

# Quantitative and Qualitative Assessment of Water Resources Using SWAT

## Overview

Earth has limited water resources, which are varied spatially and temporally. In addition to that, stress on water resources has been increasing day by day. Watershed is the basic scientific unit for planning and management of water resources. Quantitative assessment of various hydrological processes in the watershed and qualitative assessment of water resources like sediment yield, estimation of non point source pollution loads in the watershed are very important for sustainable planning and management of water resources. Many watershed models are available for modeling of the quantitative and qualitative processes in the watersheds.

In those models, SWAT (Soil and Water Assessment Tool) is gained the international acceptance as a robust interdisciplinary watershed modeling tool. This model is available in public domain. It is a continuous time model that operates on a daily time step at watershed scale. SWAT can be used to simulate at the watershed scale water and nutrients cycle in areas whose dominant land use is agriculture. It can also help in assessing the best management practices in watershed for conservation of soil and water resources. SWAT model is included in the curriculum of many universities throughout the world to understand the various aspects of watershed modeling methods which are useful in effective planning and management of soil and water resources of the watershed. Different aspects of SWAT model and its applications are part of the course syllabus for remote sensing and GIS, water resources engineering and environmental engineering graduate students of Civil Department of NIT Warangal. Several hundred students are using SWAT as a tool in their research work for modeling the various aspects of the water resources. There is also a MOU between Texas A&M AgriLIFE Research and Civil Engineering Department of NIT Warangal for mutual cooperation in the research and training in the field of water resources and geospatial systems. Prof. Raghavan Srinivasan of Texas A&M AgriLIFE Research is the main resource person for this course. Main contents of the this course are watershed characterization, quantitative and qualitative aspects in the watersheds, modeling the processes of watershed, SWAT model introduction, model inputs preparation, model calibration and validation, model output analysis, SWAT-CUP calibration approach, climate change impact analysis using SWAT and case studies of SWAT model application. Hands on training will be given to the participants on SWAT model using QGIS and QSWAT.

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| <b>Modules</b>                 | <b>A: Watershed processes and modeling concepts, SWAT model concepts and practical sessions</b><br>(12th to 16th December 2016; 15 Lectures & 5 Lab. Sessions)<br><b>B: SWAT model applications, case studies, research problems formulation with SWAT</b><br>(19th to 23rd December 2016; 15 Lectures & 5 Lab. Sessions)<br>Number of participants for the course will be limited to fifty.                                                                                                                                                                                                                                                                          |
| <b>Dates for the course</b>    | <b>12<sup>th</sup> December- 23<sup>rd</sup> December 2016</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>You Should Attend If...</b> | <ul style="list-style-type: none"><li>▪ you are a field engineer or research scientist working in the fields of hydrology, water resources management, water pollution and climate change impact.</li><li>▪ you are a student or faculty from academic institution interested in learning how to work/carrying out research in qualitative and quantitative assessment of the water resources</li></ul>                                                                                                                                                                                                                                                               |
| <b>Fees</b>                    | The participation fees (Excluding Lodging & Boarding) for taking the course is as follows:<br><b>Students Participants without/with Grading : Rs. 1000/Rs. 2000</b><br><b>Faculty (Internal &amp; External) &amp; Scientists : Rs. 4,000</b><br><b>Persons working in Industry / Consultancy firms : Rs. 8,000</b><br><b>Student participants from abroad : USD 100</b><br><b>Other participants from abroad : USD 200</b><br>The above fee include all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis. |
| <b>Evaluation and Grading</b>  | <b>Students registered with grading will be evaluated for two credits based on continuous evaluation in tutorials, midterm and end of course examinations. Grade will be awarded based on the performance in the evaluation.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## The Faculty

### International Expert



**Prof. R. Srinivasan**, is a professor at Texas A&M University and director of the Spatial Sciences Laboratory at Texas A&M (<http://ssl.tamu.edu/-people/r-srinivasan/>). He has become known and respected throughout the world for his developmental work with spatial sciences and computer-based modeling, especially the Soil and Water Assessment Tool or SWAT model. His research and its applications have contributed to long-lasting changes in natural resource assessments and development of management system options, currently being used in more than 90 countries. Over the past nine years, he has conducted more than 300 international workshops for students and professionals in more than 30 countries and the demand is increasing each year. He received various prestigious awards. He is recipient of 2014-2015 Regents Fellow Service Award, 2015 College of Agriculture Distinguished Agriculture Alumni Award, Purdue University, 2014 Vice Chancellor's Award in Excellence for International Involvement, 2014 Texas A&M AgriLIFE Research Faculty Fellow Award, 2014 College of Agriculture and Life Sciences Dean outstanding Achievement Award in the category of Interdisciplinary Research Team "Bacterial Source Tracking Team", He is member of American Society of Agricultural and Biological Engineers (ASABE) and American Water Resource Association (AWRA). He published more than 200 articles in Journal and conferences on the various applications of SWAT. His research interests include SWAT model enhancement, development of real time flood forecast systems with SWAT, integration of climate models with SWAT, decision support systems with SWAT.

### Institute Expert :



**K. Venkata Reddy**, Ph.D is a assistant professor in Civil Engineering Department at National Institute of Technology Warangal. He is carrying out research on watershed modelling applications and climate change impact on water resources. He is carried out post doctoral research work at Texas A&M University on the topic 'Impact of Climate change on Water Resources' with Raman Fellowship given by GOI under Singh-Obama 21st century Knowledge Initiative for the year 2013-14. He is actively working in research aspects of integrating the SWAT model with the Climate Models for effective study of watershed processes under climate change conditions. He is also teaching the SWAT model concepts to Post Graduate students and guiding the post graduate and research scholars on the applications of SWAT model in assesmmnt of the water resources. He has published more than 50 research papers in National and International conferences and journals in field of geospatial applications in different domains with main emphasis on water resources.

Two week GIAN course

on

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12<sup>th</sup> December- 23<sup>rd</sup> December  
2016

## Course Coordinators

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