FoC Research Guidelines

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Faculty of Computing

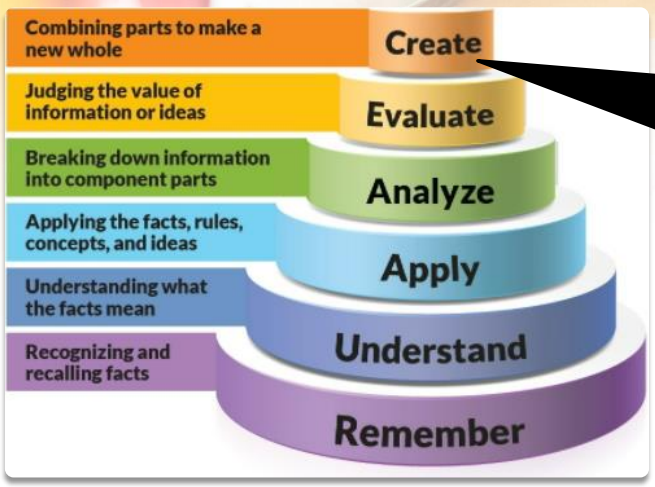
1

What to Expect in RP !

2

Research project requires highest cognitive level

Blooms Taxonomy – Levels of Thinking



Research Project (Novelty)

Provide creative and innovative solution to an open-ended complex problem

3

RP Process

Some supervisors may have research topics as parts of their ongoing research

Specialization

- Group
- Topic
- Supervisors

TAF → Proposal / Ethics Clearance → PP1 → PP2 → Final Evaluation

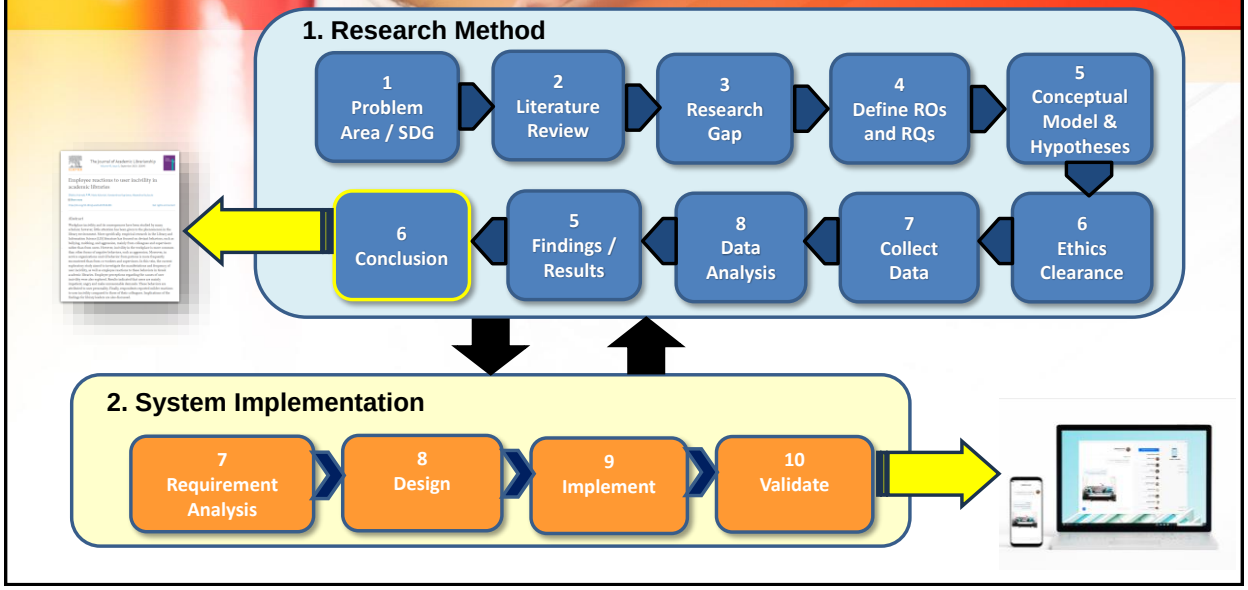
- Some supervisors may have ongoing projects / grants / industry requirements.
- Some projects may need external supervisors

Research Paper

Innovative Product

4

RP Process Overview



5

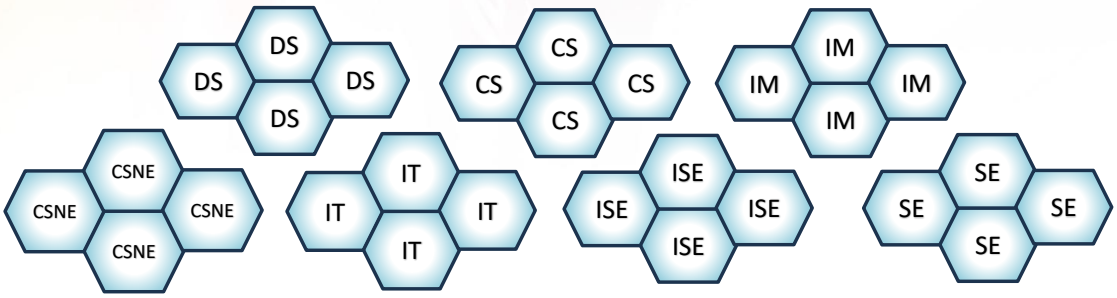
Outputs or Artefacts

- Innovative product > Win competitions
  - Requirements Spec – innovative features
  - Stakeholder Analysis
  - Business Model
  - Commercialization plan
  - UAT
- Thesis > Research publication
  - Conference / Journal
  - One more papers from one project

6

Grouping

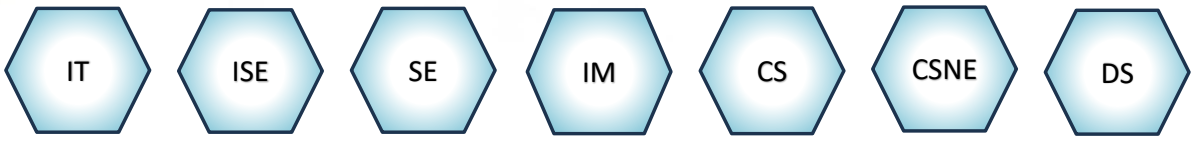
- 4 Members
- Group with students within your Specialization
- No changes after registration



7

Finding a Supervisor

- Lecturers teaching in the Specialization
- SLIIT Website: https://www.sliit.lk/graduate-studies-research/mphil-research-supervisors/
- RP Courseweb page will have a list

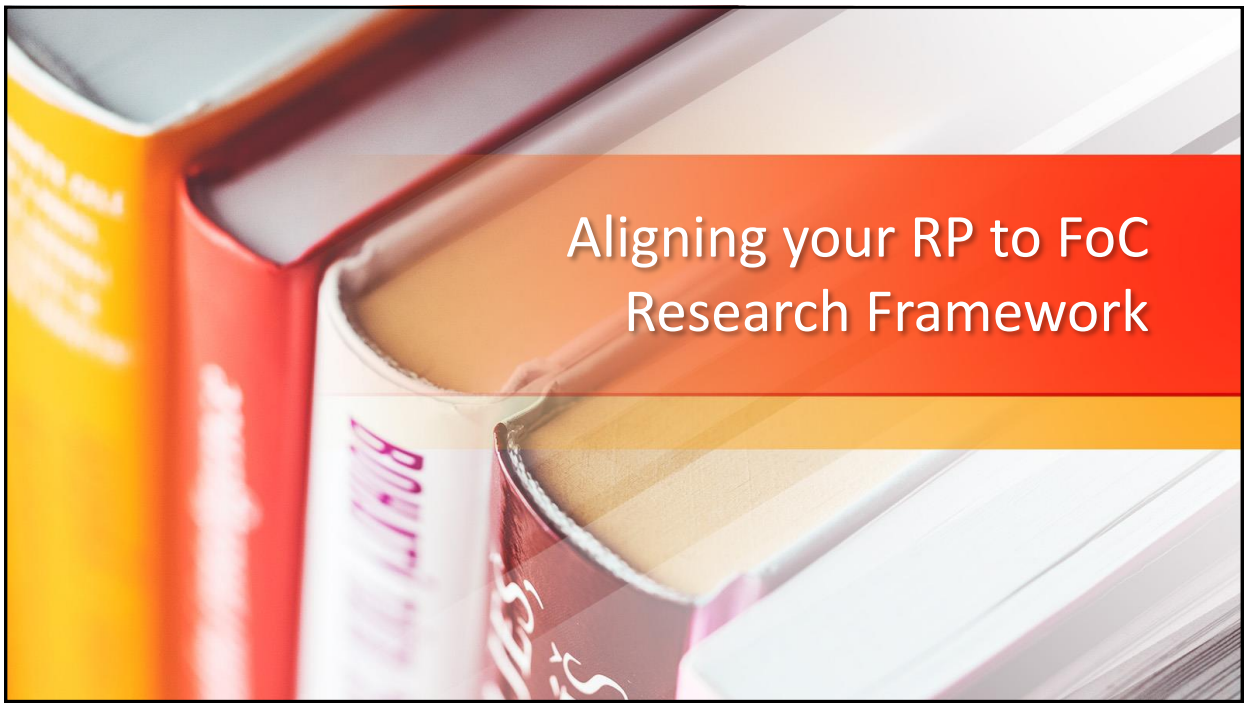


8

Finding Research Ideas

- Specialization-specific workshops
- RP Guidelines document - Courseweb
- Timely problems in Industry verticals
- UN Sustainable Development Goals
- Past research in SLIIT (https://rda.sliit.lk/)
- ICAC Proceedings (https://icac.lk/past-conferences/)
- Software competitions websites (e.g. NBQSA)
- From supervisors:
  - Industry research collaborations
  - On going research projects with grants

9



10

FoC - Research Framework

SDGs	**Zero hunger (SDG 2), Responsible consumption and production (SDG 12)**	**Good health and well-being (SDG 3),**	**Quality education (SDG 4), Decent work and economic growth (SDG 8), No poverty (SDG 1)**		**Other SDG**
Application Verticals	**Agriculture**	**Health**	**Education**		**Other Sectors (Finance, Tourism etc.)**
Services	Early Disease Detection, Nutrition Deficiency Detection, ...	Assisted Medical Diagnosis, Medical Image Recognition ...	Plagiarism Detection, Automated Marking, ...		
	Multiple Technology Areas may Map to a Single Vertical				
Technology Expertise	**Robotics (R), IoT, Embedded Systems (ES), Smart Systems (SS), Drone technology...**	**Machine Learning (ML), Deep Learning (DL), Soft Computing (SC), Image Processing (IP), NLP, Data Science (DS), ...**	**Cyber security, Information Security (IS), Computer Networks (CN), Computer Governance (CG), IS Auditing (ISA), BlockChain, Data Privacy, Network security, App security. SDN, ---**	**SE, High-Performance Computing (HPC), Parallel Computing (PC), Prog Languages (PL), Algorithms, Mobile Computing (MC), AR/VR**	**IS Strategy/ Policy Development, Frameworks, Process Improvement (BPM), Social Networks (SNA), HCI, Usability Analytics (UA), User Acceptance, Requirement Engineering (RE), Applied research**
Research Groups	**Autonomous Intelligent Machines and Systems**	**Data-driven Technologies**	**Computing Infrastructure and Security**	**Software Systems & Technologies**	**Technology Integration & Management**
BSc	**CS, CSE**	**DS, IT**	**CSNE, BSc CS**	**SE, IM, ISE**	**IT, ISE**
MSc	**IT**	**IT**	**CS, NE, IT**	**EAD, IT**	**IM, IS**
MPhil/ PhDs	**MPhil IT**	**MPhil IT**	**MPhil CN, MPhil CS**	**MPhil SE**	**MPhil IT**

11

11

12

UN Sustainable Development Goals - SDGs

Index	SDG Name
SDG 1	No poverty
SDG 2	Zero hunger
SDG 3	Good health and well-being
SDG 4	Quality education
SDG 5	Gender equality
SDG 6	Clean water and sanitation
SDG 7	Affordable and clean energy
SDG 8	Decent work and economic growth
SDG 9	Industry, innovation and infrastructure
SDG 10	Reduced inequalities
SDG 11	Sustainable cities and communities
SDG 12	Responsible consumption and production
SDG 13	Climate action
SDG 14	Life below water
SDG 15	Life on land
SDG 16	Peace, justice, and strong institutions
SDG 17	Partnerships for the goals

13

FoC Research Groups

Research Clusters	Expertise
Autonomous Intelligent Machines and Systems (AIMS)	Robotics (R), Internet of Things (IoT), Embedded Systems (ES), Smart Systems (SS), Industrial IoT, Realtime operations, Drone technology
Computing Infrastructure and Security (CIS)	Cyber security, Information Security (IS), Computer Networks (CN), Computer Governance (CG), IS Auditing (ISA), BlockChain, Data Privacy, Network security monitoring, Application security. Software-Defined Networks (SDN), Wireless communication, Communication standards, Network Opimization, Integer Linier Programming ILP, Cloud Technologies, Sensor networks, Vehicular networks, Industrial IoT, Load balancing, Virtualization (NFV), Localization, Real packet inspection, Quality of Service (QoS), Internet of Things (IoT)
Software Systems & Technologies (SST)	Software Engineering (SE), High Performance Computing (HPC), Parallel Computing (PC), Prog Languages (PL), Algorithms Design and Dev (ADD), Mobile Computing (MC), Augmented/Virtual Reality (A/VR), Rich Web-based Apps, architectures and designing (RAAD)
Data-driven Intelligence	Machine Learning (ML), Deep Learning (DL), Soft Computing (SC), Image Processing (IP), Natural Language Processing (NLP), Computational Linguistics (CL), Data Science (DS), Business Intelligence and Analytics (BIA), Knowledge Management (KM), Big Data (BD)
Technology Integration & Management	IS Strategy/ Policy Development, New Frameworks, Process Improvement (BPM), Social Networks (SNA), Human Computer Interaction (HCI), Usability Analytics (UA), User Acceptance, Requirement Engineering (RE), Applied research

14

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15

Program-wise Research Areas

Specializations	Research Areas (not limited to)
Information Technology (IT)	Machine Learning (ML), Deep Learning (DL), Software Engineering (SE), Mobile Applications, Human Computer Interactions (HCI), Image Processing, Natural Language Processing (NLP), Algorithms, Operating Systems (OS), Cloud Computing (CC), Internet of Things (IoT), Database Systems (DS), e-learning
Information Systems Engineering (ISE)	Requirement Engineering (RE), Business Process Management (BPM), Project Management (PM), Usability Analytics, Social Networks Analytics (SNA), Social Media Analytics, Business Intelligence (BI), CRM/SRM/ERP, IS Strategy/ Policy Development, Technology Adoption & Diffusion, User Acceptance, Decision modelling, IS resource management, Visualizations, Human Computer Interaction (HCI)
Software Engineering (SE)	Software Engineering (SE), High Performance Computing (HPC), Parallel Computing (PC), Prog Languages (PL), Algorithms Design and Dev (ADD), Mobile Computing (MC), Architectures and designing (RAAD), Artificial Intelligence and ML, Visualizations
Cyber Security (CS)	Confidentiality, Integrity and Availability, Data & O/S Security, Cryptography, Secure Software Development, Information Security, Information security Audit, Risk Management, Governance and Compliances, Hardware/embedded systems/ IoT security, Vulnerability Assessment, Penetration Testing, Cyber Forensic Principles, Privacy Engineering, DevOps Security, Threat Hunting / Threat Intelligence, Mobile Security, Risk Automation, Social Engineering and Security, Network Security, Authentication SOAR
Data Science (DS)	Machine Learning (ML), Optimization Methods (OM), Big Data Analytics, Visual Analytics (VA), Statistical Modeling, Operational ML, Deep Learning (DL), Natural Language Processing (NLP), Computer Vision
Computer Systems and Network Engineering (CSNE)	Network Protocols and Technologies, Network Security, Network Programming, Virtualization and Cloud Computing, System Administration, Troubleshooting and Debugging and Optimization, Wireless Communication, IoT (Internet of Things), AI/ML for Networking, Database Administration, Computer Hardware and Microprocessor Systems, Network Management and Administration, Telecommunications Engineering, Network Design and Optimization, Software Defined Networking (SDN)
Interactive Media (IM)	AR, VR, Haptics and Immersive Experience Development, Game Design & Development, Interaction Design & UI/UX, CGI for Generic and Interactive Filmmaking, Computational Creativity with New Media Applications, Creative Coding for Design and Generative Arts, Digital Media Processing and Analysis, Interactive and Generative Story Telling Technologies, Computer Vision and 3D Object Representation, Animation and Motion Capturing, Metaverse Applications Development, Digital Marketing and Digital Business

17

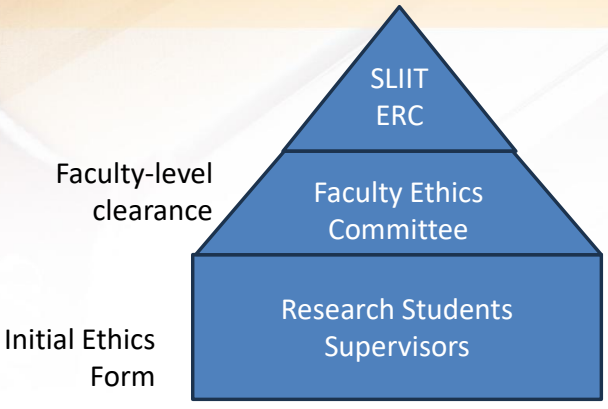
18

Ethical Aspects

- Some research projects may require ethics clearance before data collection;

E.g.

- Confidentiality, Privacy, Risk



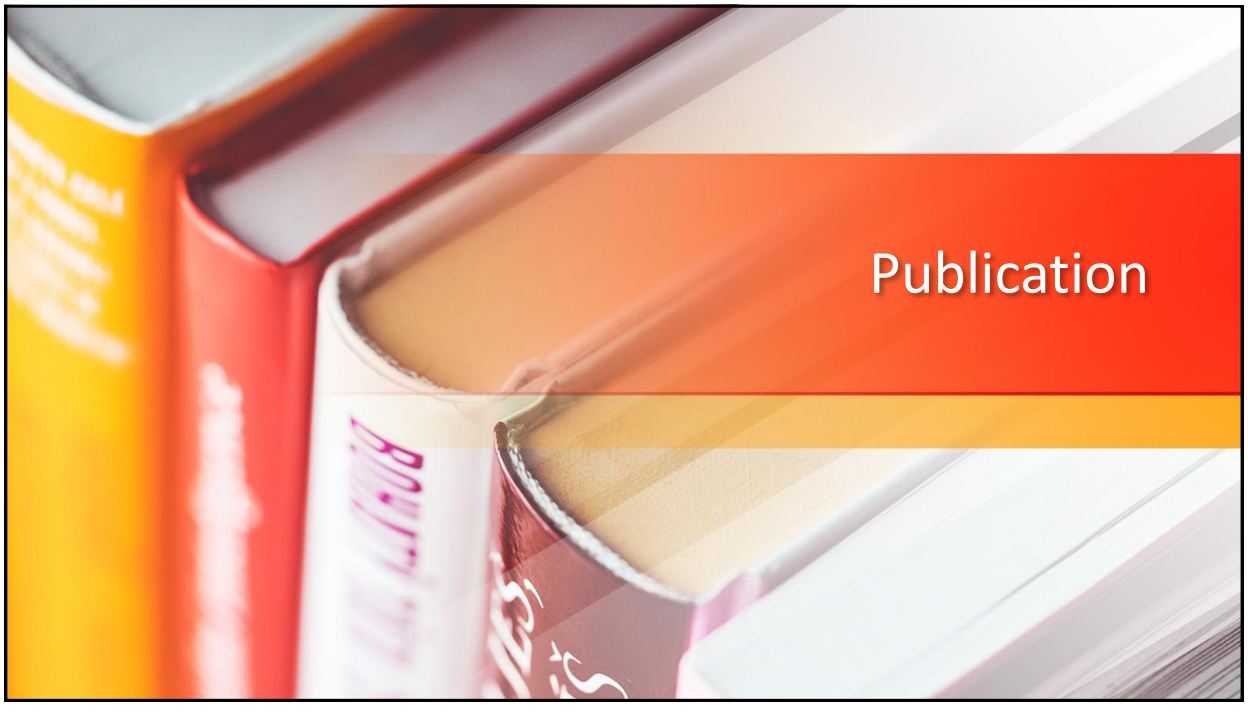
19

Ethical Aspects

Data Source	Description	Data Collection Methods
Primary Data	Primary data collection happens when researchers obtain information directly from the original sources.	Survey/ Interviews/ Observation/ Focus groups/ New Images etc.
Secondary Data	Datasets already gathered from previous research. This data is usually already analyzed and put into context. Sources of secondary data can include:	Books / Past research papers/ Annual reports/ Newspapers / Reports / Websites/ Online Databases etc.

Research Component	Data required. (e.g. Images of leaves)	Amount of Data Required	Data Source (Primary /Secondary)	Collection Method

20



21

Publication

	Length/ Details	Time for Review	Quality	Avoid
Conference Paper	Short (6 pages)	Short (Fixed)	High H index Scopus-indexed	https://beallslist.net/ Not peer reviewed
Journal Paper	Long (15 pages)	Long (Several months)	Scopus-indexed Impact Factor	https://beallslist.net/ Not peer reviewed

Theoretical / Empirical paper	Describes a theory, provides a mathematical proof for some hypothesis. Describes an experiment designed to test some hypothesis.
Review Paper	Provides a detailed review / summary of literature related to a topic or argument
An engineering paper	Describes an implementation of an algorithm, or part or all of a computer system or application Frequently required to include descriptions of system evaluation.

22

FoC Process for Submitting Research Papers

Complete writing paper → Get Supervisor Approval → Submit FoC Form (compulsory) → Format as required by conf / journal → Submit paper to conf / journal

1. **Quality of Paper?**
2. **Quality of Journal/ conf?**
3. **Author names, affiliations**

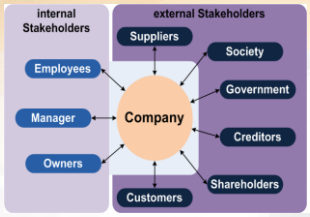
https://forms.office.com/r/zT1D0V9iDi

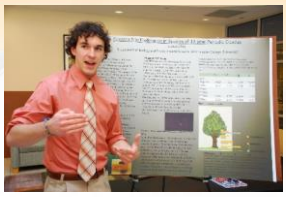
***** IMPORTANT*****
Get approval from your supervisor before submitting your paper to any conference or journal

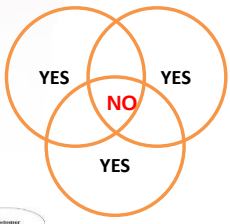
23

Preparing for Topic Assessment

- Prepare plan A, B
- Rehears with supervisor /co
- Visualize
  - Theoretical background
  - Existing solutions comparison
  - Conceptual model
  - Process models
  - Stakeholders
  - System architecture
  - Business model canvas







Features of E-ordering System	Similar Systems			EOS
	Mega-Ventory [8]	Orderhive [9]	Zoho Inventory [10]	
Purchase Order Module				
Customer Management	/	x	x	/
Catalog Management	/	/	x	/
Reporting	/	/	x	/
Inventory Module				
Re-order Management	/	x	x	/
Supplier Management	/	/	/	/
Reporting	/	/	/	/
Production Module				
Allocation	/	/	x	/
Sales & Operations Planning	/	/	x	/
Item Management	/	/	x	/
Order Management	/	/	x	/
Quantity Control	x	x	x	/
Reporting	x	x	x	/
Invoice Module				
Purchasing	x	/	/	/
Reporting	/	x	x	/

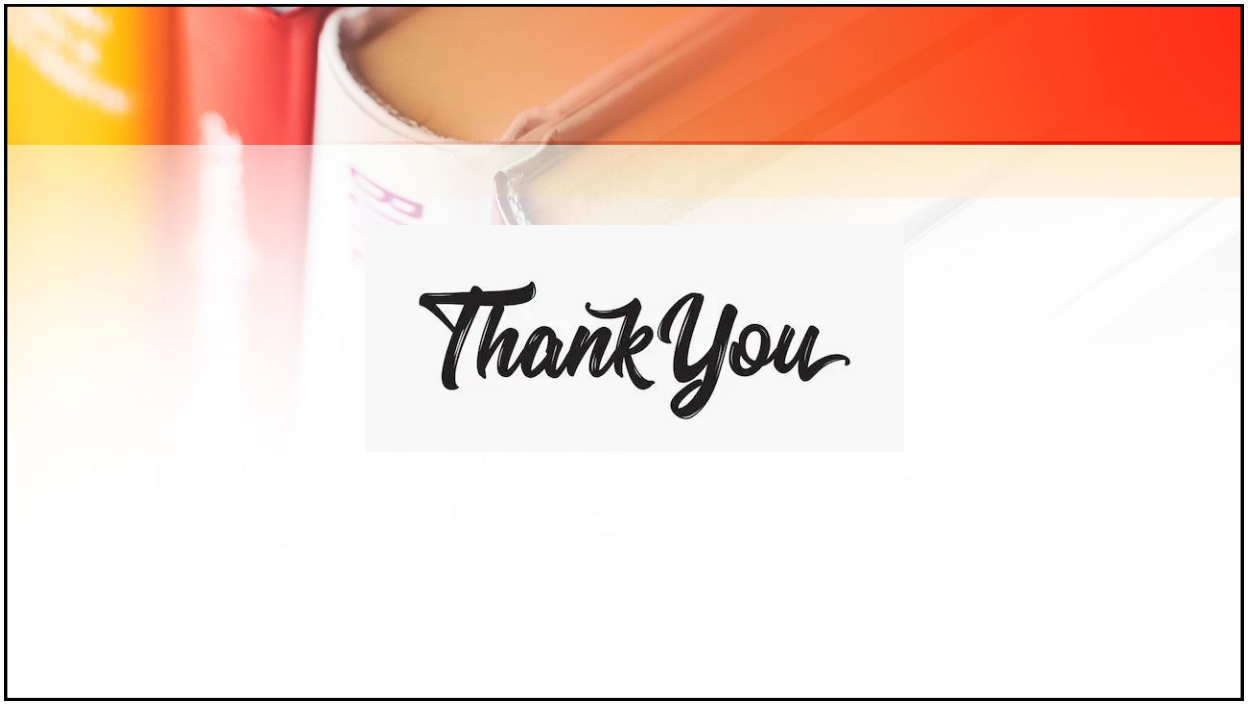
24

Documents will be Shared in Courseweb Page

- **Research Project (Comprehensive Design and Analysis Project) - IT4010 [2024/JUL]**

- Supervisors List
- RP Guidelines Document
- Supervisors' research topics
- Ethics Review Forms

25



26