### Details of revisions

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1 INTRODUCTION

This document provides guidance for the planning and design of research and laboratory spaces incorporating current design objectives to create student-centred, collaborative, flexible and technology-rich environments.

The Guidelines support the University’s Academic Heart Guidelines in creating a university of innovation with contemporary facilities, and Curtin University’s Strategic Plan – Research where the focus is on student-centred learning and the provision of innovative, richly interactive personalised learning experiences that include functional laboratory environments for learning, research and development.

As laboratories provide opportunities for learning and research activities for multiple users, their design should ensure a safe working environment for all users, and protect staff, the public and the environment. Containment requirements should be established as a project objective and documented in the project brief.
2 DESIGN OBJECTIVES

Current trending for laboratory design is open-plan, high flexibility environments that allow configurations and setups to be easily adapted to meet the requirements of the users and have better efficiency of space.

These laboratories utilise such flexible arrangements to support large or multiple users and teams that may be across disciplines. However, a combination of open laboratory spaces with smaller areas dedicated to special functions will often be necessary.

Designs are to incorporate key objectives to create spaces that are:

- student-centred learning and research
- technology-rich digital learning and research
- collaborative environments with cross-disciplinary and shared experiences

2.1 STUDENT-CENTRED LEARNING AND RESEARCH

To support student-centred learning, laboratory spaces should meet the needs of users by having appropriate functional spaces, equipment and services to allow students to undertake their activities. Research and laboratory spaces need to:

- be adaptive to readily accommodate the activities that students will be undertaking and allowing spaces to be configured in a variety of sizes with possible partitioning using flexible screens
- have zones that can be configured in which to perform specific tasks (and which might previously have been in separate buildings)
- contain flexible, multi-use or mobile furniture and equipment that can enable more efficient work spaces and cater to research and learning requirements, e.g. mobile casework
- have social spaces to encourage informal sharing, engagement and a sense of community
- have near-located support spaces, storage and facilities.

2.2 TECHNOLOGY-RICH DIGITAL LEARNING AND RESEARCH

Curtin is committed to ensuring an innovative, richly interactive, personalised learning experience for all students, both on-campus and online.

Digital learning used in blended or convergent learning modes and delivery is embedded in the on-campus experience through collaborative learning spaces, distributed learning, flipped elements, active learning strategies and authentic assessment practices.

Supportive technology that is suited to research and laboratory activities should:

- provide students with technology integrated and interactive personalised learning experiences – shared and individual
- be suited to student requirements; including their data capacity needs
- include fitted ports and outlets to accommodate multiple furniture layouts
- have appropriate cabling and/or enabling wi-fi
• have easy connects/disconnects (plug-and-play) at walls and ceilings to allow for fast and affordable hook-up of equipment and technology
• have flexible furniture to accommodate equipment and cabling.

2.3 COLLABORATIVE

Ideas and shared experiences from cross-disciplinary working environments enhance learning opportunities. Interaction/collaboration of multiple users and groups from different disciplines and over different types of work within the same lab should be encouraged. To facilitate this, designing ways to support engagement, collaboration and networking is to be part of the design and could include:

• incorporating areas that foster social interactions:
  – for people to congregate and talk with one another
  – where people can see one another e.g. through clear interior glazing
• designing for multi-use spaces:
  – organised by function, rather than discipline to promotes cross-disciplinary collaboration and interactions between people and teams, and for external collaboration
  – accommodating short- and long-term projects and temporary research teams
• providing small spaces in close proximity to laboratory areas:
  – for supportive activities, e.g. writing up research, quiet reflection
  – discussion/conference areas
• sharing resource spaces with other teams, faculties and the wider community:
  – through sharing of equipment (including expensive items) and bench space
  – reducing the number of dedicated spaces for specific users and increasing flexible use spaces.

As part of the wider Curtin community, community engagement may include organising community and schools projects that increases the utilisation of facilities and sometimes under-utilised spaces. This engagement is an additional consideration and could mean additional requirements.
3 TYPOLOGIES

With advances in technology and the embracing of contemporary models of learning and teaching, laboratories must adapt to altering needs. Laboratory spaces should reflect the change in our economy, our environment, the relationship that laboratories, users and the University have with the community at large and facilitate partnerships and development. Design should be responsive to present needs and capable of adapting to future demands and growth.

Three typologies for laboratories are:

3.1 TEACHING LABORATORIES

Teaching Laboratories: where practical and guided training and explorative activities are conducted.

3.2 RESEARCH FACILITIES

Research Facilities: where basic research and applied research is conducted under controlled conditions.

3.3 SUPERLABS

Superlabs: where large, high capacity laboratory sessions that support hands-on, problem solving, and team-based experiential learning are conducted. They may be cross-disciplinary allowing multiple classes to be run at one time, aided by the use of technology. They progress on from the open laboratory and require fewer staff to manage.

For each of the typologies, additional facilities may be required:

- Containment facilities for research activities where the containment of biohazardous materials is required; to certified construction and management levels and as per regulatory requirements.
- Ancillary facilities to support the activities for the effective operation of any and all of the above laboratory types, including storage areas, preparation rooms, and audiovisual systems.
4 CURTIN REQUIREMENTS

4.1 DISABILITY ACCESS AND INCLUSION PLAN

Curtin University believes in creating equitable and inclusive access for people with a disability to its facilities, services, events and academic programs on all its Western Australian campuses.

The Universal Design Guideline has been developed to reflect a commitment to equity and inclusion for all by embedding Universal Design principles into project planning, design and delivery guidelines. Consultant architects, designers and engineers should make themselves familiar with the particular requirements of the Universal Design Guideline before responding to a project brief.

4.2 HEALTH AND SAFETY

Curtin University is committed to providing and maintaining high standards of health and safety in the workplace and will:

- ensure compliance with relevant legislation and the University’s Health and Safety Management System
- promote an organisational culture that adopts health and safety as an integral component of its management philosophy
- ensure that health and safety is part of the business planning processes and that it is adequately resourced by all areas
- maintain an effective mechanism for consultation and communication of health and safety matters
- maintain an effective process for resolving health and safety issues and managing health and safety risks
- provide appropriate health and safety training
- regularly review health and safety performance to monitor the effectiveness of health and safety actions and ensure health and safety targets and objectives are met.

A copy of our Health and Safety Management Standards can be found at: https://healthandsafety.curtin.edu.au/local/docs/HSManagementStandards.pdf

4.3 SUSTAINABILITY AT CURTIN

It is Curtin University policy that all new or refurbishment projects on site should support its status as Australia's first university to achieve a 5-star Green Star – Communities rating from the Green Building Council of Australia (GBCA). Designers should understand and incorporate the Green Star criteria into designs and specifications in order to maintain and enhance Curtin’s Green Star status. Information on the criteria can be found in the PDG Green Star – Communities Design Guidelines.
5 REFERENCES

5.1 CONTACTS

The requirements for the design of new and refurbished research and laboratory spaces will be project-specific and will need to accommodate the latest Curtin University research, learning and teaching objectives. Designers should ensure that they establish early communications with all the relevant project stakeholders and obtain briefings on the desired outcomes.

For research and laboratory spaces, the Responsible Officer will engage the following stakeholders:

- Office of Research and Development including relevant compliance personnel
- the academic disciplines or faculties for which the research space is being designed
- Properties, Facilities & Development — Portfolio Manager, Research.

5.2 RECENT EXAMPLES

Recent projects to construct new research and laboratory spaces or to refurbish and repurpose existing spaces may be illustrative of future designs. Recent projects and outcomes are described in the following documents:

5.2.1 SUPERLABS REPORT – TOUR 2016

This report was prepared at the commencement of implementing the Superlab concept at CU and demonstrates the development of student-centred, technology-rich and collaborative research facilities and ‘Superlab’ laboratory spaces.

The report can be found in the references on the P F & D website at https://properties.curtin.edu.au/workingwithus/guidelines.cfm. The CU contact is Portfolio Manager, Research.

5.2.2 B304 RESEARCH FACILITY 2016

The B304 project demonstrates how student-centred, technology-rich and collaborative research facilities are planned and operated in a new facility.

Schematic design drawings and room data sheets can be found in the references on the P F & D website at https://properties.curtin.edu.au/workingwithus/guidelines.cfm. The lead design consultant is STH Architects, The CU contact is Portfolio Manager, Research.

5.2.3 B311 LABORATORY ADDITIONS AND REFURBISHMENT - 2018

The B311 project demonstrates how student-centred, technology-rich and collaborative laboratory and ancillary facilities can be created through the re-planning and additions to an existing building.
Schematic design drawings and room data sheets can be found in the references on the P F & D website at https://properties.curtin.edu.au/workingwithus/guidelines.cfm. The lead design consultant is Donaldson+Warn architects, the CU contact is Portfolio Manager, Research.

5.3 RELATED DOCUMENTS

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<td>PDG Green Star – Communities Design Guidelines</td>
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