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I. Introduction

The National University of Singapore (NUS) has an over-arching environmental policy endorsed by the President. In addition, the recently developed Greenhouse Gas Reduction Plan translates our climate change strategy into quantifiable goals and targets to be attained by relevant departments. Together, these two directives form a campus-wide framework that guides and forms NUS’ strategic research, education and operational thrusts.

On National University of Singapore

Founded in 1905, NUS is a global, comprehensive research-intensive university with 15 faculties and schools across three campus locations in Singapore – Kent Ridge, Bukit Timah, and Outram.

NUS’ Global Approach

NUS’ vision is to be a leading global university centred in Asia. A key strategic thrust is global education which encompasses extensive international student exchange programs, year-long experiential entrepreneurship education at seven NUS Overseas Colleges, and double degree and joint degree programmes with some of the world’s top universities. NUS is also active in leadership and participation in key academic alliances such as the International Alliance of Research Universities (IARU), the Association of Pacific Rim Universities (APRU), and the ASEAN University Network (AUN). NUS has nearly 20,000 alumni who are working or living overseas.

NUS’ Statistics

NUS’ student body comprises 36,966 students (26,418 undergraduate students and 10,548 graduate students) who come from approximately 100 different countries in academic year (AY) 2010 – 2011. The university actively promotes a very high degree of diversity on campus as this enriches the learning and social environment, and provides opportunities for NUS students to learn to be effective in many cross-cultural settings. Currently, NUS has 3,480 academic staff, 2,600 research staff, 1,980 executive and professional staff, and 2,500 unionised staff. The university recruits world-wide for faculty.

Every member of our university, irrespective of ethnic, racial, or religious background, is entitled to equal opportunities for intellectual, personal, and professional growth. The global
network of students on campus also enriches the campus’ community with their diverse social and cultural perspectives, further enhancing the vibrancy of campus life.

**NUS’ Core Competencies: Education, Research, and Development**

NUS is proud of its rich heritage as Singapore’s first tertiary educational institution and continues to offer an extraordinary array of programs, tailored to the diverse needs of an exceptional student body. It strives to provide for every student an optimal opportunity and environment to develop his skills and to expand and develop his interests.

NUS has a broad-base of research expertise and excellence. In particular, NUS has four Research Centres of Excellence, 22 university-level research centres as well as close partnerships with 16 national-level research institutes and centres. The university has particular strengths in engineering and computing, life sciences and biomedicine, Asia studies, and several physical sciences. The university places a strong focus on facilitating the translation of basic research discoveries to create new value through its entrepreneurship programs.

**NUS’ Organizational Structure**

As illustrated above, NUS is governed by a Board of Trustees (BOT) which currently comprises 23 external members and the President of the university. The Board is appointed by the
Minister of Education pursuant to the NUS Corporatisation Act. The committees of the BOT include: the Audit Committee, the Campus Planning and Development Committee, the Executive Committee, the Entrepreneurship Committee, the Investment Committee, the Nominating Committee, the Remuneration Committee, and the Development Committee.

Nature of Ownership, Legal Form and Funding

NUS is incorporated as a company limited by guarantee under the Companies Act (Cap. 50), and is registered with the Accounting and Corporate Regulatory Authority (ACRA). The university is a publically funded autonomous university under the purview of the Singapore Ministry of Education. It is also governed by the National University of Singapore (Corporatisation) Act (Cap. 204A) (“NUS Corporatisation Act”).

The university’s core operating expenditure is funded primarily through: educational funding from the government (based on a grant per graduate output), tuition fees, governmental research grants, gifts, and other income including income from non-governmental research funding, fees for other services and its endowment funds.
The Report

This is the first freestanding Charter Report to be produced by NUS. With the exception of the environmental performance information which is for the AY2009 – 2010 (August 2009 - July 2010), all other performance information provided in this report is up to date.

The boundary of this report encompasses the whole of NUS – units within Kent Ridge and Bukit Timah campuses (excluding Kent Vale Staff Housing and affiliated institutes located within the Kent Ridge campus).

For questions on this report, please contact:
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II. Reporting Principle 1: Buildings and their Sustainability Impacts

Principle 1: To demonstrate respect for nature and society, sustainability considerations should be an integral part of planning, construction, renovation and operation of buildings on the campus

A sustainable campus infrastructure is governed by respect for natural resources and social responsibility, and embraces the principle of low carbon economy. Concrete goals embodied in individual buildings can include minimizing environmental impacts (such as energy and water consumption or waste), furthering equal access (such as non-discrimination of the disabled), and optimizing the integration of the built and natural environments. To ensure buildings on campus can meet these goals in the long term, and in a flexible manner, useful processes include participatory planning (integrating end-users such as faculty, staff, and students) and life-cycle costing (taking into account future cost-savings from sustainable construction).

Management Approach

Relative to the great universities of the world, NUS is relatively young and still growing with a substantial expansion of its student body during the past decade, the development of many new academic programs, and an enormous growth in the breadth and depth of its research enterprise. It has also launched substantial initiatives to foster entrepreneurial activity that will translate research and engineering discoveries into products that benefit society.

Given the limited resources and space, the university’s central focus is to improve the quality of life on campus through creative and careful planning to strike a balance between the sustainability agenda and the ever expanding research and education curriculum. The university’s current plans will expand its gross floor area by 44% from 2008 until 2015 to provide the necessary infrastructure to support the expanded student and faculty population. Further growth beyond 2015 is expected due to increased research and collaborative activities. The university’s sustainable strategy focuses a substantial portion of its attention on meeting these new infrastructural needs in a sustainable manner. Environmentally sensitive development presents the greatest opportunity for NUS to have a lasting, long term, positive impact on the environment.

The first approach is to minimize the amount of new space required to support these infrastructural needs. The square meter that is saved by efficient design and utilization of space will be the “greenest square meter” of space in the plan. Every square meter of new development must make the maximum possible contribution to supporting overall infrastructural needs.
The second approach is to reduce the amount of new construction that uses tempered air, an enormous challenge in the warm, humid climate of Singapore, but the maximal opportunity for efficiency in new construction. While the university is exploiting new technology to reduce energy consumption with lower cooling load and more efficient chilled water production, the most efficient square meter of new office or residential space from an energy perspective is one that utilizes natural ventilation all the time. If air conditioning is required at times for the appropriate functioning of space, designs that allow for mixed mode of operation (comfortable natural ventilation or air conditioning) and appropriately price the availability and use of energy for cooling are the second alternative in this strategy. For example in the two new residential colleges that will be completed in 2011, 73% of the gross floor area does not have conditioned air. More than half of the remaining space, which has conditioned air, is designed as mixed mode so that it can be operated primarily with fans and natural ventilation but can function as air conditioned space, when required. In addition, students who opt for space that can be air conditioned will pay premium rentals and will be charged for usage of air conditioning system.

The university is committed to Singapore’s green building standard, the Green Mark (GM) scheme. This commitment has produced, within a one year period from Dec 09 to Jan 11, a GoldPLUS GM District, one GM Platinum buildings, one GM GoldPLUS building, three GM Gold buildings and two GM Certified buildings.

In 2008, NUS embarked on a Green House Gas (GHG) Inventory, covering emissions from Energy, Staff Air Travel and Vehicle Fleet & Commuter Miles, to determine the baseline carbon footprint of the university. This exercise confirmed that emissions from buildings should be the priority area for sustainability initiatives. New continuous monitoring systems for energy consumption are being installed for all buildings to permit better energy management and encourage efficient use of resources and building management systems are being incorporated into new construction.

Singapore is a small island state with a land area of 699 square kilometres and a population size of slightly over 5 million, making it one of the most densely-populated countries in the world. The island is land scarce and faces the perennial problem of collecting and storing water. As such, the university’s second area of focus on the sustainability agenda is water conservation. Singapore’s water management strategy has evolved through the years to fit the urban environment and maximise national rain water collection for a more efficient down-stream resource recovery.

In response, the university’s physical planning strategy is to reduce peak discharge to the storm water system to reduce flood risk by temporary retention on site. To augment water conservation efforts, the university has also embarked on a campus-wide plan to promote native landscaping, install water-efficient fittings, and increase utilization of recycled water.
## Topics

<table>
<thead>
<tr>
<th>Priority topics</th>
<th>Goals and Initiatives</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives and targets</td>
<td>Key initiatives</td>
<td>Performance 2009</td>
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<tr>
<td>(for reporting year, for following year, and/or beyond)</td>
<td>(in reporting year, and/or planned for the following year or beyond)</td>
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</table>

### Building design aspects

<table>
<thead>
<tr>
<th>Minimise total and conditioned GFA to be constructed</th>
<th>To reduce amount of planned space for new construction and proportion of constructed conditioned space.</th>
<th>Space standards to be reviewed and reduced where possible for all new construction and proportion of constructed space that is dual mode or non-conditioned to be increased.</th>
<th>Space standards for new student rooms reduced to 8 sq meters.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable building standards applied and explored</td>
<td>To achieve 25% energy savings for new buildings and 15% for existing buildings by 2020.</td>
<td>All new buildings to be designed to meet the minimum Green Mark (GM) standard.</td>
<td>Site-Wide: GM GoldPLUS: University Town Building: GM Gold: Laboratory Animal Centre, Mochtar Riady Building</td>
</tr>
<tr>
<td>Life-cycle costing</td>
<td>To reduce energy wastes during the life cycle of new buildings, mainly through</td>
<td>1. Building Stewardship &amp; Sustainability Guidelines was put in place to ensure that life cycle costing is taken into consideration for new building projects. 2. Building Energy Efficiency Code: The Office of the Vice President (Campus</td>
<td>Buildings: GM Platinum: Education Resource Centre GM GoldPLUS: Graduate Residence GM Gold: Cinnamon &amp; Tembusu Residential Colleges</td>
</tr>
</tbody>
</table>
reduced demand for active energy in space cooling, ventilation, lighting and others.

Infrastructure is currently setting up the in-house Building Energy Efficiency Codes (BEEC) for different building types peculiar to a campus (e.g., teaching, research, residential or administration-based spaces) to regulate the energy performance of building designs and their compliance during construction.

**Landscape integration of building design**

To actively promote native landscaping for new building projects to reduce water consumption, enhance local biodiversity and reduce urban heat island effect.

Endorsement of the “Campus in a Tropical Rainforest” theme by the President in 2007.

**Resource use**

**Energy use** (per floor area or total), possibly per type of building

Energy use forms part of NUS overall GHG Inventory. There is an overall target of reducing NUS GHG Emission by 23% by 2020 against Business-As-Usual scenario.

| 1. One Degree Up: Increase pre-set centralized air-conditioning temperature to 25°C. | 190,378 MWh | 4,767 kWh/capita |
| 2. Chiller Plant Optimisation: Engage energy services companies to conduct reviews and recommend solutions to improve energy performance through capital renewal projects. | 190,378 MWh | 4,767 kWh/capita |
| 3. Metering Infrastructure: Install meters to all buildings on campus to monitor energy consumption. | 190,378 MWh | 4,767 kWh/capita |
| 4. Sustainable Building Program: Sustainable Building Design Guidelines for new construction and renovation projects on Campus; Sustainable Laboratory & Data Centre Program to reduce energy consumption and improve energy performance. | 190,378 MWh | 4,767 kWh/capita |
| 5. Eco-Office: A project targeted at helping offices on the campus emit less carbon emissions by promoting more sustainable office habits. | 190,378 MWh | 4,767 kWh/capita |
| Water collection, conservation and use | To obtain Water Efficient Building (WEB) label for all NUS-managed buildings on campus by 2011. | 1. Replace all shower heads at the 3,000 Prince George’s Park Residence.  
2. Replace all basin taps at all student residences (excluding halls) with Public Utilities Board’s (Singapore) recommended water efficient flow rate of 2litres/minute.  
3. Promote native landscaping to reduce irrigation water consumption. | 1,661,695 m$^3$  
41.6 m$^3$/capita | 1,802,297 m$^3$  
40.7 m$^3$/capita |
| --- | --- | --- | --- |
| **Waste and recycling** | To divert 20% of waste from landfill annually by 2012. | 1. Existing recycling infrastructure was recently revamped and upgraded to a “Spoke and Hub” system.  
2. All food waste generated at NUS canteens is recycled into compost and energy since 2008.  
3. Recycling of hand phones, printer cartridges, printer toners and name card boxes put in place since 2009. | Recycling Rate = 12.6%  
Recycling Rate = 15.1% |
| **Users** | NUS places strong emphasis on stakeholder participation in all aspects of campus operations | To ensure continued engagement and improved quality of life for the university’s largest stakeholder, the student population, three student-centric working groups were set up:  
1. The Student Mobility Working Group, which focuses on recommending and developing suitable student exchange models to increase student mobility.  
2. The Student Life Working Group, which focuses on improving a student’s quality of life on campus.  
3. The Traffic Safety Working Group, which focuses on pedestrian safety within the campus road network.  
Other consultative working groups targeted at engaging specific stakeholder groups have also been set up to ensure connectedness with the greater NUS community. |
Examples are the Precinct Master Planning Working Groups and Building Design Working Groups, which comprise senior management staff, relevant offices that oversee the project development and user representatives from faculties and the student union.
III. Reporting Principle 2: Campus-wide Master Planning and Target Setting

**Principle 2: To ensure long-term sustainable campus development, campus-wide master planning and target-setting should include environmental and social goals.**

Sustainable campus development needs to rely on forward-looking planning processes that consider the campus as a whole, and not just individual buildings. These processes can include comprehensive master planning with goals for impact management (for example, limiting use of land and other natural resources and protecting ecosystems), responsible operation (for example encouraging environmentally compatible transport modes and efficiently managing urban flows), and social integration (ensuring user diversity, creating indoor and outdoor spaces for social exchange and shared learning, and supporting ease of access to commerce and services). Such integrated planning can profit from including users and neighbours, and can be strengthened by organization-wide target setting (for example greenhouse gas emission goals). Existing low-carbon lifestyles and practices within individual campuses that foster sustainability, such as easy access for pedestrians, grey water recycling and low levels of resource use and waste generation, need to be identified, expanded and disseminated widely.

**Management Approach**

Being a relatively younger institution, NUS is planning major development of its facilities beyond 2015 to support the expanding education and research curriculum. The development initiatives are guided by a comprehensive and inclusive framework that oversees carbon foot printing and master planning.

As NUS takes on a regional leadership role in tackling climate change, a Greenhouse Gas Inventory (GHG Inventory), comprising Energy Use, Air Miles by Staff and Emissions from University-owned Vehicle Fleet & Commuter (Staff & Student) Mile, is mapped annually. This facilitated the development of a baseline against which the university’s progression towards emission reduction goals can be measured. The GHG Inventory also helps to identify emission trends and areas of growth; and provides the university a basis to formulate an absolute, strategic climate action program. Although it presents an extremely challenging task for an expanding university to achieve, an overall target of 23% reduction in our GHG inventory against business as usual level by 2020 was established.

The university has also embarked on an extensive master planning exercise, which identified preservation of biodiversity, and connectivity within and to the campus as major areas of
concern. The University was an inaugural recipient of the Singapore “gold plus” Green Mark award for sustainable district planning.

The university is aggressively seeking partnerships with agencies that have clean energy vehicle capabilities to test-bed and bring into fruition the concept of sustainable personal mobility. Particular focus is also placed on improving connectivity to sustainable public transportation network, enhancing pedestrian and cycling connectivity within the campus, adjusting economic incentives to encourage public transportation to reduce commuter carbon emissions and promoting social integration through purpose-built architecture.

In addition to ensuring new buildings and networks are thoughtfully planned and designed, the university is constantly seeking adaptive re-use of buildings, especially those with heritage or cultural values. In the case of new developments, the university ensures that local biodiversity is safeguarded via the existing Kent Ridge Campus Wide Tree Inventory and Management Plan, Campus Master Plans and environmental sustainable design guidelines.

The university reflects the multi-cultural/multi-racial society of Singapore and is committed to a needs-blind, merit-based admission policy with robust financial assistance to ensure that no deserving Singaporean student is denied access to undergraduate education for financial reasons. The university also assists directly and indirectly in providing financial assistance to international students. The university is committed to protect and promote the health and safety of staff, students, and supports education, research, and clinical programs to promote a healthy Singaporean society.
<table>
<thead>
<tr>
<th>Topics</th>
<th>Goals and Initiatives</th>
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<td>Objectives and targets (for reporting year, for following year, and/or beyond)</td>
<td>Key initiatives (in reporting year, and/or planned for the following year or beyond)</td>
</tr>
<tr>
<td>Institution-wide carbon target</td>
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</tbody>
</table>
| Energy | 1. Reduce existing building emissions by 15% by 2015  
2. Reduce laboratory energy consumption benchmarked against standard regularised laboratory consumption by 20% by 2015  
3. Reduce future building emissions benchmarked against existing building energy consumption norms by 25% by 2015 | 1. One degree up: All centralized air-conditioning systems have been set to a default 25°C since 22 October 2007. This was accompanied by a campus-wide public relations campaign to educate users and serve as reminders to offices which are not centrally controlled.  
2. On-line metering: To evaluate existing metering (electricity, water and chilled water) and install meters in all buildings on campus. The meters will enable building owners to monitor the energy consumption; detect unusual trends and identify energy consumption “hot spots”.  
3. Chiller plant optimisation: Conduct reviews and recommend solutions to further improve the energy performance through Capital Renewal projects.  
4. Replacement of T8 with T5 lightings in hostel rooms | Please see Figure 1 below. |
| Vehicle fleet & commuter miles | 100% offset in vehicle fleet and commuter miles emission by 2009 | Carbon offsets for this category are pumped into energy-efficiency/carbon reduction programs on campus | | |
### Staff air travel

- 100% offset in air miles emission by 2009
- 20% cut in budget mandated from 2009
- Remaining carbon offsets in this category are pumped into energy-efficiency/carbon reduction programs on campus

### Master planning

**Precinct planning**

- Review the existing master plan to take into account the latest developments in physical infrastructure, and to seize opportunities in the higher education arena to meet the aspirations of its community whilst ensuring sustainable development

1. Sub-divide the current master plan into 4 zones to ensure focused/integrated planning within each faculty zone.
2. Superimpose an overarching connectivity/infrastructure plan to ensure campus connectedness.
3. Develop convenient pedestrian, bike, and campus bus linkages to new campus rapid rail system.

- Precinct 1 completed.
- Precinct 2 underway.

### Transportation

**Campus mobility plan**

- Enhance the accessibility, convenience, and feasibility of greener transportation within the campus

1. Conduct annual survey to determine NUS community’s reliance on the mode of transport to campus, and within campus.
2. Extend/improve existing covered walkways; widen pedestrian roads to allow bi-modal transport for cycling and walking; install more bicycle lots; test-bed electric personal mobility vehicles
3. Build a bridge to connect the adjacent campus (University Town) to the main Kent Ridge campus
4. Enhance connectivity to the new mass rapid transit station located just outside the Kent Ridge campus boundary
5. Continually improve the sustainable performance of campus bus system

- 80% of staff and 96% of students take public transport to campus
- 69% of campus community rely on internal shuttle bus within campus
## Land Use and Biodiversity

### Adaptive Renovations
Where viable, re-use existing buildings and avoid new construction. Implement key guiding principles for the renovation of pre-war bungalows to protect the NUS built heritage, through adaptive reuse. The key principles are:

1. **Maximum Retention**
   - to ensure key features are not destroyed, damaged or hidden
2. **Sensitive Restoration**
   - to ensure that it blends in with existing construction
3. **Careful Repair**
   - to avoid triggering further defects as well as arrest current failure

Bukit Timah Campus was awarded the "URA Architectural Heritage Award" as a recognition of the university’s effort and commitment to heritage and adaptive re-use.

### Conservation Area
Preserve the biodiversity of The Ridge.

1. Set aside 11 hectares of The Ridge under the Special Detailed Control Plan governed by the Urban Redevelopment Authority.
2. Conduct biodiversity survey for major developments such as the University Town, and dedicate at least 50% of the green space for indigenous planting.
3. Preserve natural terrain and as much flora as possible in developing new University Town campus expansion project.

1366 numbers of indigenous trees were added to the original stock in the University Town. The University Town won the inaugural Green Mark District GoldPlus award conferred by the Building Construction Authority of Singapore.
<table>
<thead>
<tr>
<th>Tree inventory and management plan</th>
<th>Establish baseline to guide the conservation of limited natural assets on campus</th>
<th>Establish the Kent Ridge Campus Wide Tree Inventory and Management Plan</th>
<th>Inventory completed in 2010.</th>
</tr>
</thead>
</table>

**Social inclusion and protection**

| Diversity (faculty, staff and students) | Foster a multi-cultural society. | 1. Staff and faculty come from 74 different countries.  
2. Undergraduates come from 42 countries whilst graduates originate from 92 countries.  
3. Students and staff reflect broad racial and ethnic diversity. |
|-----------------------------------------|-------------------------------|------------------------------------------------------------------------|

<table>
<thead>
<tr>
<th>Access to education</th>
<th>Committed to a needs-blind merit-based admission policy that ensures that no deserving Singaporean undergraduate is unable to attend the university due to financial constraints.</th>
<th>Different university and government financial aid schemes are available to help meet the needs of students through various means: loans, donated scholarships, bursaries, and work-study opportunities.</th>
</tr>
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<tr>
<th>Participative campus planning</th>
<th>Incorporate broad-based feedback from various NUS stakeholders, including faculty and staff, students, alumni and employers.</th>
<th>Set up several precinct master planning working groups, comprising relevant faculty, staff and students, to assure that the master planning process is driven by the needs of the users of the space.</th>
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</table>

| Work place health and safety | Protect and promote the health and safety of staff, students, and other members of its community. | The university has established a comprehensive Safety and Health Management System which promotes an integrated system of hazard identification, risk assessments and risk control / mitigation measures for all activities related to campus teaching, research and residential living. Staff and students are trained on the hazards, risks, and regulatory requirements. | Received the “Workplace Safety and Health Silver Award” from Singapore’s Ministry of Manpower  
The NUS staff injury rate in 2010 was dramatically below that of all employers as well as educational institutions in Singapore. |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|

Figure 1. NUS GHG Reduction Performance To-date

NUS GREENHOUSE GAS EMISSION
(Business As Usual vs. Business With Mitigation vs. Actual Business 2010)

GOAL: 23% GHG emission reduction from Business as Usual levels
IV. Principle 3: Integration of Facilities, Research, Education, and Outreach as a “Living Laboratory” for Sustainability

Principle 3: To align the organization’s core mission with sustainable development, facilities, research, and education should be linked to create a “living laboratory” for sustainability.

On sustainable campus, the built environment, operational systems, research, scholarship, and education are linked as a “living laboratory” for sustainability. Users (such as students, faculty, and staff) have access to research, teaching, and learning opportunities on the connections between environmental, social, and economic issues. Campus sustainability programs have concrete goals and can bring together campus residents with external partners, such as industry, government, or organized civil society. Beyond exploring a sustainable future in general, such programs can address issues pertinent to research and higher education (such as environmental impacts of research facilities, participatory teaching, or research that transcends disciplines). Institutional commitments (such as a sustainability policy) and dedicated resources (such as a person or team in the administration focused on this task) contribute to success.

Management Approach

NUS appreciates that improvements in sustainable operations require more than planning and construction. Hence environmental education and research form the key strategic thrusts in realising exponential environmental benefits for the university and society. New cross-faculty degree programs, new courses with sustainable focus, and the introduction of sustainable considerations within existing courses have been initiated to assure that sustainable principles are included in the curriculum. Focus is placed on promoting more sustainability-related faculty research programs, and cross-faculty research collaborations under the auspices of internally and externally funded research centres.

This approach has spawned off numerous notable research institutes such as the Centre for Sustainable Cities, Centre for Aquatic Science Research and the NUS-GE Singapore Water Technology Centre. The university’s focus is on translational research, whereby multi-disciplinary research and technology breakthroughs are quickly and efficiently applied into practical solutions.

Whilst the university actively cultivates a more effective learning, engagement, interaction and teaching process, the management also places strong emphasis on student
development beyond the academic curricular. This is managed by the Office of Student Affairs and the NUS Students’ Union (NUSSU). Between the two units, they oversee 14 constituent bodies, 65 student societies and 31 student interest groups. To facilitate these student activities, NUS recently redeveloped the Yusoff Ishak House (YIH) and the Shaw Foundation House to serve as focal points for student and alumni networking. The soon-to-be opened University Town, complete with a vibrant retail and dining centre, will further enhance the quality of the university’s service in this arena. Connected to the main campus via a landscaped bridge with pedestrian paths, a bikeway and vehicular lanes, this new development will also provide substantial university residences and be the home of a new residential college curriculum to foster student interaction and facilitate a closer integration with academic programs. Athletic and cultural support facilities are also integrated into the development.

NUS is also taking the lead in spearheading sustainable operations. Besides becoming the first organisation in Singapore to green its food court (having won the inaugural Eco-Food Court Award conferred by the Singapore Environment Council), NUS is continuously striving to innovate and be a leader in pursing excellence in sustainability by incorporating these principles in the day-to-day estate maintenance operations.
### Topics

<table>
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<td>Performance 2009</td>
</tr>
</tbody>
</table>

#### Labelling and number of courses that have an integrated perspective on sustainability as a key component

Whilst there is a selection of sustainability-focused courses ranging from Bachelor to Doctoral degrees listed below, please see Appendix 1 for more details.

1. Bachelor of Engineering (Environmental Engineering)
2. Bachelor of Architecture (Design Technology and Sustainability Track)
3. Bachelor of Science (Project and Facilities Management)
4. Bachelor of Environmental Studies Degree (to be launched in AY11/12)
5. Master of Science (Environmental Engineering, by coursework)
6. Master of Science (Environmental Management)
7. Master of Engineering (by research)
8. Doctor of Philosophy (PhD) of Engineering (by research)
9. Musim Mas Professorship in Sustainability (NUS Business School)

#### Course and/or research that transcends disciplines

Students taking up other fields of study may opt from a vast number of sustainability modules, which are listed in Appendix 2, as supplementary.
### Research and education projects on laboratory / IT facilities and sustainability

<table>
<thead>
<tr>
<th>Research and education programs in NUS on sustainability, water, and/or energy</th>
<th>The Office of the Deputy President (Research &amp; Technology) aims to facilitate research at NUS and establish world-leading programmes. In addition to setting policies for research and oversee strategic allocation and expansion of research funds, ODPRT oversees 22 university-level research institutes and centres, 4 Research Centres of Excellence (the 4th being a joint effort with NTU), and NUS Graduate School for Integrative Sciences and Engineering (NGS) with the aim to support researchers in every way possible. Please see Appendix 3 for a list of research, education programs and research centres and initiatives on sustainability.</th>
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<tbody>
<tr>
<td>Social integration</td>
<td>Programs that connect campus users with industry, government, and/or civil society</td>
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| Programs to further student interaction and social cohesion on campus | Social integration  
1. Grameen Creative Labs@NUS: to foster collaboration with corporations and universities around the world and its objective is to solve social problems via an entrepreneurial approach.  
2. InnoAge: a platform for knowledge sharing and collaboration with industries and the government.  
3. NUS Entrepreneurship Society: a hub for entrepreneurship with an abundance of learning and networking opportunities to assist students in developing their entrepreneurial spirit.  
Provide, in partnership with students, a total university experience that builds a strong NUS spirit.  
1. Freshmen Inauguration Ceremony: An orientation activity targeted at fresh undergraduates.  
2. Matriculation Week: a week-long program to help fresh undergraduates adjust to a university life.  
3. NUS Rag and Flag: Flag Day is the day when NUS freshmen and seniors alike fan themselves out around the entire Singapore to raise funds for charities; whereas Rag Day, traditionally held after Flag Day, is held as a celebration, complete with stunning floats and impressive performances by Faculty Clubs and Halls of Residences.  
4. Inter-Faculty/Hall Games: Annual sports competition held for students.  
Connect the campus users with industries, the government, and civil society |
| Courses that use participatory and project based teaching | NUS understands that large-scale lecturing can be extremely challenging. The university also understands the challenges that both students and lecturers face in their attempt to cultivate a more effective learning, engagement, interaction and teaching process. Hence, to stimulate and motivate students in workshops or lectures, the ‘participatory’ method is applied.

| Behavioural aiming at more sustainable actions by students, staff, or external community members | To complement the physical infrastructure, NUS has also implemented several behavioural change and social cohesion programs to raise awareness and educate the population to be more responsible global citizens.

| | Please see Appendix 4 for more details on the various participatory and project based courses provided by various faculties.

| | 1. Inter-Hall Environmental Awards: A program aimed at promoting environmentally responsible behaviour amongst Hall residents.

| | 2. Earth Hour: An annual event targeted at generating awareness within the greater NUS community. Lights of buildings are switched off during the “Earth Hour” with students holding a candle vigil amidst a celebratory atmosphere.

| | 5. NUS Green Carnival: An annual event aimed at promoting sustainable lifestyles amongst the students.

| | 6. Project Box: A program aimed at reducing consumption of disposable take-away boxes) by encouraging individuals to bring their own reusable boxes for takeaways. Since Aug 2009, about 3,000-5,000 disposable boxes have been ‘saved’

| | 7. Climate Change Cafes: Numerous talks were organised to provide a platform for all academia, researchers, staff and students to interact and exchange their thoughts on sustainability.

| | 8. Movie Screenings: Sustainability-themed movies such as “An Inconvenient Truth”, “Arctic Tale”, “Sharkwater” and “Earthlings” were screened to create awareness.
## Commitments and resources for campus sustainability

| Commitment to external sustainability principles of initiatives (this Charter and other) | 1. ISCN-GULF Sustainable Campus Charter  
2. IARU Greenhouse Gas Reduction Targets: The International Alliance of Research Universities (IARU), comprising 10 of the world's leading Universities, began collaborating on issues of sustainability in 2006 with the establishment of sustainability principles. This collaboration has lead to the development of cross cultural exchanges to promote best practice in campus sustainability.  
3. IARU Sustainability Fellowship Program: exchange program for undergraduates from member universities to undergo a rigorous learning experience that emphasises on leadership and knowledge accumulation in the area of sustainability.  
4. Singapore Eco-Food Court program  
5. Recycling initiative at local community development councils  
6. Singapore Green Mark Certification program | Integrate sustainability into education and research curriculum, as well as its campus operations, through partnership with external organisations |
### Academic Programs/Projects with a Focus on Sustainability

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arts &amp; Social Sciences</strong></td>
<td>Established an Environment Cluster which is an initiative to foster interdisciplinary approaches in environment-related research. Environmental issues are not only scientific and engineering problems but are also social, economic, cultural and political problems. The Environment Cluster is interested in 5 main research themes: (1) Carbon Budgeting; (2) Food and Natural Resource Sustainability; (3) Social Consequences of Environmental Changes and Natural Hazards; (4) Climate Change; (5) Upland Ecosystems and Metropolitan Relationships.</td>
</tr>
<tr>
<td><strong>NUS Business School</strong></td>
<td>Four research centres: (1) Centre for Asset Management Research &amp; Investments (CAMRI); (2) Centre for Governance, Institutions and Organizations (CGIO); (3) Centre for Social Entrepreneurship &amp; Philanthropy (CSEP); (4) Centre of Strategic Leadership. These centres offer several courses and programs for students and researchers to benefit.</td>
</tr>
<tr>
<td><strong>School of Computing</strong></td>
<td>PhD research topic: Application-Specific Thermal Management of Computer Systems</td>
</tr>
<tr>
<td></td>
<td>Undergraduate Projects: (1) Multi-robot exploration and mapping for environmental sensing applications (2) Environmental boundary tracking and estimation using multiple mobile robots</td>
</tr>
<tr>
<td><strong>School of Design &amp; Environment (SDE)</strong></td>
<td>Design projects in Design, Technology and Sustainability specialisation within BA(Architecture) and M.Architecture programme</td>
</tr>
</tbody>
</table>
13. A study on demand for green office
14. Observation in changing landscapes: The effects of micro-climatic conditions and user behaviour at a park connector site/vegetative changes of an un-maintained site
15. Eco-Resort Architecture: A perspective on sustainable typologies in SE Asia
16. Design, Construction and test-bedding of building integrated photovoltaic facades at SDE
17. Innovative Strategies for Sustainable Designs
18. Study of Township Climatic Conditions to Enhance Sustainability and Energy Efficient
19. Zero energy building at Building and Construction Authority’s academy (ZEB@BCAA)
21. Future Green School of ZEB@BCA
22. Advanced day lighting and photovoltaic in high performance envelopes of Building in the Tropics

<table>
<thead>
<tr>
<th>Faculty of Engineering</th>
<th>Chemical &amp; Biomolecular Engineering:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. CN4248 Sustainable Process Development</td>
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<tr>
<td>Department of Mechanical Engineering:</td>
<td></td>
</tr>
<tr>
<td>1. Specialization in Offshore Oil &amp; Gas Technology for B.Eng (Mechanical Engineering) &amp; M.Sc (Mechanical Engineering)</td>
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</tr>
<tr>
<td><a href="http://www.nus.edu.sg/registrar/nusbulletin/FoE/UGft/degprogs_overflow3.html">http://www.nus.edu.sg/registrar/nusbulletin/FoE/UGft/degprogs_overflow3.html</a></td>
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<tr>
<td><a href="http://me.nus.edu.sg/student_grad_msc.php#oongt">http://me.nus.edu.sg/student_grad_msc.php#oongt</a></td>
<td></td>
</tr>
<tr>
<td>Engineering Science Programme:</td>
<td></td>
</tr>
<tr>
<td>1. ESP3401 Photovoltaic Devices and Systems and ESP3902 Major Design I Project</td>
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<tr>
<td>2. ESP4402 Transport Phenomena in Energy Systems</td>
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<thead>
<tr>
<th>Faculty of Science</th>
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</thead>
<tbody>
<tr>
<td>1. Joint Minor Programme in Environmental Biology with University of Toronto</td>
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<tr>
<td>2. Joint Minor Programme in Environmental Chemistry with University of Toronto</td>
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<tr>
<td>3. Environmental Biology specialisation within the Life Sciences major</td>
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<tr>
<td>4. Biodiversity Summer Programme (opened to exchange students from partner universities) – takes place from June-July each year</td>
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<tr>
<td>5. Waseda Global Honours College (This is a seminar styled summer programme which involves 9 Asian and American universities. Faculty of Science is the NUS champion for this programme. The theme for the past 2 years had been on Sustainability and students engage in research, discussions and projects revolving around the theme).</td>
</tr>
</tbody>
</table>
## Sustainability Modules Available for Students from Different Fields of Study

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Module Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts &amp; Social Science</td>
<td>Natural Resources: Policy and Practice</td>
</tr>
<tr>
<td></td>
<td>Natural Hazards</td>
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<tr>
<td></td>
<td>Environmental Sustainability</td>
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<tr>
<td></td>
<td>Coastal and Environmental Management</td>
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<tr>
<td></td>
<td>Catchments and Management</td>
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<td></td>
<td>Eco-Development in Southeast Asia</td>
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<tr>
<td></td>
<td>Dynamic Environments</td>
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<td></td>
<td>The Politics of Environment in SE Asia</td>
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<tr>
<td></td>
<td>Research Methods in Environmental Sciences</td>
</tr>
<tr>
<td>Engineering</td>
<td>Sustainable Process Development</td>
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<tr>
<td></td>
<td>Photovoltaic Devices and Systems</td>
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<td></td>
<td>Major Design I Project</td>
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<td></td>
<td>Transport Phenomena in Energy Systems</td>
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<tr>
<td></td>
<td>Environmental Biological Principles</td>
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<tr>
<td>Law</td>
<td>Comparative Environmental Law</td>
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<tr>
<td></td>
<td>International Environmental Law &amp; Policy</td>
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<tr>
<td></td>
<td>ASEAN Environmental Law, Policy and Governance</td>
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<tr>
<td></td>
<td>Environmental Law &amp; Policy (MSc (Env Mgt)) – programme is jointly offered by 7 faculties in NUS</td>
</tr>
<tr>
<td>Business</td>
<td>Managerial Decision Making &amp; Ethical Values by Bob Fleming</td>
</tr>
<tr>
<td></td>
<td>Green and Competitive: Contradiction in terms and Ethical and Competitive: Contradiction in terms by Nitin Pangarkar</td>
</tr>
<tr>
<td>Science</td>
<td>Ecology &amp; Environment</td>
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<tr>
<td></td>
<td>Global Change Biology</td>
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<tr>
<td></td>
<td>Field Studies in Biodiversity</td>
</tr>
<tr>
<td></td>
<td>Field Studies in Neotropical Ecosystems (Jointly-taught module by DBS and University of Costa Rica staff as part of a Summer Programme for Life Sciences students; to be conducted for 6 weeks during the summer entirely in Costa Rica)</td>
</tr>
</tbody>
</table>
### School of Design and Environment (SDE)

- Climatic Responsive Architecture
- Strategies For Sustainable Architecture
- Designing With Environmental Systems
- Integrated Design And Sustainability
- Advanced Architectural Technology
- Renewable Energy And Architecture
- Sustainable Urban Design And Development
- Architectural & Technology Design 1
- Architectural & Technology Design 2
- Special Topics In Technology 11) Final Design Project
- Environmental Science for Building
- Development Technology and Management
- Construction Technology
- M&E Engineering Systems
- Materials Technology
- Energy Management
- Maintainability of Facilities
- Total Building Performance
- Freshmen Seminar: Urban Conservation and Sustainable Development
- Ecodesign and Sustainability
- Environmental Issues in Real Estate
- Seminars on sustainable cities (new module offered to all SDE students in AY10/11)

### University Scholars Programme

- Ethics and The Environment
- Biodiversity and Conservation Biology

### Lee Kuan Yew School of Public Policy

- Water Policy and Governance
- Environmental Policy and Natural Resource Management
- Environmental Economics and Public Policy

### Yong Loo Lin School of Medicine

- Environmental Policy and Natural Resource Management
- Environmental Economics and Public Policy
Research and Education Programs on Sustainability, Water, and/or Energy

<table>
<thead>
<tr>
<th>Project Title</th>
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</thead>
<tbody>
<tr>
<td><strong>Topical integration- topics with sustainability in mind.</strong></td>
</tr>
<tr>
<td>Development of Efficient Method for the Production of Biodiesel from Grease</td>
</tr>
<tr>
<td>Networked Environmental Monitoring</td>
</tr>
<tr>
<td>iMose – Ocean Modelling and Data Assimilation</td>
</tr>
<tr>
<td>Advanced Techniques Of Chemical And Biological Sampling Of Marine Environment</td>
</tr>
<tr>
<td>Analysis of Climate Change Impacts</td>
</tr>
<tr>
<td>Evaluation of Climate Models - Global and Regional</td>
</tr>
<tr>
<td>Study of the Legal Framework of Integrated Coastal Management for Singapore</td>
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<tr>
<td>National Solar Repository</td>
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<tr>
<td>Experiments on Wave-current Interaction</td>
</tr>
<tr>
<td>Plant Selection study for application in bioretention systems</td>
</tr>
<tr>
<td>Water Quality Monitoring at Bedok Reservoir Park – A Study on Pollutant Runoffs &amp; its Correlation with Management Practices</td>
</tr>
<tr>
<td>Characterization of Organic Matter Profile in Source Water Reservoir</td>
</tr>
<tr>
<td>Impact of stream acidification on native flora and fauna in the central nature reserve</td>
</tr>
<tr>
<td>Research Study on Use of Underground Space Beneath a Container Terminal</td>
</tr>
<tr>
<td>Development of an intelligent high-performance battery system for electric vehicles</td>
</tr>
<tr>
<td>Isolation and purification of heparin using molecularly imprinted particles</td>
</tr>
<tr>
<td>Water treatment, heavy metal recovery and energy storage based on nanosegregant-engineered resins/membranes</td>
</tr>
<tr>
<td>Environmentally Sustainable Pavement Mix for Singapore</td>
</tr>
<tr>
<td>Singapore Wild Marine Mammal Survey</td>
</tr>
<tr>
<td>Coastal Inundation Risk Map Study for Singapore</td>
</tr>
<tr>
<td>Survey of Intertidal Mudflat Organisms in Singapore Waters</td>
</tr>
<tr>
<td>Development of a multifunctional and unified water treatment system for special localized applications</td>
</tr>
<tr>
<td>Development and Exploration of Nanoparticle Decorated Carbon Supports (Graphene and Graphene Oxide) for Energy Collection, Storage, and Conversion</td>
</tr>
<tr>
<td>Impact on Urban Temperature Profile and Energy Consumption (UTPEC) of Buildings</td>
</tr>
<tr>
<td>Modelling and Analysing impacts of Climate Change on Public Health</td>
</tr>
</tbody>
</table>
### Modelling and Analysing impacts of Biodiversity in Singapore

### Environmental impacts of regional land use change

### Effect of Sewer Leaks on Surface Water Quality in Urban Catchment Area under Dry and Wet Weather Conditions

### New Carbon-Recycling Technology Based on Solution Processing of Polyaromatic Hydrocarbon from Graphite

### Vegalo’s Micro Generating Process for Gas Liquid Emulsion and its Applications

### Environtech’s Treatment of Biological Invasions through Ballast Water

| Research & education projects on laboratory/IT facilities and sustainability |
| Research on mitigating hazardous waste from research / IT facilities |

### Development of Integrated On-Board Technology for Ballast Water Treatment and Purification of Exhaust Gases: Laboratory-and Pilot-Scale Studies

### Feasibility study of using alternative renewable energy sources for portable computing system

### Computational Tools for Optimal Planning and Scheduling of Distributed Renewable Energy Sources

### Research and development in reutilization of minerals for sustainable cement and concrete technologies
### Research Centres of Excellence

#### Singapore-Delft Water Alliance (SDWA)

Hosted at NUS and partly supported by NRF, SDWA is a joint Centre of Excellence for Water Knowledge involving Public Utilities Board (Singapore), NUS and Deltares (The Netherlands). Its research agenda can be broadly categorised into five areas - analysis of aquatic systems; recognition, study and implementation of the information cycle in respect of water based systems; smart sensing of aquatic environment; integration of (aquatic) systems; and, taking account of social impacts and responses. SDWA’s focus covers six disciplines - hydrodynamics, hydrology, morphodynamics, water quality and ecology, policy analysis and hydroinformatics.

#### NUS Environmental Research Institute (NERI)

NERI aims to establish NUS as a leading global centre of interdisciplinary research, education and expertise in the Environment, particularly in areas affecting Singapore and Asia. Its objective is to coordinate, integrate and facilitate research and educational initiatives across NUS. Through interactive pursuit of excellence in initiatives across the University, NERI conducts cutting-edge research in a range of high impact areas from fundamental to applied levels. NERI engages strategic partners within NUS’ global networks, with government agencies and with industry.

#### Global Asia Institute (GAI)

The NUS Global Asia Institute was set up in September 2009 to provide a platform for integrative Asia-studies. An initial set of research themes, centred around critical issues for Asian cities in a globalising world, has been identified, including:

- Challenges for Asian cities in the globalised world economy;
- The future of urban society in Asia including issues relating to education, public health and health care, and community building; and,
- Managing resources for liveable cities in Asia including water, waste management, energy and food security, and housing.

#### Energy Studies Institute (ESI)

Multi-disciplinary, autonomous research institute at the NUS, ESI was established as the first of its kind in Southeast Asia to tap on issues pertaining to energy. ESI’s research and analyses are focused on three key areas: Energy Economics, Energy Security, and Energy and the Environment.

#### Centre for Hazards Research

The Centre for Hazards Research was set up to mitigate the effects of natural disasters including floods and the effect of climate change. While similar organisations have been set up in the past, no single organization has catered to the broad aspects of the natural-disaster spectrum. The NUS centre is an unprecedented development in Singapore and in recognition of the increasingly important impact disasters have on our lives.

#### Solar Energy Research Institute of Singapore
**APPENDIX 3**

SERIS is Singapore’s national institute for applied solar energy research and its mission is to conduct research and development for a sustainable energy supply based on solar resources.

**Tropical Marine Science Institute**

TMSI is a centre of excellence for research, development and consultancy in tropical marine science as well as environmental science. With its multi-disciplinary research laboratories and active international links, it handles projects relevant to Physical Oceanography, Acoustics, Marine Biology, Marine Mammals, Biofuels, Water Resources and Climate Change. TMSI also provides postgraduate research opportunities. Through active collaboration with academic, government and industrial sectors, TMSI aims to play a strong role in promoting integrated marine science, in R&D, as well as to establish itself as a regional and international education and training centre.

**Centre for Sustainable Asian Cities (CSAC)**

CSAC harnesses and synergises the research expertise of the three departments in the School of Design & Environment (SDE). Notable areas of research include Heat Island Studies, Greening of Industrial Estates, Energy Benchmarking and Modelling, Building Environmental Performance, Green Plot Ratio, Sustainable Neighbourhoods, Urban Spaces and other aspects of sustainable cities. The centre is also a research nexus that draws together the complementary strengths of researchers within NUS to collaborate on inter-disciplinary solutions for sustainable cities. CSAC will complement the efforts at the national level, through the work of Singapore’s Ministry of National Development, to develop appropriate solutions and best practices for more sustainable and liveable cities.

**Centre for Aquatic Science Research (CASR)**

CASR@Sg Ulu Pandan will serve as a physical site for in-depth scientific investigations and facilitate translation of research activities to real world application. A multidisciplinary team consisting of researchers from the hydraulic, chemical and biological laboratories at Deltares and National University of Singapore will coalesce to work towards achieving the research goals. This work conducted by Singapore-Delft water Alliance (SDWA) is in partnership with the Public Utilities Board (PUB).

**NUS-GE Singapore Water Technology Centre**

The NUS-GE Singapore Water Technology Centre focus on solving some of the most pertinent water challenges, including alleviating the increasing water stress found in many parts of the world. Scientists and engineers at the Centre plan to develop new solutions for low-energy seawater desalination, water reclamation and more efficient water reuse, thus advancing fundamental research and industry innovation in water treatment.
Courses that Use Participatory and Project Based Teaching

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Arts and Social Sciences**  | (a) SW3103 Social Work Field Practice  
                                (b) SW3103A Social Work Field Practice  
                                (c) SW3104 Advanced Practice In Social Work  
                                (d) FMA1201P - Meanings and Leanings: Is There a Reason Why?                                                                 |
| **NUS School of Business**    | 60% to 70% of NUS MBA courses and 40%- 50% of our BBA courses involve project works and participatory learning.  
                                Management Practicum for the UCLA - NUS Executive MBA; Advanced Study Project for the Asia-Pacific Executive MBA in Chinese |
| **School of Computing**       | All programmes have capstone modules that use participatory and project based teaching                                                                 |
| **School of Design & Environment** | (a) Masters of Science (Project Management),  
                                  (b) Masters of Science (Building Performance and Sustainability),  
                                  (c) Masters of Science (Integrated Sustainable Design)  
                                  (d) Bachelor of Arts (Architecture)  
                                  (e) Masters of Arts (Architecture)  
                                  (f) Masters of Landscape Architecture  
                                  (g) Masters of Urban Design                                                                 |
| **Faculty of Engineering**    | Department of Chemical & Biomolecular Engineering:  
                                  - CN4248 Sustainable Process Development  
                                  Department of Civil & Environmental Engineering:  
                                  - Double Degree Programme with TU Delft  
                                  - Environmental Engineering Programme  
                                  - GEK1522 Global Environmental Issues  
                                  - GEK1522T Global Environmental Issues  
                                  - ESE4405 Urban Water Engineering & Management (Technical Elective)  
                                  - ESE4406 Energy and the Environment (Technical Elective)  
                                  - ESE5603 Pollution Minimization and Prevention (Technical Elective; project-based teaching)  
                                  Department of Electrical & Computer Engineering:  
                                  - EE1002 Introduction to Circuits and Systems  
                                  - EE1003 Introduction to Signals and Communications  
                                  - CG1108 Electrical Engineering  
                                  - EE2001 Digital and Analogue System Design  
                                  - EE3001 Technology Assessment Project |
- EE4001 BEng Dissertation Thesis

Department of Industrial & Systems Engineering:
- Executive Masters in Systems Engineering & Management

Department of Mechanical Engineering:
- Specialization in Offshore Oil & Gas Technology for B.Eng (Mechanical Engineering) & M.Sc (Mechanical Engineering)
- Engineering Science Programme
- FME1202 Great Discoveries and Inventions in Science and Engineering
- ESP2109 Design Project 1
- ESP2110 Design Project 2
- ESP3902 Major Design Project I
- ESP3903 Major Design Project II
- ESP4901 Research Project

<table>
<thead>
<tr>
<th>Faculty of Science</th>
<th>Waseda Global Honours College</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Scholars Programme</td>
<td>In general, this faculty engages in participatory and project based teaching the most (as compared to other undergraduate NUS modules). The faculty also makes conscious efforts to link up with different industries, civil society, and other groups outside of the university for students to participate in service learning.</td>
</tr>
<tr>
<td>Duke-NUS Graduate Medical School</td>
<td>All of our courses are very participatory and have team-based elements to them.</td>
</tr>
<tr>
<td>Yong Siew Toh Conservatory of Music</td>
<td>A major component of music teaching in the BMus is participatory (i.e. solo and ensemble performance, as well in NUS’ case the teaching of music theory through group music writing projects and performances) and project based (i.e. preparing repertoire for a junior or senior solo recital, composers writing original works, recording artists recording and producing musical recordings, etc.)</td>
</tr>
</tbody>
</table>