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Transferable skill courses

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Abstract

Through the Doc-TIC PhD Programme a number of course modules in areas related to integrated photonics are given to the ESRs. The EDIFY ESRs will be required to attend an intensive transferable-skills based training formalised as specific courses. This will equip the ESRs with transferable skills in scientific writing, project management and business, entrepreneurship and leadership areas

Keywords: Photonics, Physics, Solid-state physics, Robotics, Training, Automation, JePPIX

Change Record

Revision	Date	Description	Reviewer
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1. INTRODUCTION

Sometimes it's difficult for PhD students to identify what skills they have since the academic experience is not necessarily focused on articulating skill sets. We also often find that PhD students struggle, understandably, to present the transferability of their academic experiences to non-academic contexts. In the EDIFY project we provided the ESRs with a set of Transferable Skill Courses that help them solve some of these problems. Specifically, we have designed three courses on these areas:

Entrepreneurship Skills

- Facilitate group discussions or conduct meetings
- Motivate others to complete projects (group or individual)
- Respond appropriately to positive or negative feedback
- Effectively mentor subordinates and/or peers
- Collaborate on projects
- Teach skills or concepts to others
- Navigate complex bureaucratic environments

Project Management & Organization

- Manage a project or projects from beginning to end
- Identify goals and/or tasks to be accomplished and a realistic timeline for completion
- Prioritize tasks while anticipating potential problems
- Maintain flexibility in the face of changing circumstances

Written & Oral Communication

- Prepare concise and logically-written materials
- Organize and communicate ideas effectively in oral presentations to small and large groups
- Write at all levels — brief abstract to book-length manuscript
- Debate issues in a collegial manner and participate in group discussions
- Use logical argument to persuade others
- Explain complex or difficult concepts in basic terms and language
- Write effective grant proposals



1.1 TRANSFERABLE SKILL COURSES

The Transferable Skill Courses included in the EDIFY program are:

Title	<i>Project management (TSC 1)</i>	Month: 40	Duration: 1 Week
Lead	UVigo		
Contents: This course will give an introduction into the basics of project management in particular to the notions of project life cycle, milestones, deliverables, special requirements of complex R&D projects, work breakdown structure and work packages, cost projection and risk assessment, communication, etc. Exercises will be provided from the many years of experiences with coordinating projects funded by the European Commission.			
Skills for ESRs: The ESRs learn to properly set-up and plan a project with new approaches to time management.			
Title	<i>Scientific writing and dissemination (TSC2)</i>	Month: 40	Duration: 2 Weeks
Lead	UVigo		
Contents: The purpose of this seminar is the improvement of written English skills specifically e vocabulary and styles required for scientific writing. Resource materials and strategies for verifying the specificity and correctness of specialty vocabulary for scientific papers and publications will be made available to the participants and discussed. These materials can be used by the participants to continue improvement of writing skills after the seminar.			
Skills for ESRs: The ESRs learn how to use written language effectively to present scientific data for scientific publishing. To learn how to deal and manage innovation processes in company, to understand the workflow of innovation and research in a company department, to learn how to manage the ESR's scientific career, to evaluate and develop a proposal for an European project.			
Title	<i>Entrepreneurship (TSC3)</i>	Month: 42	Duration: 1 Week
Lead	UVigo		
Contents: The course covers the essentials on:- Day 1 - Business Models and Business plan construction; Business mission statement, vision, products & services; Definition of the target markets using the Value Proposition Canvas; Understanding the target industry;- Day 2 - The basics of marketing and marketing for different Products or Service types: The internet side of marketing; Developing a market communications plan including how to communicate benefits and competitive advantages; Promotional components to help reach target customers including estimated costs - Day 3 - Legal and Operations Understanding the different legal entities and pros and cons of each; Basics of employment law, workers' compensation & unemployment compensation - the difference between independent contractors and employees; Basics of patents, copyright, trademarks & trade secrets - Buying a business or franchise - An overview of business operations (Technology needs, Location, Risk Management); Human Resource Management and Operations - Management/personnel regulations and job descriptions - Hiring the first employee, including recruiting & interviewing - Operations Continued; Accounting and Record Keeping; Financing- crowdfunding, angel and venture capital - Importance factors including credit for bank financing - Steps for applying for a loan - Different reasons for borrowing money (start-up, cash flow, capital equipment, expansion, etc.			
Skills for ESRs: Analyse customer value creation; Conduct an initial novelty screening and draft a patent application; Draft a business plan on a selected subject; Analyse team member skills, competencies and experience Identify business opportunities in industrial challenges.			

The courses have been developed through an agreement with Nature Research Services, via Nature Masterclasses (<https://masterclasses.nature.com/>). All ESRs have received a 18 months online training in those aforementioned subjects. This training started in month 20 and being online due to pandemia, the duration and contents are bigger than those prepared for the project.

TSC2- SCIENTIFIC WRITING AND DISSEMINATION (40 HOURS)

Scientific writing and publishing

- Develop writing skills and confidence writing for journals
- Understand editorial processes and what editors look for



- Learn best practices for submitting a paper and peer review

Effective collaboration in research

- Understand the different forms, benefits, and challenges of collaborative research
- Develop key collaborative skills such as communication and teamwork
- Learn how to initiate and run a successful collaboration
- Learn how to maximize the value of, and conclude, a collaborative project

Data Management & Narrative Tools for Researchers

- Understand the benefits of managing research data effectively
- Learn the steps required to create and maintain a data management plan
- Learn how to apply best practices to organise, store, archive and check the quality of your data
- Evaluate the different options for sharing research data
- The importance of conducting effective data analysis
- The best tools for exploring various datasets
- The range of analytic methods available and understand which is most suited to your data
- Strategies for obtaining feedback, troubleshooting and expressing the limitations of your analysis

Grant Writing, Networking, Communications and Experimental Design

- Understand how narrative tools can improve the quality of your grant applications
- Learn to align your grant proposal with the requirements and objectives of your chosen funder
- Learn how to apply narrative tools when writing their grant proposal to make it more informative, persuasive and engaging
- Identify techniques that can help to overcome the challenges that researchers commonly experience when delivering oral presentations
- Learn how to build compelling research stories to use as the foundation for your presentations
- Learn how to create professional slide decks that effectively communicate research findings to your audience
- Learn how to apply strategies to help you deliver your presentation effectively on the day, in both virtual and face-to-face environments



- Understand the theory behind and the importance of networking, and how to use your research and career goals to guide you to find appropriate networking opportunities
- Learn how to research and prepare key resources to help you build an effective network
- Learn strategies to approach and connect with potential contacts, and how to follow up – both in person and online
- Learn strategies for nurturing your networking contacts, and how to leverage them to advance your research and career

TSC1- PROJECT MANAGEMENT (150 HOURS)

Upon completion of the Nature Masterclass Course, ESRs are able to:

- Understand project management design, development, and deployment
- Use project management tools, techniques, and skills
- Employ strategies to address the ubiquitous issue of resistance to change
- Align critical resources for effective project implementation
- Understand the implications, challenges, and opportunities of organizational dynamics in project management
- Identify and use key performance metrics for project success
- Understand how to manage project cost, quality, and delivery
- Engage and lead effective project management teams in your organization
- Impart project management knowledge, tools, and processes to your colleagues
- Recognize and mitigate the early seeds of failure in the project life cycle

The syllabus of the course is:

The Right Start: Preparing people and organizations for the challenge of change: Identify and link the three essential elements of true innovation

- Examine insights into the antecedents and consequences of project failure
- Summarize the characteristics of a change-adverse workforce
- Identify the driving force in establishing individual readiness for change
- Define three domains required to create organizational readiness for change
- Discuss, interpret, and ascribe meaning to a typology for change initiatives
- Examine seven critical success factors for launching change initiatives
- Understand the structure and expectations of MGMT 5030 Project Management

Strategic Excellence in Project Management: Project Activation Management System (PAMS) Process for Project Management



- Consider the definition and common attributes of a project
- Understand stakeholders' key to the early development of a project

Phase II: The Start-Up Process. Introduction to Green-Lighted Projects PAMS Process for Project Management

- Review the steps in the Start-Up process
- Understand how to build a strong project foundation
- Discuss the challenges and opportunities of working in a team
- Discuss the team expectations document that teams created
- Consider strategies to influence without authority

Phase III: “Develop” – Preparing Projects for Launch PAMS Process for Project Management

- Explore elements of key project management tools including WBS, schedule, budget
- Understand risk mitigation strategies
- Consider key performance metrics
- Discuss scope and scope statements

Phase IV: “Implement” PAMS Process for Project Management

- Construct the final project implementation plan
- Manage plan revisions and change control
- Conduct problem solving and stakeholder management
- Discuss strategies for monitoring the project implementation plan

Phase V: “Close” PAMS Process for Project Management

- Explore the process for closing out the project
- Capture Lessons Learned
- Highlight the importance of project team recognition

Tales and tips from the Field: Enable East Case Studies

Project Presentations, assignments



TSC 3 – ENTREPRENEURSHIP (120 HOURS)

The ESRS received an additional online training on Entrepreneurship in a seven modules training:

Strategic Innovation: Building and Sustaining Innovative Organizations

- Understand key ideas about innovation and product strategy
- Strategize for value capture in a business model
- Critically examine the roles of various players in a business ecosystem

Strategic Innovation: Managing Innovation Initiatives

- Analyze innovations and their impact on organizations
- Articulate a research-informed perspective on innovation
- Utilize frameworks, tools, and concepts to address challenges that arise in innovation

Creativity Toolkit I: Changing Perspectives

Design pitches for innovative ideas to build excitement and clarity

- Evaluate the pitches of others to identify great new ideas
- Lead groups to foster effective collaboration for innovation

Entrepreneurship I: Laying the Foundation

- Develop a foundational understanding of the entrepreneurial process
- Consider the relationship between growth and error
- Understand how particular opportunities influence entrepreneurial phenomena

Entrepreneurship II: Preparing for Launch

- Develop an understanding of what is required in a new venture
- Create a plan to identify and approach your first customers
- Build financial projections for the new venture
- Understand how to raise equity capital for the new venture
- Monitor the health and scalability of a new venture



Innovation: From Creativity to Entrepreneurship Capstone

- A venture of one's own or within a larger organization
- To develop the current business model and compare against alternative business models so as to identify potential opportunities and challenges.

