Education for Sustainable Development Goals

JSS ACADEMY OF HIGHER EDUCATION & RESEARCH

(DEEMED TO BE UNIVERSITY) MYSURU

JSS ACADEMY OF HIGHER EDUCATION & RESEARCH

Teaching & Learning of Activities in Achieving UN Sustainable Development Goals

Teaching & Learning Objective Handbook

SDG-6- Clean Water and Sanitation

2024

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PREFACE

The United Nations' 2030 Agenda for Sustainable Development was adopted Globally in September 2015. It is underpinned by 17 Sustainable Development Goals (SDGs) and 169 targets and applies to every country. It helps people from various counties to work together to promote sustained and inclusive economic growth, social development and environmental protection and to benefit all, including future generations. The 2030 Agenda for Sustainable Development sets forth "a plan of action for people, planet and prosperity " and "seeks to strengthen universal peace in larger freedom".

This universal agenda requires an integrated approach to sustainable development and collective action, at all levels, to address the challenges of our time, with an overarching imperative of 'leaving no one behind' and addressing inequalities and discrimination as the central defining feature. Many countries , institutions and organisations have already started to translate the new agenda into their development plans, strategies and visions.

JSSAHER'S Social Responsibility is an approach of ethical and intelligent management, which involves both its impact on its human, social and natural context and its active role on the promotion of Sustainable Human Development of the country. Within this approach, "Sustainable Campus" is a strategy that strives to reduce the ecological footprint of the Institution via a rational use of resources and to educate the JSSAHER community on the ethics of sustainability.

Supporting the JSSAHER'S Social Responsibility, the SDG Hand Book explains the SDGs and their connection between the various goals and targets of JSSAHER . It provides a blueprint to help, identify, implement and achieve the Sustainable Development Goals (SDGs) at JSS AHER.

As the process moves towards implementation, there is a need to address the scope and systemic nature of the 2030 Agenda and the urgency of the challenges. This requires a wide range of tools and science-based analysis to navigate that complexity and to realise the ambition. JSSAHER having in place effective governance systems, institutions, partnerships, and intellectual and financial resources favouring effective, efficient and coherent approach for implementation of SDGs.

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https://www.jssuni.edu.in/JSSWeb/WebShowFromDB.aspx?MID=11011&CID=0&PID=10001

PREAMBLE

Education for Sustainable Development Goals

By 2030, ensure that all learners acquire knowledge and skills needed to promote sustainable development, including, among others, through education for sustainabledevelopment and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non- violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

Souíce: **l'he Sustainable Development Goals Repoít 2022**

http://www.un.org/sustainabledevelopment/sustainable- development-goals

Access to Learning objectives for SDG-6

Education for Sustainable Development Goals: learning objectives - UNESCO Digital Library

United Nations, n.d.

OBJECTIVE OF JSS ACADEMY OF HIGHER EDUCATION & RESEARCH TO PROMOTE EDUCATION FOR SUSTAINABLE DEVELOPMENT GOALS OF THE UNITED NATION IS TO MATCH THE TEACHING & LEARNING ACTIVITIES WITH SUSTAINABLE DEVELOPMENT GOALS THROUGH CURRICULUM DEVELOPMENT, ENHANCED RESEARCH AND EXTENDED OUTREACH ACTIVITIES.

INTRODUCTION

The Sustainable Development Goals – an ambitious and universal agenda to transform our world

On 25 September 2015, the UN General Assembly adopted the 2030 Agenda for Sustainable Development (UN, 2015). This new global framework to redirect humanity towards a sustainable path was developed following the United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro, Brazil in June 2012, in a three-year process involving UN Member States, national surveys engaging millions of people and thousands of actors from all over the world.

At the core of the 2030 Agenda are 17 Sustainable Development Goals (SDGs). The universal, transformational and inclusive SDGs describe major development challenges for humanity. The aim of the 17 SDGs is to secure a sustainable, peaceful, prosperous, and equitable life on earth for everyone now and in the future. The goals cover global challenges that are crucial for the survival of humanity. They set environmental limits and set critical thresholds for the use of natural resources. The goals recognize that ending poverty must go together with strategies that build economic development. They address a range of social needs including education, health, social protection, and job opportunities while tackling climate change and environmental protection. The SDGs address key systemic barriers to sustainable development such as inequality, unsustainable consumption patterns, weak institutional capacity, and environmental degradation.

For the goals to be reached, everyone needs to do their part: governments, the private sector, civil society and every human being across the world. Governments are expected to take ownership and establish national frameworks, policies, and measures for the implementation of the 2030 Agenda.

A key feature of the 2030 Agenda for Sustainable Development is its universality and indivisibility. It addresses all countries – from the Global South and the Global North – as target countries. All countries subscribing to the 2030 Agenda are to align their own development efforts with the aim of promoting prosperity while protecting the planet to achieve sustainable development. Thus, with respect to the SDGs, all countries can be considered as developing and all countries need to take urgent action.

The 17 Sustainable Development Goals (SDGs)

No Poverty – End poverty in all its forms everywhere

Zero Hunger – End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Good Health and Well-Being – Ensure healthy lives and promote well-being for all at all ages

Quality Education – Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Gender Equality – Achieve gender equality and empower all women and girls

Clean Water and Sanitation – Ensure availability and sustainable management of water and sanitation for all

Affordable and Clean Energy – Ensure access to affordable, reliable, sustainable, and clean energy for all

Decent Work and Economic Growth – Promote sustained, inclusive, and sustainable economic growth, full and productive employment and decent work for all

Industry, Innovation and Infrastructure – Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Reduced Inequalities – Reduce inequality within and among countries

Sustainable Cities and Communities – Make cities and human settlements inclusive, safe, resilient and sustainable

Responsible Consumption and Production – Ensure sustainable consumption and production patterns

Climate Action – Take urgent action to combat climate change and its impacts

Life below Water – Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Life on Land – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Peace, Justice and Strong Institutions – Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Partnerships for the Goals – Strengthen the means of implementation and revitalize the global partnership for sustainable development

Source: http://www.un.org/sustainabledevelopment/sustainable- development-goals

1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

TEACHING & LEARNING OBJECTIVES FOR SDG 6
JSS MEDICAL COLLEGE & HOSPITAL

SDG 6 - Clean Water and Sanitation

Ensure availability and sustainable management of water and sanitation for all

Teaching & Learning objectives for SDG 6 "Clean Water and Sanitation"

Subject/ topic/ course in regular curriculum relating to SDG 6	Microbiology, Pathology, Community Medicine, General Medicine, Dermatology and Paediatrics
Cognitive Teaching & learning objectives	**At the end of 2nd Professional year, the learner should be able to,** 1. Describe the methods used and significance of assessing the microbial contamination of food, water and air 2. Enumerate and describe water borne diseases with respect to their causative agents and pathogenesis **At the end of 3rd Professional year part -1, the learner should be able to,** 1. Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior 2. Describe the health hazards of air, water, noise, radiation and pollution 3. Describe concepts of safe and wholesome water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting 4. Describe the epidemiology and preventive aspects of water borne diseases /jaundice/hepatitis/ diarrheal diseases 5. Describe the procedures and importance of milk hygiene, meat hygiene 6. Describe the concept of solid waste, human excreta and sewage disposal 7. Describe the role of vectors in the causation of diseases. Also discuss National Vector Borne Disease Control Program 8. Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures 9. Describe the mode of action, application cycle of commonly used insecticides and rodenticides 10. Describe the types, hazards and management of biomedical waste **At the end of final year the learner should be able to** 1. Describe the clinical features, diagnosis and treatment of water

	borne diseases 2. Describe the diseases related to improper personal hygiene, water pollution, improper environmental sanitation 3. Describe the skin diseases related to improper personal hygiene and sanitation 4. Be familiar with the basic factors which are essential for the implementation of the National Health Programs including practical aspects of Sanitation and water supply
Socio-emotional Teaching & learning objectives	**At the end of final year the learner should be able to** 1. Take part in community activities of improving water and sanitation management 2. Able to explain about water pollution, water access and water saving measures 3. Counsel the individuals and families on using clean water and environmental sanitation 4. Communicate with families on importance of waste disposal 5. Can feel empathy, responsibility and solidarity for and with people for sanitation and hygiene.
Behavioural Teaching & learning objectives	**At the end of final year the learner should be able to** 1. Undertake health awareness activities on water and sanitation at community setting 2. Impart appropriate advise on prevention of water and sanitation related advices to the patients at hospital settings 3. Manage biomedical waste generated at patient care at the clinical setting in an appropriate manner 4. The learner can plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety. 5. The learner can evaluate, participate in and influence decision-making on management strategies of local, national and international enterprises related to water pollution.

Learning approaches and methods for SDG 6 "Clean Waterand Sanitation"

1. Case studies, poster competition, essay writing on the causes, consequences and impact of clean water and sanitation
2. Observation of community associated work on clean water and sanitation.
3. Family health advisory survey
4. Case based discussions on water borne diseases.
5. Assessment of hygiene of individual, family and community, planning the health sessions of the same.
6. Academic visit to water treatment plant, sewage treatment plan, slaughter houses, milk diaries swimming pool market places to understand their sanitation conditions
7. Visit to biomedical waste treatment plants
8. Facility tour in the hospital to understand the biomedical waste management at various levels
9. Observation of world water day and world environment days

Topics for SDG 6 "Clean Water and Sanitation"

1. Basic concepts of personal hygiene and environmental sanitation
2. Role of microorganisms in water contamination
3. Role of individual person in the assessment of good health and its barriers
4. Hazards of air, water, soil pollution and radiations.
5. Concepts of safe water, sources of sanitary water with water purification process
6. Standards of water quality with methods of water conservation and rainwater harvesting
7. Epidemiology, clinical features, diagnosis and management of water borne and water related diseases diseases
8. Concept of waste management including solid waste, human excreta and sewage disposal
9. National Vector Borne Disease Control Program
10. Life cycles of vectors of Public Health importance and their control measures
11. Insecticides and Pesticides
12. Biomedical waste management
13. Solid and liquid waster management
14. Milk and meat hygiene
15. Sanitation measures of schools, swimming pools, slaughter houses, market places and hostels.

TEACHING & LEARNING OBJECTIVES FOR SDG 6
JSS DENTAL COLLEGE & HOSPITAL

Subject/ topic/ course in regular curriculum relating to SDG 6	• Environment and Health (potable water, water borne diseases, water purification) • Biomedical Waste Management • Infection control and Asepsis • Health Education on importance of clean water and sanitation	• All specialties in Dentistry • All undergraduate and post graduate students
Cognitive Teaching & learning objectives	• The learner understands water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity. • The learner understands that water is part of many different complex global interrelationships and systems. • The learner knows about the global unequal distribution of access to safe drinking water and sanitation facilities. • The learner understands the concept of Integrated Water Resources Management (IWRM) and other strategies for ensuring the availability and sustainable management of water and sanitation, including flood and drought risk management.	
Socio-emotional Teaching & learning objectives	• The learner can participate in activities of improving water and sanitation management in local communities. • The learner can communicate about water pollution, water access and water saving measures and to create visibility about success stories. • The learner can feel responsible for their water use. • The learner can see the value in good sanitation and hygiene standards. • The learner can question socio-economic differences as well as gender disparities in the access to safe drinking water and sanitation facilities.	
Behavioural Teaching & learning objectives	• The learner can cooperate with local authorities in the improvement of local capacity for self-sufficiency. • The learner can contribute to water resources management at the local level. • The learner can reduce their individual water footprint and to save water practicing their daily habits. • The learner can plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety. • The learner can evaluate, participate in and influence decision-making on management strategies of local, national and international enterprises related to water pollution.	

Suggested topics for SDG 6 "Clean Water and Sanitation"

The global water cycle and water distribution

The importance of equitable access to safe and affordable drinking water (achieving water security under climate change: e.g. coping with social and economic pressure caused by frequent waves of droughts and hence water shortages, and by floods and hence too much water)

The importance of adequate and equitable sanitation and hygiene, water quality and quantity parameters for health

The human right to water and water as a global common good

Impacts of pollution, dumping and release of hazardous chemicals and materials on water quality Water

scarcity and water use efficiency

Importance of water-related ecosystems

Water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies, water patents, landscaping for groundwater recharge as well as integrated water resources management

Water exports (virtual water)

Water and sustainable development (e.g. water and gender, water and inequality, water and health, waterand cities, water and energy, water and food security, water and disaster risk reduction, water and climatechange, water and the green economy, water and jobs)

Examples of learning approaches and methods for SDG 6 "Clean Water and Sanitation"

Calculate one's own water footprint (WF)[4]

Develop a concept for local sustainable water use and supply based on success stories Develop

school partnerships between schools in regions with abundance or scarcity of water

Organize excursions and field trips to local water infrastructures, and monitor water quality at school and home

Plan and run an awareness campaign or youth action project on water and its importance

Develop a project work on the invisible water, e.g. how much water in a litre of beer, a kilo of beef,a teeshirt, etc.

Develop an enquiry-based project: "What human activity can happen without water?"

TEACHING & LEARNING OBJECTIVES FOR SDG 6
JSS COLLEGE OF PHARMACY, MYSORE

Subject/ topic/ course in regular curriculum relating to SDG 6	• Anatomy Physiology and health education, Pharmaceutical Inorganic Chemistry, Pathophysiology, Environmental Sciences, Pharmaceutical Microbiology Social and preventive Pharmacy
Cognitive Teaching & learning objectives	**At the end of 1st year, the learner should be able to,** • Explain the concept of health education • Acquire knowledge on different types fluids and importance of major and minor electrolytes • Explain the etiology, signs and symptoms, and clinical interpretation of gastrointestinal disorders • Develop an attitude of concern for the environment. • Acquire skills to help the concerned individuals in identifying and solving environmental problems. **At the end of 2nd year, the learner should be able to,** • Explain the classification of bacteria's, sterilization process and ways to prevent microbial contamination • Explaining the mode of action, factors influencing and efficiency evaluation of disinfectants, antiseptics, bacteriostatic and bactericidal agents • Explain about the microbial spoilage and preservation techniques. • Explain the cultivation, collection, processing and storage of natural drugs **At the end of final year, the learner should be able to** • Explain the importance of patient counselling and education and training program for pharmacists • Explain the causes and evaluation of diseases and public health. • Describe the preventive measures of life-threatening diseases • Explain the importance and execution of the health promotion and education programs in schools
Socio-emotional Teaching & learning objectives	**At the end of final year, the learner should be able to** • Create the awareness about environmental problems among learners. • Impart basic knowledge about the environment and its allied problems. • Take part in community activities of improving water and sanitation management • Able to explain about water pollution, water access and water saving measures

	• Counsel the individuals and families on using clean water and environmental sanitation • Communicate with families on importance of waste disposal • Can feel empathy, responsibility and solidarity for and with people for sanitation and hygiene.
Behavioural Teaching & learning objectives	**At the end of final year, the learner should be able to** • Participate in environment protection and environment improvement. • Undertake health awareness activities on water and sanitation at community setting • Impart appropriate advice on prevention of water and sanitation related advices • The learner can plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety. • The learner can evaluate, participate in and influence decision-making on management strategies of local, national and international enterprises related to water pollution.

Suggested topics for SDG 6 "Clean Water and Sanitation"

1. Basic concepts of personal hygiene and environmental sanitation
2. Effect of microorganisms in water contamination
3. Role of individuals in applying good sanitary practices towards achieving good health and its barriers
4. Hazards of air, water and soil pollution.
5. Concepts of safe water, sources of sanitary water with water purification process
6. Standards of water quality with methods of water conservation and rainwater harvesting
7. Epidemiology, clinical features, diagnosis and management of water borne and water related diseases
8. Concept of waste management including solid waste, human excreta and sewage disposal
9. Unscientific use of Insecticides and Pesticides
10. Solid and liquid waste management
11. Sanitation measures of schools, swimming pools, slaughter houses, market places and hostels.

Examples of learning approaches and methods for SDG 6 "Clean Water and Sanitation"

1. Case studies, poster competition, essay writing on the causes, consequences and impact of clean water and sanitation
2. Periodic monitoring of potability of the water supplied through all installed apparatus.
3. Conduct an awareness program on judicious use of water in laboratories and lavatories in JSS College of Pharmacy, Mysuru.
4. Observation of community associated work on clean water and sanitation.
5. Family health advisory survey
6. Case based discussions on water borne diseases.
7. Awareness programmes in villages in achieving open defecation free status.
8. Assessment of hygiene of individual, family and community, planning the health sessions of the same.
9. Academic visit to water treatment plant, sewage treatment plan, swimming pool market places to understand their sanitation conditions
10. Observation of world water day and world environment days

TEACHING & LEARNING OBJECTIVES FOR SDG 6
JSS COLLEGE OF PHARMACY, OOTY

Subject/ topic/ course in regular curriculum relating to SDG 6	• **I M Pharm** **Subject: Scale Up and Technology Transfer** **Topics: Industrial Safety - Industrial effluent testing & treatment** **Cognitive Teaching & learning objectives** • The learner understands the importance of water, as an essential material for the livelihood, the causes and the causes and factors responsible for water pollution, their possible ways by recycling it to avoid water scarcity. **Socio-emotional Teaching & learning objectives:** • The learner can participate in activities of effective effluent treatment systems for improving the quality and reusable water.. • The learner can initiate about sources of water pollution and measures to create an awareness for its recycling. • The learner can feel sole responsible for their water use on a daily basis. **Behavioural Teaching & learning objectives:** • The learner can avoid unnecessary wastage of water and to save water by their daily habits. • The learner can exercise certain activities to increase the quality of water with safe consumption. **I D Pharm** **Subject :** Social Pharmacy Topics: Preventive Healthcare - Effect of Environment on Health: Water pollution, Importance of safe drinking water, Waterborne diseases Water Purification Techniques, Use of water testing kits, Content calculation of bleaching powder and KMnO4 **Cognitive Teaching & learning objectives:** • The learner understands water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity. • The learner knows about the global unequal distribution of access to safe drinking water and sanitation facilities. **Socio-emotional Teaching & learning objectives:** • The learner can participate in activities of improving water and sanitation management in local communities. • The learner can communicate about water pollution, water access and water saving measures and to create visibility about success stories. • The learner can feel responsible for their water use.

	• The learner can see the value in good sanitation and hygiene standards. **Behavioural Teaching & learning objectives:** • The learner can reduce their individual water footprint and to save water practicing their daily habits. • The learner can plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety. **IV B Pharm - VIII Semester** **Subject: Social and Preventive Pharmacy** **Topic: Community services** in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school. **Cognitive Teaching & learning objectives:** • The learner understands water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity. • The learner knows about the global unequal distribution of access to safe drinking water and sanitation facilities. **Socio-emotional Teaching & learning objectives:** • The learner can participate in activities of improving water and sanitation management in local communities. • The learner can communicate about water pollution, water access and water saving measures and to create visibility about success stories. • The learner can feel responsible for their water use. • The learner can see the value in good sanitation and hygiene standards. **Behavioural Teaching & learning objectives:** • The learner can reduce their individual water footprint and to save water practicing their daily habits. • The learner can plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety. B.Pharm, Second Year, III Sem, Pharmaceutical Microbiology, Practicals - Bacteriological analysis of water

TEACHING & LEARNING OBJECTIVES FOR SDG 6
FACULTY OF HEALTH SYSTEM MANAGEMENT STUDIES

Subject/ topic/ course in regular curriculum relating to SDG 6	• Environmental studies/ Ecosystems, Water pollution / Semester1- BBAHHSM • Business economics/ Macro Economics/ Semester2- BBAHHSM • Business law / Economic and Environmental Laws / Semester3- BBAHHSM SEM) • Management principles and practices/ Concepts of Organizing/ Semester1- MBAHA & PA • Strategic management/ strategy Formulation / Semester2- MBAHA & PA • Hospital support services/ Various Hospital Support Services / Semester3 – MBAHA & PA • Epidemiology/ Communicable Diseases and Transmission / Semester3- MBAHA • Basic Health Sciences/Different Organ Systems in the Human Body/ Semester3 – MBAHA • Public health/ Principles and Practices of Public Health/ Semester4 - MBAHA • Safety and Risk Management / Hospital Related Infections / Semester4- MBAHA • Medical Ethics/ Laws Governing the Commissioning of Hospital & Patient Safety / Semester4 - MBAHA
Cognitive Teaching & learning objectives	• The learner also identifies the importance of infrastructural requirements in organizations for providing basic amenities to their employees • The learner will understand the importance of the proper planning and designing of the organization to provide clean water and sanitation. • The learner will know the different business laws that an organization should abide for efficient functioning • Learner knows the importance of clean water and sanitation on health, epidemiology, and its effects on public health • The learner will also learn the contribution of clean water and sanitation towards management of various health risks • The learner also identifies the fundamental ethical practices of organizations in providing basic amenities to their employees • The learner learns the vital role of sanitation and waste disposal practices

Socio-emotional Teaching & learning objectives	• The learner can participate in the various camping activities conducted by the organizations and healthcare facilities to save natural resources • The learner can spread the knowledge demonstrating the importance of clean water and sanitation to have better health • The learner can appreciate the value of basic needs in terms of clean water and sanitation • The learner can make societies and communities aware on significance of clean water and sanitation **Societal Activities on Sanitation**
Behavioural Teaching & learning objectives	• The learner can perceive clean water as a life making material and learns to utilize water resources with gratitude • The learner can share his/ her knowledge with people around on water conservation and importance of sanitation in day-to-day life. • The learner can play an active role participating in various local, national and international strategies for addressing water pollution • The learner can help the local agencies in spreading awareness on implementing sanitation measures and contribute towards betterment of health conditions.

TEACHING & LEARNING OBJECTIVES FOR SDG 6
JSS SCHOOL OF LIFE SCIENCES, OOTY

Subject/ topic/ course in regular curriculum relating to SDG 6	• Course: BSc Biotechnology ○ Biotechnological Applications in Wastewater Management
Cognitive Teaching & learning objectives	• The learner understands water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity. • The learner understands that water is part of many different complex global interrelationships and systems. • The learner knows about the global unequal distribution of access to safe drinking water and sanitation facilities. • The learner understands the concept of Integrated Water Resources Management (IWRM) and other strategies for ensuring the availability and sustainable management of water and sanitation, including flood and drought risk management.
Socio-emotional Teaching & learning objectives	• The learner can participate in activities of improving water and sanitation management in local communities. • The learner can communicate about water pollution, water access and water saving measures and to create visibility about success stories. • The learner can feel responsible for their water use. • The learner can see the value in good sanitation and hygiene standards. • The learner can question socio-economic differences as well as gender disparities in the access to safe drinking water and sanitation facilities.
Behavioural Teaching & learning objectives	• The learner can cooperate with local authorities in the improvement of local capacity for self-sufficiency. • The learner can contribute to water resources management at the local level. • The learner can reduce their individual water footprint and to save water practicing their daily habits. • The learner can plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety. • The learner can evaluate, participate in and influence decision-making on management strategies of local, national and international enterprises related to water pollution.

Suggested topics for SDG 6 "Clean Water and Sanitation"

The global water cycle and water distribution

The importance of equitable access to safe and affordable drinking water (achieving water security under climate change: e.g. coping with social and economic pressure caused by frequent waves of droughts and hence water shortages, and by floods and hence too much water)

The importance of adequate and equitable sanitation and hygiene, water quality and quantity parameters for health

The human right to water and water as a global common good

Impacts of pollution, dumping and release of hazardous chemicals and materials on water quality

Water scarcity and water use efficiency

Importance of water-related ecosystems

Water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies, water patents, landscaping for groundwater recharge as well as integrated water resources management

Water exports (virtual water)

Water and sustainable development (e.g. water and gender, water and inequality, water and health, water and cities, water and energy, water and food security, water and disaster risk reduction, water and climate change, water and the green economy, water and jobs)

Examples of learning approaches and methods for SDG 6 "Clean Water and Sanitation"

Calculate one's own water footprint (WF)[4]

Develop a concept for local sustainable water use and supply based on success stories

Develop school partnerships between schools in regions with abundance or scarcity of water

Organize excursions and field trips to local water infrastructures, and monitor water quality at school and home

Plan and run an awareness campaign or youth action project on water and its importance

Develop a project work on the invisible water, e.g. how much water in a litre of beer, a kilo of beef, a teeshirt, etc.

Develop an enquiry-based project: "What human activity can happen without water?"

DEPARTMENT OF YOGA

Subject/ topic/ course in regular curriculum relating to SDG 6	Yoga & Food Science, Physiology, Human Nutrition & Yoga.
Cognitive Teaching & learning objectives	**At the end of 2nd year and course the learner should be able to,** • Understand the importance of water to human body the causes, effects and water scarcity on health. • Knows about the prevalence of water related disorders / diseases. • Relate the concept of drinking-water and its positive impact on body.
Socio-emotional Teaching & learning objectives	**At the end of 2nd year and course the learner should be able to,** • Educate the individuals and families on using clean water and environmental sanitation.
Behavioral Teaching & learning objectives	**At the end of 2nd year the learner should be able to,** • Plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety.

Topics for SDG 6 "Clean Water and Sanitation"

- Strategies to maintain sanitation & hygiene at work place, home.
- The importance of adequate and equitable sanitation and hygiene, water quality and quantity parameters for health.
- Importance of Water & sanitation in sustainable development – strategies to tackle water scarcity, floods, water conservation, WASH practices.

Examples of learning approaches and methods for SDG 6 "Clean Water and Sanitation

- Calculate water footprint (WF) at individual, home & institutional levels.
- Develop partnerships between institutions, schools, PHCs and regions with abundance or scarcity of water.
- Organize visits to local water infrastructures, checking & monitoring water quality at schools, urban and rural setups.
- Develop a project / awareness campaign on water and its importance, water conservation, water recycling, Green environment.
- Awareness programs on WASH practices - at schools, institutions, Anganwadi centres and vulnerable areas on WASH practices to reduce burden of infections and development of related health disorders.

BSC Yoga

Subject/ topic/ course in regular curriculum relating to SDG 6	Environmental studies, Environmental psychology
Cognitive Teaching &learning objectives	**At the end of 1st & 2nd Professional year, the learner should be able to,** ▪ Describe the methods used and significance of assessing the microbial contamination of food, water and air ▪ Enumerate and describe water borne diseases with respect to their causative agents and pathogenesis ▪ Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior ▪ Describe the health hazards of air, water, noise, radiation and pollution ▪ Describe concepts of safe and portable water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting ▪ Describe the epidemiology and preventive aspects of water borne diseases /jaundice/hepatitis/ diarrheal diseases ▪ Describe the procedures and importance of food hygiene ▪ Describe the concept of solid waste, and sewage disposal ▪ Describe the role of vectors in the causation of diseases. Also discuss National Vector Borne Disease Control Program ▪ Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures ▪ Describe the mode of action, application cycle of commonly used insecticides and rodenticides ▪ Describe the types, hazards and management of biomedical waste • Understands water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity. **At the end of final year the learner should be able to** ▪ Describe the clinical features, diagnosis and treatment of water borne diseases ▪ Describe the diseases related to improper personal hygiene, water pollution, improper environmental

	sanitation ▪ Describe the skin diseases related to improper personal hygiene and sanitation • Understands water is part of many different complex global interrelationships and systems.
Socio-emotional Teaching &learning objectives	**At the end of final year the learner should be able to** ▪ Take part in community activities of improving water and sanitation management ▪ Able to explain about water pollution, water access and water saving measures ▪ Analyze the individuals and families on using clean water and environmental sanitation ▪ Communicate with families on importance of waste disposal ▪ Can feel empathy, responsibility and solidarity for and with people for sanitation and hygiene. ▪ understands the concept of Water Resources and other strategies for ensuring the availability and sustainable management of water and sanitation, including flood and drought risk management. ▪ knows about the global unequal distribution of access to safe drinking water and sanitation facilities.
Behavioural Teaching &learning objectives	**At the end of final year the learner should be able to** • Undertake health awareness activities on water and sanitation at community setting • Impart appropriate advise on prevention of water and sanitation related advices to the patients at hospital settings • Manage biomedical waste generated at patient care at the clinical setting in an appropriate manner • The learner can plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety. • The learner can evaluate, participate in and influence decision-making on • management strategies of local, national and international enterprises related to water pollution.

Topics for SDG 6 "Clean Water and Sanitation"

- Basic concepts of personal hygiene and environmental sanitation
- Role of microorganisms in water contamination
- Role of individual person in the assessment of good health and its barriers
- Hazards of air, water, soil pollution and radiations.
- Concepts of safe water, sources of sanitary water with water purification process
- Standards of water quality with methods of water conservation and rainwater harvesting
- Epidemiology, clinical features, diagnosis and management of water borne and
- water related diseases diseases
- Concept of waste management including solid waste, human excreta and sewage disposal
- Life cycles of vectors of Public Health importance and their control measures
- Insecticides and Pesticides
- Solid and liquid waste management
- Sanitation measures of schools, swimming pools, slaughter houses, market places and hostels.

Examples of learning approaches and methods for SDG6 "Clean Water and Sanitation"

- Case studies, poster competition, essay writing on the causes, consequences and impact of clean water and sanitation
- Develop an enquiry-based project:" What human activity can happen without water?"
- Observation of community associated work on clean water and sanitation.
- Family health advisory survey
- Case based discussions on water borne diseases.
- Assessment of hygiene of individual, family and community, planning the health sessions of the same.
- Academic visit to water treatment plant, sewage treatment plan, slaughter houses, milk diaries

TEACHING & LEARNING OBJECTIVES FOR SDG 5
JSS SCHOOL OF LIFE SCIENCES, MYSORE
DEPARTMENT OF MICROBIOLOGY

Subject/ topic/ course in regular curriculum relating to SDG 6	• Value Based Course (VBC) 01 Health & Wellness (BSc I Sem); Environmental Microbiology (MSc V Sem); Medical Microbiology & Immunology (MSc III Sem); Disease Diagnostic Technology (MSc III Sem); Microbiological Analysis of Air & Water (BSc III Sem)
Cognitive Teaching & learning objectives	• The learner understands the importance of water quality and quantity, the causes, effects and consequences of water pollution and water scarcity; unhygienic water as the source of disease, their effects to the public, testing protocols and treatment; need for improvement and accessto safe drinking water and sanitation facilities; concept of Integrated Water Resources Management for ensuring the availability and sustainable management of water and sanitation, including flood and drought risk management.
Socio-emotional Teaching & learning objectives	• The learner can participate in activities of improving water and sanitation management in local communities; communicate about water pollution, water access and water saving measures and to create visibility about success stories; know their responsibility for water usage; acquire the knowledge of good sanitation and hygiene standards.
Behaviorial Teaching & Learning objectives	• The learner can cooperate with local authorities and improve the hygienic and sanitation condition; contribute to water resources management at the local level; reduce their individual water footprint and to save water practicing their daily habits; plan, implement, evaluate andreplicate activities that contribute to increasing water quality and safety; participate in decision-making on management strategies of local, national and international enterprises related to water pollution.

Learning approaches and methods for SDG 6

- Development of sustainable WASH products, diagnostic and detection kits of waterborne diseases
- Safe methods for recyling and reuse of wastewater

Suggested topics for students workshop

- Training on water quality testing
- Training on detection of water-borne pathogens
- Demo on WASH techniques
- Include environmental and medical Microbiology expertise in sensitization and policy making on clean water.

DEPARTMENT OF ENVIRONMENTAL SCIENCES

Course Name in curriculum relating to SDG 6	• Hydrology (DSE 01a) • Integrated Water resource Management (DSE 02a) • Water Supply and Sanitation (DSE 03a) • Water Energy and Food Nexus (DSE 04a)
Cognitive Teaching & learning objectives	• The learner understands water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity. • The learner understands that water is part of many different complex global interrelationships and systems. • The learner knows about the global unequal distribution of access to safe drinking water and sanitation facilities. • The learner understands the concept of Integrated Water Resources Management (IWRM) and improved water reclamation strategies for ensuring the availability and sustainable management of water and sanitation, including flood and drought risk management. • The learners understand the source of contaminations including point and non-point sources
Socio-emotional Teaching & learning objectives	• The learner can participate in education and awareness activities of improving water and sanitation management in local communities. • The learner can communicate about water pollution, water access and water-saving measures and to create visibility about success stories. • The learner can feel responsible for their water use. • The learner can see the value in good sanitation and hygiene standards. • The learner can question socio-economic differences as well as gender disparities in the access to safe drinking water and sanitation facilities.
Behavioral Teaching & learning objectives	• The learner can cooperate with local authorities in the improvement of local capacity for self-sufficiency. • The learner can contribute to water resources management at the local level. • The learner can reduce their individual water footprint and to save water by practicing their daily habits. • The learner can plan, implement, evaluate, and replicate activities that contribute to increased water quality and safety. • The learner can evaluate, participate in and influence decision-making on management strategies of local, national, and international enterprises related to water pollution.
Suggested topics for SDG 6 "Clean Water and Sanitation"	

- The global water cycle, water and sanitation and water distribution
- The importance of equitable access to safe and affordable drinking water (achieving water security under climate change: e.g. coping with social and economic pressure caused by frequent waves of droughts and hence water shortages, and by floods and hence too much water)
- The importance of adequate and equitable sanitation and hygiene, water quality and quantity parameters for health
- The human right to water and water as a global common goods
- Impacts of pollution, dumping and release of hazardous chemicals and materials on water quality water scarcity and water use efficiency
- Importance of water conservation-related ecosystems
- Water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies, water patents, landscaping for groundwater recharge as well as integrated water resources management
- Water and sustainable development (e.g. water and gender, water and inequality, water and health, water and cities, water and energy, water and food security, water and disaster risk reduction, water and climate change, water and the green economy, water and jobs)
- Plan and run an awareness campaign about water conservation and management locally and globally
- Plan and implement local service-learning and engagement opportunities for empowering poor people, reducing their vulnerability to different hazards and increasing their resilience to access fresh water in collaboration with NGOs, the private sector, community groups, etc.
- Conduct a case study on freshwater and sanitation in selected countries (through desktop research) or at the local level (through excursions, doing interviews, etc.)
- Provide internships within organizations addressing water issues and freshwater distribution
- Develop an enquiry-based project around: “Is water required for healthy livelihood?”

Examples of learning approaches and methods for SDG 6 “Clean Water and Sanitation”

- Calculate one’s own water footprint (WF)
- Develop a concept for local sustainable water use and supply based on success stories
- Develop school partnerships between schools in regions with abundance or scarcity of water
- Organize excursions and field trips to local water infrastructures, and monitor water quality at school and home
- Plan and run an awareness campaign or youth action project on water and its importance
- Develop a project work on the invisible water, e.g. how much water in a liter of beer, a kilo of beef, a T shirt, etc.
- Develop an enquiry-based project: “What human activity can happen without water?”
- Develop safe and low-cost water treatment techniques for freshwater access by all

DEPARTMENT OF NUTRITION & DIETETICS

Subject/ topic/ course in regular curriculum relating to SDG 6	• Topics - Fundamentals of Food Science, Life Cycle Nutrition & Physiology, Medical Nutrition Management, Community Nutrition, Maternal & Child Nutrition. • Access to safe water and sanitation reduces undernutrition, helps prevention and management of various disease conditions.
Cognitive Teaching & learning objectives	**At the end of 2nd year and course the learner should be able to,** • Understand the importance of water, the causes, effects and consequences of water pollution and water scarcity on health. • Knows about the prevalence of water related disorders / diseases. • Can relate the concept of access to safe drinking-water, sanitation, and hygiene (WASH) services, its positive impact on nutrition.
Socio-emotional Teaching & learning objectives	**At the end of 2nd year and course the learner should be able to,** • Can participate in activities of improving water and sanitation management at schools, local communities, and community at large, promote water conservation, WASH practices, recycling of water. • Can create awareness about consumption of potable water, water pollution, and saving methods. • Can see the value in good sanitation and hygiene standards. • Can question socio-economic differences as well as gender disparities in the access to safe drinking water and sanitation facilities.
Behavioral Teaching & learning objectives	**At the end of 1st year the learner should be able to,** • Help implementation of safety guidelines and tools on WASH practices, mindful usage of water, at household / institution levels. • Participate in risk assessment to identify, prioritize, manage and monitor coordinated action to protect public health with support of Anganwadi centres, PHC's, Govternment / NGO's. • Reduce their individual water footprint and to save water practicing their daily habits. **At the end of 2nd year and course the learner should be able to,** • Can be participate in addressing critical issues such as a lack of access to diverse food and micronutrients, limited access to healthcare and inadequate water, sanitation and hygiene (WASH), which are essential for preventing malnutrition. • Can evaluate, participate in and influence decision-making on management strategies of local, national and international enterprises related to water pollution.

Suggested topics for SDG 6 "Clean Water and Sanitation"

- The importance of adequate and equitable sanitation and hygiene, water quality and quantity parameters for health.
- Impacts of water pollution on agriculture and the nutrient quality of the crops.
- Water- and sanitation-related activities and programmes such as rain water harvesting, conservation of water resources.
- Strategies to maintain sanitation & hygiene at home, work place, health are set ups.
- Importance of Water & sanitation in sustainable development – strategies to tackle water scarcity, floods, water conservation, WASH practices.

Examples of learning approaches and methods for SDG 6 "Clean Waterand Sanitation" Suggested topics for SDG 1 "No Poverty" for students workshop

- Calculate water footprint (WF) at individual, home & institutional levels.
- Develop partnerships between institutions, schools, PHCs and regions with abundance or scarcity of water.
- Organize visits to local water infrastructures, checking & monitoring water quality at schools, urban and rural setups.
- Develop a project / awareness campaign on water and its importance, water conservation, water recycling, Green environment.
- Awareness programs on WASH practices - at schools, institutions, Anganwadi centres and vulnerable areas on WASH practices to reduce burden of infections and development of related health disorders.
- Strategies to educate & implement WASH practices at household & community levels, especially in children under five reducing the risk of infections & diarrhea.
  - The interrelation of poverty, natural hazards, climate change and other economic, social and environmental shocks and stresses – Group exercise, debate, skits
  - Nutrition awareness program & planning strategies for implementing during extreme conditions like natural calamities, pandemic/endemic situations, emergencies
  - Consequences of poverty such as malnutrition, mortality, and violence - Competitions

MSc Sports Nutrition & Management

Subject/ topic/ course in regular curriculum relating to SDG 6	• M.Sc Sports Nutrition and Management • Entrepreneurship Development (As workshop)
Cognitive Teaching & learning objectives	• At the end of 1st Professional year, the learner should be able to • understand the use of available resources efficiently and reduces waste generation. • The learner analyzes the environmental issues and deliver the best in the circumstances. • The learner knows about the constraints to access of safe drinking water and sanitation facilities..

Socio-emotional Teaching & learning objectives	At the end of the program, the learner should be able to • participate in activities of improving water and sanitation management. • communicate about efficient utilization of available resources and maintenance of sanitation in the surrounding • feel responsible for their water use and waste disposal and management. • see the value in good sanitation and hygiene standards. • question access to safe drinking water and sanitation facilities.
Behavioural Teaching & learning objectives	At the end of the program, the learner should be able to • contribute to reducing water waste, waste generation and resources management. • reduce their individual water footprint and to save water practicing their daily habits. • plan, implement, evaluate and replicate activities that contribute to hygiene, sanitation and safety. • evaluate, participate in and influence decision-making on management strategies related to water pollution.

Suggested topics for SDG 6 "Clean Water and Sanitation"

The global water cycle and water distribution

The importance of equitable access to safe and affordable drinking water (achieving water security under climate change: e.g. coping with social and economic pressure caused by frequent waves of droughts and hence water shortages, and by floods and hence too much water)

The importance of adequate and equitable sanitation and hygiene, water quality and quantity parameters for health

The human right to water and water as a global common good

Examples of learning approaches and methods for SDG 6 "Clean Waterand Sanitation"
Calculate one's own water footprint (WF)[4] Develop a concept for local sustainable water use and supply based on success stories Develop school partnerships between schools in regions with abundance or scarcity of water Organize excursions and field trips to local water infrastructures, and monitor water quality at school and homePlan and run an awareness campaign or youth action project on water and its importance Develop a project work on the invisible water, e.g. how much water in a litre of beer, a kilo of beef,a teeshirt, etc.

BSc Food, Nutrition & Dietetics

Subject/ topic/ course in regular curriculum relating to SDG 6	Food microbiology/ Food Forensics & Toxicology/ Food Preservation & Adulteration/ Food Quality Control
Cognitive Teaching &learning objectives	**At the end of 1st & 2nd Professional year, the learner should be able to,** ▪ Describe the methods used and significance of assessing the microbial contamination of food, water and air ▪ Enumerate and describe water borne diseases with respect to their causative agents and pathogenesis **At the end of 3rd Professional year the learner should be able to,** ▪ Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior ▪ Describe the health hazards of air, water, noise, radiation and pollution ▪ Describe concepts of safe and portable water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting ▪ Describe the epidemiology and preventive aspects of water borne diseases /jaundice/hepatitis/ diarrheal diseases ▪ Describe the procedures and importance of food hygiene ▪ Describe the concept of solid waste, and sewage disposal ▪ Describe the role of vectors in the causation of diseases. Also discuss National Vector Borne Disease Control Program ▪ Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures ▪ Describe the mode of action, application cycle of commonly used insecticides and rodenticides

	▪ Describe the types, hazards and management of biomedical waste • Understands **water as a fundamental condition of life itself, the importance of water quality and quantity**, and the causes, effects and consequences of water pollution and water scarcity. **At the end of final year the learner should be able to** ▪ Describe the clinical features, diagnosis and treatment of water borne diseases ▪ Describe the diseases related to improper personal hygiene, water pollution, improper environmental sanitation ▪ Describe the skin diseases related to improper personal hygiene and sanitation • Understands **water is part of many different complex global interrelationships and systems.**
Socio-emotional Teaching &learning objectives	**At the end of final year the learner should be able to** ▪ Take part in community activities of improving water and sanitation management ▪ Able to explain about water pollution, water access and water saving measures ▪ Analyze the individuals and families on using clean water and environmental sanitation ▪ Communicate with families on importance of waste disposal ▪ Can feel empathy, responsibility and solidarity for and with people for sanitation and hygiene. ▪ understands the concept of **Water Resources** and other strategies for ensuring the availability and sustainable management of water and sanitation, including flood and drought risk management. ▪ knows about the **global unequal distribution of access to safe drinking water and sanitation facilities**.
Behavioural Teaching &learning objectives	**At the end of final year the learner should be able to** 1. Undertake health awareness activities on water and sanitation at community setting 2. Impart appropriate advise on prevention of water and sanitation related advices to the patients at hospital settings 3. Manage biomedical waste generated at patient care at the clinical setting in an appropriate manner 4. The learner can plan, implement, evaluate and replicate activities that contribute to increasing water quality and safety. 5. The learner can evaluate, participate in and influence decision-making on management strategies of local, national and international enterprises related to water pollution.

Topics for SDG 6 "Clean Water and Sanitation"

- Basic concepts of personal hygiene and environmental sanitation
- Role of microorganisms in water contamination
- Role of individual person in the assessment of good health and its barriers
- Hazards of air, water, soil pollution and radiations.
- Concepts of safe water, sources of sanitary water with water purification process
- Standards of water quality with methods of water conservation and rainwater harvesting
- Epidemiology, clinical features, diagnosis and management of water borne and water related diseases diseases
- Concept of waste management including solid waste, human excreta and sewage disposal
- National Vector Borne Disease Control Program
- Life cycles of vectors of Public Health importance and their control measures
- Insecticides and Pesticides
- Solid and liquid waste management
- Sanitation measures of schools, swimming pools, slaughter houses, market places and hostels.

Examples of learning approaches and methods for SDG6 "Clean Water and Sanitation"

- Case studies, poster competition, essay writing on the causes, consequences and impact of clean water and sanitation
- Develop **an enquiry-based project**:" What human activity can happen without water?"
- Observation of community associated work on clean water and sanitation.
- Family health advisory survey
- Case based discussions on water borne diseases.
- Assessment of hygiene of individual, family and community, planning the health sessions of the same.
- Academic visit to water treatment plant, sewage treatment plan, slaughter houses, milk diaries

Current WHO statistics are damning, making this an issue that must be addressed urgently as it is thought that around 2 billion people are using a contaminated water supply. In addition, over 485,000 people die each year from diarrhoeal related illnesses and diseases such as polio, typhoid, and cholera are once again being transmitted as a further consequence. Based on current trends and data, it is thought that by 2025 half of the total global population will be living in water-stressed or water-scarce areas. Crowded, expanding cities in many parts of the world are experiencing an increased demand for fresh water, and planners are unclear as to how the water needs of tomorrow will be met.

India to be precise has 4% of the global freshwater resources but ~18% of the world's population. The country, which was largely rural years ago, has *en masse* become urban in the past two decades. The urban population has risen from 28% in 2000 to 33% in 2016. With a growth rate over 6% in gross domestic product (GDP), the most populous countries, such as India and China, are increasing their chemical, pharmaceutical, agrochemical, automotive, petrochemical, semiconductor, and many other outputs all aimed at enriching the various economical ecosystems. On this note, The World Bank has predicted that achieving a growth rate of 8% or above for India will be possible only with a robust water management system.

While there are a wide-range of effective water purification methods and techniques which are already widely accepted to include boiling, filtration, oxidation, and distillation, but these often require high amounts of energy. Other treatment processes may include the use of chemical agents which is only possible in areas having infrastructure that is up to par. The more affordable and portable devices currently available are not failproof as they cannot guarantee 100% removal of harmful viruses, bacteria, dust, and even microplastics. Therefore, a nanotechnological approach could offer affordable and accessible clean water solutions to the world's most vulnerable populations.

Clean water challenges are highly interdisciplinary, and solutions therefore must cut across boundaries of disciplines. Water in its diverse forms is related to climate, food, health, and many other aspects of life. Over the past half century, 83% of freshwater species have also drastically diminished due to mankind's contribution to the ecosystem through poor sanitary conditions. Henceforth, water and sanitization is and will continue to be one of the most important interdisciplinary subjects of research.

Nanotechnology is a process that involves manipulating and controlling matter on the atomic scale. In the process of water purification, this involves using nanomembranes to soften the water and eradicate biological and chemical contaminants as well as other physical particles and molecules. Recent advances in the field of nanoscience provide many solutions to alleviate needs with regard to reducing scarcity or removing contamination. Operating at the nanoscale makes assembling atoms and molecules to exact specifications easier. In reference to water filtration, this means materials can be tailored, or tuned, to filter out heavy metals and biological toxins.

Nanofiltration membranes are already widely applied to remove dissolved salts and micro-pollutants, soften water and treat wastewater. The membranes act as a physical barrier, capturing

particles and microorganisms bigger than their pores, and selectively rejecting substances. Nanotechnology is expected to further improve membrane technology and also drive down the prohibitively high costs of desalination which are currently in place. For example, pesticide filters have already reached over 7.5 million people by 2016 reducing pesticide levels from over 20 times the safety standard to concentrations substantially below it. On a similar note, use of nanostructured materials to remove arsenic from drinking water has helped deliver clean water to more than 1 million people each day, providing hope for another 80 million or so in India affected. Such a solution does not require electricity and is affordable, even for those living in the poorest parts of the world.

Alternate methods of microbial disinfection, desalination, water harvesting, recycling, contaminant sensing, and monitoring are debuting in the marketplace. Scalability and massive implementation of technologies is slow but encouraging. With nanotechnology, the key principle is to have "More for less". As constituent materials reduce in dimension, their effective capacity to remove contaminants increases due to additional derivatization of the material to increase charge, solubility, affinity, *etc* giving more effective scavenging capacity per unit mass of the material at the nanoscale than the bulk material, making a purifier composed of nanoscale material smaller and more affordable.

The question remains, can nanotechnologies really help solve water problems in developing countries? There are two positive signs that they will. First, water professionals and scientists are increasingly including local communities in dialogues to understand the problems with, and opportunities for, applying nanotechnology to water improvements. Second, since the commercialisation of nanotechnology is at an early stage, we can hope that such discussions between researchers, communities and industry will encourage scientists and businesses to develop appropriate business models to exploit their inventions.

Cognitive Teaching & learning objectives	• The learner understands water as a fundamental condition of life itself, the importance of water quality and quantity, and the causes, effects and consequences of water pollution and water scarcity. • The learner understands conventional methods being used in water purification and sanitization • The learner knows the different methods of purification using nanomaterials • The learner learns about the various types of nanomaterials that can be used in water purification • The learner understands the mechanism behind nanomaterials' ability in water remediation • The learner knows about regulations and toxicity related to water purification applications • The learner gets to synthesis their own nanomaterials and make their own purification system

Socio-emotional Teaching & learning objectives	• The learner can participate in activities of improving water and sanitation management in local communities. • The learner can communicate about water pollution, water access and water saving measures and to create visibility about success stories. • The learner can feel responsible for their water use. • The learner can see the value in good sanitation and hygiene standards. • The learner can question socio-economic differences as well as gender disparities in the access to safe drinking water and sanitation facilities.

Suggested topics for SDG 6: "Clean Water and Sanitation"

Source and types of water pollution

Conventional purification methods

Nanomaterials and types of purification processes

Nanoparticle characteristics which make them efficient in purifying water

Nanoparticle purification mechanism

Industrial and portable nano-based purification systems

DEPARTMENT OF MEDICAL PHYSICS

Subject/ topic/ course in regular curriculum relating to SDG 6	• Radiation protection safety and standards
Cognitive Teaching & learning objectives	• Describe the health hazards of air, water, noise, radiation and pollution. • Describe the types, hazards and management of biomedical waste and Radiation waste. • Describe the concept of solid waste, human excreta and sewage disposal in Nuclear medicine waste management.
Socio-emotional Teaching & learning objectives	• Communicate with families on importance of waste disposal. • Can feel empathy, responsibility and solidarity for and with people for sanitation and hygiene.
Behavioural Teaching & learning objectives	• Impart appropriate advise on prevention of water and sanitation related advices to the patients at hospital settings. • Manage biomedical waste and radiation waste generated at patient care at the clinical setting in an appropriate manner.

Suggested topics for SDG 6 "Clean Water and Sanitation"

- Radioactive waste disposals and transport of Radio isotopes as per the guidelines of the AERB and IAEA
- Radioactive wastes- classification of waste – permissible limits for disposable of waste- sampling techniques for air water and solids- geological hydrological and metrological parameters -management of radioactive waste in medical industrial agricultural and research establishments.
- The importance of adequate and equitable sanitation and hygiene, water quality and quantity parameters for health & well-being.

DEPARTMENT OF MEDICAL STATISTICS

Subject/ topic/ course in regular curriculum relating to SDG 6	• Time Series Analysis

Cognitive Teaching & learning objectives	• The learner understands time-series predictions which have been widely used in public health surveillance
	• The learner understands the waterborne disease risk and climate
	  ○ patterns, risk management approaches which is consider potential ha-
	  ○ zards posed by climate change by using time series analysis.
	• The learners understand the Longer-term impacts of Water safety plans (WSP) implementation, such as water quality and health improvements by taking different lag period through the study of different time series models.
	• The learner understands the concept of spectral analysis that can be applied to public health.

Socio-emotional Teaching & learning objectives	• The learner can participate in activities of improving water and sanitation management in local communities. • The learner can communicate about water pollution, water access and water saving measures and to create visibility about success stories. • The learner can feel responsible for their water use. • The learner can see the value in good sanitation and hygiene standards. • The learner can question socio-economic differences as well as gender disparities in the access to safe drinking water and sanitation facilities.
Behavioural Teaching & learning objectives	• The learner can cooperate with local authorities in the improvement of local capacity for self-sufficiency. • The learner can contribute to wastewater treatment plans at the local level. • The learner can reduce their individual water footprint and to save water practicing their daily habits. • The learner can predict and forecast water related and vector related diseases with respect to meteorological variables by adopting different time series models. • The learner can evaluate, participate in and influence decision-making on management strategies of local, national, and international enterprises related to water pollution.

Suggested topics for SDG 6 "Clean Water and Sanitation"

- ✓ Time series analysis helps organizations understand the underlying causes of trends or systemic patterns over time.
- ✓ Using data visualizations, one can see seasonal trends and dig deeper into why these trends occur.
- ✓ With modern analytics platforms, these visualizations can go far beyond line graphs.
- ✓ Time series allows you to analyze major patterns such as trends, seasonality, cyclicity, and irregularity.

Examples of learning approaches and methods for SDG 6 "Clean Waterand Sanitation"

- ✓ Webinar on the application of time series analysis with respect to public health.
- ✓ Seminar on water related diseases and the application of different ARIMA model can be discussed.
- ✓ Project or dissertation related the important time series analysis with respect to public health.

DEPARTMENT OF GEOINFORMATICS

Subject/ topic/ course in regular curriculum relating to SDG 1	• Subject: Geoinformatics for Hydrology • water quality monitoring through Remote Sensing. • Watershed Management using GIS and Remote Sensing
Cognitive Teaching & learning objectives	At the end of 2nd year the learner should be able to • Get knowledge on hydrology, scientific hydrology development, hydrological cycle etc. • Familiar with the application of GIS in water quality monitoring, water resource planning and management and Hydrologic InformationSystem • Learn about Approaches to planning and development of water resources and methods to evaluate surface water resources and groundwater, policies and management. • Use of GIS for surface water modelling, groundwater modelling, and flood plain mapping.
Socio-emotional Teaching & learning objectives	At the end of final year the student should be able to • Deals with the basics of hydrology and also various remote sensing and GIS applications in the field of hydrology and water resources. • Understand the assessment of Basin and its hydrology using Geospa- tial technology. • Get exposure to the Groundwater and Watershed Management as-pects of GIS. • Provide expected knowledge and skills to run water resources mod- els.
Behavioural Teaching & learning objectives	At the end of the program the learner should be able to • Understand the importance of water management. • Contribute to water resources management at the local level. • Plan, implement, evaluate and replicate activities that contribute to increased water quality and safety using GIS technology. • Apply GIS to evaluate, participate in and influence decision-mak- ing on management strategies of local, national and international enterprises related to water pollution.

Suggested topics for SDG 6 "Clean Water and Sanitation."
• Hydrologic Cycle, Hydrological parameters, porosity, permeability, specific yield, types of aquifers. Watershed Management, Watershed characterization, watershed problems and management strategy.Geoinformatics approach for watershed prioritization. • Subsurface Water Exploration: Application of remote Sensing in hydro- geomorphological interpretationfor groundwater exploration, water quality monitoring through remote Sensing.

Examples of learning approaches and methods for SDG 6 "Clean Water and
• Case Studies: Hydro-geomorphological mapping in Plateau region, Flood Prone zone mapping in Indo-Gangetic Plains, Water harvesting Initiatives in Urban built-uparea. • Use of models and visual teaching aids in teaching the importance of water and watershed management. • Self- learning such as the use of NPTEL materials and websites, e.g. NRSC, NAASA, USGS

JSSAHER

Sustainable Development Goals

'Touching the lives of Millions'

Focusing on a purpose as expansive and yet as specific as improving quality of life through Human Development, the JSS Mahavidyapeetha has grown from strength to strength. A long and healthy life, Education for all and a decent standard of living, the indicators of Human development, have been the underlying philosophy of Jagadguru Sri Veerasimhasana Mahasamsthana Math, Suttur Srikshethra, for centuries. This is also the philosophy for which the Mahaidyapeetha today stands for.

Under the untiring efforts of Jagadguru Dr. Sri Shivarathri Rajendra Mahaswamiji, the Mahavidyapeetha has witnessed enormous growth in the field of education and today has over 300 institutions under its fold, from kindergartens to postgraduate centres and postdoctoral research catering to the educational needs of more than 1,00,000 students.

The Mahavidyapeetha continues to play an important role in expanding the scope of its activities to several branches of knowledge, welfare, and culture. Its educational efforts span crèches for toddlers of working rural women, schools to impart primary and secondary education in both Kannada and English medium, Colleges, Polytechnics, Technical, Medicine, etc. For realizing its mission, it has equipped itself with an extensive infrastructure and an army of dedicated and highly qualified human resource. These institutions, located in strategic areas, serve a broad spectrum of society, from virtually remote tribal villages to metropolitan cities such as Bengaluru, Noida, New Delhi, Ooty, and Coimbatore, besides their presence in United States, Mauritius, and Dubai.

Apart from formal education, the initiatives stretch to integrated rural development through training and empowering of rural folk, reaching out healthcare to people through modern and traditional Indian systems of medicine, patronizing literary activities, visual arts, performing arts, restoration of temples and historical monuments.

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