusions.

References

If the report contains less than five references, use footnotes to list the references; otherwise include a separate section. For references in technical reports, the preferred formats for papers and texts are as follows:

Eckert, E. R. G., Hartnett, J. P. and Birkebak, R., 1957, “Simplified Equations for Calculating Local and Total Heat Flux to Nonisothermal Surfaces”, *Journal of the Aeronautical Sciences*, July, pp. 549- 551.

Holman, J. P., 1989, *Heat Transfer*, SI edition, McGraw-Hill, New York, pp. 83-91.

Where more than one reference is made to a source – to different pages in a text, for example – use letters to distinguish the references: Holman (1989a) and Holman (1989b).

As an alternative, references can be numbered sequentially, and referenced in the text as bracketed numbers, [1], or superscripts, ¹.

¹ Error analysis is outside the scope of this document. The reader is referred to the following sources:

Holman, J.P., 2001, *Experimental Methods for Engineers*, 7th edition, McGraw-Hill, New York.
Stokes Research Institute

Appendices

The purpose of an appendix is to present material which is relevant, but not essential, to the report. For example, an appendix may contain mathematical derivations, detailed descriptions of equipment, computational codes and so on – peripheral information which would disrupt the flow of the report.

2. THESIS

In terms of structure and style, a thesis may differ little from a long technical report. Two particular documents address the presentation of theses:

BS 4821, 1990, “Recommendations for the Presentation of Theses and Dissertations”.

University of Limerick Guidelines

<http://www.ul.ie/studentservices/academic-regulations-2001.pdf>

The **scope** of a thesis is far more extensive than that of a technical report, however, and the content of a thesis should be agreed between student and supervisor before commencement of writing.

Style issues

The report must be presented in a style that is clear and consistent. Some key issues are highlighted here²:

- Reports should be formatted for A4 printing, with margin sizes of 25mm for the top and bottom, and right-hand side: the left-hand margin should be 30-40mm, depending on the binding.
- A clear font such as Time Roman, of size 11 or 12 point, should be used throughout. Characters in equations or figures should not be less than 8 point.
- Line spacing should be between single and double.
- Consistent styles should be used for chapter, section and sub-section headings.
- Headers and footers may be used to convey information such as report title, revision, draft status, author’s affiliation, date and page number. Characters in the header and footer should be italicised, and 2 points smaller than the main text.
- For a short report or paper, figures, tables and equations should be numbered consecutively from (1): for a long report or thesis, the numbering scheme should follow each chapter, as (1.1), (1.2) and so on.

² For further reading on style, the reader is referred to section 808 in the University of Limerick library.

Numbering in an appendix should be in accordance with that appendix, as (A.1) for example.

- In general, the report should be expressed in the past tense. The present tense may be used to describe work in progress, and the future tense may be suitable for some conclusions or recommendations.
- Passive voice should be used throughout, and use of the first person avoided: for example, “The temperature was measured...” is appropriate; “We measured the temperature...” is not.
- Jargon and slang terms should be avoided. Where technical terms from another discipline are used – for example, the use of medical terms in a report on biomedical engineering – a glossary of terms should be included in the report.
- Abbreviations or symbols should not appear in the text, but they can be used in tables and figures – provided that they are clearly defined in the nomenclature or the text.
- If an acronym is to be used in a report, the term should be given in full at the first instance of its use, followed by the acronym in brackets.
- SI units should be used throughout the report.

Finally, ‘signposting’ statements may be used to guide the reader through long reports or theses. These are usually appropriate at the start or end of a chapter or section. For example: “A theoretical model for moisture diffusion within plastic packages was developed in chapter 4.0. In this chapter, an experimental investigation is described, and the results of this investigation are listed in chapter 6.0.”

Common mistakes

A brief list of common mistakes is presented here.

- Spelling mistakes
- Bad grammar – in particular, poor sentence structure
- ‘Waffle’ included to increase the length of a report
- Inconsistent tenses
- Use of the first person
- Incorrect use of apostrophes: in particular, note that “its” = “of it” whereas “it’s” = “it is”.
- Acronyms not defined in full on the first instances of their use
- Symbols not defined
- Units not defined, or inconsistently used
- Unclear abstract
- References to sections, equations, tables or figures in the abstract
- Objectives not clearly stated
- Unclear figures

Postgraduate Handbook

- Poorly defined experimentation
- Table title not before the table; figure title not after the figure
- Graphs without the axes clearly labelled
- Curves fitted to experimental data, without indication of the curve-fit scheme
- Conclusions not drawn in the text
- Conclusions incommensurate with objectives; recommendations that do not follow conclusions
- References presented incorrectly

Finally, many reports, papers and theses have been written by the staff and postgraduates of the SRI. Refer to these for examples of structure and style.

9.0 Guide to Publishing

It is anticipated that every student will at some time publish a paper. Each student is required to complete a 'Publication Submission' form when requesting authorisation to attend a conference or when submitting to a Journal, Newspaper or book. An electronic copy of this form should be saved on the StokesServer/Intellectual_Property/Publications Submission Forms/ under the relevant year. An electronic copy, in PDF format, of the finalised paper should also be saved on StokesServer/Intellectual_Property/Publications under the relevant year.

The procedure for submitting a paper for publication in a technical journal or at a conference is typically as follows:

Abstract Submission

Your supervisor should advise you on selecting a suitable technical session at a conference at which to present your work. The paper title and abstract are submitted for approval by the conference session chair (a deadline for submission is normally strictly enforced). This is generally done through the conference website. An abstract submission would not normally be required for publication in a journal.

Abstract Acceptance

The conference session chair will inform you (via email) that your abstract has been accepted. You can now proceed to writing your paper.

Draft Paper Submission

For a conference, the first draft of your paper must be submitted before a specified date so that the publishers can review it. In the case of a journal, the draft paper may be submitted at any time. If the publishers require that the paper be written in a specific format, it is important that you adhere to their rules (this may include font style and size, number of pages and citation format). Most conference organiser will request that the paper be submitted in PDF format (Word documents can be converted by using the Adobe software available in L1-025).

Paper Review

A number of reviewers (normally up to 3) will read your paper, checking that the work is original and that any references are properly cited. They may comment on the clarity of presentation, point out grammatical errors and ask questions if the presentation of your work is unclear. It is possible that your paper could be rejected for publication at this point.

Correction and Final Paper Submission

Once the paper has been reviewed, it will be returned to you with comments and recommendations that you should address before submitting the final paper. After the paper has been corrected and rewritten, the final version can be submitted for publication.

Final Acceptance and Presentation

You will be notified if your paper has been accepted. If you are the lead author, you are expected to present the paper at the conference. However, a co-author may present the paper in your absence should you be unable to attend.

In general, a completed technical paper will include the following elements:

Title

The title of the paper should succinctly capture the content of the paper so that readers can decide if it is of interest to them. It should avoid jargon and include keywords (which can be identified by search engines).

Abstract

The abstract is a summary of the important points of the paper without details. No figures or tables are included and in general it should be between 150 and 400 words.

Keywords (optional)

Keywords are useful to identify the content of the paper and are often used in database search engines to enable researchers to select papers of interest and filter out irrelevant papers. Between 2 and 10 keywords should be sufficient.

Introduction

The introduction should outline the problem you are investigating, state why it is of importance and detail how you propose to approach the problem. It can include a selective literature review (with properly formatted citations) to show the context of the work you are doing.

Theory

This section can be included to present any theoretical models you have developed. Ensure that the development of any theory presented is logical and references the work of others where necessary

Experiments

This section should include descriptions of any experimental procedures you used with appropriate diagrams and details of any specific equipment used.

Results

Presentation of the results of your work in a clear and concise manner is very important. Use graphs, tables and figures as necessary, including referenced data from other researchers where appropriate.

Discussion

The discussion section will review your results and discuss any observations or patterns you have found. You should summarise your findings and compare them with the work of other researchers, explaining any differences or similarities with appropriate evidence. Suggestions for continuing the work can also be made.

Conclusions

A number of conclusions should be drawn on completion of your work and should be presented succinctly to capture the main findings.

References

This section is a list of published works by other authors, which you have made reference to in your paper. The publishers may stipulate the format, but typically the Harvard style is used. Refer to the University of Limerick guidelines on thesis presentation for details of this method.

10.0 Guide to Writing a Research Proposal

Administrative procedure

- If a description of the host institution is required, download the SRI profile from the website. Adjust as appropriate.
- On completion of the proposal, obtain a copy of the document “Authorisation Form for Research Proposals” from \\Xp7sbbm1jfoconn\stokeserver\Intellectual Property. Complete the form and ensure that all signatures are present. Take the proposal and the completed form to the research office in order to obtain the authorisation of the VP Research – the ultimate signatory of the proposal.
- File an electronic copy of the paper, in Word or PDF format, on the Stokes server in the intellectual property/proposals folder (\\Xp7sbbm1jfoconn\stokeserver\Intellectual Property) under the relevant year. An index document exists within the folder for each year. Take the next number available for your proposal. This number is for SRI use only. Please fill the relevant information for your proposal. A paper copy of the final proposal, with the internal reference number highlighted on the front page, should then to be given to the SRI administrator. When you know the funding status of the proposal, put this information in the index document. Also stamp the paper copy of your proposal, which is on file with the SRI administrator, ‘funded’ or ‘not funded’. The stamps are available from the SRI administrator.

Tips

The main objective of all research proposals – governmental or industrial – is to create **confidence** in the reviewers that you can carry out the research, and meet their requirements. As such, a proposal is a *selling* document: before submission, review your completed document and ask “Would I spend my funding on this project?” If not, then revise again! The following sub-sections contain tips for compiling governmental and industrial proposals

University, National or EU Research Proposals – 10 Good Rules

1. In selecting a topic for research, conduct a thorough literature survey³ to ensure that you are not proposing to duplicate existing research. Most research proposals require the compilation of a state-of-the-art review, and up-to-date references are useful for this.

³ The Web of Science (wos.heatnet.ie) is particularly useful for surveys.

Scencedirect.com

pubmed – www.ncbi.nih.gov/PubMed

Stokes Research Institute

2. Be aware that there is a broad range of research programmes – from scholarships and basic research grants, to applied research grants and commercialisation support. Ensure that your research proposal is pitched at the appropriate programme – for example, do not propose an applied project to a programme which supports basic research.
3. Obtain all available information on the research programme: download all programme documentation; if possible, attend information days; and do not hesitate to seek clarification from the programme administrator.
4. Ensure that your proposal complies with **all** terms and conditions stipulated in the programme documentation.
5. It is important that you address **all** the requirements of the proposal: highlight key words in bold, if necessary. For example, if it is required to define the novelty of your research, incorporate a paragraph which *explicitly* states the novel aspects – in essence, make it easy for the reviewers to locate the information which they seek. Incorporate the language used in the programme documentation into your proposal.
6. Bear in mind that it is unlikely that your proposal will be reviewed by an expert in your field. Consequently, it is **imperative** that your proposal is clearly written – in particular the introductory and background sections, and the abstract or summary. A poorly-written proposal is not likely to succeed, no matter how worthy the research or how capable the research team...
7. Many sections – work programmes, Gantt charts, project management, risk analysis – are quite standard: check existing proposals for examples.
8. Keep your CV up to date in order to fill in the track record section. Adjust as appropriate.
9. In costing a proposal, define the phases and tasks first, and then assign labour time – days, weeks or months – and additional items such as equipment, consumables, travel and overheads. Allocate costs to each item, and use the labour rate specified for the programme: if in doubt about costs, *ask!* For large projects, compile a spreadsheet – such that it is easy to adjust if tasks or phases are changed. Adhere strictly to the financial guidelines stated in the research programme!
10. Finally, make sure that the proposal looks good and is free of typos and spelling mistakes.

Industrial Research Proposals – 1 Good Rule

Industrial research proposals differ from governmental programmes in that the requirements (or needs) are rarely clearly stated. It is usually up to the researcher to elicit the requirements, define them, and compile an appropriate research proposal. In this regard, the keys to compiling industrial research proposals are as follows:

1. Clearly define the **need** for the research, as expressed by the company;
2. Indicate how you will meet that need – the **approach**;
3. Define the **outcomes** of your research;
4. State the **benefits** of your research to the company;
5. Outline your research **team**.

These aspects should be stated clearly and explicitly in the introductory or summary sections. It is particularly important to define the need for the research – this be determined from discussions and meetings with the client – and clarified subsequently, if necessary. Consider putting a one-page summary to the client before compiling a full proposal with costs – if the client approves, then there is a good chance that a full proposal will be accepted. In terms of the remainder of the proposal, many sections are similar to governmental research proposals – work programme, project team, project management, Gantt chart and so on – so follow the guidelines presented in section 3.1. A section on track record may be omitted, however, as clients tend to be only interested in your portfolio of work for previous industrial clients – and this can be communicated through calls or meetings.

Finally

Remember that the staff of the SRI have many years of experience in writing research proposals*. Most of these proposals are on file with the SRI administrator, or on the Stokes server. Read these sample proposals, and do not hesitate to pester their authors for good advice. Go to it!

* The SRI has bid successfully for support from the University of Limerick, grants from Enterprise Ireland (Basic Research Grants, Research Innovation Funds, Advanced Technology Research Programme), IRCSET scholarships, and European Union programmes. Moreover, many successful proposals for Industrial research projects have been issued.