Janus Sistema Administrativo da Pós-Graduação

Relatório de Dados da Disciplina

Sigla: SHS5934 - 1 Tipo: POS
Nome: Soluções Aplicadas para Segurança Hídrica
Área: Hidráulica e Saneamento (18138)

Datas de aprovação:
CCP: 30/06/2017 CPG: 03/07/2017 CoPGr:
Data de ativação: 03/07/2017 Data de desativação:

Carga horária:
Total: 180 h Teórica: 4 h Prática: 4 h Estudo: 4 h
Créditos: 12 Duração: 15 Semanas

Responsáveis: 3665025 - Eduardo Mario Mendiondo - 03/07/2017 até data atual

Objetivos:

Introduce concepts and applications of water security relating traditional and novel approaches in water engineering sciences
Evaluate viable strategies of water security adapting novel design and innovation solutions for a wide range of problems at local, regional, national and international levels
Coach future water leaders through practical cases studies of water security, using past and running research and development projects, with international frameworks and standards.

Justificativa:

Water security is an interdisciplinary and multi-dimensional concept, which assesses levels of hydrological risks considered tolerable for a society under change. Also, water security reaches a variety of multipurpose water resources and uses, both consumptive and nonconsumptive, which affect sustainability in general. However, this concept is rapidly evolving with recent emergence of human demands of climate-resilient mechanisms, sustainable development goals and social engagement to cope with disaster risks in the actural Anthropocene's moment.
Approximately 50% of Brazilian population and ca. 60% of world population will suffer with water insecurity until year 2020. More than two thirds of global wealth is under compromise with the security of the nexus water-food-energy. Thus, both integrated and applied approaches on water security are necessary to assist the new generation of water leaders and decision makers to wisely address innovative solutions in a wide range of possibilities of economic, social and environmental issues.
The selected syllabi and dynamics of classes of this new course were specially prepared to help with those challenges using: (1) updated references, books, reports and papers to assist classes and practical assignments, (2) an international network of leading institutions and specialists on water security to collaborate with lessons learned from regional and local scales, and (3) own experiences throughout 25 years of national and international participation in water resources enginering projects. Special focus of the Course will be addressed from the running National Science & Technlogy Institute (INCT) on Climate Change, Water Security Component (2016-2020), with support of CNPq and FAPESP.

Conteúdo:

1. Conceptual perspectives of water security
1.1 Introduction
1.1.1 Security.
1.1.2 Risk.
1.1.3 Management.
1.1.4 Risk Management & ISO 31000
1.2 Water Security's Linkages.
1.2.1 Ecosystem-based Adaptation.
1.2.2 Risk-based Analyses
1.2.3 Water Footprint Assessment.

Gerado em 06/08/2018 13:52:24

Janus Sistema Administrativo da Pós-Graduação

Relatório de Dados da Disciplina

1.2.4 Disaster Risk Reduction
1.2.5 Sustainable Development Goals
1.3 Graphical Charts for Decision Support Systems
1.4 Disgressions on Water Security
1.4.1 Critical analysis of emerging trends and definitions
1.4.2 Past, present and future of a controversial concept
1.4.3 Systemic risks and adaptive water governance and management
1.4.4 Water Security and Adaptive Water Management
1.5 Security through the Water-Food-Energy Nexus
1.6 Limitations
1.7 Examples

2. Thematic Perspectives of water security
2.1 Perspectives on climate change impacts and water security
2.2 Groundwater and security
2.3 Agricultural and economic development
2.4 Human security and access to water, sanitation, and hygiene
2.5 The ecology of water security
2.6 Water security and environmental water needs
2.6.1 Ecosystem services concept
2.6.2 Transformation of governance systems
2.7 Water Demand Models
2.8 Limitations
2.9 Examples

3. Water security under non-stationary demands
3.1 Definitions of water demand terms
3.2 Living with droughts and desertification growth
3.3 Water management principles for demand
3.4 Water demand at future times
3.5 Water demand models
3.5.1 Classical water demand models (CLAwdm)
3.5.2 Regionalized water demand forecasting models (REGwdm)
3.5.3 Optimization-based water demand prediction models (OPTwdm)
3.5.4 Permit-driven water demand forecasting models (PERwdm)
3.5.5 A comparative classification of water demand forecasting models
3.6 Identification and common gaps for water security
3.7 Price elasticity for water demand
3.8 Climate change and water demand forecast
3.9 Dialogue on water demand scenarios
3.9.1 Population
3.9.2 Gross domestic product
3.9.3 Irrigated areas
3.9.4 Reservoir construction
3.9.5 Recommendations for addressing gaps
3.9.5.1 Water demand under decentralization scenario
3.9.5.2 Water demand under globalization scenario
3.9.5.3 Resilient-driven hypotheses related to water demand
3.10 Limitations and examples

4. Water Security and Water Footprint Assessment
4.1 Goals and Scope of Water Footprint Assessment
4.2 Water Footprint Accounting
4.3 Water footprint within a geographically delineated área
4.4 National water footprint accounting
4.5 Water footprint accounting for catchments and river basins
4.6 Water Footprint Sustainability Assessment
4.7 Library of Water Footprint Response Options
4.8 Limitations and Challenges for Water Security
4.9 Environmental Flow Requirements
4.10 Limitations
4.11 Examples

5. Water Security and Insurance
5.1 Vulnerability, Impacts and Adaptation Strategies
5.2 Water Funds for Water Security.

Gerado em 06/08/2018 13:52:24

Relatório de Dados da Disciplina

5.2.1 Concepts and defintions.
5.2.2 World's comparative examples
5.2.3 Payment for Ecosystem Services
5.3 Insurance modeling for Water Security
5.3.1 Introduction
5.3.2 Insurance Value. Economic Value. WTP and Premiums
5.3.3 Baumgarten-Strunz Model (BSM) with Risk-Resilience Diagrams
5.3.4 Hydrologic Risk Transfer Model (MTRH-SHS) with Optimization
5.3.5 Empirical Diagrams of WTP-Stock-Risk-Losses (WTP-S-R-L)
5.4 Regional and Local Perspectives of Water Security and Insurance
5.4.1 Floods
5.4.2 Droughts
5.4.3 Pollution
5.4.4 Freshwater biodiversity losses
5.5 Limitations
5.6 Examples

6. Water Security and Socio-Hydrological Approaches
6.1 Introduction
6.2 Socio-hydrological models for water security
6.3 Srinivasan-Sivapalan Dynamic Model (SSDM) of Water Security
6.4 Human-in-the-Loop models
6.4.1 Volunteer Geographic Information (VGI) for water security
6.4.2 Dashboards of Water Security
6.4.3 Citizen Observatory for Water Security
6.5 Communicating Water Security Program Effectiveness
6.6 Managing Water Risk with Assurance Report Cards
6.7 Limitations
6.8 Applied water security solutions in water-scarce regions
6.8.1 Spain.
6.8.2 China.
6.8.3 Southern Africa.
6.8.4 Southeast Asia.
6.8.5 Australia.
6.8.6 United States
6.8.7 Chile
6.8.8 Argentina
6.8.9 Brazil.

7. Practical Modules and Hand-On Exercises on Water Security
7.1 Global elicitation on water security with international specialists
7.2 Blue/green water-based accounting framework for assessment of water security
7.3 Freshwater security addressed by ecohydrology of urban areas
7.4 Water security based on quali-quantitative freshwater assessment
7.5 Assessing uncertainties for water security using empirical multimodel
7.6 Economic indicators of water security insurance under changing scenarios
7.7 Water security decision support systems for multi-hazards, -risks and –sectors
7.8 Water security and ecosystem-based adaptation using grey-water footprint
7.9 Water Security through participatory engagement and citizenship sensing

Bibliografia:

Baumgärtner, S., Strunz, S (2014) Economic insurance value of ecosystem resilience, Ecol. Econ.: 101 (2014) 21–32

Beddington, J. R. et al. Achieving food security in the face of climate change. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), 2011.

De Nys, E., V. Vazquez, E. S. P.R Martins, E. M Mendiondo, C. Frazão, M. Moraes, A. Souza-Filho, G. Marques, P. Freitas (2011-a, 2011-b, 2011-c, 2012) Como adaptar o planejamento e a operação dos recursos hídricos àvariabilidade e mudanças climáticas em bacias hidrográficas selecionadas no Nordeste do Brasil, In: NLTA/Banco Mundial, Rel. I, II, III e IV, Oficinas Regionais (Fortaleza-CE, Natal-RN, João Pessoa-PB).

Dionne, G. (2013) Handbook of Insurance, Springer. ISBN 978-1-4614-0155-1

Hoekstra, A. J, Chapagain, A. K., Aldaya, M. A, Mekonnen, M. M, The Water Footprint Assessment Manual: Setting the

Janus Sistema Administrativo da Pós-Graduação

Relatório de Dados da Disciplina

Global Standard, London: Earthcan, ISBN: 978-1-84971-279-8

Kunreuther, H., Pauly, M., McMorrow, S. (2013). Insurance Behavioral Economics: Improving Decisions in the Most Misunderstood Industry. Cambridge University Press. Cambridge.

Marengo, J, Cavalcanti, I, Nunes, L., Camarinha, P., Alves, L., Fisch, G., Toledo, M C, Fisch, S., Mendiondo, E. M., Alvalá, R, Lombardo, M. (2015) Glossário Técnico: avaliação dos impactos e vulnerabilidade às mudanças climáticas no Brasil e estratégias de adaptação, São José dos Campos: INPE, FAPESP PFPMCG 2008/58161-1

Mendiondo, E M (2010) Dialogue on Water and Climate: Risk Adaptation of Water Resources Management under Brazilian Policy on Climate Chage, Summary Report, Brazilian CapNet – MMA, Training Course Summary 27-29 July, 2010, Brasilia, DF.

Mendiondo, E. M, Rodrigues, D., Chaves, I., Bressiani, D. (2013) Demandas atuais e futuras sob incertezas e adaptações de longo prazo em bacias do Jaguaribe e Piranhas-Açu, In: XX SImp. Bras. Rec. Hídricos, Bento Gonçalves, RS, ABRH-Acquacon, Anais

Mohor, G. S., Mendiondo, E M (2017) Economic indicators of Hydrologic Drought Insurance Under Water Demand & Climate Change Scenarios in a Brazilian Context, Ecological Economics, DOI: 10.1016/j.ecolecon.2017.04.014

Pahl-Wostl, C., Badhuri, A., Gupta, J. (eds.) 2015, Handbook of Water Security, Cheltenham, UK: Edgar Elgar Publ. ISBN978178254 800 3

Pedrosa, V. de A. 2017, Solução de conflitos pelo uso da água. Serra, ES. ISBN 978-85-67907-14-7

Rodrigues, D, Gupta, H, Mendiondo, E M (2014) A blue/green water-based accounting framework for assessment of water security, Water Res. Research, doi: 10.1002/2013WR014274

Rodrigues, D, Gupta, H, Mendiondo, E M, Oliveira, P T (2015) Assessing uncertainties in surface water security: An empirical multimodel, Water Res. Research, DOI: 10.1002/2014WR016691

Rodrigues, D, Gupta, H, Serrat-Capdevila, A, Oliveira, P T, Mendiondo, E M, Maddock II, T, Mahmoud, M (2014) Contrasting American and Brazilian Systems for Water Allocation & Transfers, J. Wat. Resour. Plan. Mgmt. , 10.1061/(ASCE)WR.1943-5452.0000483

Rootzen, H., Katz, R (2013), Design Life Level: Quantifying risk in a changing climate, Water Resour. Res., 49, 5964–5972, doi:10.1002/wrcr.20425.

Sadoff, C., Muller, M (2009) Water Management, Water Security and Climate Change Adaptation:Early Impacts and Essential Responses, Global Water Partnership Technical Committee (TEC), Tec.Back.Papers No. 14, Elanders, ISSN: 1652-5396

Salas, J., Obeysekera, (2013). ”Revisiting the Concepts of Return Period and Risk for Nonstationary Hydrologic Extreme Events.” J. Hydrol. Eng., 19(3), 554–568.

Sivapalan, M., Savenije, H., Blöschl, G (2011) Socio-hydrology: A new science of people and water. Hydrol. Process. 26(8): 1270-1276.

Taffarello, D, Mohor, G S, Calijuri, MC, Mendiondo, E M (2016): Field investigations of the 2013–14 drought through qualiquantitative freshwater monitoring at headwaters of Cantareira System, Brazil, Water International, DOI:10.1080/02508060.2016.1188352

Zaffani, A G, Cruz N, Taffarello, D, Mendiondo, E M (2015) Uncertainties in the Generation of Pollutant Loads using Brazilian Nested Catchment Experiments under Change of Land Use & Land Cover. J. Phys Chem Biophys, DOI: 2015.10.4172/2161-0398.1000e123

Zhu, D., Yang, Y. (2014). ”Special Issue on Drinking Water Safety, Security, and Sustainability.” J. Environ. Eng. 140, SPECIAL ISSUE: Drinking Water Safety, Security, and Sustainability, A2014001.

Forma de avaliação:

Final score is weighted through assisted assignments (33%), mentoring seminars (33%) and coached praxis (33%), thereby addressing all theoretical concepts and p

Gerado em 06/08/2018 13:52:24

Janus Sistema Administrativo da Pós-Graduação

Relatório de Dados da Disciplina

Observacão:

English is the oficial language of the course, with simultaneous translation available to Spanish and Portuguese. Throughout the Course, under the supervision of Professor(s) performing the planned assigments and praxis, the Student will maintain contacts with a list of selected international specialists on water security, as part of a global net of think-tanks, from the following institutions: Valmont Industries, Omaha, Nebraska, USA; Institute of Development Studies (IDS), Brighton, UK; Veolia Environment, France; The University of British Columbia, Vancouver, Canada; Environmental Governance section of the Copernicus Institute, Utrecht University, the Netherlands; Center for the Management of Agricultural and Environmental Risks (CEIGRAM), Technical University of Madrid, Spain; Global Water System Project (GWSP), International Project Office, Bonn, Germany; Peace Research and European Security Studies (AFES- PRESS), Mosbach, Germany; Australian Rivers Institute, Griffith University, Brisbane, Australia; School of Archaeology and Anthropology, College of Arts and Social; Sciences, Australian National University, Canberra, Australia; International Food Policy Research Institute, Washington DC, USA; University of Amsterdam, the Netherlands; Centre for Socio-Legal Studies, University of Oxford, UK; College of Arts and Sciences, University of the Philippines Los Banos, Laguna, the Philippines; Villanova University School of Law, Philadelphia, Pennsylvania, USA; Geodynamics Department, Faculty of Geological Sciences, Complutense University of Madrid, Spain; FutureWater, Wageningen, the Netherlands; Fenner School of Environment and Society, ANU College of Medicine; Biology and Environment, Canberra, Australia; Hebrew University of Jerusalem, Israel; McKinsey & Company, Inc., Vienna, Austria; Planning and International Development Studies, University of Amsterdam, the Netherlands; Department of Human Geography, University of Seville, Spain. The Hague Institute for Global Justice, The Hague, the Netherlands; Australian National University, Canberra, Australia Institute of Environmental Systems Research, University of Osnabrück,Germany; International Groundwater Resources Assessment Centre (IGRAC), Delft, the Netherlands; Stockholm International Water Institute, Stockholm, Sweden School of Nature Conservation, Beijing Forestry University, Beijing, China; University of Leeds, UK; Earth System Science–Climate Change and Adaptive Land and Water Management Group, Wageningen University and Research Centre, the Netherlands; Alliance for Global Water Adaptation, Corvallis, Oregon, USA Institute of Development Studies (IDS), Brighton, UK and Noragric; Norwegian University of Life Sciences, Aas, Norway

Gerado em 06/08/2018 13:52:24