

UNIVERSITI TEKNOLOGI MARA

**FLOOD RISK USING STOCHASTIC
RAINFALL-RUNOFF MODEL**

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of the requirements for the degree of
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CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 12nd November 2014 to conduct the final examination of Aisar Ashra Binti Muhammad Ashri on his Master of Science thesis entitled “Flood Risk Using Stochastic Rainfall-Runoff Model” in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiners recommends that the student be awarded the relevant degree. The panel of Examiners was as follows:

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Generated runoff data have been used in the past for planning and management of water resources. However, in Malaysia, runoff data is usually unavailable for long term forecasting. If the runoff data is available, the record is too short to give any statistical significance. This long term record is needed in order to estimate the long term forecasting of the future events such as flood and drought. This study intended to use stochastic rainfall-runoff model in simulation of synthetic monthly stream flow data. The main objective of this research is to generate the synthetic runoff data that preserved the statistical properties of historical data. The Lag-one Markov Chain is adopted to generate synthetic rainfall data at four selected study areas in Malaysia. Then, the parameter from the synthetic rainfall is used as an input to the stochastic rainfall-runoff model. A stochastic rainfall-runoff model has been developed to simulate monthly sequences of runoff for the selected study areas. In this method, runoff was generated using ARMAX model. The generated sequence is then used for determination of monthly risks and exceedance probability. The comparison of results indicates that the model developed satisfactorily preserves the monthly stochastic and statistical properties of the historical data sequences. Hence, the model was found able to generate monthly runoff data for the Segamat, Maran, Kuala Pilah and Besut. The generated data can be used to simulate the unavailable historical records and the same approach may also be used for other sites in Malaysia.

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