

The Development of Islamic Astronomy Studies in Higher Learning Institutions in Malaysia

¹Saadan Man, ²Mohd Zambri Zainuddin,
³Mohd Roslan Mohd Nor, ¹Mohd Anuar Ramli,
¹Rahimin Affandi Abdul Rahim, ¹Rushdi Ramli and ¹Ridzwan Ahmad

¹Department of Fiqh and Usul, Academy of Islamic Studies,
University of Malaya, 50603 Kuala Lumpur, Malaysia

²Department of Physics, Faculty of Science,
University of Malaya, 50603 Kuala Lumpur, Malaysia

³Department of Islamic History and Civilization,
Academy of Islamic Studies, University of Malaya, 50603 Kuala Lumpur, Malaysia

Abstract: This paper attempts to analyse current development, achievement as well as contemporary challenges of Islamic astronomy studies at higher learning institutions in Malaysia. The studies in the institutions generally taught as an elective subject embedded in science based courses, as can be seen in several public universities. There are also specific courses of Islamic astronomy offered by some colleges or universities in form of short course at a level of certificate degree. At the moment, there is only one university in Malaysia, i.e. the University of Malaya, the prime university in the country which offers full time course of Islamic astronomy integrated with Shariah studies at level of baccalaureate degree. The existence of Islamic astronomy studies in Malaysian higher learning institutions has gradually help the society to solve various Shariah issues related to astronomy such as Islamic calendar, the determination of prayer times, *qiblah* directions and the beginning of lunar month.

Key words: Islamic astronomy • Higher learning institution • Malaysia • Development • Challenges

INTRODUCTION

Astronomy was once regarded as one of Muslim's pride of civilization. The history witnesses that Islam has made considerable contributions to the field astronomy. This claim is not only made by Muslim themselves, but also recognized by the West [1-2]. This field of study has come to its peak during the Abbasid period from 8th to 13th century. After the fall of Baghdad in 1258 AD, this knowledge which is regarded as "queen of science" [3-4] has lost from Muslims. The study of astronomy has become stagnant among Muslim community. Much of their treatises and manuscripts on astronomy had lost or had been brought to the West [5-6]. Since then until present days, the West has been dominating this field of knowledge while Muslim ummah has been suffering from various internal illness and crises. Only since several past decades, simultaneously with the heightening of Islamic awareness among Muslim ummah, they have embarked on

efforts on revivalism. Among their significant act of reform is to advance the knowledge which includes re-exploring the studies of Islamic astronomy. This can be seen throughout the Muslim world including Malaysia.

The Development of Islamic Astronomy Studies: In Malay world, the origins of Islamic astronomy studies are believed to have been started simultaneously with the advent of Islam to this region, i.e. in the 14th century. As Muslims, they are required to perform regular worships, such as prayers, *zakah*, fasting and hajj. These obligations, some of them have been fixed by the Shariah to be performed on certain times and some to be done on particular dates. The direction of *qiblah* is as equal important, especially in case of performing daily prayers and some other worship. All these need to be determined by using the astronomical methods. The Terengganu inscription found in 1899 AD with some Hijri dates written on it supports the theory that Islamic calendar has been

used prior to that time [7]. In these early days of Islam in Malay world, it is assumed that the knowledge of Islamic astronomy was taught within the teaching of fiqh.

According to Baharrudin Zainal [8], the first writing on astronomy in Malay world is a manuscript related to Islamic cosmology entitled *Bad' Khalq al-Samawat wa al-Ard* written by a prominent Aceh scholar Nuruddin al-Raniri (1658 AD). This treatise was actually a translation work from Arabic written in 1636 AD (1046 H) which contains schedules of sun and earth movements, believed to be copied from Ulugh Beg's *Zij* in 15 century.

In modern era, the most eminent Malay scholar of astronomy was the late Syeikh Tahir Jalaluddin al-Falaki al-Azhari (1869-1956 AD) who studied astronomy in al-Azhar University of Egypt. He, who was also a key leader of Malay reformists during the rising of Islamic reform in Malaya (from 1900 until 1950s), has written several major treatises on astronomy such as *Natijat al-'Umur* (1936), *Pati Kiraan* (1938) and *Nukhbat al-Taqrirat* (1939). Among these writings, *Pati Kiraan* is regarded to be a masterpiece of his astronomical works in which he comprehensively describes calculation methods of prayer times by using logarithm and determination of *qiblah's* direction by applying modern methods [8-9]. During his time, his in-depth knowledge and experience in Islamic astronomy was well recognized in Malay world and he travelled a lot around the region in fulfilling invitations by many parties to deliver talks, discussions and consultations about issues related to Islamic astronomy. His significant contribution in astronomy has led the government to dedicate an establishment of astronomy center and observatory named after him in Pulau Pinang [10].

There were also some other renown Malay ulemas linked to the dissemination of Islamic astronomy studies in Malaya, such as Syeikh Ahmad al-Fatani, Syeikh Muhammad Nur bin Syeikh Muhammad, Syeikh Nik Mat Kecil bin Ismail Daud al-Fatani, Haji Umar of Sungai Keladi Kelantan, Haji Abu Bakar bin Haji Hasan the Qadhi of Muar Johor and Syeikh Abdullah Fahim of Pulau Pinang. Several works on astronomy have been written by them. Among them, Syeikh Abdullah Fahim (d. 1961) was the most popular one especially for his contribution in consulting the government to determine the date of Malaya's Independence Day [11].

After the demise of Syeikh Abdullah Fahim in 1961 the studies of Islamic astronomy seemed to be in a state of sluggishness and only taught within the circle of students of the traditional educational institutions such as *pondok* and *madrasah*. Fortunately, one of Syeikh Tahir Jalaluddin's student, Haji Mohd Khair b. Mohd Taib (1922-1989) has embarked on effort to promote this

knowledge to society. Haji Mohd Khair started to induce Malay Muslim community's awareness of this knowledge through journals, particularly *Utusan Zaman* during 1960s era. In 1969 he was appointed by Islamic Center of Malaysia as a member of *ru'yah al-hilal* committee. As an experienced figure, he was then, in 1979, assigned as a trainer for Falak Course run by Islamic Center. This course was open to public and surprisingly, it met a warm response from the community [12].

Islamic Astronomy in Malaysian Higher Learning Institutions

A Foundation Phase (1980'S): Because of his significant contribution to the Muslim community, Haji Mohd Khair was then invited to hold a position as Karyawan Tamu (Guest Lecturer) at the National University of Malaysia (UKM) from 1981-1984. There he began intensively taught Islamic astronomy and his lectures attracted student from various study background. The teaching of Islamic astronomy has then become an official course in the university and thus led to the establishment of Falak Unit in Department of Shariah at the Faculty of Islamic Studies.

The Module Taught in this Course Included: The history and philosophy of Islamic astronomy, texts of Quran and Hadith (the prophetic tradition) on astronomy, Islamic calendar, determination of prayer times, determination of early lunar month, *ru'yah* and *hisab*, *qiblah's* direction, determination of eclipse, physical astronomy and instrumentation. The Falak course led by Haji Mohd Khair in the university has produced many expert graduates who were then managed to form an astronomy organization named Persatuan Falak Syar'i Malaysia.

Haji Mohd Khair left strong foundation of Islamic astronomy studies in Malaysia and which was then developed and expanded by his students and inspired others to take more serious action in promoting and establishing official and systematic study of Islamic astronomy, especially in the tertiary education system. At that time, several universities such as University of Science, University of Malaya and University of Technology have formed their own Falak Unit aimed at undertaking research and offering consultation in this particular area of study. Other than these universities, some other government agencies such as Department of Survey and Mapping and National Electricity Board have been contributing a lot to the early development of Islamic astronomy studies in Malaysia [9].

A Beginning of New ERA (1990S-Present Days)

KUSZA (Presently Known as UniSZA): The existence of a strong foundation together with a need to produce

experts who are capable to encounter challenges and resolve problems in modern Islamic astronomy issues, new steps have been taken. This begins with the foundation of Falak Unit at Sultan Zainal Abidin Religious College (KUSZA) of Terengganu in 1990. In 2007, KUSZA has been merged with newly founded public university namely as Sultan Zainal Abidin University (Universiti Sultan Zainal Abidin (UniSZA) and since then the Falak Unit is placed under the Faculty of Contemporary Islam, KUSZA Campus. Among the main objectives of this unit is to plan effective falak courses in order to produced skillful and credible Muslim astronomers. At the moment, there are two types of courses offered. The first is an elective course offered for KUSZA's students (at Diploma and Bachelor level). The second is a special course at certificate level offered for government servants especially those who serve at states' Mufti Department and those who are interested in this field of study.

The module of this course is divided into two parts (each part takes two weeks full time study) which include following subjects:

Part One	Part Two
History and Philosophy of Science	Instrumentation, Practical (2) and <i>Ru'yah</i>
Introduction To Islamic Astronomy	Hijri Calendar System
Istilah Calendar and <i>Qiblah's</i> Direction	Physical Astronomy
Instrumentation and Practical (1 and 3)	Project
Prayer Times <i>Taqwim</i>	

Source: Unit Falak website

This course, which is considered as the first systematic course offered in higher learning institution, has long been a training ground for them to develop their knowledge and skill in Islamic astronomy. Since its formation, this unit has successfully trained hundreds of falak officers, not only nationally but also regionally, i.e. from Brunei, Singapore and Indonesia. One of KUSZA's speciality is that it has been equipped with its own observatory in order to facilitate the study of astronomy, as well as being an official place of monthly crescent sighting.

In recent development, UniSZA offers postgraduate program in Falak which covers several areas of study such as Philosophy of Science, Taqwim and Comparative

Studies [13]. Since its establishment, KUSZA in particular has been a hub for Islamic astronomy study and research activities for the past twenty years, especially in east coast of Malay Peninsula.

AARU at University of Science Malaysia (USM): It was at about the same time in 1990, the Astronomy and Atmospheric Science Research Unit (AARU) has been founded at University of Science in Penang. The purpose of this unit is to undertake an intergrated research programme in the fields of applied astronomy and atmospheric science. The unit functions as an important research set-up with considerable focus on internationally interactive research. There is already a postgraduate research programme, an active publications programme and a special service providing information on astronomical data to the public as well as advice on other scientific aspects

As a research unit, it also covers research on applied Islamic astronomy and International Islamic calendar program. This unit is equipped with complete facilities which includes The Syeikh Tahir Astronomical and Observatory Centre located at Pantai Acheh, Penang [10,14]. Though this unit does not offers any course as offered by KUSZA, its various research and graduate program in has been assisting the development of Islamic astronomy studies in Malaysia since two decades ago.

Department Of Geomatic Engineering, University Of Technology Malaysia (UTM): Graduate from this department usually serve at government Land Surveying and Mapping Department (JUPEM) who are also involved directly in Islamic astronomy activities such as in determining *Qiblah's* direction for mosques and *musallas*, preparing official data for prayer times calculation, crescent sighting and etc. However, during their study at the department, they were not exposed to Islamic astronomy knowledge, though they were taught field and geodetic astronomy. Aware that the need for Islamic astronomy knowledge is apparently significant, the department has offered an elective course of Falak Syar'i for students of geomatic engineering.

Since 1994, the department offers short course of Falak Syar'i for public especially for government servant whose profession linked to this field. This one year course is divided into three modules run as follows [15]:

Module	Duration	Subject Content
A: Basic Knowledge of Astronomy	13 weeks (4 hours a week)	Solar system, sphere trigonometry, triangular astronomy, movement of heavenly bodies, Astronomical coordinate system, solar time system and siderial time.
B: Basic knowledge of Falak Syar'i	12 weeks (4 hours a week)	Movement of earth-moon, calculation of hijrah and gregorian taqwim, <i>Qiblah's</i> direction and prayer times calculation
C: Advanced Falak Syar'i	13 weeks (4 hours a week)	Hijri taqwim system, determining hijrah month in Malay region, <i>imkan al-ru'yah</i> criterion, collecting data of crescent sighting and technical project.

Source: Mohamad Saupi Che Awang (2007)

Those who successfully finish these modules are awarded certificate of Falak Syar'i by the UTM. In 1995, a shorter part time course has been offered using the same modules but with addition of Rubu' Mujayyab subject. This course runs for 36 hours and certificate is awarded at the end. Aside from that, the department also conduct a special course in collaboration with state's religious departments in order to provide training for their officers who works on this area.

As far as an elective course of Falak Syar'i is concerned, this course is offered since 1998 until present days for students of Bachelor of Geomatic Engineering. This course consists of important subjects of Islamic astronomy, range from cosmology to issues of Islamic astronomy in Malaysia, such as prayer time calculation, Islamic calendar and determination of *Qiblah*'s direction. The graduates will have enough knowledge of Islamic astronomy and are expected to be capable of resolving technical issues of this field study. Surprisingly, this course is not only taken by Muslim students but also non-Muslim students [15].

Academy of Islamic Studies-Physics Department, University of Malaya (UM): The most advanced step has ever been taken in the effort of advancing the Islamic astronomy study in Malaysia is what has been doing by the University of Malaya, the top and prime university in the country. The university, through collaboration

between the Department of Fiqh and Usul of the Academy of Islamic Study and the Department of Physics of Science Faculty, has embarked on effort to integrate between Shariah and astronomy knowledge. In 2002, a program of Bachelor of Shariah majoring in Islamic Astronomy has been launched. The student will acquire knowledge both in Shariah and astronomy. This program aims at, among others, producing excellent graduates who have knowledge and skill in the field of Islamic astronomy in order to meet current challenges and capable to contribute to national and global development [16].

The intake of student for this program is currently limited to 10 student per year to preserve the quality of graduates. This full time program which runs in 6 semesters with 102 credit hours of study combines between Shariah studies and astronomy where students are required to undertake certain project linked to astronomical and Shariah issues in their final year study. The strength of this program is it offers balanced study of Shariah and astronomy in which student will have enough skill to use their knowledge in both domains to resolves current issues of astronomical and Shariah issues. The structure of program is as follows:

Courses	Credit Hours
University Courses	15
Shariah Courses	36
Astronomy Courses	51
Total	102

The courses offered in Shariah and Astronomy are shown in following table:

Shariah Courses (36 CH-3 credit hours each)	Astronomy Courses (51 CH)	Credit Hours
Nazariyyah al-Hukm	Astronomy Mathematic (Geometry)	2
Fiqh al-Ibadat	Astronomy Mathematic (Trigonometry)	2
Fiqh al-Muamalat	Intoduction to Physics Science	3
Fiqh al-Usrah	Computer Language	2
Fiqh al-Jinayat	History of Astronomy	2
Maktabah Shariah	General Astronomy	2
Qawa'id Tafsir al-Nusus	Astronomical Instrumentation	3
Islamic Research Methodology	Physics Practical	2
Al-Qawai'd al-Fiqhiyyah	Introdution to Science and Technology	3
Al-'Urf wa al-Maslahah	Computer Practical	2
Al-Qiyas	Basics of Astronomy	3
Al-Siyasah al-Syar'iyah	Sun, Moon and Earth System	3
	Islamic Calendar System	3
	Galaxy and Cosmology	3
	Astronomical Computering	2
	Prayer Times Calculation and <i>Qiblah</i> 's Direction	3
	Crescent Sighting (Practical)	3
	A s t r o n o m i c a l Project	6
	Knowledge Epistemology	3
	Science History and Philosophy	3

Source: Undergraduate Program Guidebook

Currently, the Shariah courses are conducted by the Academy while astronomy courses are taught by several lecturers from Department of Physics. This program has been accredited by Malaysian Qualification Agency (MQA) and officially recognized by the government of Malaysia. As for last year, the total graduate of this program is 28. The graduates are supposed to be serving as officers and researchers in government agencies linked to astronomy activities such as states' Mufti and Religious departments, Malaysia Islamic Development Department (JAKIM) Malaysia National Space Agency (ANGKASA), Department of Survey (JUPEM) and others. This program has been recently reviewed and slight modification has been made for the next batch. The intake of student for will also increase to 30 student per year and total credit hours will be added to 125 with some addition in Shariah and astronomy subjects.

At the meantime, the academy also has a postgraduate program in the field of Islamic astronomy jointly conducted by the Department of Fiqh and Usul and the Department of Physics. Even though it was started about 5 years ago, the postgraduate program has attracted many students to undertake research at PhD and Master level degrees.

Other Institutions: The current increasing interest of Malaysian Muslim community in Islamic astronomy has engendered several private higher learning institution to offer courses in this field of knowledge. For example, Selangor International Islamic College (KUIS) under its Center For Life-Long Learning has offered short courses in Islamic astronomy. It is open for public and jointly conducted by the college and the Selangor Religious Department (JAIS).

At the same time, the College of Islam, Science and Technology (KIST) in Kelantan has recently launched its new Shariah studies majoring Islamic astronomy at diploma level [17]. Moreover, some higher learning institutions such as Islamic University of Science (USIM), International Islamic University (IIUM), Mara University of Technology (UiTM) and Petronas University of Technology (UTP) also offer an Islamic astronomy courses as an elective course for their students.

Roles and Achievements: With regard to contemporary situations and needs, the higher learning institutions have been playing their significant role in establishing, strengthening and propogating the study of Islamic astronomy among Muslim community.

- The first role is to grow the seed and induce the interest of Muslim community to engage in the study Islamic astronomy. This has been successfully undertaken by the National University of Malaysia (UKM) led by Hj Mohd Khair Taib in early 1980's.
- The next role is to provide a fertile ground with complete infrastructure to let the study of Islamic astronomy grows, develops and spreads among the national and global community. This include providing study programs in the area of Islamic astronomy at various level of studies. This role has been doing by endeavours taken by UniSZA, USM, UTM and UM.
- To advance the research in Islamic astronomy in order to bring about solutions to current various problems, such as questions of establishing International Islamic calendar, determining fiqh rulings (*hukm*) on new issues such as performing acts of worships in International Space Station (ISS), time prayer calculation on moving air flights or submarines, setting new criteria for *imkan al-ru'yah* etc. This vital role has been playing by most of abovementioned institutions.
- To promote the niche area of expertise in Islamic astronomy among academics and intelligentsia in order to widen the opportunities for intensifying researches and to encourage them to conduct innovative and creative researches in the area. This has been a strong challenge that need to be seriously considered by the institutions in particular and the Malaysian government in general.

CONCLUSIONS

The higher learning institutions are the best place to nourish Islamic astronomy study among Malaysian Muslim community. The heightening of Malaysian Muslim awareness on Islamic astronomy has been well managed by them by providing study programs and research facilities. Various efforts have been taken to ensure the Islamic astronomy study in Malaysia develops in the right path towards the right objectives. Malaysia is one of Muslim countries that has been propounding various ideas and issues regarding Islamic astronomy to the international level. These mostly came through the channels of higher learning institutions. Through research and development taken by their scholars, it is hoped that Malaysia will continue to seriously contribute ideas on this area and may find possible ways to collaborate with their fellow Muslim countries in enhancing this field of study for the betterment of global Muslim community.

ACKNOWLEDGMENTS

This article has been presented at the 2nd Emirates Astronomical Conferences organized by Emirates Astronomical Society and Islamic Crescent Observation Project held in Abu Dhabi, UAE on 30 May-1 June 2010 and has been published in the conference proceeding. This is an updated version of the initial work. It aims to engage a wider community of scholars and researchers in this area and hopefully get some feedback from them to improve the research for future studies.

REFERENCES

1. Sarton, G., 1927. Introduction to the History of Science. Baltimore: The Williams and Wilkins.
2. King, D.A., 1993. Astronomy in the Service of Islam. Great Britain: Variorum.
3. Ilyas, M., 1988. Astronomy of Islamic Times For The Twenty-First Century. London: Mansell, pp: 11-12.
4. Saliba, G., 2007. Islamic Science and the Making of The European Renaissance. Massachusetts: MIT, pp: 27.
5. Ismail, M., 2009. Ilmu Falak Suatu Penerokaan. Selangor. Jabatan Mufti Selangor, pp: 26-30; See also.
6. Osman, B., 1993. Sumbangan Sains Islam Khususnya Ilmu Falak Dalam Tamaddun Dunia, in Koleksi Kertas Kerja Seminar Persatuan Falak Syar'i Malaysia, pp: 146-152.
7. al-Attas, S.N., 1984. The Correct Date of the Trengganu Inscription. Kuala Lumpur. National Museum.
8. Zainal, B., 2002. Pengenalan Ilmu Falak. Kuala Lumpur. Dewan Bahasa dan Pustaka, pp: 12.
9. Wan, M., 2004. Syeikh Tahir Jalaluddin-Ahli Falak Dunia Melayu in Utusan Malaysia, 6 July.
10. Pusat Falak Syeikh Tahir. Retrieved September 3, 2012 from <http://mufti.penang.gov.my/v1/pusatfalak.htm>.
11. Wan, M., 2005. Abdullah Fahim Ulamak Mahir Ilmu Falak in Utusan Malaysia, 14 April.
12. Khair, M., 1987. Perkembangan Kursus Falak Pusat Islam Malaysia, in Koleksi Kertas Kerja Seminar Falak Syar'ii Malaysia, pp: 34-35.
13. Unit Falak University of Sultan Zainal Abiddin. Retrieved September 3, 2012 from http://www.falak.unisza.edu.my/files/sijil_falak_udm_2011_jabatan.pdf.
14. University of Science Malaysia. Retrieved September 3, 2012 from <http://www.usm.my/images/stories/pdf/research.pdf>.
15. Saupi, C.A. and M.K. Nor, 2007. Ke Arah Meningkatkan Kegemilangan Ilmu Falak Syarie: Modul Pembelajaran dan Pengajaran di Universiti Teknologi Malaysia in Simposium Pengajaran dan Pembelajaran UTM, pp: 131.
16. Buku Panduan Ijazah Dasar Akademi Pengajian Islam Sesi 2009/2010, Kuala Lumpur.
17. Islamic College of Science and Technology. Retrieved September 3, 2012 from <http://www.kist.edu.my/kist/index.htm>.